Higg Facility Environmental Module (Higg FEM) How to Higg Guide

Version 4.0

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About this How to Higg Guide Version 4.0, Publication August 2023

The purpose of this How to Higg Guide is for Higg FEM users to start understanding and preparing at the Question level for the next version of the Higg FEM ("Higg FEM 4.0"), which will officially be released on the Worldly platform in November 2023. Facilities will start reporting their 2023 performance using the Higg FEM 4.0 framework.

The SAC is currently undergoing a final review process to ensure we can provide sufficient information and guidance on the Higg FEM 4.0. Please note that there will be an updated version of the How to Higg Guide for FEM 2023 cadence available in November 2023. Please use this document for reference in the meantime and stay tuned for more updates.

Higg Facility Environmental Module (Higg FEM) Convergence Partners

The Higg FEM Chemicals Management section is a joint effort among the Sustainable Apparel Coalition (SAC), the Outdoor Industry Association (OIA), and the Zero Discharge of Hazardous Chemicals (ZDHC) Programme to converge their respective chemicals tools into one assessment questionnaire.

Higg FEM replaces the standalone OIA Chemicals Management Module Facilities Indicators. OIA recommends that all its members utilize the Higg FEM as one holistic tool in its entirety, and as their primary source of benchmarking and measurement for chemicals management best practices at the facility level.

Higg FEM replaces the ZDHC Audit Protocol V.2.0, which is no longer supported by ZDHC. ZDHC Contributors are encouraged to access and utilize Higg FEM as a critical part of the ZDHC system of tools for management and improvement of chemical management. Further, ZDHC requests that Contributors accept Higg FEM assessments and verifications as indicators of chemical management performance. Through the process of convergence, ZDHC, OIA, and the SAC intend to reach thousands of facilities to harmonize chemical management assessments and reduce duplicative efforts, while also increasing assessment quality and enabling data sharing.

Higg Facility Environmental Module (Higg FEM) How to Higg Guide

Before Getting Started:

**This section guide will be available in next update of the How to Higg Guide*

Higg FEM How to Higg guide Table of Contents:

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Introduction: What is the Higg Facility Environmental Module (Higg FEM)?

The Higg Facility Environmental Module (Higg FEM) is a sustainability assessment tool that standardizes how facilities measure and evaluate their environmental performance, year over year.

The Higg FEM is designed to:

- Measure and quantify the sustainability impacts of a facility
- Reduce redundancy in measuring and reporting sustainability performance
- Drive business value through reducing risk and uncovering efficiencies
- Create a common means and language to communicate sustainability to stakeholders

A facility should complete and post one Higg FEM per year. The reporting period for the Higg FEM will run from **January 1 to April 30, 2024** and measure performance from the most recent calendar year (e.g. 2023 modules measure performance from the 2023 calendar year)**.** All modules must be posted by the April 30th deadline.

How long will it take to complete the Higg FEM?

The time required to complete the Higg FEM will vary depending on how much of the required data and information has already been collected prior to starting the module. Typically, it will take facilities between 3-6 weeks to complete the full module, accounting for time to have internal discussions and review. It is highly encouraged for facilities to review all the questions within the module before getting started to understand the type of information and data they will need to input into the module.

For step by step guidance on how to start and complete your module in the higg.org platform, please review the Complete a Higg FEM Assessment guide.

What to Know Before You Get Started

Facilities should be honest and transparent when completing assessments. The Higg FEM is NOT a pass/fail assessment, rather a tool that identifies opportunities to improve.

If you are unsure about whether your answer qualifies as "Yes," it is recommended to take a more conservative approach and answer "Partial Yes" or "No or Unknown," where applicable. The guidance for each of the questions below will help define how a question should be responded to accurately. When you have selected "Yes" or "Partial Yes" to a question, you should provide as much supporting information as possible in the sub-questions and can use document uploads to provide supporting documentation.

Please note that many questions in the guide will reference "**suggested uploads**" – these uploads are not required, but are there to give users an idea of the type of documentation that would support a response to the question. These documents will however be checked during module verification.

Scoring

Higg FEM Scoring System Guidance will be available in the next update of How to Higg Guide. You may review the Higg FEM 4.0 Scoring methodology in the Higg FEM 4.0 Technical Paper.

Help

If you have any issues with the Worldly platform or are confused by a question in the assessment, you may contact the Higg Index support team by submitting a form on support.worldly.io.

Summary of Updates to the How to Higg Guide (4.0 - 2023)

SAC worked with a team of experts to update and improve guidance throughout the How to Higg FEM guide in order to address the feedback collected from users during the previous adoption cycle. Below is a summary of the sections where updated guidance was implemented for the 2023 Higg FEM cadence, dated November 2, 2023:

Note: This section will be available in the next update of How to Higg Guide
You may review high level key changes from FEM 3.0 to FEM 4.0 in the Higg FEM 4.0 Technical Paper.

Site Information and Permits

General Introduction

The Site Information & Permits section of the FEM requires you to complete questions and provide detailed information relating to your facility's location, size, and operations. Your responses to these questions will be used to categorize your facility for comparative analytics.

You will also be asked for information on your facility's permits on this page. The intent of this is to determine your compliance status with relevant environmental permits. Please provide information on any rules or regulations your facility is required to follow such as permits, authorizations, licenses, registrations, certificates, or other compliance documentation your facility is required to follow. Examples of non-permit requirements to include are annual required government reports and required registration of specific chemicals.

Note: The Site Information & Permits section of the FEM should be completed first before moving on to any other sections of the module.

Facility Scope

The FEM is a facility level assessment that is designed to be completed by a single business entity or manufacturing unit. It is understood that there may be complexities in defining this globally therefore, the following definitions and exceptions apply when determining the facility scope for the completion of a single FEM.

- The FEM shall cover the entire facility which is defined as all onsite business activities of a legal business entity as defined by the scope of the applicable business license/operating permit in the facility's country of operation. This includes all owned and operated onsite processes, equipment, and areas (e.g., facilities cannot exclude specific operations or facility areas from the FEM).

- One (1) Higg FEM is required for each legal business entity as defined by the applicable business license/operating permit except in the following circumstance:
    - Where multiple manufacturing units (facilities) are located at the same premises with different business licenses, however the facilities are fully owned and operated by a single legal business entity, one (1) FEM can be completed.
        - **Note:** If the separate facilities are not legally owned/operated by a single parent business entity with a valid operating license, which includes ownership of all facilities, separate FEMs must be completed for each facility.

- Where a material or component supplier of the facility with a separate business license is located at the same premises and supplies 100% of its materials/services to the facility, its operations can be included in the facility's FEM.
    - **Note:** If the material or component supplier provides materials or services to other facilities, it must not be included in the facility's FEM scope and would require a separate FEM.

- Facilities located at two separate physical locations (i.e., different legal addresses) must complete one (1) FEM per location regardless of ownership (e.g., if two facilities are located at different physical locations, but their operations are covered under one (1) parent business license, separate FEMs are still required.)

Scoring

The Site Information and Permits section of the FEM is NOT SCORED. This means that you do not get points for being in compliance with basic legal requirements. However, the following scenarios will result in a score of ZERO for the entire FEM as these are considered basic compliance practices that must be met to achieve a FEM score.

- If your facility does not have a valid operating license. (i.e., if you answer "No" to the question "Does your factory site have a valid operating license?").

- If your facility does not have a required environmental permit. (i.e., if you answer, "Not Available" to the question "What is your status for this permit?" for any required environmental permits).
    - **Note:** If the permit status is "Not available due to authorization in progress" or "Available but Invalid" the FEM may be scored based on the condition below.

- If your facility is no longer able to meet the requirement of obtaining a required permit (i.e., if you answer, "Facility is no longer able to meet the requirement of obtaining the required permit" to the question "Please specify the reason why this permit is invalid?").

Site Information

Facility Profile Questions Pathway (by Facility Type)

The Site Information section contains questions on facility type, product and material categories, facility processes and industry sector. Your facility's responses to these questions will lead you through a series of predefined selections where you can select the applicable responses.

Note: It is possible for multiple profile pathways to apply if more than one facility type is selected. This means that the facility would need to input information about the product and material category, and facility processes for each selected facility type.

- For example, a vertical integrated facility will select two facility types ("Finished Product Assembler" and "Material Production (Raw and intermediate materials are transformed into their final state before assembly)") and will need to provide information on the products, materials and processes for each facility type.

Country or Region

Facilities will select the country or region that the facility is located in.

Facility Type

Facilities will first select their facility type(s) from the list of options below. Based on the selected facility type(s) and then additional questions on applicable product categories, materials used, facility processes, and industry sector will apply.

Note: If applicable, more than one facility type should be selected, for example:

- If you are a vertically integrated facility with cut and sew operations as well as wet processing (e.g., dyeing) you would select both "Final Product Assembler" **and** "Finished Product Processing (Product Printing, Product Painting, Product Dyeing, Product Laundering and Product Finishing)". OR
- If you are a hardgoods facility that assembles final product and manufactures hard components on site, you would select both "Final Product Assembler" **and** "Component / Sub-Assembly Manufacturing (including Packaging)"

Facility Type Option	**Examples**
Finished Product Assembler	Finished goods production/ final product assembly.
Finished Product Processing (Product Printing, Product Painting, Product Dyeing, Product Laundering and Product Finishing)	Printing and dyeing of materials, including wet processing, and laundering
Component / Sub-Assembly Manufacturing (including Packaging)	Label, zipper, snap, button, elastic buggie, cardboard
Material Production (Raw and intermediate materials are transformed into their final state before assembly)	Fabric dye-house, fabric manufacturer, yarn dyeing, PCB manufacturer, Hardgoods: Metal pieces, wooden laminates, metal plating
Raw Material Processing (Raw Materials are processed into intermediate material products)	Yarn spinning Hardgoods: foundry, metal processing, plastic injection
Raw Material Collection & Bulk Refining (Materials are collected/extracted/farmed and refined to bulk commodity state)	Cotton farming and ginning, processing of bottles, fabric scrap, etc. into new recycled materials, forestry, mining, crude oil refinery

Product Category

This question will be only applicable to facilities that selected the following as their facility type(s):

- Finished Product Assembler, **and/or**
- Finished Product Processing (Product Printing, Product Painting, Product Dyeing, Product Laundering and Product Finishing)

Facilities will select all of the applicable product categories from the list below.

Note: For each selected product category, a detailed product list will be available for the facility to select which specific products they manufacture for each selected product category.

- Apparel
- Footwear
- Home Textiles (includes bed linens, tablecloths, towels, cloth napkins, and similar products)
- Accessories (includes handbags, jewellery, belts, and similar products)
- Home Furnishings
- Electronics
- Toys
- Outdoor Sporting Goods - Soft goods (includes tents, backpacks, luggage, harnesses, slings etc. with a textile component)
- Outdoor Sporting Goods - Hard Goods (includes bikes, coolers, climbing gear, watercraft, and other equipment made of metal, plastic, or wood)
- Packaging manufacturer

Material Category

Facilities will select all the applicable type(s) of material categories from the list below based on their facility type.

Note: For specific facility types, a detailed list of materials will be available for the facility to select which materials they use for each selected material category.

- Barriers
- Foams
- Insulation Materials
- Leather
- Metals
- Plastics
- Rubbers
- Synthetic Leathers

- Textiles
- Wood-Biomass Based
- MMCF
- Electronic related material
- Packaging related material
- Fiber (natural and man-made)
- Chemicals
- Metals
- Other

Facility Processes

Facilities will select all the applicable processes from the available lists based on their facility type.

Note: The list of specific facility processes that can be selected will be predefined for each facility based on their selected facility type, products type (if applicable), and materials used.

Industry Sector

Facilities will select all the applicable industry sectors from the list below.

Note: Industry sector refers to the industry which the facility makes products or materials for.

- Apparel
- Footwear
- Home Textiles (includes bed linens, tablecloths, towels, cloth napkins, and similar products)
- Accessories (includes handbags, jewellery, belts, and similar products)
- Home Furnishings
- Electronics
- Toys
- Outdoor Sporting Goods - Soft goods (includes tents, backpacks, luggage, harnesses, slings etc. with a textile component)
- Outdoor Sporting Goods - Hard Goods (includes bikes, coolers, climbing gear, watercraft, and other equipment made of metal, plastic, or wood)
- Other

How many days did your facility operate in this reporting year?

Enter a total number (not a range) of days that the facility operated in the reporting year. Operating days are considered days when production and/or production related activities (e.g. product/raw material loading/shipment) were conducted at the facility. Any operating day where the number of hours in operation OR the number of workers is less than 50%, then count the day as 0.5 day. Where the number of hours in operation OR the number of workers is greater than 50%, then count the day as 1 day.

For Higg FEM Verification, it is recommended that summaries of operating data be available in a format that is easy to review [e.g., spreadsheet (e.g., Microsoft Excel) or similar data analytics program that allows export of data in a human readable format (e.g., Excel, csv)] and any relevant supporting evidence be readily available for review.

Total Number of Employees:

Enter the average number (*not* a range) of full-time and temporary employees that worked at the facility in this reporting year. The calculation guidance below applies for both full-time and temporary employees.

How To Track Facility Data:
Facilities should establish a process to track the number of workers in each pay period (e.g. weekly, bi-weekly, monthly). The average number of employees (full-time or temporary) can then be determined using the following guidance:

1. Add the total number of employees your facility paid in all pay periods during the year.
2. Count the number of pay periods your facility had during the year.
3. Divide the number of employees by the number of pay periods.
4. Round the answer to the next highest whole number to get the annual average number of employees

For example:

- Pay period 1: 520 employees
- Pay period 2: 525 employees
- Pay period 3: 545 employees
- **Average number of employees: 530** [(520+525+545)/3]

Note: The same calculation methodology should be applied for full-time and temporary employees.

For Higg FEM Verification, it is recommended that summaries of this data be available in a format that is easy to review [e.g., spreadsheet (e.g., Microsoft Excel) or similar data analytics program that allows export of data in a human readable format (e.g., Excel, csv)] and any relevant supporting evidence be readily available for review.

How This Will Be Verified:

Documentation Required:

- Payroll/accounting records that show the number of each worker category (full-time and temporary) in each pay period.
- Payroll/accounting records that show the number of pay periods in the reporting year.

What was your facility's annual volume?

Facilities will be required to complete a table to provide the following information on their annual volume in the FEM reporting year for each applicable facility type:

- Facility Type (This will be pre-populated based on the selected facility types)
- Annual Quantity
- Unit of Measure (This will be pre-populated based on the selected facility types)
- Annual Quantity (Additional Option)
- Unit of Measure (Additional Option)

Note: The additional options for reporting annual quantity and unit of measure are provided to allow for reporting of annual volume in different units from a predefined list of units of measure for each facility type.

Reporting Annual Volume in the FEM
Facilities should report the total amount of product shipped/sold in the FEM reporting year.

Note: Total amount of product shipped/sold should **not** include the total amount of rejects in the last calendar year.

Why does the FEM use shipped/ sold quantity instead of annual production output?

The main rationale is to create a consistent production metric that all facilities are able to track and the data are more comparable for industry benchmarking at the end. Besides, using shipped/ sold amount as the metric is to discourage excessive or unnecessary production including leftovers, semi-products, samples and rejects which are also an environmental concern.

We understand that some products may have to be shipped / sold after the calendar year that they are actually manufactured. The limitation of using shipped/ sold quantity is - the reported energy, water and waste amounts are not covering the products being made in the same calendar year but shipped in the following year, instead they would cover some products which are shipped in the same year but actually being produced in the previous year. By considering this as a usual practice in the factory every year, the impact to the total shipped/ sold quantity should be relatively limited. However, if there is any exceptional case that may cause a significant impact on the environmental performance of the facility (e.g. demonstrate improved energy / water

consumption), we encourage the factories to communicate to relative stakeholders to explain their situation if needed.

Reporting Standard Allowed Minutes in the FEM

For some facility types, additional production volume reporting options allow facilities to report in Standard Allowed Minute (SAM) which is a metric that provides an indicator of the time allowed to produce a product by workers including general allowances (e.g., efficiency, machine, personal, fatigue allowances, etc.). The guidance below provides an overview and examples how SAM can be determined.

Different products utilize different amounts of time and resources during production which will in turn influence resource consumption (i.e., energy, water used, etc.). SAM can be used as a production metric to relate resources consumption and the environmental impact to different types of products or be added together and used as a metric to normalize resource consumption and environmental impacts for production over a period of time (e.g., a calendar year). It should be noted that the SAM will vary by the type of product (e.g. shorts versus a jacket).

Year on year, tracking of SAM against energy, water and other parameters can allow facilities to review the efficiency of resource consumption and help inform performance improvement.

When reporting production volume in SAM, the user must report the TOTAL SUM of SAM for the reporting year and **not** the INDIVIDUAL SAM for each product type that is manufactured in your facility.

Once individual SAM values are known for a specific product, the product SAM can be multiplied by the number of products shipped / sold. This is done across all product types / categories and the total is calculated to arrive at the TOTAL SAM. This total is reported as the "Annual Quantity".

Example for Apparel facility:

Product type	Processes	SAM per piece	Number of products shipped/ sold in reporting year	Total SAM per product type
Polo shirt	Cutting Sewing Packaging	15	100,000	15 x 100,000= 1,500,000
V-neck shirt	Cutting Sewing Packaging	12	500,000	12 x 500,000 = 6,000,000
			Total SAM	**7,500,000**

Example for Hardgoods facility:

Product type	Processes	SAM per piece	Number of products shipped/ sold in reporting year	Total SAM per product type
Rucksack	Cutting Gluing Sewing Assembly Packaging	45	20,000	45 x 20,000= 900,000
Tent	Cutting Gluing Sewing Assembly Packaging	60	30,000	60 x 30,000= 1,800,000
Camping table	Cutting Assembly Packaging	150	10,000	150 x 10,000 = 1,500,000
			Total SAM	**4,200,000**

There are different approaches to calculating SAM, however if a consistent methodology is used across all products, this will produce comparable data that can be compared year over year. Below are some resources that look at the different methods of determining SAM (which is often used interchangeably with Standard Minute Value or SMV):

- https://www.ilo.org/global/publications/ilo-bookstore/order-online/books/WCMS_PUBL_9221071081_EN/lang--en/index.htm
- https://www.onlinetextileacademy.com/sam-standard-allowed-minute/
- https://www.onlineclothingstudy.com/2011/02/how-to-calculate-sam-of-garment.html#:~:text=Standard%20allowed%20minutes%20(SAM)%20%3D,%2B0.048)%20%3D%200.31%20minutes.
- https://ordnur.com/apparel/standard-minute-value-smv-garments-calculation-importance/

How To Track Facility Data:

Facilities should establish a process to track the amount of product shipped/sold in the last calendar year. For FEM Verification, it is recommended that summaries of this data (e.g., daily, weekly, monthly records) be tracked in a format that is easy to review [e.g. spreadsheet (e.g. Microsoft Excel) or similar data analytics program that allows export of data in a human readable format (e.g. Excel, csv)] and any relevant supporting evidence be readily available for review during Verification.

How This Will Be Verified:

Documentation Required

- Production, sales, product shipment records that show the quantity of products shipped/sold in the reporting year.

Does your facility operate within an industry zone/park?

Answer Yes if: Your facility is located inside a designated industry zone/park.

Does your facility have onsite water treatment (i.e., Pre-treatment and/or Wastewater treatment)?

Answer Yes if: Your facility performs onsite pre-treatment of incoming water and/or your facility performs onsite treatment of wastewater.

If you answer Yes to this question, you will be asked to select the type of pre-treatment and/or wastewater treatment that your facility performs onsite from the list of treatment options below and complete the following sub questions:

Note: After selecting the applicable treatment options, facilities will also need to select the specific treatment methods/technologies used from a predefined list for each treatment option.

- Select the type of treatment.
    - Pre-Treatment
    - Primary Treatment
    - Secondary Treatment
    - Tertiary Treatment
    - Advanced treatment / Zero Liquid Discharge (ZLD) / Salt recovery
    - Sludge Treatment
- How many employees are engaged in the operation and regular maintenance of the water treatment processes?
- Please upload your facility's water treatment process flow and hydraulic diagrams, if you have one.

Suggested Uploads: Facility's water treatment process flow and/or hydraulic diagrams.

How This Will Be Verified:

Documentation Required

- Facility's water treatment flow chart and hydraulic diagrams

Inspection - Things to Physically Look For:

- Observations onsite are consistent with the facility's reported water/wastewater treatment processes.

Has your facility participated in industry programs related to sustainability or have sustainability related certificates valid during the reporting year?

Answer Yes if: Your facility participated in industry programs related to sustainability and/or have valid sustainability related certificates during the FEM reporting year.

Note: Brand or customer-specific auditing schemes that include environmental aspects should not be reported in this question as the focus is on broader industry sustainability programs or initiatives such as those listed in the Higg FEM.

If you answer Yes to this question, you will be asked to select the program and provide the following information on your facility's participation in the program, if applicable:

- How long have you been in this program?
- Enrollment/Validity Period.
- Start Date (Month/Year)
- Enrollment/Validity Period.
- End Date (Month/Year).
- What rating/status did you receive?
- If available, please enter a direct link you can provide to view the status of this program or certificate.
- If a direct link is not available, please upload a copy of the program enrollment status or certificate.
- Provide any additional notes.

Suggested Uploads:

- Documentation of ALL programs the facility has participated or enrolled in, which includes the name of the program, any certification or declaration of enrolling the program.
- Result of the industry program (e.g., certification), if applicable.

Technical Guidance:

Industry Programs enable facilities to build robust programs and practices that can improve overall sustainability or specific impact areas. There are a wide range of industry programs related to Environmental Sustainability that are focused on supporting facilities in identifying environmental impacts and providing solutions or standards of practice that can help mitigate impacts to the environment (e.g., Apparel Impact Institute's Clean by Design, Textile Exchange's Global Recycled Standard (GRS), ZDHC CleanChain, bluesign System Partner, etc.)

Facilities can select programs from the list in the FEM or select Other to add programs that are not listed.

Note: Facilities can also use the listed programs to identify industry programs or initiatives that can be considered for adoption. The table below provides links to many of the available industry programs or initiatives.

Name of Industry Programs or Certification Scheme	Reference Link
Alliance for Water Stewardship Standard	https://a4ws.org/
Apparel Impact Institute Clean by Design (CbD)	https://apparelimpact.org/clean-by-design-energy-water-efficiency-for-stage-1-tier-2/
Apparel Impact Institute Clean by Design +	https://apparelimpact.org/clean-by-design-energy-water-efficiency-for-stage-2-tier-2-program/
Apparel Impact Institute Clean by Design Tier 1	https://apparelimpact.org/clean-by-design-for-tier-1-energy-efficiency-stage-1-tier-1-program-cbd-s1t1/
Apparel Impact Institute Clean by Design Chemistry & Wastewater	https://apparelimpact.org/chemistryandwastewaterprogram/
Apparel Impact Institute Carbon Leadership Program	https://apparelimpact.org/apparel-impact-institute-carbon-leadership-project/
Apparel Impact Institute Renewable Energy Pilot	https://apparelimpact.org/apparel-impact-institute-carbon-leadership-project/
Apparel Impact Institute Coal Phase Out	https://apparelimpact.org/apparel-impact-institute-carbon-leadership-project/
Business Environmental Performance Initiative (BEPI)	https://www.amfori.org/content/amfori-bepi
bluesign System Partner	https://www.bluesign.com/en
BREEAM	https://bregroup.com/products/breeam/
BVE3 (Environmental Emission Evaluator)	https://e3.bvonesource.com/cd/cpdHome
Country specific Green Building Certification	
Cradle to Cradle Certified	https://www.c2ccertified.org/get-certified/product-certification

Eco-management and Audit Scheme (EMAS)	https://ec.europa.eu/environment/emas/index_en.htm
Fair Wear Foundation	https://www.fairwear.org/
Fashion for Good	https://fashionforgood.com/
Forest Stewardship Council (FSC) Certificate	https://fsc.org/en
GOTS	https://global-standard.org/
Initiative for Compliance and Sustainability (ICS)	https://ics-asso.org/
ICTI Ethical Toy Program (IETP) (Environmental Assessment)	https://www.ethicaltoyprogram.org/en/our-program/environmental-assessment/
IDH Race to the Top	https://www.idhsustainabletrade.com/
IFC PaCT	https://www.textilepact.net/
IPE	https://wwwen.ipe.org.cn/
ISO 14001	https://www.iso.org/iso-14001-environmental-management.html
ISO 45001 (previously known as OHSAS 18001)	https://www.iso.org/standard/63787.html
ISO 50001	https://www.iso.org/iso-50001-energy-management.html
ITC Resource Efficiency and Circular Production	https://www.sustainabilitygateway.org/; https://learning.intracen.org/course/info.php?id=1918
Leather Working Group Standard	https://www.leatherworkinggroup.com/
LEED	https://www.usgbc.org/leed
OEKO-TEX Made in Green	https://www.oeko-tex.com/en/our-standards/made-in-green-by-oeko-tex

OEKO-TEX STeP	https://www.oeko-tex.com/en/apply-here/step-by-oeko-tex
Responsible Business Alliance Validated Assessment Program (VAP) (previously known as EICC)	https://www.responsiblebusiness.org/vap/about-vap/
Roundtable on Sustainable Palm Oil (RSPO) certification	https://rspo.org/certification
Science-Based Target Initiative	https://sciencebasedtargets.org/
Textile Exchange Global Recycled Standard	https://textileexchange.org/standards/recycled-claim-standard-global-recycled-standard/
Textile Exchange Organic Content Standard	https://textileexchange.org/standards/organic-content-standard/
Textile Exchange Recycled Content Standard	https://textileexchange.org/standards/recycled-claim-standard-global-recycled-standard/
Textile Exchange RDS – Responsible Down Standard	https://textileexchange.org/standards/responsible-down/
Textile Exchange RWS – Responsible Wool standard	https://textileexchange.org/standards/responsible-wool/
ZDHC Gateway- Chemical Module (with InCheck Solution)	https://www.zdhc-gateway.com/
ZDHC Supplier to Zero (with certificate)	https://www.implementation-hub.org/supplier-to-zero
ZDHCGateway - Wastewater module(with ZDHC ClearStream)	https://www.zdhc-gateway.com/modules/wastewater-module
Other	

How This Will Be Verified:

Documentation Required:

- Documentation of ALL programs the facility has participated or enrolled in, which includes the name of the program, any certification or declaration of enrolling the program.
- Result of the industry program (e.g., certification), if applicable.

Interview Questions to Ask:

- Facility staff responsible for managing or implementing the program are knowledgeable on the program's requirements or initiatives and what is required to meet or maintain the program requirements (e.g., certification maintenance)

Inspection - Things to Physically Look For:

- Facility practices and onsite observations align with the reported program requirements or initiatives.

Is this facility's GHG emissions included in a broader corporate disclosure?

Answer Yes if: Your facility's GHG emissions are included in a broader corporate GHG report/disclosure.

Note: In this question a "broader corporate disclosure" refers to GHG reporting/disclosure that was performed by a business entity other than the facility (e.g., parent, or manufacturing group corporate headquarters, etc.) that includes the facility's GHG emissions data in the overall GHG reporting/disclosure.

If you answer Yes to this question, you will be asked to select the program and provide the following information on your facility's participation in the program:

- What reporting platform is used?
    - CDP
    - Corporate website or Sustainability report
    - Other
        - If other, please describe.

Suggested Uploads:

- If available a copy of the report (or link to reporting platform where the GHG report can be viewed.

How This Will Be Verified:

Documentation Required:

- Documentation of ALL programs the facility has participated or enrolled in, which includes the name of the program, any certification or declaration of enrolling the program.
- Result of the industry program (e.g., certification), if applicable.

Interview Questions to Ask:

- Facility staff responsible supporting the corporate reporting/disclosure can describe how the facility's GHG emissions data was provided and involved in the corporate reporting/disclosure.

Permits

Does your factory site have a valid operating license, if required by law?

Answer Yes if: Your facility has a current and valid operating license **or** if an operating license is not required by local law.

Answer No if: Your facility's operating license is expired even if your facility is in the process of updating your operating license.

Note: If you answer "No" this question you will score ZERO points for the entire FEM. This is because a valid and current operating license is required to score points in the Facility Environmental Module.

Suggested Uploads:

- A copy of the valid operating license.
- If applicable, evidence that demonstrates an operating license is not required by local law.

What is the intent of the question?
The intent of this question is for facilities to demonstrate that they have the required legal authorization (e.g., license) to operate as a business.

How This Will Be Verified:

Documentation Required:

- Copy of current and valid business license, if applicable and any other relevant licenses

Interview Questions to Ask:

- Who in the facility is responsible for ensuring the business license is kept up to date?
- What is the procedure for updating the business license, when required?

Inspection - Things to Physically Look For:

- Name on Business License matches the business name of the facility.
- Validity of the License that indicates it is not expired, if applicable.

Did your facility receive any government-issued environmental violation records for this reporting year?

Answer Yes if: Your facility received a government-issued environmental violation in the FEM reporting year.

If you answer Yes to this question, you will be asked the following sub question:

- Please describe the violation and your site's action plan to improve.

Suggested Uploads:

- Copy of the government issues violation notice
- If applicable, the facility's defined action plan to correct the violation.

What is the intent of the question?

The intent of this question is for facilities to disclose any government-issued environmental violation received in the reporting year and if applicable, provide information on their plans to correct the violation.

How This Will Be Verified:

Documentation Required:

- Copy of government-issued violation notice.
- If applicable, the facility's action plan to correct the violation.

Interview Questions to Ask:

- Staff responsible for environmental management can explain why the violation was received and the facility's plans to correct the violation and prevent it from occurring in the future.

Inspection - Things to Physically Look For:

- Observations of the noted issues listed on the violation, or any actions completed to correct the violation.
- Online search of available government database(s)/records to identify any violations.

Does your facility currently have any records in the Institute of Public & Environmental Affairs (IPE) database?

Note: This question is only applicable to facilities located in China.

Answer Yes if: Your facility currently has any records on the IPE database.

If you answer Yes to this question, you will be asked the following sub questions:

- If yes, what violation is it? (Select all that apply)
    - Wastewater
    - Air
    - Waste
    - Other
        - If other, please describe.
- If yes, has your facility registered on the IPE database?
- If yes, has your facility supplied enterprise feedback to the database and/or taken steps to remove the record(s) from the database?

Suggested Uploads:

- A copy of the IPE database record.
- If applicable, documents of the facility's action and/or enterprise feedback to the database to remove the record.

What is the intent of the question?
The intent of this question is for facilities to disclose any records on the IPE database if applicable, and provide information on actions taken to have the record removed from the database.

Technical Guidance:

The following reference links are provided to assist users in accessing the IPE website, records, and additional information on using the IPE platform.

If your facility is new to the IPE, it is recommended that you visit these informational pages to learn more:

- IPE homepage: https://www.ipe.org.cn/index.html

- Introduction to Data: http://wwwen.ipe.org.cn/InfoDetail/Show.aspx?id=18638&jid=18637&bid=18644&isnb=1
- User Guide: http://wwwen.ipe.org.cn/InfoDetail/Show.aspx?id=18636&jid=18635&bid=18646&isnb=1
- Link to register for a corporate user account (required to search a list of suppliers/save information for export): http://wwwen.ipe.org.cn/User/UserRegister.aspx

Viewing records database on IPE website and guidance on record removal:

- IPE Records Database (Chinese): http://www.ipe.org.cn/IndustryRecord/Regulatory.aspx
- Record removal guidance document (Chinese) click "监管记录处理方式": http://www.ipe.org.cn/GreenSupplyChain/SupplyGCA.aspx
- IPE Records Database (English): http://wwwen.ipe.org.cn/IndustryRecord/Regulatory.aspx.
- Record removal guidance document (English) click "Approaches to Record Removal": http://wwwen.ipe.org.cn/GreenSupplyChain/SupplyGCA.aspx

Note: If your site has a violation record and would like to supply enterprise feedback to IPE and/or take steps to remove the record from the database, please contact ipe@ipe.org.cn

How This Will Be Verified:

Documentation Required:
- A copy of the IPE database record.
- If applicable, documents of the facility's action and/or enterprise feedback to the database to remove the record.

Interview Questions to Ask:
- Staff responsible for environmental management can explain why the IPE record(s) were created and the facility's plans or actions taken to have the record removed.

Inspection - Things to Physically Look For:
- Observations of the noted issues listed in the IPE record, or any actions completed to have the record removed.

Please complete the following questions to provide details on your facility's environmental permits requirements and compliance status.

For this question, facilities will be asked to complete a table to provide the following information on all applicable environmental permits.

- Type of Permit (This list will be pre-populated with a list of environmental aspects which may require permits)
- Is a permit required?
    - If yes, what is your status for this permit?
        - If "Not available" is selected, please describe, or provide additional details.
    - Name of the regulatory agency issuing the permit
    - Is there an expiration date?
    - Please enter expiration date (Month / Year)
    - Please specify the reason why this permit is invalid.
        - Required if "Available but Invalid" or "Not available due to authorization in progress" is selected for permit status.
    - If "Available and valid" is selected, Do you have any outstanding legal notice documenting a non-compliance issue?
        - If yes, please describe.
    - Please upload a copy of your permit.
- Provide any additional notes.

Note: The following scenarios will result a score of ZERO for the entire FEM as these are considered basic compliance practices that must be met to achieve a FEM score:

- If your facility does not have a required environmental permit. (i.e., if you answer, "Not Available" to the question "What is your status for this permit?" for any required environmental permits).
    - **Note:** If the permit status is “Not available due to authorization in progress” or “Available but Invalid” the FEM may be scored based on the condition below.

- If your facility is no longer able to meet the requirement of obtaining a required permit (i.e., if you answer, "Facility is no longer able to meet the requirement of obtaining the required permit" to the question "Please specify the reason why this permit is invalid?").

Suggested Uploads:

- Copies of all up-to-date environmental permits/registrations which are applicable to the facility.
- If applicable, supporting evidence of applications for renewal for any expired permits.

Note: that licenses/permits for hazardous waste contractors will be requested in the Waste section

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have obtained all applicable legally required environmental permits.

Technical Guidance:
Maintenance of all legally required environmental permits is a foundational compliance requirement. Please provide information on any rules or regulations your facility is required to follow such as permits, authorizations, licenses, registrations, certificates, or other compliance documentation your facility is required to follow. Examples of other non-permit requirements to include:

- General Environmental Discharge permits.
- Annual required government reports and required registration of specific chemicals.
- Permits or authorizations for air emissions from stacks of onsite utilities (boilers, diesel generators, etc.)
- Compliance with REACH
- Include compliance or all laws / regulations / permits needed for specific chemicals. For example: Potassium Permanganate is controlled for purchasing and registration with the police office is required in some jurisdictions. This is not a permit, but registration required by law - therefore it must be included here.

How This Will Be Verified:

Documentation Required:

- Copies of all up-to-date environmental permits/registrations which are applicable to the facility as at the date/year when the verification takes place, as well as any applicable permits/registrations for the reporting year.
- If applicable, supporting evidence of applications for renewal for any expired permits.

Interview Questions to Ask:

- Staff members responsible for environmental compliance and permitting can describe the facility's procedures to ensure all required permits have been obtained and are being maintained and/or updated as required.

Inspection - Things to Physically Look For:

- Name and address on permits match the facility's business name.
- Observations indicate that the facility is operating in compliance with any permit requirements.

Environmental Management System (EMS)

General Introduction

An Environmental Management System (EMS) is a holistic strategy and process to identify, track and manage the environmental impacts of your facility over time. While it's possible to make incremental environmental improvements at your facility without a comprehensive plan, your facility can only maximize environmental performance by setting a long-term strategy that will inform decision-making on environmental management.

The Higg Environmental Management System (EMS) section encourages you to:

- Ensure there are dedicated staff responsible for coordinating environmental management activities that have sufficient qualifications and technical knowledge.
- Identify significant environmental impacts associated with facility operations.
- Set a long-term environmental management strategy.
- Develop a system to ensure compliance with all laws, regulations, standards, and other requirements.
- Ensure all levels of staff are aware of the facility's environmental strategy and programs and how they can support the program.
- Engage with subcontractors and upstream suppliers on environmental performance.
- Engage with local stakeholders on environmental performance improvements.

Additional details on the intent and criteria for each Higg FEM EMS question is provided in the guidance below along with useful technical guidance and resources to support your facility in setting up and implementing an effective environmental management system.

EMS - Level 1

1. Are one or more employees at your facility responsible for coordinating your facility's environmental management activities?

Answer Yes if: Your facility has any full-time, part-time, seasonal or contract employees that have dedicated responsibilities for coordinating environmental management activities in your facility.

If you select Yes, you will need to complete a table with the following questions to provide details on these employees during the reporting year.

Note: You are required to enter the details of at least one (1) employee and can provide details for up to six employees. If you wish to provide details on more than six employees, these can be uploaded to the FEM in a separate document.

- Name
- Job Title
- Time spent on environmental management.
- Select environmental topic (select all that apply)
    - If staff members have multiple responsibilities, you have the option to indicate select topics and provide details in the description section.
- Describe the roles and responsibilities (description of employee's roles and responsibilities for environmental management)

Suggested Uploads:

- Documentation that supports the environmental management staffing structure at your facility (e.g., organization chart, job descriptions for environmental team members, etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have staff dedicated to managing environmental activities at the facility.

Technical Guidance:

Facilities should have clearly defined roles and responsibilities for any staff responsible for coordinating environmental management activities at the facility. These employees must deal directly with environmental management and have defined roles for that purpose. The roles

could be either required in their job description or accountabilities or designated by relevant management system documentation. Maintaining an up-to-date environmental management team organizational chart and clear job descriptions can help with defining clear responsibilities and accountabilities.

Resources:
Additional information on internationally recognized environmental management schemes are provided at the links below.

- ISO 14001:2015 Environmental management systems — Requirements with guidance for use https://www.iso.org/standard/60857.html
- EU Eco-Management and Audit Scheme (EMAS) https://green-business.ec.europa.eu/eco-management-and-audit-scheme-emas_en

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that shows the environmental management staffing structure at the facility. This may include:
    - Environmental management team organization chart.
    - Documented job descriptions or accountabilities for environmental staff.
    - Other environmental management system documentation.

Interview Questions to Ask:

- Staff responsible for environmental management at the facility can explain the facility's environmental management and accountability structure.
- Key staff responsible for coordinating environmental management activities understand and can explain their roles and responsibilities.

Inspection – Things to Physically Look For:

Observations onsite indicate that the environment management activities reported by the facility are being implemented and managed in accordance with the facilities procedures and team structure.

Partial Points: N/A

2. Has your facility identified the significant environmental impacts associated with current operations within the factory premises?

Answer Yes if: Your facility has performed an environmental impact assessment that covers all environmental aspects to identify significant environmental impacts from current facility operations.

Note: If your facility has a valid environmental management system scheme certification that includes requirements for environmental aspects and impacts assessment such as ISO 14001, you should select Yes to this question.

If you select Yes, you will be asked the following sub questions:

- Please upload documentation, if available
- If you cannot upload the documents, please describe here.

Suggested Uploads:

- Documentation that demonstrates your facility has conducted an assessment to identify the significant environmental impacts associated with current operations (e.g., Environmental Impact Assessment (EIA), environmental aspects and impact aspect evaluation, environmental permits, etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have conducted an assessment to identify significant environmental risks associated with facility operations.

Technical Guidance

An environmental impact assessment is used to identify and characterize potential and actual adverse risks to the environment from all aspects of facility operations. An environmental impact assessment is a comprehensive review of all inputs and outputs of facility operations and production processes to identify potential impact areas, including impact areas covered in the Higg FEM (e.g., energy, water, waste, etc) as well as other impact areas such as legal compliance, environmental noise and vibration. Understanding a facility's most significant risks helps to prioritize improvement actions to reduce impacts on the environment. After completing the EIA, facilities should compare the risk and impact scores of each activity with each other to ensure scoring is consistent. In addition, significant impacts should be addressed within the environmental strategy. In this way, the EIA and the environmental strategy are linked to each other.

An EIA should also consider any applicable environmental laws and regulations to determine the significance of risk as well as specific legal requirements for conducting the EIA.

Resources:
Several resources are provided below that provide additional information understanding and identifying environmental impacts.

- International Finance Corporation (IFC) Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts https://www.ifc.org/wps/wcm/connect/8804e6fb-bd51-4822-92cf-3dfd8221be28/PS1_English_2012.pdf?MOD=AJPERES&CVID=jiVQIfe
- International Finance Corporation (IFC) Environmental, Health and Safety Guidelines https://www.ifc.org/wps/wcm/connect/29f5137d-6e17-4660-b1f9-02bf561935e5/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES&CVID=jOWim3p
- American Public Works Association (APWA) EMS Procedure (Example) Environmental Aspects and Impacts Procedure: https://www.apwa.net/library/accreditation/ems/CON-P0001_EMS_Procedure-Environmental_Aspects_with_Templates.doc
- ISO 14001:2015 Environmental management systems — Requirements with guidance for use https://www.iso.org/standard/60857.html
- EU Eco-Management and Audit Scheme (EMAS) https://green-business.ec.europa.eu/eco-management-and-audit-scheme-emas_en

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that shows the facility has conducted an assessment and identified the significant environmental impacts associated with current operations. This may include:
    - Environmental Impact Assessment (EIA) report
    - Environmental aspects and impact evaluation,
    - Most recent local government environmental assessment report, if applicable

Interview Questions to Ask:

- Staff responsible for environmental management at the facility are aware of all significant environmental impacts.
- Relevant staff can describe the process used to identify and evaluate the significance of environmental impacts associated with facility operations.

Inspection - Things to Physically Look For:

- Observations onsite are consistent with the facility's identified environmental aspects and impacts (e.g., reported impacts and significance are representative of conditions at the facility)

Partial Points: N/A

3. Does your facility have a company environmental policy?

Answer Yes if: Your facility has a documented environmental policy that is aligned with your organization's long-term environmental management strategy and is approved by top management.

If you select Yes, you will be asked the following sub question:

- Please upload documentation, if available.

Suggested Uploads:

- A copy of the facility's environmental policy.
- Other relevant supporting documentation that demonstrates the policy is integrated with the company's environmental strategy (e.g., environmental objects and targets, employee and stakeholder communications related to the policy etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have clear environmental policy that outlines commitment to reducing its environmental impacts.

Technical Guidance
An environmental policy demonstrates an organization's commitment to reducing its environmental impacts. Establishing a clear environmental policy provides a framework for a facility to establish and monitor its environmental programs and communicate its commitments to all internal and external stakeholders.

An environmental policy, as defined by ISO 14001 an Environmental Management Systems certification scheme, is a policy that should:

- Be appropriate to the organisation.
- Include a commitment for continual improvement.
- Include a commitment to comply with relevant legal and other requirements.
- Provide the framework for setting and reviewing environmental objectives and targets.

In general, there is no required format or content for an environmental policy, however it is important to consider key aspects that address environmental problems and outline your organization's culture around these. The following list provides some examples of aspects that may be included in the policy:

- Describing the importance of environmental issues to the company.
- Your organisation's environmental objectives and goals (e.g., reduction of resource and material consumption, climate protection, reducing waste, etc).

- It is important that all objectives and goals be supported by performance indicators that allow your organization to demonstrate commitments to the policy, continual improvement, and environmental performance.
- How your organization raises environmental awareness, encourages participation, and trains staff on environmental matters.
- How your organization assesses the environmental impact of operations and supply chains.
- How your organization applies similar environmental expectations for suppliers and contractors.
- How your organization communicates environmental goals and objectives to internal and external stakeholders.

How This Will Be Verified:

Full Points:

Documentation Required:

- A documented environmental policy that is approved (signed) by top management.
- Other supporting documentation that demonstrates the policy aligns with the facility's environmental management strategy and goals. This may include:
  - Details on the facility's environmental objectives, targets, KPIs and how these are monitored in relation to the policy.
  - Records or evidence of stakeholder communications and/or training on the policy

Interview Questions to Ask:

- Staff responsible for environmental management at the facility, including top management, and employees are aware of the facilities policy and can describe the facility's efforts to meet its stated objectives.

Inspection - Things to Physically Look For:

- Observations onsite are consistent with the facility's environmental policy (i.e., the policy is relevant to the facility operations and environmental impacts)
- Posting of the environmental policy at the site or other forms of communication to staff.

Partial Points: N/A

4. Does your facility have a company environmental management strategy that guides long-term decision-making on environmental management?

Answer Yes if: Your facility has a documented environmental strategy in place that sets forth environmental priorities and includes defined goals and actions for three (3) years or longer.

Notes:

- Your facility has an environmental strategy that aligns with the requirements of ISO 14001 for objectives and targets that covers 3 or more years, you should answer Yes to this question.
- The 3 year timeline must include the Higg FEM reporting year. For example, for FEM 2024, the strategy must include the 2024 calendar year.

Answer Partial Yes if: Your facility has a documented environmental strategy in place that covers less than 3 years **OR** sets forth environmental priorities and goals for 3 or more years, but the strategy does not include defined actions that the facility plans to take to achieve the goals. For example, your facility has a goal to reduce energy use by 30% over 3 years but have not identified the specific actions required to achieve this reduction.

If you select Yes or Partial Yes, you will be asked the following sub questions:

- Select all topics covered by this strategy (select all that apply).
- Please upload environmental management strategy, if available
- If you cannot upload the documents, please describe here.

Suggested Uploads:

- A copy of the facility's environmental strategy.
- Other relevant supporting documentation that supports the environmental strategy (e.g., environmental objects and targets, relevant environmental impacts of the site, list of detailed actions planned together with their responsibilities, timelines, cost, status to achieve the strategy etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have set an environmental management strategy that defines long term goals and actions to meet the facility's goals.

Technical Guidance

A documented environmental strategy provides a clear path for an organization to reduce impacts and to improve environmental performance and efficiency. It offers a structured way to incorporate environmental considerations into day-to-day operations and long-term planning.

Before creating an environmental strategy it is important that a facility's environmental impacts have been identified and prioritized which will allow a strategy to be developed based on a facility's significant impacts. Once there is a clear understanding of the key environmental impacts, an overarching environmental strategy and measurable environmental targets can be created. Targets should drive continuous improvement of environmental performance in the medium to long term (3 or more years). Additionally, facilities should have procedures in place to review and adjust the strategy periodically, as needed.

Aligning with the requirements (and/or seeking certification) with internationally recognized environmental management system certification schemes (such as ISO 14001 or EMAS) can help provide a structured framework to support facilities with creating a long term environmental strategy and defining actions to improve environmental management.

Resources:

- ISO 14001:2015 Environmental management systems — Requirements with guidance for use https://www.iso.org/standard/60857.html
- EU Eco-Management and Audit Scheme (EMAS) https://green-business.ec.europa.eu/eco-management-and-audit-scheme-emas_en

How This Will Be Verified:

Full Points:
Full Points will be awarded for facilities that have a documented environmental strategy in place that sets forth environmental priorities and includes defined goals and actions for 3 years or longer.

Documentation Required:

- The company's environmental strategy and all relevant supporting documentation. This should include:
    - Strategic Environmental objects and targets that extend 3 or more years into the future.
    - A list of detailed actions planned to achieve the strategy.
    - Documentation that demonstrates the strategy has been approved and is supported by top management (e.g., budget approval/planning to support the strategy, strategy review meeting minutes).

Note: If information and details on environmental targets and actions (e.g., specific energy targets or action plans) are maintained in separate documentation, they should be available for review and be directly related to the facility's environment strategy.

Interview Questions to Ask:

- Top management understands the long-term strategy in place and are able to explain their role in ensuring the actions in the strategy are being implemented.
- Relevant staff responsible for managing and implementing the facility's environmental objectives and targets explain their role in implementing the environmental strategy.

Inspection - Things to Physically Look For:

- Observations onsite are consistent with the facility's environmental strategy (i.e., the strategy and defined actions to implement the strategy are relevant to the facility operations)

Partial Points:

- Partial Points will be awarded for facilities that have a documented environmental strategy in place that covers less than 3 years **OR** that sets forth environmental priorities and includes defined goals for 3 years or longer, but the strategy does not include defined actions that the facility plans to take to achieve the goals.

5. Does your facility have a mechanism in place to regularly review and monitor environmental permit status and renewal (where appropriate) and ensure compliance?

Answer Yes if: Your facility has established procedures and defined responsibilities to regularly review environmental permitting requirements, monitor current permit requirements, and renew environmental permits to ensure compliance.

If you select Yes, you will be asked the following sub questions:

- Please upload documentation, if available.
- If you cannot upload the documents, please describe here.

Suggested Uploads:

- Documentation that supports the facility's procedures to review and monitor environmental permit status, and renew permits to ensure you are meeting the legal requirement (e.g., documented permit monitoring procedure, related job descriptions or duties, list of required permits, calendar of permit activities/renewal requirements, etc.)

What is the intent of the question?
The intent of this question is to ensure facilities have established procedures to monitor and maintain compliance with environmental permits.

Technical Guidance

Maintaining compliance with applicable environmental laws and regulations is a fundamental business practice. Facilities should have established procedures and defined responsibilities to ensure permit requirements are well understood and that compliance is maintained.

Environmental permits often require facilities to take action to ensure the facility is operating in compliance with permit requirements which may include:

- Environmental testing or reporting
- Renewing permits that have expirations dates.
- Updating/re-applying for permits based on changes in facility operations or changes to relevant laws and regulations.

For this question in the FEM, having a mechanism in place means that the facility has processes in place to ensure staff are responsible for, and following established practices to review, monitor and renew environmental permits on a defined schedule. This schedule should be defined based on the organizational structure of the facility's environmental team and the applicable environmental permitting requirements.

Resources:

- Example permit inventory and tracking template: https://howtohigg.org/resources/resources-library/#templates

How This Will Be Verified:

Full Points:

Documentation Required:

- Supporting documentation that shows the facility has procedures to review and monitor environmental permit status and renew permits to ensure you are meeting the legal requirement. This may include:
    - Copies of all applicable environmental permits with applicable compliance requirements
    - Documented permit monitoring procedures
    - Job descriptions or list of responsibilities for relevant staff
    - List of required permits with calendar of permit activities/renewal requirements (e.g., a permit tracking document with defined actions to maintain compliance)
    - Corrective Action plans (if applicable)

Note: The supporting documentation noted above may be included in various documents, however collectively they must demonstrate that the facility has a mechanism to review, monitor, and renew environmental permits to ensure compliance.

Interview Questions to Ask:

- Staff responsible for environmental management are able to describe the facility's processes for ensuring permit requirements are being complied with.
- Key staff involved in permit monitoring and renewal processes are able to describe their role and responsibilities for ensuring compliance with all environmental permits.

Inspection - Things to Physically Look For:

- Observations onsite confirm the applicable environmental permitting requirements are being complied with (e.g., scope of facility operations, environmental impacts or discharges that require permits, etc.)

Partial Points: N/A

6. Does your facility maintain a documented system to identify, monitor and periodically verify all laws, regulations, standards, codes, and other legislative and regulatory requirements for your significant environmental impacts (in addition to areas that are covered in required permits)?

Answer Yes if: Your facility has documented procedures and defined responsibilities to identify, monitor and periodically verify all laws, regulations, standards, codes, and other requirements for your significant environmental impacts **and** the facility is in compliance with all applicable legal and/or other requirements.

Answer Partial Yes if: Your facility has documented procedures and defined responsibilities to identify, monitor and periodically verify all laws, regulations, standards, codes, and other requirements for your significant environmental impacts, but you are currently not in compliance with one (1) or more legal and/or other requirements **and** you have a documented plan to correct the non-compliance(s).

Notes:

- These procedures may be implemented at the manufacturing groups level, but facilities must be able to demonstrate how these procedures are aligned with at the facility level.
- This question is not inclusive of the mechanism for monitoring and renewing legally required permits covered in the Higg FEM question "Does your facility have a mechanism in place to regularly review and monitor environmental permit status and renewal (where appropriate) and ensure compliance?"

- For this question, significant impacts related to impacts that have been identified and determined to be significant based on the criteria and guidance for the Higg FEM question “Has your facility identified the significant environmental impacts associated with current operations within the factory premises?”

If you select Yes, you will be asked the following sub questions:

- Select all topics covered by the system (select all that apply)
- Are the findings used to set an improvement plan that is regularly reviewed?
- Please upload documentation, if available
- If you cannot upload the documents, please describe here:

Suggested Uploads:

- Documentation that supports the facility’s procedures to review and monitor environmental permit status, and renew permits to ensure you are meeting the legal requirement (e.g., documented legal and other requirements monitoring procedure, related job descriptions or duties, list of applicable requirements (legal and other), calendar of review and monitoring activities, corrective action plans, etc.)

What is the intent of the question?
The intent of this question is to ensure that facilities are systematically and proactively identifying and reviewing requirements in applicable laws, regulations, standards, codes and other requirements for their significant environmental impacts.

Technical Guidance

Understanding, identifying, monitoring, and verifying environmental compliance requirements for legal and other requirements for a facility’s significant environmental impacts is important to ensure a facility is operating in compliance with legal and other requirements. Having established procedures should be part of a facility’s or manufacturing group’s formal environmental management system. These processes should be documented (for example, through a standard operating procedure), maintained and implemented by qualified staff that have a good understanding of environmental regulations and other requirements. Requirements may include:

- Legal and other regulatory requirements
- Industry or client brand requirements (e.g., industry stakeholder initiatives, brand code of conduct requirements or expectations)

A facility’s procedures should include systematic processes to:

- Identify, review, and monitor the scope of regulatory and other requirements for the facility's significant environmental impacts.
- Define Responsible staff/departments and specific duties to ensure implementation.
- Establish formal internal review & tracking procedures and documentation (e.g., legal, and other requirements register)
- Define a review and monitoring schedule and frequency to identify changes in requirements.
- Define processes to address any identified non-compliances or actions required to maintain compliance

Periodic review and updates of environmental regulations should be conducted and documented. This review schedule should be defined based on the organizational structure of the facility's or manufacturing group's environmental team and the applicable environmental regulatory and other requirements.

Resources:

Example regulatory and other requirement tracking template:
https://howtohigg.org/resources/resources-library/#templates

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities that have documented procedures and defined responsibilities to identify, monitor and periodically verify all laws, regulations, standards, codes, and other requirements for your significant environmental impacts **and** the facility is in compliance with all applicable legal and/or other requirements..

Documentation Required:
- Supporting documentation that shows the facility has documented procedures to identify, monitor, and verify environmental compliance requirements for legal and other requirements for the facility's significant environmental impacts. This may include:
    - A list of applicable legal and other requirements (e.g., legal and other requirements tracking registry)
    - Job descriptions or list of responsibilities for relevant staff
    - Documented procedures for the review and monitoring processes that include the review process and frequency.
- Corrective Action Plans, if applicable

Notes:
- These procedures may be implemented at the manufacturing groups level, but facilities must be able to demonstrate how these procedures are aligned with at the facility level.

- The supporting documentation noted above may be included in various documents, however collectively they must demonstrate that the facility has documented procedures in place to identify, review, and monitor legal and other requirements to ensure compliance.

Interview Questions to Ask

- Staff responsible for environmental management are able to describe the facility's processes to identify, monitor, and periodically verify all regulatory and other requirements for the facility's significant environmental impacts.
- Key staff involved in processes are able to describe their role and responsibilities for ensuring compliance with all regulatory and other requirements.

Inspection - Things to Physically Look For

- Observations onsite confirm all significant sources of environmental impacts have been identified and applicable legal and other requirements are being complied with.

Partial Points:

- Partial points will be awarded for facilities that have documented procedures and defined responsibilities to identify, monitor and periodically verify all laws, regulations, standards, codes, and other requirements for your significant environmental impacts, but you are currently not in compliance with one (1) or more legal and/or other requirements **and** they have a documented plan to remediate the non-compliance(s).

7. Does your facility provide training to employees on environmental awareness and company environmental management strategy?

Answer Yes if: Your facility has provided training on environmental awareness and the facility's environmental strategy to all employees.

Note: Different levels of training may be provided based on employees' position and/or responsibilities, however training must have been provided to all employees to answer Yes to this question.

If you select Yes, you will be asked the following sub questions:

- If yes, how many employees were trained?
- If yes, how frequently do you train your employees?
- Do you evaluate your employees after the training?
- How do you evaluate the knowledge of your employees after the training?

- Please upload documentation, if available.

Suggested Uploads:

- Documentation that demonstrates the facility has conducted training for all employees (e.g., Training plan, training records, training material used for environmental training, post-training evaluation procedures and/or records)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that environmental training has been to all employees.

Technical Guidance

It is important that all levels of employees are aware of the facility's environmental programs and strategy. Facilities should have formal documented training processes to ensure awareness and knowledge is shared with all employees. An environmental training program can provide employees with information about the specific actions they can take to reduce the facility's environmental impacts and help to promote a culture of environmental responsibility, leading to greater employee engagement and commitment to sustainability goals.

Employees may require different levels of trainings that are appropriate for their position or responsibilities. For example, general workers may only require awareness training on existing company environmental practices and goals, while management personnel may require more detailed training on environmental management systems or strategy as it relates to their responsibilities.

Having procedures to collect information to evaluate the effectiveness of training programs (e.g. trainee feedback questionnaires or test, observation or reviews of trainer performance, etc) will help facilities ensure the effectiveness of environmental trainings and knowledge retention.

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that shows the facility has provided environmental training for all employees. This may include:
    - Training plan that identifies training schedule(s) and type of training for all levels of employees.

- Training attendance records
- Training material used for environmental training,
- Training evaluation procedures and/or records

Interview Questions to Ask:

- Staff responsible for the facility's environmental training program can explain how trainings are provided and if applicable, how the effectiveness of training is evaluated.
- Employees who have received the trainings are aware of the content of the training and the facility's environmental programs and their roles in supporting the program.

Inspection - Things to Physically Look For

- Supporting evidence of the facility's environmental training program (e.g., awareness posters, informational postings related to the facility's environmental programs and strategy, if available)

Partial Points: N/A

8. Does your facility have documented procedures to enable employees to report on environmental incidents?

Answer Yes if: Your facility has a documented procedure that enables workers to report environmental incidents or issues and all employees have been trained on the procedures to report.

Note: If your facility has a general grievance/worker feedback procedure, but it does not specifically outline procedures to report on environmental incidents/issues, **or** employees have not been trained on the environmental reporting procedure you should select No for this question.

If you select Yes, you will be asked the following sub question:

- Please upload documentation.

Suggested Uploads:

- Documentation of procedures in place to enable workers to report environmental incidents or issues (e.g., reporting procedure, employee training, examples of reporting templates or previous reports submitted by employees, etc.)

What is the intent of the question?

The intent of this question is to demonstrate that facilities have established a proper channel for workers to report for environmental incidents or issues and that employees have been trained on the reporting procedure.

Technical Guidance

As part of an effective environmental management program, it should be every employees' obligation to report suspected or actual violations of regulation or environmental incidents. Facilities should establish clear reporting channels and procedures to facilitate and encourage employees to report environmental incidents or issues. This is critical to prevent facilities from not reporting any violations and/or delaying the necessary actions to reduce environmental contamination.

Procedures should include:

- A clear description of the steps for reporting environmental incidents or issues based on the nature of the incident or issue to both internal and external parties (e.g., the facility's environmental management, local environmental bureau)
- Identify the responsible contacts or departments (internally and externally) who the report should be submitted to.
- Include details on how reports will be managed or escalated by the facility's environmental management team)
- Include guarantees that there will be no punished or retaliated against for reporting truthful information to law enforcement.

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that shows the facility has procedures in place to enable workers to report environmental incidents or issues. This may include:
    - Environmental incident or issues reporting procedure.
    - Employee training attendance records and/or training material.
    - List of contacts (internally and externally) who incidents should be reported to.
    - Examples of reporting templates or previous reports submitted by employees.

Interview Questions to Ask:

- Staff responsible for environmental management are able to describe the facility's reporting procedures and how employees are trained on the procedures.
- Employees are aware of the procedures and how they can report environmental incidents or issues.

Inspection - Things to Physically Look For:

> Onsite observations confirm procedures to report environmental incidents or issues are available to workers (e.g., posting of reporting procedures and/or contacts, etc.)

Partial Points: N/A

9. Does your facility have a process and schedule to maintain all equipment?

Answer Yes if: Your facility has a documented process and maintenance schedule covering all equipment used for production and facility operations that is being implemented.

Answer Partial Yes if: Your facility has a documented process and maintenance schedule for equipment used for production and facility operations, but it does not include all production and operations equipment **and/or** some equipment is not being maintained per the maintenance schedule.

If you select Yes or Partial Yes, you will be asked the following sub questions:

- Please upload documentation, if available.
- If you cannot upload the documents, please describe here.

Suggested Uploads:

- Facility equipment maintenance procedures and schedule
- Examples of equipment maintenance records/logs

What is the intent of the question?

The intent of this question is for facilities to demonstrate they have appropriate maintenance procedures that are being implemented for all production and operations equipment at the facility.

Technical Guidance

All equipment used for production and facility operations should be maintained regularly to ensure it is operating efficiently and as designed. Properly maintained equipment is crucial to minimize environmental impact (e.g., minimizing waste or air emissions due to inefficient machinery or leakage and excess resource consumption) and can help identify problematic equipment and opportunities to reduce waste and resource consumption (e.g., energy, compressed air, and water use).

Depending on the type of equipment, the frequency and scope of maintenance can vary. Regular maintenance should be scheduled based on available information for each piece of equipment (e.g., manufacturer's recommendations, past breakdowns or leaks from equipment, operating conditions, etc.) and be performed with the goal to reduce the chances of equipment failure and identify potential problems before they result in breakdowns or leaks.

Key aspects of a good maintenance program should include procedures for:

- Appointing qualified staff to oversee, manage and implement the maintenance program (including any external contractors).
- Creating an inventory of all equipment at the facility (e.g., name, function, make, model, serial number, etc).
- Identifying the required and/or recommended maintenance activities for each piece of equipment (e.g., from manufacturers specifications, legally required inspection/testing or certification requirements, etc.)
- Defining the appropriate maintenance scope and schedule for each piece of equipment.
- Creating standardized documentation or utilizing technology/software to record and track maintenance for all equipment (e.g., maintenance checklists, maintenance records/logs, etc)
- Ensuring the appropriate resources are available for staff to implement the maintenance program. (e.g., budget, time, and proper tools/equipment).

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities that have a documented process and maintenance schedule covering all equipment used for production and facility operations that is being implemented

Documentation Required:

- Documentation that demonstrates the facility has a process and schedule for maintaining maintenance of all equipment used for production and facility operations. This may include:
    - Facility equipment maintenance procedures and schedule that covers all facility equipment.
    - Equipment maintenance records/logs that indicate equipment has been maintained per the maintenance schedule.

Interview Questions to Ask:

- Staff responsible for the facility's maintenance program should be able to explain how the maintenance procedures and schedule were developed and how these are being implemented.
- Relevant staff (e.g., maintenance staff) should be aware of the established maintenance procedures and schedule and understand their responsibilities for implementation of the maintenance program.

Inspection - Things to Physically Look For:

- Observations onsite indicate that the facility is implementing the maintenance program as per the established procedures and schedules (e.g., equipment is in good operating order, equipment maintenance tags/records indicate maintenance is occurring per the schedule, etc.)

Partial Points:

- Partial Points will be awarded for facilities that have a documented process and maintenance schedule for equipment used for production and facility operations, but it does not include all production and operations equipment, **and/or** some equipment is not being maintained per the maintenance schedule.

10. Can you please confirm there is no soil and/or groundwater contamination in your facility?

Answer Yes if: Your facility has confirmed there has been no soil/ groundwater contamination at your facility. This means that there have not been any spills or leaks of hazardous materials at the facility that resulted in soil and/or groundwater contamination.

Answer Partial Yes if: If there has been one (1) or more spill that caused contamination of soil and/or groundwater at the facility, but you have fully remediated, or the facility is in the process of remediating the contamination and has an established remediation plan that includes details of the specific actions, responsibilities, investment, and timeline for remediation activities.

Note: If your facility currently has soil and/or groundwater contamination onsite and have not begun remediation, you should answer No to this question.

If you select Yes, you will be asked the following sub questions:

- Please describe how your facility prevented such contamination.

If you select Partial Yes, you will be asked the following sub question:

- Is your facility remediating and/or have you remediated the issue?
- If yes, please upload documentation (Photographs, Report, Action plan, Legal notice if any)
- If you cannot upload the documents, please briefly explain how you remediate the issue:

If you select No, you will be asked the following sub questions:

- Please describe the contamination in detail
- Please upload documentation if any (i.e., Photographs, Report, Legal notice)

Suggested Uploads:

- Documentation that demonstrates your facility has not caused soil and/or groundwater contamination at your facility site (e.g., soil and/or groundwater investigation reports, current environmental impact assessment, etc.).
- Where applicable, documentation of remediation activities to address any soil and/or groundwater contamination (e.g., records of spills response/clean-up activities or procedures, remediation action plans, post clean up investigations that show contamination soil and/or groundwater was remediated, etc.).

What is the intent of the question?
The intent of this question is for facilities to demonstrate that their operations have not resulted in contamination of soil and/or groundwater, or if contamination has occurred, that this has been remediated.

Technical Guidance
Soil or groundwater contamination refers to the presence of hazardous substances in the soil or groundwater at levels that can have negative impacts on human health and/or the surrounding environment.

Contamination can occur as a result of various activities associated with manufacturing operations including spills of hazardous materials, leaks from hazardous materials storage tanks or areas, improper waste disposal or storage. When hazardous substances enter the soil or groundwater, they can persist for years, potentially leach into nearby waterways which can pose health risks to humans and the environment. Having procedures to prevent and remediate contamination will help facilities reduce potential environmental impacts and compliance risks.

Additionally, facilities should have procedures to monitor risk of contamination through internal audits / walkthroughs to check for indications of soil/groundwater contamination from its operations.

If contamination is identified, the facility should establish appropriate action plans to remediate the contamination. This may include:

- Initial containment activities to prevent or reduce the spread of contamination.
- Soil/groundwater investigation to determine the extent and severity of the contamination.
- Specific actions required to remove and/or clean up contaminated soil and/or groundwater.
- Post remediation investigation to confirm the contamination was remediated.

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities that can demonstrate that there has been no soil/ groundwater contamination at the facility. This means that there have not been any spills or leaks of hazardous materials at the facility that have resulted in soil and/or groundwater contamination.

Documentation Required:

- Documentation that demonstrates the facility has not caused soil and/or groundwater contamination at the facility site. This may include:
    - Soil and/or groundwater investigation reports.
    - Environmental impact assessment indicating that the facility's operations did not contaminate groundwater / soil.
    - Document procedures or records of internal audits, walkthroughs to monitor risks of contamination.
- Where applicable, documentation of remediation activities taken to remediate soil and/or groundwater contamination. This may include:
    - Records of spills response/clean-up activities or procedures.
    - Remediation action plan that includes details on the specific actions and timeline for remediation activities.
    - Post clean up investigations/reports that show contamination soil and/or groundwater has been remediated.

Interview Questions to Ask:

- Staff responsible for environmental management at the facility are able to explain the facility's procedures and action taken to confirm no soil and/or groundwater contamination has occurred and how this is monitored.
- Staff responsible for any soil/groundwater remediation are able to explain the actions taken by the facility to remediate the contamination.

Inspection - Things to Physically Look For:

- Onsite observations indicate that there is no contamination of soil and/or groundwater occurring (e.g., no observed spills or leaks of hazardous materials or direct discharge of wastewater to the environment, no evidence of improper waste disposal, etc.)
- Indication that any contamination has been appropriately remediated.

Partial Points:

- Partial Point will be awarded if there has been one (1) or more spill that caused contamination of soil and/or groundwater at the facility, and there is supporting evidence that the contamination has been have fully remediated, or the facility is in the process of remediating the contamination and has an established remediation plan that includes details on the specific actions, responsibilities, investment, and timeline for remediation activities.

EMS - Level 2

11. Does your facility review the environmental management system with your facility's managers each calendar year?

Answer Yes if: Your facility has conducted a review of your environmental management system with the facility's management team(s) in the last calendar year.
Note: The review must have been conducted in the Higg FEM reporting year (e.g., for FEM 2023, the meetings must have been conducted in the 2023 calendar year).

If you select Yes, you will be asked the following sub questions:

- Please upload documentation, if available
- If you cannot upload the documents, please describe here:

Suggested Uploads:

- Records of environmental management system review(s) conducted during the Higg FEM reporting year.

What is the intent of the question?

The intent of this question is for factories to demonstrate that their environmental management system is reviewed on an annual basis with facility management team(s).

Technical Guidance

Conducting a management review of environmental management systems and programs is an important part of the plan, do, check, and act (PDCA) management system model to review performance and create action plans to drive improvement. Having a defined schedule for regular management meetings to discuss performance is recommended (e.g., on quarterly basis). At least one full management review is recommended annually. The meeting should review

environmental information such as legal compliance, environmental performance, status of objectives and targets, status of preventive & corrective actions (including those from internal/external audits, incidents, accidents, emergency drills etc, recommendations for improvements, etc.)

Recognized environmental management system certification schemes (such as ISO 14001) include key objectives and processes for management systems reviews. Key areas that should be covered in a successful management review include:

- Results of internal audits, legal compliance, and other requirements to which the organization subscribes.
- Communication from external parties
- Environmental performance
- Progress of objective and targets
- Progress of corrective actions
- Follow-up actions from previous management review
- Changing circumstances including the update of legal requirements
- Recommendations for improvement

Resources:

- ISO 14001:2015 Environmental management systems — Requirements with guidance for use https://www.iso.org/standard/60857.html

- EU Eco-Management and Audit Scheme (EMAS) https://green-business.ec.europa.eu/eco-management-and-audit-scheme-emas_en

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that demonstrates the facility has conducted a management review of the facility's environmental management system in the FEM reporting year. This may include:
    - EMS management review meeting plan/agenda
    - Meeting minutes and/or attendance records
    - Meeting outcomes (e.g., action plan updated environmental strategy, objectives, or targets, etc.)

Interview Questions to Ask:

- Staff responsible for the facility's environmental management system should be able to explain the facility's procedures for management review of the environmental management system and programs.
- Facility management should be able to explain how they participate in the management reviews.

Inspection - Things to Physically Look For:

- Where applicable, onsite observations indicate that management reviews are conducted of the facility's environmental management systems (e.g., posted meeting minutes or outcomes of management review meetings)

Partial Points: N/A

12. Do employees at your facility responsible for environmental management have the technical competence required to do their job?

Answer Yes if: Your facility is meeting all of the criteria below:

- Your facility has evaluated and defined the technical competencies and qualifications required to manage your facility's environmental programs.
- Your current staff responsible for managing environmental programs meets the defined qualifications.
- Competency needs are evaluated on an annual basis to evaluate staff performance and competency and to identify needs for further professional development (e.g., obtaining additional certification or accreditation, attending professional development trainings, etc).

Answer Partial Yes if: Your facility has evaluated and defined the technical competencies and qualifications required for staff member responsible for managing your facility's environmental programs, however your current staff do not meet the defined qualifications **and/or** competency needs are not evaluated on an annual basis to determine whether staff are qualified or require further professional development.

If you select Yes or Partial Yes, you will be asked the following sub questions:

- Please upload documentation, if available.
- If you cannot upload the documents, please describe here.

Suggested Uploads:

- Documentation that demonstrates the facility has processes in place to ensure environmental staff have the required technical competencies/qualifications (e.g., list of environmental

staff/roles with the required competencies or qualifications, job descriptions that include competencies for environmental management, competency/qualifications need assessment, copies of staff's certifications or accreditations, etc.)
- Documentation that demonstrates competencies and professional development needs are reviewed on an annual basis (e.g., annual competency/qualification needs assessment, professional development plan for environmental staff, etc)

What is the intent of the question?

The intention of this question is for facilities to demonstrate that processes are in place to ensure staff responsible for managing environmental matters have appropriate technical competencies and qualifications to effectively manage the facility's environmental programs and that this is reviewed on an annual basis.

Technical Guidance:

Managing environmental programs at a facility requires an in depth understanding of both technical environmental subject matter as well as how to implement an effective environmental management system. One of the major barriers to progress on environmental performance and sustainability is the lack of technical expertise. Having staff with strong technical expertise in relevant impact areas

A team with appropriate qualifications and knowledge, helps facilities better understand environmental risks and impacts, and helps to identify and implement appropriate measures to mitigate those risks and make improvements. Also, it helps ensure compliance with environmental regulations and other requirements, which are constantly evolving and becoming more complex.

Facilities should have a process in place to evaluate and define the specific experience and qualification requirements for environmental team members. This should include:
- Educational requirements (e.g., Tertiary degree in environmental related field)
- Certification or accreditation requirements (e.g., legally required environmental certifications, Certified Environmental Professional (CEP), ISO 14001 Auditor certification, etc.)
- Required training(s) for reputable training providers on specific environmental subject matter (e.g., Energy and GHG management, wastewater, or chemicals management, legally required trainings, etc)

It is also important for facilities to ensure that competency needs for environmental staff are regularly evaluated and that opportunities are available for environmental management staff to participate in professional development activities to enhance their knowledge on environmental management and technical subject matter such as attending external trainings, obtaining additional environmental certification or accreditation, etc.

How This Will Be Verified:

Full Points:

Full points will be awarded for facilities that are meeting all the criteria below:

- The facility has evaluated and defined the technical competencies and qualifications required to manage environmental programs.
- Current staff responsible for managing environmental programs meets the defined qualifications.
- Competency needs are evaluated on an annual basis to evaluate staff performance and competency and to identify needs for further professional development.

Documentation Required:

- Documentation that shows the facility has processes in place to ensure environmental management staff have the required technical competencies/qualifications. This may include:
  - A list of environmental staff/roles with the required competencies or qualifications for each role.
  - Job descriptions that include competencies for environmental management.
  - Competency/qualifications needs assessment.
  - Copies of certifications or accreditations for environmental management staff.
- Documentation that demonstrates competencies and professional development needs are reviewed on an annual basis. This may include:
  - Annual competency/qualification needs assessment.
  - Professional development plan for environmental staff.
  - Meeting records of performance and/or competency evaluations.

Interview Questions to Ask:

- Staff responsible for recruiting environmental management staff are aware of the competency and qualification requirements for environmental staff and can explain how the facility ensures qualified staff are recruited for environmental management roles.
- Relevant environmental staff can demonstrate their knowledge and expertise related to the areas of environmental management they oversee.
- Relevant staff can explain the facility's procedures for reviewing competency/qualification requirements and professional development needs for environmental management staff.

Inspection - Things to Physically Look For:

- Onsite observations indicate that environmental programs are being managed by staff with appropriate technical competency and qualifications (e.g., Certifications or trainings provided are for the individuals responsible for environmental management, environmental management staff's ability to demonstrate technical understanding on environmental subject matter throughout the verification, etc.)

Partial Points:

- Partial points will be awarded for facilities that have evaluated and defined the technical competencies and qualifications required for staff member responsible for managing environmental programs, however current staff do not meet the defined qualifications **and/or** competency needs are not evaluated on an annual basis to determine whether staff are qualified or require further professional development.

13. Does your facility have a program to build awareness of your environmental impacts and performance with your employees?

Answer Yes if: Your facility has a documented program for communicating awareness on your facility's environmental impacts and performance to all employees **and** this is communicated to all employees on an annual or more frequent basis.

Answer Partial Yes if: Your facility has a documented program for communicating awareness on your facility's environmental impacts and performance, but this has not been communicated to all employees **or** your facility is in the process of developing a communication program.

Note: This communication program must be in addition to basic environmental training for staff on their roles and responsibilities covered in level 1 and specifically include awareness on the facility's environmental impacts and performance (e.g., performance on environmental KPIs and/or progress on the facility's environmental strategy)

If you select Yes, you will be asked the following sub questions:

- Please upload documentation, if available
- If you cannot upload the documents, please describe here:

Suggested Uploads:

- Documentation that shows your facility has a communication plan in place that focuses on providing awareness on the facility's environmental impacts and performance, and that communication was provided to all employees (e.g., Environmental performance communication plan and schedule, communication materials such as presentations, bulletins, newsletters, meeting agendas/minutes, etc)

What is the intent of the question?

The intent of this question is for facilities to have a formal program to communicate environmental performance and strategy to inform and motivate employees to support the facility's environmental strategy.

Technical Guidance:

Clearly communicating a facility's environmental management programs and performance to its workforce is a key to its success. The more involved employees are, the more committed they will be which can increase the effectiveness of environmental programs and performance.

Communicating environmental impacts and performance to employees can be done in a number of ways including training/presentations, meetings, bulletin boards, newsletters, posters, or other established communication channels at the facility.

Regardless of the mode(s) of communications used, a communication plan and procedures should be established to ensure that information is communicated in a clear and consistent way that provides employees with key information on the facility's environmental programs, performance, and strategy. Some key areas to include in employee communications include:

- Information on the environmental aspects and impacts of the facility

- Information on the facility's environmental strategy and updates on the facility's progress on environmental objective and targets
- Information on any key performance indicators (KPIs) or metrics used to monitor the facility's environmental performance.
- Information on how employees can participate in environmental programs and the benefits of doing so.
- Information on how employees can communicate suggestions for environmental improvements.

How This Will Be Verified:

Full Points:
Full Points will be awarded for facilities that have a documented program for communicating awareness of environmental impacts and performance to all employees and this is communicated to all employees on an annual or more frequent basis.

Documentation Required

- Documentation that shows the facility has an established communication program and that communication to all employees occurs on an annual basis or more frequent. This may include:
    - Environmental performance communication plan and schedule
    - Communication materials such as presentations, bulletins, newsletters, meeting agendas/minutes.
    - Records that demonstrate information on environmental impacts and performance had been provided to workers where applicable (e.g., meeting attendance records, past bulletins, or newsletters, etc.).

Interview Questions to Ask

- Staff responsible for the communication program can describe what information is communicated with employees and how it is communicated.
- Employees can demonstrate awareness of the facility's environmental impacts, performance, strategy and KPIs.

Inspection - Things to Physically Look For

- Observations indicate the communication program has been implemented per the documented and reported communication procedures (e.g., awareness posters or bulletins, visible postings of the facility's environmental performance and strategy, etc.)

Partial Points:

- Partial points will be awarded for facilities that have a documented program for communicating awareness on your facility's environmental impacts and performance, but this has not been communicated to all employees or your facility is in the process of developing a communication program.

EMS - Level 3

14. Does your facility monitor, evaluate, and/or engage with your subcontractors on their environmental performance using the Higg Index or other relevant environment assessment?

Answer Yes if: Your facility engages all subcontractors to improve environmental performance using the Higg Index or other related environmental assessment scheme (e.g., ISO14001, Amfori BEPI, etc) **and** can demonstrate that improvements have been made in subcontractor environmental performance.

Answer Partial Yes if: Your facility engages with at least one (1), but not all subcontractors to improve environmental performance using the Higg Index or other related environmental assessment scheme (e.g., ISO14001, Amfori BEPI, etc) **and** has procedures to monitor and track subcontractor performance, but cannot demonstrate that improvements have been made in subcontractor environmental performance.

Answer Not Applicable if: Your facility does not use any subcontractors.

Notes:

- The scope of subcontractors for this question refers to subcontractors used for production (e.g., a separate business entity used to perform a specific process or manufacturing step to produce a final product such as garment dyeing, embroidery, and screen-printing tasks, etc.)

- If the engagement only requires subcontractors to complete an assessment, but there is no follow-up monitoring or reporting of improvements at the subcontractor required, you should answer No to this question. (e.g., if the subcontractor is only required to share their Higg FEM module and your facility does not follow-up to provide support or require and track improvements)

If you select Yes or Partial Yes, you will be asked the following sub questions:

- Please upload documentation, if available.
- If you cannot upload the documents, please describe here:

Suggested Uploads:

- Documentation that demonstrates your facility has engaged with subcontractors using the Higg FEM or other environmental assessment scheme (e.g., list of subcontractors, evidence of FEM module sharing, other environmental assessment reports)
- Documentation that shows this engagement has resulted in environmental performance improvements at the subcontractor (e.g., records of the facility's monitoring or tracking of subcontractor improvements plans, corrective action support or requests from the facility, completed improvement actions plans from subcontractors, etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they leverage the Higg FEM or other environmental assessment to work with subcontractors to evaluate their performance, monitor impacts, and make improvements.

Technical Guidance:

The environmental footprint and impacts of the products you produce includes your subcontractors' activities. Engaging with subcontractors using an established environmental assessment scheme will help to understand environmental performance at subcontractor facilities and identify areas where your company can support and drive improvements.

Subcontractor engagement programs should include procedures for requiring subcontractors to perform assessment of current environmental practices and report improvement plans and/or actions to demonstrate improvements. Facilities should also have established procedures to monitor and track subcontractor improvements over time.

Expectations and requirements for subcontractors' environmental programs can also be included in the terms and conditions of contractual agreements to ensure the subcontractors clearly understand and are held accountable to these expectations.

How This Will Be Verified:

Full Points:

Full points will be awarded for facilities that have engaged with all subcontractors using the Higg Index or other related environmental assessment scheme (e.g., ISO14001, Amfori BEPI, etc) **and** can demonstrate that improvements have been made in subcontractor environmental performance.

Documentation Required:

- Documentation that shows your facility has engaged with subcontractors using the Higg FEM or other environmental assessment scheme. This may include:
    - Subcontractor engagement procedures or business agreements/contracts with environmental performance terms.
    - List of all subcontractors that your facility conducts business with.
    - Evidence of FEM module sharing or other environmental assessment reports.
    - Other relevant communications with subcontractors related to engagement on environmental performance.

- If applicable, documentation that shows environmental performance improvements at the subcontractor. This may include:
    - Records of the facility's monitoring or tracking of subcontractor improvements plans.
    - Completed improvement actions plans from subcontractors.
    - Other relevant communications with subcontractors related to environmental improvements.

Interview Questions to Ask:

- Staff responsible for managing the subcontractor engagement program are able to describe:
    - How the facility engages with subcontractors.
    - The facility's procedures for how subcontractor performance and improvement are monitored.
    - How they facility uses subcontractor Higg FEM or other environmental assessment results to drive environmental improvements.

Inspection - Things to Physically Look For:

- Observations are consistent with the reported subcontractor engagement program (e.g., evidence of subcontracted processes are consistent with the reported subcontractors used by the facility, etc)

Partial Points:

- Partial points will be awarded for facilities that have engaged with at least one (1), but not all subcontractors using the Higg Index or other related environmental assessment scheme (e.g., ISO14001, Amfori BEPI, etc) **and** have procedures to monitor and track subcontractor performance, but cannot demonstrate that improvements have been made in subcontractor environmental performance.

15. Does your facility monitor, evaluate, and/or engage with your upstream suppliers using the Higg Index or other relevant environment assessment?

Answer Yes if: Your facility engages with one (1) or more upstream suppliers to improve environmental performance using the Higg Index or other related environmental assessment scheme (e.g., ISO14001, Amfori BEPI, etc.) **and** can demonstrate that improvements have been made in upstream supplier environmental performance.

Answer Partial Yes if: Your facility engages with one (1) or more upstream suppliers using the Higg Index or other related environmental assessment scheme (e.g., ISO14001, Amfori BEPI, etc.) **and** has procedures to monitors and track performance, but cannot demonstrate that improvements have been made in upstream supplier environmental performance.

Note: If the engagement only requires upstream suppliers to complete an assessment, but there is no follow-up monitoring or reporting of improvements required, you should answer No to this question. (e.g., if the upstream supplier is only required to share their Higg FEM module and your facility does not follow-up to provide support or require and track improvements)

If you select Yes or Partial Yes, you will be asked the following sub questions to provide details on your upstream supplier engagement:

- Which types of suppliers?
    - Chemical suppliers
    - Raw material suppliers (i.e., suppliers of raw materials other than chemicals)
    - Component suppliers (i.e., suppliers of premade/assembled components such as zippers, buttons, etc)
    - Other suppliers
- For each, describe the engagement activities and the resulting environmental benefits.
- Please upload documentation, if available

Suggested Uploads:

- Documentation that demonstrates your facility has engaged with upstream suppliers using the Higg FEM or other environmental assessment scheme (e.g., list of upstream suppliers, evidence of FEM module sharing, other environmental assessment reports)
- Documentation that shows this engagement has resulted in environmental performance improvements at the upstream supplier (e.g., records of the facility's monitoring or tracking of upstream supplier improvements plans, corrective action support or requests from the facility, completed improvement actions plans from upstream supplier, etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they leverage the Higg FEM or other environmental assessment to work with upstream suppliers to evaluate their performance, monitor impacts, and make improvements.

Technical Guidance:

The environmental footprint and impacts of the products you produce includes your upstream suppliers' activities. Engaging with upstream suppliers using an established environmental assessment scheme will help to understand environmental performance at upstream supplier facilities and identify areas where your company can support and drive improvements.

Upstream supplier engagement programs should include procedures for requiring upstream suppliers to perform assessment of current environmental practices and report improvement plans and/or actions to demonstrate improvements. Facilities should also have established procedures to monitor and track upstream supplier improvements over time.

Expectations and requirements for s upstream suppliers' environmental programs can also be included in the terms and conditions of contractual agreements to ensure the upstream suppliers clearly understand and are held accountable to these expectations.

How This Will Be Verified:

Full Points:

Full points will be awarded for facilities that have engaged with one (1) or more upstream suppliers using the Higg Index or other related environmental assessment scheme (e.g., ISO14001, Amfori BEPI, etc) **and** can demonstrate that improvements have been made in upstream supplier environmental performance.

Documentation Required:

- Documentation that shows your facility has engaged with s upstream suppliers using the Higg FEM or other environmental assessment scheme. This may include:

- Upstream supplier engagement procedures or business agreements/contracts with environmental performance terms.
- List of all upstream suppliers that your facility conducts business with.
- Evidence of FEM module sharing or other environmental assessment reports.
- Other relevant communications with upstream suppliers related to engagement on environmental performance.

- If applicable, documentation that shows environmental performance improvements at the upstream supplier. This may include:
  - Records of the facility's monitoring or tracking of upstream supplier improvements plans.
  - Completed improvement actions plans from upstream supplier.
  - Other relevant communications with upstream suppliers related to environmental improvements.

Interview Questions to Ask:

- Staff responsible for managing the upstream supplier engagement program are able to describe:
  - How the facility engages with upstream suppliers.
  - The facility's procedures for how upstream supplier performance and improvement are monitored.
  - How the facility uses upstream suppliers' Higg FEM or other environmental assessment results to drive environmental improvements.

Inspection - Things to Physically Look For:

- Observations are consistent with the reported upstream supplier engagement program (e.g., evidence of supplied chemicals, raw materials, and/or components are consistent with the reported upstream suppliers used by the facility, etc.)

Partial Points:

Partial points will be awarded for facilities that have engaged with one (1) or more upstream suppliers using the Higg Index or other related environmental assessment scheme (e.g., ISO14001, Amfori BEPI, etc) **and** have procedures to monitor and track upstream supplier performance, but cannot demonstrate that improvements have been made in upstream supplier environmental performance.

16. Does your facility engage in environmental improvement in your local community?

Answer Yes if: Your facility has engaged with local stakeholders in your facility's local community and have contributed and/or participated in one (1) or more project, worked with local stakeholder, business, or government agency working group(s) on environmental

management improvements in the Higg FEM reporting year and have supporting documentation to demonstrate this engagement.

Note: If the facility is part of a manufacturing group and the engagement is initiated and/or coordinated by the manufacturing group, facilities can answer Yes, if the facility actively contributes to the engagement by providing resources (e.g. staff participation or financial support)

If you select Yes, you will be asked to select the ways in which your facility engages in environmental improvement and provide additional details for each type of engagement using the options listed below:

- We support (financially or otherwise) conservation or improvement projects for environmental issues (e.g., preserving wetlands).
- We work with other similar businesses to share best practice for environmental management.
- We engage in dialogue with local communities to understand their views on how we as a company should manage our environmental impacts.
- We work within a group of other local stakeholders including government and communities, to understand and address local environmental issues together.
- We engage directly with local or national governance bodies on environmental regulation or management issues.
- We work together in a group with other local stakeholders, to engage with local or national governance bodies on environmental regulation or management issues.
- Other

Suggested Uploads:

- Documentation that demonstrates how your facility has contributed or participated in activities focused on environmental improvement in your local community in the Higg FEM reporting year (e.g., lists of activities and stakeholders with dates of engagement, pictures, articles or press releases; list of organizations/initiatives your facility support, etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they are actively engaging with local businesses, organizations, NGOs, and/or community groups to contribute and/or participate in initiatives to make environmental improvements in the communities where they operate.

Technical Guidance:

Engaging with local community stakeholders is important because your facility has a direct impact on the local environment your facility operates in and working collaboratively with local businesses and organizations (e.g. government agency, NGOs, community environmental

groups) can create a shared focus and resources to make environmental improvement in the community.

Facilities can engage with the local community in a number of ways. A list of some examples of engagement activities are provided below:

- Support conservation or improvement projects for environmental issues. For example:
  - Organize/support local waste or river clean-ups for the community
  - Organize/support wetland preservation projects
  - Organize local fundraisers for environmental non-profits or community groups.
  - Organize/support educational events for children to start environmental stewardship.
- Work with other similar businesses to share best practice for environmental management. For example:
  - Establish collaborative working groups with local manufacturers to share best practices for environmental management and/or protection.
- Work within a group of other local stakeholders including government and communities, to understand and address local environmental issues. For example:
  - Provide waste disposal opportunities such waste collection facilities to the community to support the proper disposal of household hazardous waste or electronic waste.
- Engage directly with local or national governance bodies on environmental regulation or management issues
  - Facilitate regular meetings with local or national government agencies to review and support policy and regulatory developments to protect the environment.
- Work together in a group with other local stakeholders, to engage with local or national governance bodies on environmental regulation or management issues. For example:
  - Attend or facilitate regular meetings with other manufacturing stakeholder groups and local or national government agencies to review and support policy and regulatory developments to protect the environment

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that shows the facility contributed or participated in activities focused on environmental improvement in the local community in the Higg FEM reporting year. This may include:
  - List of engagement activities and stakeholders with dates of engagement.
  - Evidence of funding or donations to local charities or environmental groups.
  - Records of participation in local environmental initiatives (e.g., newspaper articles, pamphlets, or photo evidence of local community involvement)
  - Records of environmental policy collaboration with local government agencies.

- Other relevant documentation of local stakeholder engagement and/or environmental improvements.

Interview Questions to Ask:

- Staff responsible for management external stakeholder engagement are able to explain how and who they engage with on environmental improvement in the community.

Inspection - Things to Physically Look For:

- Where applicable, observations onsite are consistent with the reported engagement activities (e.g., community waste disposal facilities onsite, evidence posted in the facility such as event photos, newspaper articles showing the facility's engagement, etc.)

Energy & GHG

General Introduction

Energy production and energy use are the largest man-made sources of air pollution and greenhouse-gas (GHG) emissions. The operational, environmental, and financial impacts of energy are key issues for facility operations. Driving energy efficiency and use of renewable energy throughout facility operations is an important area of focus for all factories.

As climate change emerges as the most severe human, environmental, and economic risk in the world, more stringent requirements and regulations may be imposed by governments. If your facility reduces your energy consumption and greenhouse gas emissions, it will help to reduce your exposure to regulatory risks or new requirements from brands. This may also create an economic advantage for your company by mitigating risk of fossil fuel and energy cost increase.

In general, the Higg FEM Energy and GHG section encourages you to:

- Identify and understand the types of energy used at your facility.
- Understand what operations and processes at your facility use the most energy.
- Track and report the quantity of energy consumption at your facility.
- Calculate Scope 1, 2, and 3 GHG emissions.
- Evaluate, plan for, and adopt solutions to reduce energy use and GHG emissions through better manufacturing practices and energy management.

- Implement leading practices to reduce energy use and GHG emissions. (e.g., phase out the use of coal and fossil fuels for cleaner/renewable energy solutions).

Additional details on the intent and criteria for each Higg FEM Energy and GHG question is provided in the guidance below along with useful technical guidance and resources to support your facility in the management and reduction of energy and GHG.

Energy Use in Your Factory

Energy is used throughout manufacturing facilities for various operational and production activities. The Higg FEM requires that facilities track and report energy use data for the energy sources listed below, which are grouped into three categories (Purchased, Renewable, and Non-Renewable Energy).

Additional requirements on reporting energy data in the Higg FEM including any specific exclusions are provided in the relevant Higg FEM question guidance below.

<table>
<tr><th>Purchased Energy</th><th>Renewable Energy</th><th>Non-Renewable Energy</th></tr>
<tr><td>• Purchased Electricity
• Purchased Steam
• Purchased Chilled Water
• Purchased Heating (District Heating)</td><td>• Biodiesel
• Biogas
• Geothermal
• Hydro
• Mini or Micro-Hydro (onsite)
• Purchased Renewables
• Solar Photovoltaic (electricity)(onsite)
• Solar Thermal (onsite)
• Wind (onsite)</td><td>• CNG - Compressed Natural Gas
• Coal - commercial mix (1)
• Coal Water Slurry (2)
• Diesel
• Fabric Waste
• Fuel Oil - Blended (3)
• LNG - Liquid Natural Gas
• LPG - Liquid Petroleum Gas
• Natural Gas
• Petrol/ Gasoline
• Propane</td></tr>
<tr><td colspan="2">Biomass</td><td rowspan="2"></td></tr>
<tr><td colspan="2">• Biomass – Sustainably sourced with certification. (4)
• Biomass - Without sustainably sourced biomass certification. (5)</td></tr>
<tr><td colspan="3">Notes:
(1) Coal - commercial mix includes all types of traditional coal (e.g., anthracite, bituminous, etc.)
(2) Coal Water Slurry is a combustible mixture of fine coal particles suspended in water used as fuel source.</td></tr>
</table>

(3) Fuel Oil - Blended includes all types of fuel oils (e.g., furnace oil, bunker fuel, etc.)
(4) Biomass – Sustainably sourced with certification is any biomass that has supporting certification documentation from a sustainably sourced biomass program (e.g., Forest Stewardship Council (FSC), Programme for the Endorsement of Forest Certification (PEFC), ISCC Biomass Certification, Sustainable Biomass Program (SBP) Certification, Better Biomass Certification, Country Specific Certification, etc.)
(5) Biomass - Without sustainably sourced biomass certification is any biomass that is not certified through a sustainably sourced biomass program.

Greenhouse Gas (GHG) Emissions in the Higg FEM

Greenhouse gases (GHGs) are gases in the Earth's atmosphere that absorb/trap some of the Earth's outgoing radiation, maintaining the earth's temperature (called the 'greenhouse effect'). Anthropogenic GHGs, or GHGs emitted due to human activity, are causing the planet to warm faster than natural climatic variations, and this is called global warming or climate change. Energy generation and use, transportation, use of refrigeration gases, and other activities produce greenhouse gas emissions that harm the environment. Reference IPCC: www.ipcc.ch

GHG emissions are categorized into 3 different scopes:

- **Scope 1 Emissions:** Direct emissions from owned or controlled sources.
- **Scope 2 Emissions:** Indirect emissions from the generation of purchased energy consumed.
- **Scope 3 Emissions:** All other indirect emissions that occur in a company's value chain.

The Higg FEM calculates Scope 1 and 2 GHG emissions based on the energy use values entered in the Energy section, as well as the refrigerant use listed in the Air section. Energy use values input into the FEM are converted to a common unit (MJ) and GHG emissions (CO2e) are calculated using the 100-year Global Warming Potential factors for each GHG in the IPCC 5th assessment report, including non-carbon GHGs.

In the FEM, location based emission factors are used by default when market-based emission factors are not provided by the user or required to be input into the FEM. Location-based and market-based emission factors are defined as follows:

- Location-based emission factors use the average emission factor for the energy/emission source (e.g. regional or national emission factors)
- Market-based emission factors consider contractual arrangements under which the organization procures power from specific sources (e.g. fossil fuels, renewable). These emission factors are typically specified in Energy Attribute Certificates (EACs), contracts such as a power purchase agreement (PPA), to purchase electricity from a specified generating facility, or provided as Supplier-Specific Emission Factors.

Additional information on the Higg FEM GHG emissions calculation methodology can be found on the howtohigg.org website here: https://howtohigg.org/fem-user-selection/fem-facility-users-landing/ghg-revisions/

Reporting Energy Use in the FEM for Purchased Electricity, Purchased Renewables, Onsite Renewables and EACs

The following provides guidance on how to report, purchased electricity, purchased renewables, onsite renewables and relevant EACs in the FEM:

Scenario 1

How Purchased Electricity should be reported if Purchased Renewables are also purchased through a PPA by the facility

The facility should report their Purchased renewables and answer the relevant sub questions under purchased renewables category.

If the facility purchases grid electricity in addition to purchased renewables, the additional grid electricity purchased should be reported under Purchased electricity.

Example: Facility A uses 100 MWh of Electricity within the facility, out of which 60MWh is from Purchased renewables connected to a PPA, and the remaining 40MWh is directly taken from the Electricity service provider without any renewable attributes.

The Facility should report their electricity consumption as below,

- Purchased Electricity = 40,000 kWh
- Purchased Renewables = 60,000 kWh

Scenario 2

How Purchased Electricity should be reported if EACs are also purchased and retired from an external party without any power purchase agreement for purchase of renewable electricity.

The facility should report their Purchased electricity under purchased electricity category.

The annual quantity of EACs purchased and retired under the facility name will need to be reported under the separate question on purchase of Energy Attribute certificates.

No deduction or addition of electricity usage is required in this situation, the facilities GHG emissions will be calculated by the system, taking into consideration the GHG emissions from purchased electricity and the GHG reduction credits relevant for the purchased and retired EACs.

Example: Facility B uses 100 MWh of Electricity within the facility, and also purchased and retired 40MWh of EACs.

The Facility should report their electricity consumption as below,

- Purchased Electricity = 100,000 kWh
- Report 40 MWh under the EAC question.

Note: The facility should **NOT** report any quantity under Purchased Renewables.

Scenario 3

How Purchased Electricity should be reported if Purchased Renewables are also purchased through a PPA by the facility, and the relevant EACs for the purchased renewables are also retired under the facility name.

The facility should report their Purchased electricity under purchased electricity category.

The facility should report their Purchased renewables and answer the relevant sub questions under purchased renewables category.

Since the EACs for the purchased renewables are also retired under the facility name, the facility should answer "Yes" to the sub question on ownership of the purchased renewables.

The Higg FEM has now accounted for both the Purchased Electricity and the Purchased Renewables.

The associated EACs of the Purchased Renewables should NOT be reported under the EAC question as the consumption and GHG reduction have already been considered when reporting both the consumption information.

Example: Facility C uses 100 MWh of Electricity within the facility, out of which 60MWh is from Purchased renewables connected to a PPA and associated EACs are also retired under the facility name, and the remaining 40MWh is directly taken from the Electricity service provider without any renewable attributes.

The Facility should report their electricity consumption as below,

- Purchased Electricity = 40,000 kWh
- Purchased Renewables = 60,000 kWh

Note: The facility should **NOT** report any EACs under the EAC question.

Scenario 4

How Purchased Electricity should be reported if Purchased Renewables are also purchased through a PPA by the facility, and additional EACs are purchased and retired under the facility name to offset the associated Scope 2 emissions from purchased renewables.

The facility should report their Purchased electricity under purchased electricity category.

The facility should report their Purchased renewables and answer the relevant sub questions under purchased renewables category.

The PPA should state that the ownership of the Renewable Energy or associated GHG Offsets are also transferred to the facility when purchasing the purchased renewables, if so, the facility should answer "Yes" to the sub question on ownership of the purchased renewables.

The Higg FEM has now accounted for both the Purchased Electricity and the Purchased Renewables.

The additional EACs purchased and retired under the facility name should be reported under the EAC question.

Example: Facility D uses 100 MWh of Electricity within the facility, out of which 60MWh is from Purchased renewables connected to a PPA and additional EACs are retired under the facility name for the remaining 40MWh that the facility purchases from the electricity service provider.

The Facility should report the their electricity consumption as below,

- Purchased Electricity = 40,000 kWh
- Purchased Renewables = 60,000 kWh
- In this case, The facility should report the 40MWh of EACs under the EAC question.

Note: No deduction or addition of electricity usage is required in this situation, the facilities GHG emissions will be calculated by the system, taking into consideration the GHG emissions from purchased electricity , the purchased renewables and the GHG reduction credits relevant for the purchased and retired EACs.

Scenario 5

How Purchased Electricity should be reported if a facility generates onsite renewable electricity and sells it to the grid without using it onsite, but registers the onsite renewable electricity under an EAC scheme and retires it under the facility name.

The facility should report their Purchased electricity under purchased electricity category.

The facility should NOT report the onsite generated renewable electricity under any of the onsite renewable electricity categories.

The EACs registered and retired under the facility name should be reported under the EAC question.

Example: Facility E uses 100 MWh of Purchased Electricity within the facility, and generates 20MWh of onsite solar PV electricity and exports the renewable electricity to the grid, while registering the onsite renewable electricity under an EAC scheme and retires them under the facility name,

The Facility should report their electricity consumption as below,

- Purchased Electricity = 100,000 kWh
- In this case, The facility should report the 20MWh of EACs under the EAC question.

Note: The facility should **NOT** report any consumption under Onsite Solar PV or deduct any electricity consumption from the purchased electricity.

Scenario 6

How Purchased Electricity should be reported if a facility generates onsite renewable electricity and uses it onsite, and also registers the onsite renewable electricity under an EAC scheme and retires it under the facility name.

The facility should report their Purchased electricity under purchased electricity category.

The facility should report the onsite generated renewable electricity under the relevant the onsite renewable electricity categories.

The EACs registered and retired under the facility name should NOT be reported under the EAC question.

Example: Facility F uses 100 MWh of Purchased Electricity within the facility, and generates 20MWh of onsite solar PV electricity and uses it onsite, also while registering the onsite renewable electricity under an EAC scheme and retires them under the facility name,

The Facility should report their electricity consumption as below,

- Purchased Electricity = 100,000 kWh
- Onsite Solar PV = 20,000kWh
- Also indicate within the sub question for onsite solar PV that the facility has not sold the EACs to an external party.

Note: In this case, The facility should **NOT** report the 20MWh of EACs under the EAC question.

Scenario 7
How Purchased Electricity should be reported if a facility generates onsite renewable electricity and uses it onsite, and also registers the onsite renewable electricity under an EAC scheme and sells it to another organization which retires the credits under their name.

The facility should report their Purchased electricity under purchased electricity category.

The facility should report the onsite generated renewable electricity under the relevant onsite renewable electricity categories., also report whether the credits were sold to an external party and the relevant percentage of EACs sold to that party in the sub questions posted to the facility.

The facility should not report the EACs under the EAC question.

Example: Facility G uses 100 MWh of Purchased Electricity within the facility, and generates 20MWh of onsite solar PV electricity and uses it onsite, also it registered the onsite renewable electricity under an EAC scheme and sells EACs relevant for 15MWh to Facility H which retires them under Facility H. and the remaining 5MWh is retired under the Facility G.

The Facility should report their electricity consumption as below,

- Purchased Electricity = 100,000 kWh
- Onsite Solar PV = 20,000kWh
- Also indicate within the sub question for onsite solar PV that the facility has sold 75% of the EACs to an external party.

Note: In this case, The facility should **NOT** report the 20MWh of EACs under the EAC question, or even the 5MWh EACs that it retired under its own name.

Energy Data Quality

Accurately tracking and reporting energy use data over time provides facilities and stakeholders with detailed insight into opportunities for improvement. If data is not accurate, this limits the ability to understand the facility's energy use footprint and identify the specific actions that will help reduce environmental impacts and drive efficiencies.

When establishing an energy tracking and reporting program, the following principles should be applied:

- **Completeness** – The tracking and reporting program should include all relevant sources (as listed in the FEM). Sources should not be excluded from data tracking and reporting should be based on materiality (e.g., small quantity exceptions).
- **Accuracy** - Ensure that the data input into the energy tracking program is accurate and is derived from credible sources (e.g., calibrated meters, established scientific measurement principles or engineering estimates, etc.)

- **Consistency** - Use consistent methodologies to track energy data that allows for comparisons of energy use over time. If there are any changes in the tracking methods, energy sources, or other operations that impact energy use data, this should be documented.
- **Transparency** – All data sources (e.g., energy bills, meter readings, etc.), assumptions used (e.g., estimation techniques), and calculation methodologies should be disclosed in data inventories and be readily verifiable via documented records and supporting evidence.
- **Data Quality Management** – Quality assurance activities (internal or external) should be defined and performed on energy data as well as the processes used to collect and track data to ensure reported data is accurate. For additional guidance on managing data quality, refer to Chapter 7 of the *GHG Protocol a Corporate Accounting and Reporting Standard: Managing Inventory Quality.*

The above principles are adapted from The Greenhouse Gas Protocol - Chapter 1: GHG Accounting and Reporting Principles (https://ghgprotocol.org/)

Energy & GHG - Level 1

1. Select all sources of energy for your facility (exclude sources used for company owned and controlled vehicles). Select all that apply:

Purchased Energy

- Purchased Electricity
- Purchased Steam
- Purchased Chilled Water

Renewable Energy

- Biodiesel
- Biogas
- Mini or Micro-Hydro (onsite)
- Purchased Renewables
- Solar Photovoltaic (electricity) (onsite)
- Solar Thermal (onsite)
- Wind (onsite)

Non-Renewable Energy

-
- CNG - Compressed Natural Gas
- Coal - commercial mix
- Coal Water Slurry
- Diesel
- Fabric Waste (e.g. Scrap or unused fabric from the facility or an external source that is suitable for energy generation (e.g. incineration))
- Fuel Oil - Blended
- LNG - Liquid Natural Gas
- LPG - Liquid Petroleum Gas
- Natural Gas
- Petrol/Gasoline
- Propane

Biomass

- Biomass - Sustainably Sourced with certification.
- Biomass - Without sustainably sourced biomass certification.

After selection your energy sources, you will be asked the following sub questions to provide additional details on your energy sources:

- **What is the source of biomass? Select all that apply.**
    - Under what certification system is this biomass certified under?
    - If Other or Country Specific Certification, please describe and give reference link to certification system.
    - Please upload certificates.

- **Does your facility know the GHG emission factor of your purchased electricity source in the reporting year?**
    - If Yes, please indicate the emission factor (kg CO2e/kWh)
    - Please provide a direct link to the source of this emission factor
    - Please upload documentation if available.
    - **Note:** If reported, the specific emission factor will be used in the facility's GHG emissions calculations.

- **Does your facility know the energy source (energy mix) used to generate your purchased steam?**
    - If Yes, please select the energy sources.
    - Complete the following table to provide details on the energy mix of the purchased steam for the reporting year.
    - What is the pressure of the steam received at the facility (kg/cm^2)?

- What is the temperature of the steam received at the facility (Celsius)?
- Please upload any reference documents
- **Note:** If reported, specific data will be used to generate a representative GHG emission factor for this source.

- **Does your facility know the GHG emission factor of your purchased chilled water source?**
  - If Yes, please indicate the emission factor (kg CO2e/kWh)
  - Please provide a direct link to the source of this emission factor
  - Please upload documentation if available.
  - **Note:** If reported, the specific emission factor will be used in the facility's GHG emissions calculations.

- **Does your facility know the GHG emission factor of your purchased heating?**
  - If Yes, Please indicate the emission factor (kg CO2e/kWh)
  - Please provide a direct link to the source of this emission factor
  - Please upload documentation if available.
    - **Note:** If reported, the specific emission factor will be used in the facility's GHG emissions calculations
  - What is the temperature of the heated water received at the facility (Celsius)?
  - What is the temperature of the heated water from district heating exiting the facility (Celsius)?

- **Does your facility know the GHG emission factor of your purchased renewables in the reporting year?**
  - If Yes, Please indicate the emission factor (kg CO2e/kWh)
  - Please provide a direct link to the source of this emission factor
  - Please upload documentation if available.
    - **Note:** If reported, the specific emission factor will be used in the facility's GHG emissions calculations
  - Does your facility have the ownership of the associated renewable energy credits/carbon offsets from these purchased renewables?
  - Does your facility know the renewable energy sources (energy mix) used to generate your purchased renewables?
  - If Yes, please select the energy sources
  - Complete the following table to provide details on the energy mix of your purchased renewables for the reporting year.
  - Please upload a copy of your PPA (Power Purchase Agreement)

- **From the reported Onsite Solar or Wind Power Generation, Are the carbon or renewable energy credits sold/allocated to an external party?**
  - From the reported Onsite Solar or Wind Power Generation, Are the carbon or renewable energy credits sold/allocated to an external party?
  - What is the percentage of the credits sold/allocated to the external party?

- **What is the capacity of the onsite Solar Photovoltaic (electricity generating) system (in kWp)?**

- **What is the percentage of your total Diesel usage, used for the onsite Generator ?**

Note: If Diesel and /or Biodiesel are selected as sources, you will be asked the following sub questions to provide details on the fuel blend of these fuels. For example, if the biodiesel blend used at your facility is B20 (20% Biodiesel and 80% traditional diesel fuel), the numeric value of 20 should be input for the question "What is the percentage of Biodiesel within your biodiesel source?" :

- **Is the Diesel used within your facility a mixture of both Biodiesel and Diesel?**
    - If Yes, What is the percentage of Biodiesel within your diesel source? (ie. B10, B15, B20 etc)

- **Is the Biodiesel used within your facility a mixture of both Biodiesel and Diesel?**
    - If Yes, What is the percentage of Biodiesel within your biodiesel source? (ie. B100, B90, B75 etc)

Suggested Uploads
- Energy tracking records that show all of the facility's energy sources.
- Supporting documentation that supports responses to the applicable sub questions.

What is the intent of the question?
The intent of this question is to ensure facilities have identified and understand important characteristics of all energy sources used at the facility.

Technical Guidance:
Understanding all of your facility's energy sources is an important first step in energy management that will support identifying and tracking what energy is being used, where it is being used, and how much is being used.

In the FEM for this question, facilities are required to select all energy sources used within the site's physical boundary and operations under your business control (owned, operated, or directly leased).

Note: Several of the sub questions require specific data on energy sources such as GHG emission factors for purchased electricity and chilled water, energy mix and pressure/temperature of purchased steam, etc. This information may be available directly from the utility provider, government sources, or other credible publicly available sources.

Reporting Fuel Blends in the Higg FEM for Diesel and Biodiesel

Commercially available fuels are often blended and may be available in different concentrations. For example, B10 (10% Biodiesel and 90% traditional diesel fuel). In the FEM, facilities are asked to report details on the proportions of the fuel blends used to allow for accurate accounting of GHG emissions. This information should be obtained from fuel providers.

How This Will Be Verified:

This question is unscored.

Documentation Required:

- List of all energy sources used at the facility and any supporting documentation that may include:
    - Energy purchasing and/or use records (e.g., invoices, metering records)
- Documentation that supports responses to the sub questions on energy source characteristics. This may include:
    - Published GHG emission factor data for energy sources.
    - Certifications for biomass energy sources.
    - Purchased steam temperature and pressure data.
    - Documentation that indicates the fuel blend ratio for Diesel, Biodiesel, if applicable.

Interview Questions to Ask:

- Staff responsible for managing energy understand the facility's energy sources and any supporting energy source characteristics reported in the sub questions (e.g., GHG emission factors, sources of biomass and any associated certification, purchased steam temperature and pressure, etc.)

Inspection - Things to Physically Look For:

- Observations onsite are consistent with the facility's reported energy sources (i.e., the reported sources are observed to be in use at the facility)

2. Select all sources of energy/fuel for company owned and controlled vehicles. Select all that apply:

Notes: For sources below that relate to charging or fuelling of vehicles onsite, you should not select the energy source below unless this energy consumption is tracked separately and is not included in the facility's overall energy reporting for the source(s) selected in the above question as this will double count this energy use in the Higg FEM. For example, if your facility has electric vehicles and charges them onsite using purchased electricity and the electricity consumption of these vehicles is not tracked separately (i.e., subtracted from overall facility electricity consumption), you **should not** select this source for this question. Similarly, if the

facility has natural gas or propane fueled vehicles that are refueled onsite and this is not tracked separately from overall facility usage, you **should not** select these as sources for this question.

Purchased Energy

- Purchased Electricity

Renewable Energy

- Biodiesel
- Biogas
- Ethanol
- Hydrogen - Renewable Source (i.e., Produced from renewable energy (green hydrogen))
- Purchased Renewables (electricity)
- Solar Photovoltaic (electricity)
- Wind (electricity)

Non-Renewable Energy

- CNG - Compressed Natural Gas
- Diesel
- Hydrogen -Non- Renewable Source(i.e., Produced from non-renewable energy (grey hydrogen))
-
- LNG - Liquid Natural Gas
- LPG - Liquid Petroleum Gas
- Petrol/Gasoline
- Propane

Note: If Diesel, Biodiesel, Ethanol and/or Petrol/Gasoline are selected as sources, you will be asked the following sub questions to provide details on the fuel blend of these fuels. For example, if the petrol/gasoline used at your facility is 90% petrol/gasoline and 10% Ethanol, the numeric value of 10 should be input for the question "What is the percentage of Ethanol within your Petrol/Gasoline source?" :

- **Is the Diesel used for the vehicles a mixture of both Biodiesel and Diesel?**
    - If Yes, What is the percentage of Biodiesel within your diesel source? (ie. B10, B15, B20 etc)
- **Is the Biodiesel used for the vehicles a mixture of both Biodiesel and Diesel?**
    - If Yes, What is the percentage of Biodiesel within your biodiesel source? (ie. B100, B90, B75 etc)
- **Is the Petrol/Gasoline used for the vehicles a mixture of both Ethanol and Petrol/Gasoline?**
    - If Yes, What is the percentage of Ethanol within your Petrol/Gasoline source? (ie. E10, E15, E20 etc)

- **Is the Ethanol used for the vehicles a mixture of both Ethanol and Petrol/Gasoline?**
    - If Yes, What is the percentage of Ethanol within your Ethanol source? (ie. E100, E85, E50 etc)

Suggested Uploads

- Energy tracking records that show all of the facility's energy sources of energy/fuel for company owned and controlled vehicles.

What is the intent of the question?

- The intent of this question is to ensure facilities have identified all energy sources of energy/fuel for company owned and controlled vehicles.

Technical Guidance:

Understanding all of your facility's energy sources is an important first step in energy management that will support identifying and tracking what energy is being used, where it is being used, and how much is being used.

In the FEM for this question, facilities are required to select all energy sources used for company owned and controlled vehicles. This should include company owned or controlled vehicles used for transporting including, but not limited to employees (workers and management staff), contractors, customers, raw materials, or product.

Reporting Fuel Blends in the Higg FEM for Diesel, Biodiesel, Ethanol and Petrol/Gasoline

Commercially available fuels are often blended and may be available in different concentrations. For example, B10 (10% Biodiesel and 90% traditional diesel fuel), or E85 (up to 85% Ethanol and 15% traditional petrol/gasoline). In the FEM, facilities are asked to report details on the proportions of the fuel blends used to allow for accurate accounting of GHG emissions. This information should be obtained from fuel providers.

How This Will Be Verified:

This question is unscored.

Documentation Required:

- List of all energy sources of energy/fuel used for company owned and controlled vehicles and any supporting documentation that may include:
    - Energy purchasing and/or use records.
    - Supporting documentation that indicates the fuel blend ratio for Diesel, Biodiesel, Ethanol and Petrol/Gasoline in company owned and controlled vehicles, if applicable.

Interview Questions to Ask:

- Staff responsible for managing energy understand the facility's energy sources used for company owned and controlled vehicles.

Inspection - Things to Physically Look For:

- Observations onsite are consistent with the facility's reported energy sources for company owned and controlled vehicles (i.e., company vehicles that use the reported energy sources).

3. Does your facility purchase Energy Attribute Certificates (EACs) (e.g., Renewable Energy Certificates (RECs))?

Note: When reporting EAC data in the FEM, Facilities should refer to the "Reporting Energy Use in the FEM for Purchased Electricity, Purchased Renewables, Onsite Renewables and EACs" in the Introduction section of this Guidance.

Answer Yes if: Your facility purchased **and** retired EACs for the reporting year. If another business entity (e.g., Manufacturing group or brand partner) purchased and retired the EAC on behalf of your facility, it must have been registered/retired under your facility's name and location (i.e., legal business entity name and address) as listed on their Higg.org account.

Note: If your facility purchased, but did not retire the EACs for the reporting year, you should answer No to this question.

If you answer Yes to this question, you will be asked the following sub questions to provide details on your purchased EACs:

- What type of Energy Attribute Certificates does your facility purchase?
- How much MWh did your facility purchase and retire in the reporting year?
    - **Note**: Report the MWh quantity retired in the reporting year (e.g., If 100MWh was purchased, but only 75MWh was retired for the reporting year, 75MWh should be input)
- Please upload your certificate
- Please select the energy sources of your EACs
- Complete the following question to provide details on the energy mix of the EAC for the reporting year.

Suggested Uploads

- Documentation that demonstrates your facility purchased/retired EACs or that EACs were registered and retired on behalf of your facility in the reporting year (e.g., documentation from the relevant EAC scheme authority that shows the EAC has been used/retired).

What is the intent of the question?

- The intent of this question is for companies to demonstrate that they have purchased and retired EACs in the Higg FEM reporting year.

Technical Guidance:
Energy Attribute Certificates (EACs) is a general term for a variety of market-based instruments that represent how energy is generated and ownership of the attributes of that energy. The name and specific requirements for EACs are typically defined by the jurisdiction or program under which they are issued. EACs can be issued as part of government initiatives or be offered by independent third-party providers such as the EAC programs listed below:

- Renewable Energy Certificates (RECs) in North America https://www.epa.gov/green-power-markets/renewable-energy-certificates-recs
- Guarantees of Origin (GOs) in Europe https://www.aib-net.org/
- Renewable Energy Guarantees of Origin (REGOs) in the UK https://www.ofgem.gov.uk/environmental-and-social-schemes/renewable-energy-guarantees-origin-rego
- International RECs (I-RECs) https://www.irecstandard.org/
- Tradable Instruments for Global Renewables (TIGRs) across the rest of the world https://apx.com/about-tigr/
- Green-e Energy (EACs) https://www.green-e.org/
- EKOenergy certified EACs https://www.ekoenergy.org

- Green Electricity Certificate (GEC) http://www.greenenergy.org.cn/

- Renewable Energy Guarantees of Origin System (YEK-G) https://yekgnedir.com/en/

Certificates are typically produced per Megawatt hour (MWh) and are registered in a tracking system as part of the EAC scheme. EACs will have several unique identification and data attributes associated with them such as:

- Certificate type/unique identification number
- Tracking system ID
- Renewable fuel type
- Renewable facility location
- Emissions rate of the renewable resource

Retiring EACs

Once the end user of the EAC claims the energy attributes of the EAC, it is then retired and no longer available to be attributed to future energy use. Each EAC scheme will have established criteria and/or procedures for the purchase, transfer, and retirement of EACs that should be followed.

Resources:

Details on specific EACs can be found at the links provided above. Additionally, an overview of how EACs can be applied in a GHG accounting program can also be found at the link below:

- Greenhouse Gas Protocol - Scope 2 Guidance - https://ghgprotocol.org/scope_2_guidance

How This Will Be Verified:

This question is unscored.

Documentation Required:

- Documentation to show you have purchased/retired energy associated with an EAC in the reporting year including the certificate(s) and any other relevant documentation required by the respective EAC scheme to demonstrate the facility's ownership and purchase/retiring of the EAC.
- If the EAC was purchased by another company (i.e., manufacturing group or brand partner) and retired under the facility's name, documentation must be available to demonstrate that the EAC was retired for the specific facility name and location (i.e., legal business entity name and address) as registered on their Higg.org account.
- Energy tracking records that show the facility's energy consumption and demonstrate that claims or reported energy attributes of the EAC(s) were appropriately applied.

Interview Questions to Ask:

- Staff responsible for managing the EAC(s) must be knowledgeable on the respective EAC scheme and be able to explain the facility's procedures for utilizing EAC(s) (e.g., purchasing and retiring certificates, reporting claims of energy attributes of the EAC).

Inspection - Things to Physically Look For:

- Observations onsite of the facility's energy use and sources are consistent with the reported EACs used.

4. Does your facility purchase Carbon Offsets?

Answer Yes if: Your facility purchased and retired carbon offsets for the reporting year. If another business entity (e.g., Manufacturing group or brand partner) purchased and retired the offset on behalf of your facility, it must have been registered/retired under your facility's name and location (i.e., legal business entity name and address) as listed on their Higg.org account.

Note: If your facility purchased, but did not retire carbon offsets for the reporting year, you should answer No to this question.

If you answer Yes to this question, you will be asked the following sub questions to provide details on your carbon offsets:

- What was the registry the offset was registered under?
- If Other, please describe.
- How many carbon offsets (in Metric Tons CO2e) were purchased and retired in the reporting year?
- Please upload your purchase invoices or other supporting documents.

Suggested Uploads

- Documentation that demonstrates your facility purchased/retired offsets or that offsets were registered and retired on behalf of your facility in the reporting year (e.g., documentation from the relevant carbon offset registry or scheme that shows the offsets have been used/retired).

What is the intent of the question?

- The intent of this question is for companies to demonstrate that they have purchased and retired carbon offsets in the Higg FEM reporting year.

Technical Guidance:

Carbon offsets are market-based instruments that are designed to lower the amount of GHG in the atmosphere (mainly CO_2). Offsets provide credits that can be purchased and applied to reduce an organization's carbon footprint by accounting for CO_2 emission reductions that occur elsewhere. Carbon offsets fund specific projects that either lower CO_2 emissions, or sequester CO_2, meaning they take some CO_2 out of the atmosphere and store it. Common examples of projects include reforestation, construction of renewable energy infrastructure, carbon-storing agricultural practices, and waste and landfill management.

There are a number of carbon offset schemes that are available globally, and the specific requirements relating to the purchase and use of offsets are typically defined by the jurisdiction or scheme under which they are issued. Several carbon offset schemes are listed below:

- CDM Registry (Clean Development Mechanism) - https://cdm.unfccc.int/about/index.html
- American Carbon Registry (ACR) - https://americancarbonregistry.org/
- Gold Standard Registry - https://www.goldstandard.org/resources/impact-registry
- Climate Action Reserve (CAR) - https://www.climateactionreserve.org/
- Social Carbon Registry - https://www.socialcarbon.org/
- Plan Vivo Registry - https://www.planvivo.org/
- Verified Carbon Standard (VCS) Registry - https://verra.org/programs/verified-carbon-standard/
- Climate, Community, & Biodiversity Standards (CCBS) Registry - https://www.climate-standards.org/ccb-standards/

Carbon Offset projects typically allow users to purchase a specified amount of Carbon equivalents in tonnes (tonnes of CO2e) and are registered in a tracking system as part of the offset scheme. Offsets will have several unique identification and data attributes associated with them such as:

- Project name/type
- A unique identification number or Registry system ID
- Total of carbon offset (in CO2e)

Retiring Carbon Offsets

Once the end user of the offset claims the carbon credit to offset their emission, it is then retired and no longer available to be used. Each carbon offset scheme/registry will have established criteria and/or procedures for the purchase and retirement of offsets that should be followed.

Resources:
Details on specific carbon offset schemes can be found at the links provided above. Additionally, an overview of how offsets can be applied in a GHG accounting program can be found in the GHG Protocol at the link below:

- Greenhouse Gas Protocol – Corporate Standard - https://ghgprotocol.org/corporate-standard

How This Will Be Verified:

This question is unscored.

Documentation Required:

- Documentation to show you have purchased/retired carbon offsets in the reporting year including proof of purchase and any other relevant documentation required by the respective offset scheme to demonstrate the facility's ownership and purchase/retiring of the offset.
- If the offset was purchased by another company (i.e., manufacturing group or brand partner) and retired under the facility's name, documentation must be available to demonstrate that the offset was purchased retired for the specific facility name and location (i.e., legal business entity name and address) as registered on their Higg.org account.
- GHG accounting records that show the facility's GHG emissions and demonstrate that offsets were appropriately accounted for.

Interview Questions to Ask:

- Staff responsible for managing the carbon offsets must be knowledgeable on the respective offset scheme and be able to explain the facility's procedures for utilizing the

offsets (e.g., purchasing and retiring, GHG accounting and inclusion of offsets in GHG reporting).

Inspection - Things to Physically Look For:

- Observations onsite of the facility's energy use and GHG emissions are consistent with the reported offsets used.

5. Does your facility track any of its energy use?

Answer Yes if: Your facility tracks the quantity of energy used for one (1) or more of your energy sources.

Note: If your facility did not track energy use from one (1) or more of your energy sources in the reporting year, you should answer No to this question.

If you answer Yes to this question, you will be asked the following set of questions to provide details on your facility's energy tacking and use.

6. **Does your facility track energy use from each energy source your facility utilizes?**
    - **Answer Yes if**: You track the quantity energy used from all sources at your facility**.**
    - **Answer Partial Yes if:** You track the quantity energy used from least one (1) but not all sources at your facility**.**

If you answer Yes or Partial Yes to the questions above, you will be asked the following questions on energy tracking.

7. **Does your facility identify and track separately energy use in domestic vs. production?**
    - **Answer Yes if**: You track the quantity energy used for domestic use and production use separately.

Note: Energy used for administrative functions (e.g. offices) is categorized as domestic use in the FEM.

If you answer Yes to this question, you will be asked to complete two (2) tables to provide details on your facility's domestic and production energy use for each applicable energy source.

Note: If your facility selects multiple facility types in the facility profile structure section of the FEM (e.g., Finished Product Assembler and Material Production), a separate table for production energy use will be displayed for each selected facility type.

If you answer No to this question, you will be asked to complete a single table to provide details on your facility's total energy use for each applicable energy source.

The following question on your facility's energy use will be asked for each applicable energy source:

- Does your facility use this energy source (for domestic/production use, or in this facility type)?
- Does your facility track its energy use from this source?
- What is the quantity of energy used by this source during this reporting year?
- Unit of Measure
- Which method was used to track this energy source?
- What was the frequency of measurement?
- Provide any additional comments.

Suggested Uploads

- Documentation that demonstrates the facility has identified and is tracking energy consumption for all applicable energy sources. (e.g., an inventory and/or tracking records for energy sources, samples of energy purchase invoices or metering records etc.)

  Note: Uploading of all utility bills is not required, however they should be available for review at the time of verification.

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have identified and track energy use from all energy sources.

Technical Guidance:

Measurement of energy use from all sources is the foundation of energy management and the overall sustainability program for a company. Measurement of all energy sources allows you to identify areas of significant energy use, detect any abnormal consumption, establish energy reduction targets, and calculate GHG emissions.

When establishing your energy tracking and reporting program, start by doing the following:

- Map out business and operational processes to identify sources of energy use.

- **Note:** Energy consumed by facilities or tenants on-site that are NOT owned or controlled by your facility should be excluded from your energy reporting in the Higg FEM.

- Establish procedures to collect and track energy use data:
  - Use utility bills to determine the quantity of purchased electricity, steam, and other sources where applicable.
  - Track other fuels used for onsite energy generation such as diesel in generators and coal in boilers owned or controlled by the facility.
  - Install sub-meters to track the amount of renewable energy generated if renewable energy is generated in-house.
  - If estimation techniques are used to determine energy use, the calculation methodology should be clearly defined and be supported by verifiable data.
- Record tracking data (e.g., daily, weekly, monthly consumption records) in a format that is easy to review [e.g., spreadsheet (e.g., Microsoft Excel) or similar data analytics program that allows export of data in a human readable format (e.g., Excel, csv)] and maintain relevant supporting evidence for review during verification.

Reporting Energy Data in Higg FEM

Note: When reporting energy data in the FEM, Facilities should refer to the "Reporting Energy Use in the FEM for Purchased Electricity, Purchased Renewables, Onsite Renewables and EACs" in the Introduction section of this Guidance.

Before reporting energy data in the FEM, data quality checks should be performed to ensure that the data AND the processes used to collect and record the data are effective at producing accurate energy data.

Do:

- ✓ Review source data (e.g., utility invoices, meter logs, etc) against aggregated totals to ensure it is accurate.
- ✓ Compare the current year with historical data. Any significant changes (e.g., an increase or decrease of over 10%) should be attributable to known changes. If not, further investigation may be warranted.
- ✓ Ensure the most recent and updated versions of data tracking spreadsheets are being used and that all automated calculations/formulas are correct.
- ✓ Ensure the proper units are reported and verify any unit conversions from source data to reported data.
- ✓ Review any assumption or estimation methodology/calculations to ensure accuracy.

✓ Add notes in the "Provide any additional comments" field to describe any data assumptions, estimation methodology, or other relevant comments on the data for a particular source.

Do Not:

X Report data that is not accurate (e.g., the data source is unknown or has not been verified).
X Report estimated data if it is not supported by verifiable and reasonably accurate estimation methodology and data (e.g., engineering calculations).

How This Will Be Verified:

When verifying a facility's energy data, Verifiers **must** review all aspects of the facility's energy tracking program that could produce inaccuracies including:

- The initial data collection processes and data sources (e.g., invoices, on-site meters, metering logs, etc.); and
- The process and tools used to aggregate the data (e.g., spreadsheet calculations, unit conversions, etc.)

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points

Facilities will receive full points for tracking energy use from **all** energy sources.

Documentation Required:

- Documentation that supports the reported energy use data which may include:
    - Energy consumption records (e.g., utility bills, metering records, etc)
        - **Note:** Annual consumption records compiled in a spreadsheet (e.g., Excel) is ok if detailed consumption records are available for review.
    - Energy meter calibration records where applicable (e.g., as per manufacturer's specifications)
    - Documented estimation methodologies if applicable.

Interview Questions to Ask:

- Staff responsible for managing energy are able to explain the facility's energy tracking program (e.g., how energy sources are identified, and energy quantities are tracked).
- Key staff should understand:
    - The procedures in place for tracking energy use.
    - How data quality of the energy use tracking program is maintained.
    - Any estimation methodologies used to calculate annual energy use.

Inspection - Things to Physically Look For:

- All energy sources observed are properly identified and tracked.
- Appropriate equipment for energy use measurement (e.g., meters) if applicable.

Partial Points

- Partial Points will be awarded if energy use from at least one (1) energy source is tracked in full.

8. Does your facility track energy/fuel use from each energy/fuel source of company owned and controlled vehicles that your facility utilize?

Answer Yes if: Your facility tracks the quantity of energy/fuel consumption for all energy sources used for company owned and controlled vehicles.

Answer Partial Yes if: Your facility tracks the quantity of energy/fuel used for at least one (1), but not all your energy sources used for company owned and controlled vehicles.

If you answer Yes or Partial Yes to this question, you will be asked to complete a table with the following questions to provide details on your facility's energy/fuel use for each applicable energy source:

- Does your facility track its energy/fuel use from this source?
- What quantity of energy/fuel is used by this source during this reporting year?
- Unit of Measure
- Which method was used to track this energy/fuel source?
- Provide any additional comments.

Note: If your facility uses fuels for vehicles onsite, you **should not** report the energy use in this question unless it has been subtracted from the facility's overall energy use for the respective energy source reported in the overall facility energy consumption data in the question(s) above.

Suggested Uploads

- Documentation that demonstrates the facility has identified and is tracking energy/fuel consumption energy sources used for company owned and controlled vehicles. (e.g., an inventory and/or tracking records for energy/fuel use, samples of energy purchase invoices or metering records etc.)

Note: Uploading of all energy/fuel purchase bills is not required, however they should be available for review at the time of verification.

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have identified and track energy/fuel consumption for all energy sources used for company owned and controlled vehicles.

Technical Guidance:

Measurement of energy/fuel use for company owned and controlled vehicles is an important part of understanding your facility's energy and carbon footprint. It also allows you to identify areas of significant energy use, detect any abnormal consumption, establish energy reduction targets, and calculate GHG emissions.

Note: The principles and technical guidance provided for the Higg FEM question above "Does your facility track any of its energy use?" should also be applied for tracking energy/fuel use for company owned and controlled vehicles.

How This Will Be Verified:

When verifying a facility's energy data, Verifiers **must** review all aspects of the facility's energy tracking program that could produce inaccuracies including:

- The initial data collection processes and data sources (e.g., invoices, on-site meters, metering logs, etc.); and
- The process and tools used to aggregate the data (e.g., spreadsheet calculations, unit conversions, etc.)

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points

Facilities will receive full points for tracking energy/fuel use from **all** energy sources used for company owned and controlled vehicles.

Documentation Required:

- Documentation that supports the reported energy/fuel use data which may include:
    - Energy consumption records (e.g., energy/fuel purchase invoices, metering records, etc)
        - **Note:** Annual consumption records compiled in a spreadsheet (e.g., Excel) is ok if detailed consumption records are available for review.

- Documented estimation methodologies if applicable.

Interview Questions to Ask:

- Staff responsible for managing energy are able to explain the facility's energy/fuel use tracking program for company owned and controlled vehicles (e.g., how energy sources are identified, and energy quantities are tracked).
- Key staff should understand:
  - The procedures in place for tracking energy/fuel use.
  - How data quality of the energy use tracking program is maintained.
  - Any estimation methodologies used to calculate annual energy/fuel use.

Inspection - Things to Physically Look For:

- All energy/fuel sources used for company owned and controlled vehicles observed are properly identified and tracked.
- Appropriate equipment for energy use measurement (e.g., meters) if applicable.

Partial Points

- Partial Points will be awarded if energy/fuel use from at least one (1) energy source for company owned and controlled vehicles is tracked.

Energy & GHG - Level 2

9. Has your facility set a baseline for any of its energy use?

Answer Yes if: Your Facility has set a baseline for one (1) or more energy sources.

If you answer Yes to this question, you will be asked to complete a series of tables with the following questions to provide details on your baselines for each applicable energy source (All applicable energy sources will be pre-populated in the tables):

10. Which energy source does your facility set baseline on?

- Have you set a baseline for this energy source?
- Is this a normalized or absolute baseline?
- If normalized, are you setting separate baselines based on your facility type?
  - **Note**: If your facility selected multiple facility types in the facility profile structure section of the FEM (e.g., Finished Product Assembler and Material Production), and you set baselines for each facility type, a separate table for baseline data will be displayed for each selected facility type.

For all energy sources that have baselines, you will be asked to complete a table with the following questions based on whether the baseline is absolute or normalized:

Absolute Baselines	**Normalized Baselines**
What is the baseline quantity for this source?	What is the baseline quantity for this source?
Unit of Measure	Unit of Measure
Enter baseline year	What is your normalized baseline based on?
How was your baseline calculated?	Enter baseline year.
Was the baseline verified?	How was your baseline calculated?
Provide any additional comments	Was the baseline verified?
	Provide any additional comments

Note: From FEM2024 onwards, in the above table, baseline data can be auto populated or manually entered in the following ways:

- New FEM Users: Required to manually input baseline.
- Existing FEM Users without a baseline: Facility can choose to:
    - Enter the baseline manually OR
    - Have the FEM auto populate a baseline based on the data from the previous year's FEM.
- Existing FEM Users with an existing baseline: Baseline will auto populate based on the data from the previous year's FEM.

Suggested Uploads:

- Documentation that supports how the baseline was established for each energy source (e.g., energy use tracking data and production data from the baseline year, supporting calculations or assumptions used to determine the baseline).

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have established baselines for energy use at the facility so that future reduction efforts can be quantified.

Technical Guidance:

A "baseline" is a starting point or benchmark that a facility can use to compare changes over time and quantify any reduction efforts.

Baselines can be absolute or normalized. For example:

- **Absolute**: The total amount of energy consumption for a period of time. (e.g., 1,500,000 kWh per year or purchased electricity in the reporting year)

- **Normalized:** The amount of energy used while making a unit of product (for example, 0.15 kWh per pair of shoes produced).

Note: It is recommended to use the 'Normalized' method to account for operational fluctuations. Normalized baselines provide more accurate and useful comparisons over time.

When establishing a baseline, be sure to do the following:

- Confirm the energy source data is stable, and sufficient to be used to determine a baseline. In the Higg FEM, a baseline should generally comprise of a full calendar year's data.
    - **Note:** If your factory has undergone major structural or operational changes such as acquisition or changes in product type, in general, you should establish or reset a baseline *after* those changes have been completed.
- Determine if the baseline will be Absolute or Normalized (Normalized baselines are preferred)
- Verify the source data and normalizing metrics data is accurate.
    - Energy and production volume data from previous Higg FEM verifications, internal or external audits conducted by qualified personnel are acceptable sources of data verification.
- Apply the appropriate baseline metric (i.e., per year for absolute OR divide by the chosen normalizing metric 1,500,000 kWh per 1,000,000 pieces = 1.5kWh/piece)
    - **Note:** For energy consumption that is not related to production, other normalizing metrics should be used where appropriate (e.g., Natural gas consumption in the canteen can be normalized per meal served or per worker)

Note: If the baseline is used to evaluate performance against a target, the baseline should remain unchanged.

Reporting baseline data in Higg FEM:

Do:

- ✓ Review source data and raw normalizing metric data (utility invoices, meter logs, production quantity, etc.) against aggregated totals used to determine the baseline(s) to ensure they are accurate. (e.g., double check monthly energy consumption records to ensure they match the annual consumption quantities used to calculate the baseline).
- ✓ Select the appropriate baseline type in the FEM - Absolute or Normalized.
- ✓ Ensure the proper units are reported and verify any unit conversions from source data to reported data.
- ✓ Enter the baseline year. This is the year the baseline data represents.
- ✓ Provide sufficient details on how the baseline was calculated (e.g., electricity consumption was normalized per meter of fabric produced).

✓ Only select Yes to the question "Was the baseline verified?" if the baseline data was fully verified in a previous Higg FEM verification, or by an internal or external audit conducted by qualified personnel.

Do Not:

X Report a baseline that is not accurate (e.g., the data source is unknown or has not been verified)
X Report a baseline that is based on insufficient data (e.g., not a full year's data).
X Report an estimated baseline if it is not supported by verifiable and accurate estimation methodology and data (e.g., engineering calculations).

How This Will Be Verified:

When verifying a facility's baselines, Verifiers **must** review:

- All source data (utility invoices, metering logs, production quantity) and aggregated data totals for the baseline year; and/or
- Records of baseline data verification where available (e.g., previous Higg Verification, data quality review, internal or external audits, etc.)

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points:
Full Points will be awarded if the facility has established baselines for all energy sources.

Documentation Required:
- Documentation that supports how the baseline was established for each energy source. This may include:
    - Energy use tracking and production data from the baseline year.
    - Supporting calculations methodologies or assumptions used to determine the baseline.
- Supporting evidence to demonstrate how baseline data was validated (e.g., verified Higg FEM data for the baseline year, external or internal data validation process or report).

Interview Questions to Ask:
- Staff responsible for energy management are able to describe how the baselines were determined including any normalizing metrics used or any assumption made in the calculation methodology.
- Relevant staff are able to describe the facility's process to validate the accuracy of baseline data.

Inspection – Things to Physically Look For:

- The observed energy management practices on-site are consistent with the facility's reported methods for determining baselines (e.g., energy sources used, energy tracking methods/equipment, etc.)
- Observations on-site do not indicate that there have been significant changes at the facility that could impact the appropriateness of the baseline (e.g., new production areas, changes to products, new buildings, etc.)

Partial Points:

- Partial points will be awarded if the facility has established baselines for one (1) or more energy source.

11. Does your facility know what facility processes or operations use the most energy?

Answer Yes if: Your facility tracks the quantity of energy used at the facility and has established methodology to determine which processes or operations use the most energy at the facility.

If you answer Yes to this question, you will be asked to complete the following sub questions to provide details on the processes or operations that used the most energy at your facility:

- Does your facility utilize any of these to help you identify? (Select all that apply)
    - Identifying individual machines that consume energy by creating a machinery list.
    - Analyzing the power ratings of equipment multiplied by the hours of operation to estimate energy use.
    - Installing electronic devices to track energy usage over time (e.g., data loggers, data recorders, or sub-meters)
    - Hiring a certified professional energy engineer to conduct an energy assessment.
    - Consolidating the energy consumption per manufacturing process/ machine type and sort them from highest consumption to lowest consumption.
    - Other
    - What quantity of energy/fuel use by this source during this reporting year?
    - Unit of Measure
- Please upload the methodology for identifying the highest energy use factors.
- If you do not have a document to upload, describe your methodology.
- What are the highest energy use factors at your facility?

Suggested Uploads

- Documentation that demonstrates the facility's methodology for determining the processes or operations that use the highest amount of energy. (e.g., energy consumption data that shows which equipment, processes, or operations that consume the most energy, copies of an energy audit/assessment conducted by an internal or external energy management specialist, etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have collected and analysed sufficient energy use data to determine which processes or operations consume the most energy at the facility.

Technical Guidance:

For sustainability efforts to mature, facilities should have processes in place to identify and rank their most significant energy consuming operations or processes (e.g., specific production processes, lighting, HVAC, boilers, etc.). Once a facility understands what operations or processes consume the most energy, it can strategically reduce energy consumption by prioritizing and targeting those operations or processes or replacing the energy source with renewable energy.

A facility can evaluate the highest energy consuming processes and operations by conducting a facility-wide assessment to map out and evaluate energy use from all production processes, equipment and operations.

When evaluating the energy use breakdown of processes and operations at your facility, the following are some key considerations:

- Identify individual equipment that consume energy by creating an equipment inventory list.
- Use manufacturers specifications (e.g., power usage ratings) and operating time to estimate energy use.
- Install electronic devices to track energy usage over time (e.g., energy meters or sub-meters, data loggers, etc.)
- Consolidate the energy consumption per process/ machine type and sort them from highest consumption to lowest consumption.
- Consider using external service providers to conduct an energy audit/assessment (e.g., a certified energy professional/engineer).

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that shows the facility has analysed a breakdown of energy use at the facility by equipment, process and/or operations that identifies the highest energy use factors at the facility. This may include:
    - Equipment list with energy use rating for equipment.

- Energy consumption data based on facility operations for all equipment, process and/or operations.
- Manufacturers specifications with energy use ratings for facility equipment (if used to calculate energy consumption)
- Energy audit/assessment report(s) conducted by an internal or external energy management specialist conducted within the past 5 years.

Note: If the facility has undergone any significant changes (e.g., new processes/equipment, expansion, etc.) the analysis and ranking of highest energy use factors should reflect the facilities operations in the Higg FEM reporting year.

Interview Questions to Ask:

- Staff responsible for energy management are able to describe how energy use from equipment, process and/or operations was analysed and the methodology for determining the highest energy use factors at the facility.

Inspection – Things to Physically Look For:

- The observed energy use and equipment, process and operations on-site are consistent with the facility's reported methodology for determining the highest energy use factors at the facility (e.g., energy metering or submetering)
- Observations on-site do not indicate that there have been significant changes at the facility that could impact the appropriateness of the energy use analysis.

Partial Points: N/A

12. Has your facility set targets for improving energy use?

Answer Yes if: Your facility has set a target to improve energy use for one (1) or more energy sources.

Note: If your facility has not conducted a formal evaluation of energy improvement opportunities and calculated how much energy consumption can be reduced to support your target, you should select No for this question.

If you answer Yes to this question, you will be asked to complete a series of tables with the following questions to provide details on your targets for each applicable energy source (All applicable energy sources will be pre-populated in the tables):

13. Which energy source does your facility set targets on?

- Have you set a target for this energy source?
- Is this a normalized or absolute target?
- If normalized, are you setting separate targets based on your facility type?
    - **Note**: If your facility selected multiple facility types in the facility profile structure section of the FEM (e.g., Finished Product Assembler and

Material Production), and you set targets for each facility type, a separate table for target data will be displayed for each selected facility type.

For all energy sources that have targets, you will be asked to complete a table with the following questions based on whether the target is absolute or normalized:

Absolute Targets	**Normalized Targets**
What is your target for change (in %) in energy use from this source? (Enter negative value for reduction target or positive value for increased target)	What is your target for change (in %) in energy use from this source? (Enter negative value for reduction target or positive value for increased target)
Enter the Intermediate and/or final target year.	What is your normalized target based on?
Describe the measures planned to achieve this target	Enter the Intermediate and/or final target year.
	Describe the measures planned to achieve this target

Suggested Uploads:

- Documentation that supports how the target was established and demonstrates the target is based on a formal evaluation of improvement opportunities (e.g., energy use data and baselines, new/proposed equipment specifications or work practices, plans to utilize renewable energy, etc.)

What is the intent of the question?
The intent of this question is for facilities to demonstrate that they have established formal targets to improve energy use at the facility.

Technical Guidance:
Targets can use absolute or normalized metrics to drive quantifiable improvements by a set date compared to the baseline. For Higg FEM, reduction targets may be normalized to the production volume unit or another appropriate operational metric. A normalized target shows you when progress is real, rather than being a result of business changes such as reductions in production. An example of a normalized target is kWh of energy used to produce one kilogram of sellable product (kWh/kg).

When establishing formal improvement targets, be sure to do the following:

- Base the target on a formal evaluation of improvement opportunities and actions (e.g., equipment replacement or upgrades) to calculate the amount of energy that can be reduced.
    - For example: Setting a target based on an evaluation of a boiler replacement that is expected to provide a 10% reduction in annual energy consumption per piece that was calculated based on a formal review of the boiler manufacturer's specifications and the expected operating load.

- Define the exact target quantity, expressed as a percent (e.g., reduce normalized electricity consumption per piece by 5%). This **must** be based on a formal evaluation as noted above.
- Determine if the target will be Absolute or Normalized to a production or operating metric.
- Define the start date (i.e., "baseline") of the target.
- Define the end date of the target, meaning the intended completion date of the required improvements.
- Define the appropriate measurement units.
- Establish procedures to review the target. This review should include an evaluation of the actions taken and progress on reaching the defined target. Quarterly reviews are recommended.
- Ensure the target is relevant to reducing the site's energy use (e.g., focuses on the most significant energy use factors at the site)

Reporting Targets in Higg FEM:

Do:

- ✓ Review the target to ensure all aspects noted above are covered and that the information is accurate.
- ✓ Enter the targeted reduction or improvement as a percentage. **Make sure to enter a negative percentage for a reduction target (e.g., -5 for a 5% reduction), and a positive percentage for an increased usage target (e.g., 5 for a 5% increase in usage).**
- ✓ Provide sufficient details on how the target will be met in the "Describe the measures planned to achieve this target:" field (e.g., Achieve a 3% reduction in normalized electricity consumption by replacing 500 T8 lights with LED lights).

Do Not:

- X Report a target that is not accurate (e.g., the data source is unknown or has not been verified)
- X Report a target that is based on insufficient data. (e.g., a reduction target that is not based on a formal evaluation of options such as equipment upgrades to meet the stated target OR actions to meet the target have not been defined.)
- X Report an estimated target if it is not supported by verifiable and accurate estimation methodology and data (e.g., engineering calculations).

How This Will Be Verified:

When verifying a facility's targets, Verifiers **must** review:

- All supporting evidence (e.g., calculations, energy use and baselines, new/proposed equipment specifications, etc) to verify the target is based on a formal evaluation of improvement opportunities.
- Facility operations in relation to its energy sources and use to ensure targets and opportunities evaluated are relevant to the site's energy use.

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points:
Full Points will be awarded if the facility has established targets for all energy sources and the targets cover greater than 90% (by total energy use in MJ) of energy used at the facility.

Documentation Required:
- Documentation that supports how the target was established for each energy source and are based on a formal evaluation of reduction opportunities. This may include:
    - Energy tracking and production data.
    - Documented evaluations of new/proposed equipment specifications, modifications to production processes or work practices that will result in energy use improvements.
    - Supporting calculations methodologies or assumptions used to determine the target.

Interview Questions to Ask:
- Staff responsible for energy management are able to describe how the targets were determined including any calculations or assumptions made in the target setting methodology.
- Relevant staff are able to describe the facility's proposed actions to achieve the target and how progress is monitored and tracked.

Inspection – Things to Physically Look For:
- The observed energy management practices on-site are appropriate in relation to the established targets (e.g., energy sources and tracking of energy use, etc.)

Partial Points:
- Partial points will be awarded if the facility has established targets for one (1) or more energy source and the targets cover 50% to 89% (by total energy use in MJ) of energy used at the facility.

14. Has your facility set targets for reducing your facility overall Scope 1 and Scope 2 GHG emissions?

Answer Yes if: Your facility has calculated your Scope 1 and 2 GHG emissions to establish as baseline and set a target to reduce Scope 1 and 2 GHG emissions.

Note: If your facility has not calculated your Scope 1 and 2 GHG baselines or conducted a formal evaluation of GHG reduction opportunities and calculated how much GHG emissions can be reduced to support your target, you should select No for this question.

If you answer Yes to this question, you will be asked to complete the following questions to provide details on your GHG reduction target:

- What is your overall GHG emission baseline quantity (in Metric Tons of CO2e)?
- What is your baseline year?
- What is your target for reducing your facility's overall GHG emissions (in Metric Tons CO2e) for Scopes 1 and 2?
- What is your target year?
- What is your target for change (in %)? (Enter negative value for reduction target or positive value for increased target)
- Is this a normalized or absolute target?
- Describe the measures planned to achieve this target.

Suggested Uploads:

- Documentation that supports how the target was established and demonstrates the target is based on a formal evaluation of GHG reduction opportunities (e.g., GHG emission data and baselines, plans to utilize energy sources with lower GHG emissions, new/proposed equipment specifications, etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have established formal targets to reduce Scope 1 and 2 GHG Emissions from the facility.

Technical Guidance:

For this question in the FEM, the focus is on targets to reduce GHG emissions from Scope 1 and 2 sources which are defined by the GHG Protocol Corporate Standard below. Emissions from Scope 3 GHG sources (e.g., business travel, purchased services, or materials, etc.) should not be included.

- **Scope 1 Emissions** - Direct emissions from owned or controlled sources (e.g., combustion of fuel in onsite boilers, generators, company vehicles).
- **Scope 2 Emissions** - Indirect emissions from the generation of purchased energy (e.g., purchased electricity or steam).

Targets can use absolute or normalized metrics to drive quantifiable improvements by a set date compared to the baseline. For Higg FEM, reduction targets may be normalized to the production volume unit or another appropriate operational metric. An example of a normalized target is kilograms of CO2e released during production of one kilogram of sellable product (kg CO2e/unit)

When establishing formal improvement targets, be sure to do the following:

- Base the target on a formal evaluation of improvement opportunities and actions (e.g., switching to cleaner fuels).
    - For example: Setting a target based on an evaluation of a boiler replacement that is expected to provide 10% reduction in annual GHG emission that was calculated based on a formal review of the boiler manufacturer's specifications and the expected operating load.
- Define the exact target quantity, expressed as a percent (e.g., reduce normalized GHG emissions (kg of CO2e/unit) by 4%). This **must** be based on a formal evaluation as noted above.
- Determine if the target will be Absolute or Normalized to a production or operating metric.
- Define the start date (i.e., "baseline") of the target.
- Define the end date of the target, meaning the intended completion date of the required improvements.
- Define the appropriate measurement units.
- Establish procedures to review the target. This review should include an evaluation of the actions taken and progress on reaching the defined target. Quarterly reviews are recommended.
- Ensure the target is relevant to reducing the site's overall GHG emissions (e.g., focuses on the highest GHG emissions sources at the site)

Reporting Targets in Higg FEM:

Do:

- ✓ Review the target to ensure all aspects noted above are covered and that the information is accurate.
- ✓ Enter the targeted reduction or improvement as a percentage. **Make sure to enter a negative percentage for a reduction target (e.g., -5 for a 5% reduction).**
- ✓ Select the appropriate target type in the FEM - Absolute or Normalized.
- ✓ Provide sufficient details on how the target will be met in the "Describe the measures planned to achieve this target:" field (e.g., Reduce normalized GHG emissions (Tons of CO2e/unit) by 15% by switching to natural gas-fired boilers).

Do Not:

- X Report a target that is not accurate (e.g., the data source is unknown or has not been verified)
- X Report a target that is based on insufficient data (e.g., a reduction target that is not based on a formal evaluation of options such as equipment upgrades/switching fuel sources to meet the stated target OR actions to meet the target have not been defined.)
- X Report an estimated target if it is not supported by verifiable and accurate estimation methodology and data (e.g., engineering calculations).

How This Will Be Verified:

When verifying a facility's GHG reduction targets, Verifiers **must** review:

- All supporting evidence (e.g., calculations, GHG inventories and baselines, new/proposed equipment specifications, etc) to verify target is based on a formal evaluation of improvement opportunities.
- Facility operations in relation to its GHG emissions to ensure targets and opportunities evaluated are relevant to the site's GHG emissions.

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points:

Documentation Required:

- Documentation that supports the facility's GHG baseline and how the target was established and is based on a formal evaluation of GHG reduction opportunities. This may include:
    - Scope 1 and 2 GHG emission tracking and baseline data.
    - Documented evaluations of new/proposed equipment specifications, plans to utilize energy sources with lower GHG emissions, modifications to production processes or work practices that will result in GHG emissions reductions.
    - Supporting calculations methodologies or assumptions used to determine the target.

Interview Questions to Ask:

- Staff responsible for energy/GHG management are able to describe how the facility's Scope 1 and 2 GHG baselines was established and how GHG reduction targets were determined including any calculations or assumptions made in the target setting methodology.
- Relevant staff are able to describe the facility's proposed actions to achieve the target and how progress is monitored and tracked.

Inspection – Things to Physically Look For:

- The observed energy/GHG management practices on-site are appropriate in relation to the established targets (e.g., energy sources and tracking of energy use and GHG emissions, etc.)

Partial Points: N/A

15. Does your facility have an implementation plan to improve energy use and/or GHG Emissions?

Answer Yes if: Your facility has a current documented plan with defined actions that your facility is planning to implement to improve energy use and/or GHG emissions.

If you answer Yes to this question, you will be asked to upload a copy of your implementation plan.

Suggested Uploads:

- A copy of the implementation plan that includes details of the specific actions the facility plans to take to improve energy use and/or GHG emissions implementation timelines.
- Documentation to support the calculated energy use or GHG emissions reductions from actions listed in the plan (e.g., specification from new equipment, process modifications, etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have identified and evaluated energy use improvements and/or GHG emissions reduction opportunities and have established formal plans with defined actions to improve energy use and/or GHG emissions from the facility.

Technical Guidance:

Creating an implementation plan includes the process of reviewing and evaluating available options to improve energy use and/or GHG emissions. The key steps of creating an implementation plan should include the following:

- Identify improvement opportunities through internal assessment by qualified personnel or third-party experts.
- Evaluate improvement options to determine the most suitable options (e.g., feasibility studies, cost benefit analyses)
- Approve funds/budget for chosen options.
- Create a timeline and define the actions needed to implement the solution and realize reductions.
- Conduct regular reviews of the implementation plan check on progress.

Some examples of actions that can results in energy use and/or GHG emissions improvements include:

- Generating and or utilizing energy sources that result in lower GHG emissions (e.g., renewables, alternative fuels).
- Heat/energy recovery (from hot water, steam, exhaust gases)
- Steam condensate collection & recovery
- Optimizing compressed air systems
- Insulating piping
- Energy efficient lighting

Resources:
Additional resources with examples of opportunities to reduce GHG emissions and an implementation plan template that can be used are provided below:

- Apparel Impact Institute - Clean by Design: https://apparelimpact.org/news-resources/?category=clean-by-design
- Implementation plan template: https://howtohigg.org/resources/resources-library/#templates

How This Will Be Verified:

Full Points:

Documentation Required:

- An implementation plan that includes details of the specific actions the facility plans to take to improve energy use and/or GHG emissions. This may include:
    - Documentation of the energy consumption or GHG emissions specifications or calculated emissions estimates from proposed new equipment or alternative energy sources included in the implementation plan that show the expected improvements.
    - Implementation timelines (i.e., the planned start and completion dates for actions listed in the plan).

Notes:

- Actions to improve energy use and/or GHG emissions should not consider improvements due to reductions in production volume or equipment operating time as these factors will not result in sustainable improvements.
- If the facility has completed all actions in the plan prior to reporting year and does not have an implementation plan for improvements in the reporting year and beyond, a No response should be selected (i.e., points are not awarded for historical plans that were implemented prior to the reporting year).

Interview Questions to Ask:

- Staff responsible for the implementation plan can explain the facility's process for evaluating improvement opportunities and the facility's implementation plans and actions to improve energy use and/or GHG emissions.

Inspection - Things to Physically Look For:

- The actions listed in the implementation plans directly relate to the observed energy use and GHG emission sources onsite.

Partial Points: N/A

16. Has an energy audit been conducted at your facility within the last 5 years?

Answer Yes if: Your facility has conducted an energy audit within the past five (5) years that was performed by a qualified (internal or external) energy professional (e.g., a certified energy professional/engineer).

Note: The 5 year timeline should be counted based on the Higg FEM reporting year. For example, for FEM 2024 (which reports environmental data from 2024), the energy audit must have been conducted in or after 2019. This is based on the year not the date of the energy audit report or Higg FEM Verification.

If you answer Yes to this question, you will be asked to upload a copy of your energy audit report.

Suggested Uploads

- Copy the energy audit report.

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have conducted an energy audit within the past five (5) years that was performed by a qualified (internal or external) energy professional (e.g., a certified energy professional/engineer).

Technical Guidance

An energy audit is a systematic review of a facility's energy use to identify areas of inefficiency and opportunities for improvement. An energy audit uses the principles of effective energy management systems and audit processes, such as ISO50001 and ISO50002 to help identify inefficiencies and define energy strategies for reducing energy consumption and operating costs. An energy audit must be conducted by qualified individuals that understand the various equipment, processes, and energy systems used within a facility and have the technical knowledge to identify and recommend improvements for overall energy systems performance.

In general, an energy audit report should include the key aspects listed below:

- An energy analysis (e.g., energy balance of a facility to determine energy consumption, demand, and profile of energy use)
- Proposal and recommendations on energy efficiency improvements
- Detailed information feasibility and justification for investment in energy efficiency measures (e.g., cost benefit analysis, estimated return on investment, etc.)

Resources:

Resources that provide additional information on energy auditing are provided below.

Note: The resources and examples provided below are for informational purposes only and do not constitute an endorsement by the SAC.

- ISO 50002:2014 Energy audits - Requirements with guidance for use: https://www.iso.org/standard/60088.html
- EU Standard EN 16247-1 Energy audits - Part 1: General requirements https://www.en-standard.eu/din-en-16247-1-energy-audits-part-1-general-requirements/
- US EPA Lean & Energy Toolkit: Chapter 4 – Energy and Greenhouse Gas Assessment Strategies - https://www.epa.gov/sustainability/lean-energy-toolkit-chapter-4
- Association of Energy Engineers - https://www.aeecenter.org/

How This Will Be Verified:

Full Points:

Documentation Required:

- Copy of an energy audit report that meets the following criteria:
  - Conducted within the past five (5) years from the Higg FEM reporting year.
    - For example, for FEM 2024 (which reports environmental data from 2023), the energy audit must have been conducted in or after 2018.
  - Was performed by a qualified (internal or external) energy professional (e.g., a certified energy professional/engineer).
- If conducted internally, documentation to support the qualifications of internal staff who performed the audit (e.g., professional energy auditor certification or accreditation).

Interview Questions to Ask:

- Staff conducting or coordinating the energy audit understand the contents of the report and can explain the facility's process for coordinating or conducting the energy audit (internally or externally).

Inspection - Things to Physically Look For:

- The contents of the audit report are consistent with the observed energy sources and use onsite.

Partial Points: N/A

17. Does your facility have a plan to phase-out Coal?

Answer Yes if: Your facility has a current documented plan with defined actions that your facility is planning to implement to phase-out the use of coal.

Note: This question is only applicable to facilities that have selected coal or coal water slurry as energy sources.

If you answer Yes to this question, you will be asked the following questions to provide details on your coal phase-out plan:

- Have you done any financial analysis/cost impact to replace Coal as an energy source?
- What is your plan and what are your steps to phase-out?
- Please upload your plan and financial analysis
- What is your final date to complete your Coal phase-out?

Suggested Uploads:

- A copy of the phase-out plan that includes details of the specific actions the facility plans to take to phase-out coal use.
- Other documentation supporting the plan (e.g., financial analysis of replacing coal, new/proposed equipment specifications, etc)

What is the intent of the question?
The intent of this question is for facilities to demonstrate that they have evaluated options to phase out coal and have established formal plans with defined actions to phase-out coal use at the facility.

Technical Guidance:
Eliminating the use of coal and transitioning to cleaner energy sources is a key goal of many international initiatives to reduce GHG emissions and combat climate change. Facilities that currently use coal as an energy source are encouraged to proactively seek cleaner energy alternatives to support this goal.

Creating an implementation plan includes the process of reviewing and evaluating available options to improve energy use and/or GHG emissions. The key steps of creating an implementation plan should include the following:

- Identify available options to phase-out coal use through internal assessment by qualified personnel or third-party experts.
- Evaluate phase-out options to determine the most suitable options (e.g., feasibility studies, cost benefit analyses)
- Approve funds/budget for chosen options.
- Create a timeline and define the actions needed to phase out coal use.
- Conduct regular reviews of the implementation plan check on progress.

How This Will Be Verified:

Full Points:
Full points will be awarded if the facility has a documented coal phase-out plan that includes the following:

- A list of defined steps or actions that the facility plans to take to phase-out coal use.
- A financial analysis of the options/action needed to phase-out coal use.
- A targeted date to complete the phase-out.

Documentation Required:

- A copy of the phase-out plan that includes details of the specific actions the facility plans to take to phase-out coal use.
- Other documentation supporting the plan (e.g., financial analysis of replacing coal, new/proposed equipment specifications, etc)

Interview Questions to Ask:

- Staff responsible for the phase-out plan can explain the facility's process for evaluating phase out options and the facility's planned actions to phase-out coal use.

Inspection - Things to Physically Look For:

- The actions listed in the plans are consistent with the observed coal use onsite.

Partial Points: N/A

18. Has your facility improved energy consumption compared with its baseline in the reporting year?

Answer Yes if: Your Facility has improved energy consumption for one (1) or more of your energy sources compared with your baseline.

Note: Improvements in energy consumption due to reductions in production volume should not be considered as improvements as this will not result in sustainable improvements.

If you answer Yes to this question, you will be asked to complete a table with the following questions to provide details on your consumption improvements for each applicable energy source:

- This is your reported baseline quantity.
- This is your reported unit of measure.
- This is your reported baseline year.
- **Note**: The above data will be auto-populated in the table based on your reported baseline data.
- Has your facility improved energy consumption for this source compared with its baseline?
- What is your achievement for change (in %) in energy use from this source compared to its baseline? (Enter a negative value for reduction and a positive value for increase
- Describe the strategies used to achieve this improvement.

Note: If your facility selected multiple facility types in the facility profile structure section of the FEM (e.g., Finished Product Assembler and Material Production), a separate table for improvement data will be displayed for each selected facility type.

Suggested Uploads:

- Documentation that supports an energy consumption improvement was achieved and that the improvement was related to specific actions taken by the facility to improve energy use (e.g., energy consumption data and baselines, evidence of process modifications, new equipment or work practices or increases in cleaner/renewable energy use that resulted in improvements).

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have improved energy consumption at the facility.

Technical Guidance:

Improvements can be absolute or normalized, however it is recommended that you show normalized reductions such as “electricity used was reduced by 0.015 kWh/unit in the reporting year.” .

When evaluating your energy improvements, be sure to do the following:

- Review the energy source data and aggregated total to ensure the data and any automated calculations are accurate.
- Review the actions taken to make improvements and determine if they have resulted in measurable improvements by comparing the data with historical energy use data to determine the improvement quantity. **Note:** Historical data accuracy should also be verified.
    - For example: Optimizing the facility’s compressed air system and reducing the operating pressure by 5psi produced a 5.3% year over year reduction in energy consumed by air compressors on-site or a 1.5% reduction in energy consumed per

unit of production. This was measured by the sub-meters installed in compressor rooms.

Reporting Improvements in Higg FEM:

Do:

- ✓ Review the improvement data to ensure all aspects noted above are covered and that the information is accurate.
- ✓ Input the percent (%) change in the energy consumption from the baseline year. (e.g., -5 for a 5% reduction or 5% for a 5% increase)
- ✓ Provide sufficient details in the "Describe the strategies used to achieve this improvement:" field (e.g., Normalized electricity consumption was reduced by optimizing the facility's compressed air system).

Do Not:

- X Report improvements that are not accurate (e.g., the data source is unknown or has not been verified)
- X Report an improvement that is absolute and relates to a decrease in production or reduced facility operations. This is why data normalization is important.
- X Report an improvement that is based on insufficient data. (e.g., an overall reduction was achieved but this was not related to measurable or defined actions taken to achieve the reduction). This is particularly important when the improvements are marginal (e.g., less than 1-2%) and possibly attributable to measurement/ tracking errors and/or operational variability.

How This Will Be Verified:

When verifying a facility's improvements, Verifiers **must** review:

- All supporting evidence (e.g., energy use data and baselines, etc.) to verify the reported improvement quantity is accurate and attributable to measurable actions taken to improve energy use.
- The implemented changes or actions taken to achieve the improvements.

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points:

Full Points will be awarded if the facility has reduced/improved? energy consumption compared with the baseline quantity **and** achieved year over year improvements for all energy sources.

Note: Points are automatically calculated in the Higg FEM and awarded for an improvement of any amount (i.e., scoring is not based on the amount of the improvement achieved).

Documentation Required:

- Documentation that demonstrates improvements were achieved for each applicable energy source and result from specific actions taken by the facility to improve energy consumption. This may include:
    - Energy tracking data showing improvements in energy consumption.
    - Documented evidence of facility actions to improve energy consumption (e.g., evidence of process modifications, new equipment or work practices or increases in cleaner/renewable energy use that resulted in improvements).
    - Supporting calculations methodologies or assumptions used to determine the improvements.

Interview Questions to Ask:

- Staff responsible for energy management are able to describe how improvements were achieved including any calculations or assumptions made determining the improvements.

Inspection – Things to Physically Look For:

- Onsite observations that indicate the facility has implemented the noted actions to improve energy consumption (e.g., process modifications, new equipment or work practices or increases in cleaner/renewable energy use).

Partial Points:

- Partial Points will be awarded if the facility has achieved improvements in energy consumption compared with the baseline quantity **or** achieved year over year improvements for one (1) or more energy sources.

19. Has your facility reduced your facilities overall Scope 1 and Scope 2 GHG emission compared with its baseline in the reporting year?

Answer Yes if: Your Facility has reduced Scope 1 and 2 GHG emissions in the reporting year compared with your baseline.

Notes:

- Reductions attributed to phase out or reductions in refrigerant emission (i.e., Replacement of high GWP refrigerants with more sustainable alternatives) can be included in this question.

- Reductions in GHG emissions due to reductions in production volume should not be considered as improvements as this will not result in sustainable improvements.

If you answer Yes to this question, you will be asked to complete the following questions to provide details on your GHG reductions:

- Your reported overall GHG emissions baseline quantity (in Metric Tons CO2e)
- Your reported baseline year
- **Note**: The above data will be auto-populated in the table based on your reported baseline data.
- How much (in Metric Tons CO2e) have you reduced in this reporting year compared to its baseline?
- Is this a normalized or absolute reduction?
- Please describe the strategies used to achieve this improvement.

Suggested Uploads:

- Documentation that supports GHG reductions were achieved and that the reduction was related to specific actions taken by the facility to reduce GHG emissions (e.g., GHG emission data and baselines, evidence of process modifications, new equipment or increases in cleaner/renewable energy use that resulted in reductions).

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have reduced Scope 1 and 2 GHG emissions from the facility.

Technical Guidance:

Reductions can be absolute or normalized, however it is recommended that you show normalized reductions such as "GHG emissions were reduced by 0.005 Tons of CO2e/unit in the reporting year.".

When evaluating your GHG emission reductions, be sure to do the following:

- Review the GHG source data and aggregated totals to ensure the data and any automated calculations are accurate.
- Review the actions taken to make improvements and determine if they have resulted in measurable improvements by comparing the data with historical GHG emission data to determine the improvement quantity. **Note:** Historical data accuracy should also be verified.
    - For example: Switching to natural gas fired boilers from coal boilers reduced GHG emissions by 5,000 Tons of CO2e compared with the previous year.

Reporting Improvements in Higg FEM:

Do:

- ✓ Review the improvement data to ensure all aspects noted above are covered and that the information is accurate.
- ✓ Input the amount of GHG emissions reduced in metric tons of CO2e.
- ✓ Provide sufficient details in the "Describe the strategies used to achieve this improvement:" field (e.g., Normalized GHG emissions reduced by switching to natural gas boilers or utilizing renewable energy sources).

Do Not:

- X Report reductions that are not accurate (e.g., the data source is unknown or has not been verified)
- X Report reduction that is absolute and relates to a decrease in production or reduced facility operations. This is why data normalization is important.
- X Report an improvement that is based on insufficient data. (e.g., an overall reduction was achieved but this was not related to measurable or defined actions taken to achieve the reduction). This is particularly important when the improvements are marginal (e.g., less that 1-2%) and possibly attributable to measurement/ tracking errors and/or operational variability.

How This Will Be Verified:

When verifying a facility's improvements, Verifiers **must** review:

- All supporting evidence (e.g., GHG emission data and baselines, etc.) to verify the reported improvement quantity is accurate and attributable to measurable actions taken to reduce GHG emissions.
- The implemented changes or actions taken to achieve the improvements.

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points:
Full Points will be awarded if the facility has reduced GHG emissions compared with the baseline quantity **and** achieved a year over year reduction in GHG emissions.

Note: Points are automatically calculated in the Higg FEM and awarded for reductions of any amount (i.e., scoring is not based on the amount of the reduction achieved).

Documentation Required:
- Documentation that demonstrates reductions in GHG emissions were achieved and resulted from specific actions taken by the facility to reduce GHG emissions. This may include:
    - GHG emissions tracking data showing reductions.

- Documented evidence of facility actions to reduce GHG emissions (e.g., evidence of process modifications, new equipment or increases in cleaner/renewable energy use that resulted in reductions).
- Supporting calculations methodologies or assumptions used to determine the reductions.

Interview Questions to Ask:

- Staff responsible for energy and GHG management are able to describe how reductions were achieved including any calculations or assumptions made determining the reduction quantity.

Inspection – Things to Physically Look For:

- Onsite observations that indicate the facility has implemented the noted actions to reduce GHG emissions (e.g., process modifications, new equipment or increases in cleaner/renewable energy use).

Partial Points:

- Partial Points will be awarded if the facility has achieved GHG reductions compared with the baseline quantity **or** achieved a year over year reduction in GHG emissions.

Energy & GHG - Level 3

20. Were your facility's annual Scope 3 greenhouse gas (GHG) emissions calculated during this reporting year?

Answer Yes if: Your facility has calculated Scope 3 GHG emissions in the reporting year from all material upstream **and** downstream Scope 3 sources and there is supporting evidence to justify an exclusions based on materiality.

Answer Partial Yes if: Your facility has calculated Scope 3 GHG emissions in the reporting year from all material upstream Scope 3 sources and there is supporting evidence to justify an exclusions based on materiality.

Note: If your facility has not conducted an evaluation to identify all applicable upstream and/or downstream Scope 3 GHG emission sources and calculated the associated GHG emission in accordance with a recognized methodology such as the GHG Protocol Corporate Value Chain (Scope 3) Standard, you should answer No to this question.

If you answer Yes or Partial Yes to this question, you will be asked to complete the following sub questions to provide details on your scope 3 GHG emissions:

- Report your facility's annual Scope 3 GHG emissions in Metric Tons CO2e here:

- Please describe your Scope 3 calculation

Suggested Uploads:

- Documentation that supports your calculation of scope 3 GHG emissions in the reporting year (e.g., Scope GHG emission totals, inventory of scope 3 sources with associated operational data and emission factors used, etc.).

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have identified and calculated scope 3 GHG emissions.

Technical Guidance:

Calculating Scope 3 emissions associated with a facility's operations is particularly important for the manufacturing industry because it provides insights on the environmental impact associated with the manufacturing and consumption of a product including upstream and downstream operations. All relevant upstream and downstream business activities (except in-house manufacturing) should be captured to calculate the Scope 3 footprint.

The GHG Protocol Corporate Value Chain (Scope 3) Standard allows companies to assess the emission impact of its entire value chain. The Scope 3 standard focuses on the following:

- Upstream emissions which are indirect GHG emissions related to purchased or acquired goods and services.
- Downstream emissions which are indirect GHG emissions related to sold goods and services.

In the Standard, upstream and downstream sources are further subdivided into 15 main categories as follows:

Upstream Scope 3 Emission Sources	1. Purchased goods and services 2. Capital goods 3. Fuel- and energy-related activities (Not included in scope 1 or scope 2) 4. Upstream transportation and distribution 5. Waste generated in operations 6. Business travel 7. Employee commuting 8. Upstream leased assets
Downstream Scope 3 Emission Sources	9. Downstream transportation and distribution 10. Processing of sold products 11. Use of sold products 12. End-of-life treatment of sold products 13. Downstream leased assets 14. Franchises

	15. Investments

The GHG Protocol Scope 3 Evaluator (http://www.ghgprotocol.org/scope-3-evaluator) is a tool that can be used to help identify and estimate GHG emissions from Scope 3 Sources.

In order to be able to answer **Yes** to this question, Scope 3 GHG must be calculated and reported in accordance with the Corporate Value Chain (Scope 3) Standard. This includes:

- Calculating GHG emissions from all Scope 3 emissions sources (as defined by Chapter 5 & 6 of the Standard)
- Scope 3 emissions are reported in accordance with the requirements defined in Chapter 11 of the Standard including a list of scope 3 activities excluded from the reporting with justification for their exclusion.

How This Will Be Verified:

When verifying a facility's Scope 3 GHG emission reporting, Verifiers **must** review:

- The reporting methodology and scope to ensure that it aligns with the requirements outlined in the Corporate Value Chain (Scope 3) Standard. This includes:
  - The minimum reporting boundaries/requirements for scope 3 sources and categories
  - Required documentation for any excluded scope 3 categories or activities excluded from the inventory that justifies their exclusion.

Full Points:

- Full points will be awarded if the facility has calculated Scope 3 GHG Emissions from all material upstream **and** downstream Scope 3 sources and there is supporting evidence to justify an exclusions based on materiality.

Documentation Required:

- Documentation that shows GHG emissions from all relevant Scope 3 emissions sources have been identified and calculated (as defined by Chapter 5 of the GHG Protocol Corporate Value Chain (Scope 3) Standard). This may include:
  - An inventory/list of all Scope 3 sources associated with facility operations that shows GHG emission totals in the reporting year.
  - Documentation that supports the GHG emission calculations or assumptions used (e.g., emission factors or operational data for Scope 3 sources)
  - Documentation for any excluded scope 3 sources or activities excluded from the inventory that justifies the exclusion.

Note: Basic reporting of only a select number of scope 3 sources without following the reporting requirements outlined in Chapter 11 of the Standard does not meet the expectations for a Yes Answer (e.g., informal tracking/reporting of emissions from 1 or 2 sources of Scope 3 emissions)

Interview Questions to Ask:

- Staff responsible for energy and GHG management are able to explain the facility's methodology for identifying Scope 3 sources and boundaries and calculating Scope 3 GHG emissions.

Inspection – Things to Physically Look For:

- Onsite observations are consistent with reported Scope 3 sources, where applicable (e.g., third party transportation or other services observed on site).

Partial Points:

- Partial points will be awarded if the facility has calculated Scope 3 GHG Emissions from all material upstream Scope 3 sources and there is supporting evidence to justify an exclusions based on materiality.

21. Has your facility set a Science-Based Target?

Answer Yes if: Your Facility has set a Science-Based Target to reduce GHG emissions **or** if your facility is part of a manufacturing group/organization that set a Science-Based Target that includes your facility's operations.

Notes:

- Targets are considered 'science-based' if they are in line with what the latest climate science deems necessary to meet the goals of the Paris Agreement.
- If your facility has set GHG reduction targets, but these have not been formally evaluated to determine if they align with specific climate action goals (e.g., the Science Based Targets Initiative (SBTi), you should answer No to this question.

If you answer Yes to this question, you will be asked to complete the following sub questions to provide details on your Science-Based Target:

- Please indicate which methodology you use to set the Science-Based Target:
  - SBTi
  - Other
- If Other, please specify.
- Has this Science-Based Target been approved?
- What is your Science-Based Target?
- Please provide the name under which the approved target is reported.

If you answer No to this question, you will be asked to complete the following sub question:

- Is your facility preparing to set a Science-Based Target?

Note: If your company has committed to the SBTi but has not yet established or submitted a target for approval, or if your target is under review (i.e., the company's status on the SBTi

website is listed as “Committed”), you should answer Yes to the sub question “Is your facility preparing to set a Science-Based Target?”

Suggested Uploads:

- Documentation that supports your facilities Science-Based Target (e.g., target commitment letter, target evaluation/verification or approval documentation, etc.).

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have established science-based GHG emission targets.

Technical Guidance:

Targets are considered “science-based” if they align with the latest climate science and are designed to meet the goals of the Paris Agreement which seeks to limit GHG emissions and climate change. Targets must be validated and approved by a recognized governing body (e.g., The SBTi) to ensure that the target is valid and aligns with current climate science.

The Science Based Targets Initiative (SBTi). https://sciencebasedtargets.org/ has established procedures for the commitment, submission, validation, and approval of targets, which generally includes:

- Company commitment to setting Science-Based Targets in line with the SBTi. Formal commitment to the SBTi is required (i.e., submitting the commitment letter and paying the applicable fees)
- Setting your company’s GHG target and having it validated and approved by the SBTi.

Additional details on the requirements for setting a Science-Based Target with the SBTi can be found here: https://sciencebasedtargets.org/step-by-step-guide/

Information on companies who have committed and set targets that are validated and approved by the SBTi can be found here: https://sciencebasedtargets.org/companies-taking-action/

How This Will Be Verified:

Full Points:
Full points will be awarded if the facility has set a Science-Based Target **or** if your facility is part of a manufacturing group/organization that set a Science-Based Target that includes your facility’s operations.

Documentation Required:

- Documentation that shows the facility has set a Science-Based Target. This may include:

- Target commitment letter, target evaluation/verification or approval documentation.
- Listing of facility's Science-Based Target on online registry that indicates the company's target is set (e.g., Target status is "set "on the SBTi database https://sciencebasedtargets.org/companies-taking-action/)
- Documentation to support the facility's actions to meet the target.

- If the facility's operations are included in a Science-Based Target of a larger manufacturing group or organization, supporting documentation that shows the target includes the facility's operations.
- If the facility is preparing to set a target, supporting documentation that shows target for approval, or if your target is under review (e.g., target commitment letter, the target's status on the SBTi website is listed as "Committed").

Interview Questions to Ask:

- Staff responsible for energy and GHG management are able to explain the facility's methodology for setting the Science-Based Target.

Inspection – Things to Physically Look For:

- Onsite observations are consistent with reported business activities or other supporting documentation associated with the target.

Partial Points: N/A

22. Does your facility have a plan to phase-out any fossil fuel, other than Coal?

Answer Yes if: Your facility has a current documented plan with defined actions that your facility is planning to implement to phase-out the use of **all** fossil fuels used onsite other than coal.

Answer Partial Yes if: Your facility has a current documented plan with defined actions that your facility is planning to implement to phase-out the use of **one (1) or more, but not all** fossil fuels used onsite other than coal.

Note: For this question phase-out means discontinuing the use of fossil fuel. Replacing a fossil fuel with another fossil fuel (e.g., phasing out furnace oil and using diesel for the boiler) is not considered a phase-out.

If you answer Yes to this question, you will be asked the following questions to provide details on your phase-out plan:

- Have you done any financial analysis/cost impact to replace any fossil fuel, other than Coal as an energy source?

- Which fossil fuel does your facility have a plan to phase-out? (Select from the list of applicable fossil fuel sources used at the facility)
- What is your plan and what are your steps to phase-out?
- Please upload your plan and financial analysis
- What is your final date to complete your fossil fuel phase-out?

Suggested Uploads:

- A copy of the phase-out plan that includes details of the specific actions the facility plans to take to phase-out fossil fuel use.
- Other documentation supporting the plan (e.g., financial analysis of replacing the fossil fuel, new/proposed equipment specifications, renewable energy solutions, etc)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have evaluated options to phase out fossil fuels and have established formal plans with defined actions to phase-out fossil fuel use at the facility.

Technical Guidance:

Eliminating the use of fossil fuels and transitioning to cleaner energy sources is a key goal of many international initiatives to reduce GHG emissions and combat climate change. Facilities that currently use fossil fuels as an energy source are encouraged to proactively seek cleaner energy alternatives such as renewable energy solutions to support this goal.

Creating an implementation plan includes the process of reviewing and evaluating available options to improve energy use and/or GHG emissions. The key steps of creating an implementation plan should include the following:

- Identify available options to phase-out fossil fuel use through internal assessment by qualified personnel or third-party experts.
- Evaluate phase-out options to determine the most suitable options (e.g., feasibility studies, cost benefit analyses)
- Approve funds/budget for chosen options.
- Create a timeline and define the actions needed to phase out fossil fuel use.
- Conduct regular reviews of the implementation plan check on progress.

How This Will Be Verified:

Full Points:

Full points will be awarded if the facility has a documented fossil fuel phase-out plan that covers **all** fossil fuel sources and includes the following:

- A list of defined steps or actions that the facility plans to take to phase-out fossil fuel use.
- A financial analysis of the options/action needed to phase-out fossil fuel use.
- A targeted date to complete the phase-out.

Documentation Required:

- A copy of the phase-out plan that includes details of the specific actions the facility plans to take to phase-out fossil fuel use.
- Other documentation supporting the plan (e.g., financial analysis of replacing fossil fuel, new/proposed equipment specifications, renewable energy solutions, etc)

Interview Questions to Ask:

- Staff responsible for the phase-out plan can explain the facility's process for evaluating phase out options and the facility's planned actions to phase-out fossil fuel use.

Inspection - Things to Physically Look For:

- The actions listed in the plans are consistent with the observed fossil fuel use onsite.

Partial Points:

- Partial points will be awarded if the facility has a documented fossil fuel phase-out plan that covers **one (1) or more, but not all** fossil fuel sources and includes the following:
    - A list of defined steps or actions that the facility plans to take to phase-out fossil fuel use.
    - A financial analysis of the options/action needed to phase-out fossil fuel use.
    - A targeted date to complete the phase-out.

23. Has your facility successfully replaced any fossil fuel(s) with renewable energy?

Answer Yes if: Your facility has replaced **all** fossil fuels used onsite with renewable energy solutions **or** your facility has never used fossil fuels onsite (i.e., only renewable energy was used when facility operations began).

Answer Partial Yes if: Your facility has replaced **one (1) or more, but not all** fossil fuels used onsite with renewable energy solutions within the last 5 years.

Note: The 5 year timeline should be counted based on the Higg FEM reporting year. For example, for FEM 2024 (which reports environmental data from 2024), the replacement must have been made in or after 2019. This is based on the year, not the date of replacement or Higg FEM Verification.

If you answer Yes or Partial Yes to this question, you will be asked the following questions to provide details on your fossil fuel replacement:

- Which fossil fuel did your facility successfully replace?

Note: If your facility has never used fossil fuels onsite (i.e., only renewable energy was used when facility operations began), you should select Not Applicable for the above question.

Suggested Uploads:

- Documentation that supports actions taken by the facility replace fossil fuel with renewable energy solutions (e.g., new equipment or renewable energy solutions specifications, equipment replacement logs or photos of previous fossil fuel burning equipment, etc)

What is the intent of the question?
The intent of this question is for facilities to demonstrate that they have replaced fossil fuel use onsite with renewable energy solutions.

Technical Guidance:
Eliminating the use of fossil fuels and transitioning to cleaner energy sources is a key goal of many international initiatives to reduce GHG emissions and combat climate change. Facilities that have proactively transitioned to renewable energy solutions demonstrate a commitment to sustainable manufacturing and reduce future risks of reliance on fossil fuels.

Renewable energy solutions may include:

- Use of biodiesel or electric vehicles (EVs) for onsite or company vehicle use.
- Use of sustainably sourced biomass (with certification) or geothermal or solar for heat/steam generation.
- Use of hydro, solar photovoltaic, or wind energy to generate electricity.

How This Will Be Verified:

Full Points:
Full points will be awarded if the facility has replaced **all** fossil fuels used onsite with renewable energy solutions **or** the facility has never used fossil fuels onsite (i.e., only renewable energy was used when facility operations began).

Documentation Required:

- Documentation that supports actions taken by the facility replace fossil fuel with renewable energy solutions. This may include.

- Specification of new equipment or renewable energy solutions
- Equipment replacement logs or photos of previous fossil fuel burning equipment.

Interview Questions to Ask:

- Staff responsible for the implementing/managing the renewable energy solutions can explain how fossil fuel use was phased out at the facility.

Inspection - Things to Physically Look For:

- Onsite observations indicate that no fossil fuels are used at the facility.

Partial Points:

- Partial points will be awarded if the facility has replaced one (1) or more, but not all fossil fuels used onsite with renewable energy solutions within the last 5 years.

Note: The 5 year timeline should be counted based on the Higg FEM reporting year. For example, for FEM 2024 (which reports environmental data from 2024), the replacement must have been made in or after 2019. This is based on the year, not the date of replacement or Higg FEM Verification.

Water

General Introduction

There is a finite amount of water on Earth. The increase in global demand for water not only creates a risk for your business but creates a risk for your community and planet on a broader scale. The operational, environmental, and financial impacts of water use are key issues for facility operations. Driving efficient water use and reductions throughout facility operations is an important area of focus for all factories.

In general, the Higg FEM Water section encourages you to:

- Identify and understand all water sources and uses at the facility.
- Understand what operations and processes at your facility use the most water.
- Track and report the quantity of water consumption at your facility.
- Evaluate, plan for, and adopt solutions to reduce water use through better manufacturing practices and water reuse/recycling.
- Implement leading practices to reduce water use at your facility.
- Contribute to sustainable water management and water stewardship activities in your community.

Additional details on the intent and criteria for each Higg FEM Water question is provided in the guidance below along with useful technical guidance and resources to support your facility in the management and reduction of water usage.

Water Use at Your Facility

In the Higg FEM, water use is categorized as either used for production or domestic purposes as defined below:

- **Water used for Production:** Water used in manufacturing processes or operations used to make goods (e.g., dyeing or rinse water, steam generation, water used in mixtures applied to the product, cleaning of equipment components or tools that contact the product during the manufacturing process, etc.)

- **Water used for Domestic Purposes:** Water used for washrooms, sanitation, food preparation, landscape irrigation etc.

The Higg FEM requires facilities to select the sources of water used at their facility. The FEM includes a list of predefined sources that can be selected. The table below provides a description

of the available water source options in the FEM. These are categorized blue and grey water sources.

Water Source	Description
Blue Water Sources Blue water is fresh surface and groundwater, in other words, the water in freshwater lakes, rivers and aquifers	
Surface Water	Water that is naturally occurring on the Earth's surface (ice sheets, ice caps, glaciers, icebergs, ponds, lakes, rivers / streams, wetlands, bogs, etc.) Surface water has a low concentration of dissolved solids, is of an acceptable quality, and/or requires minimal treatment to be used for domestic, municipal, or agricultural applications.
Groundwater	Water in soil beneath the soil surface, usually under conditions where the pressure in the water is greater than the atmospheric pressure, and the soil voids are substantially filled with the water. Non-renewable groundwater is generally located at deeper depths and cannot be replenished easily or is replenished over very long periods of time. They are sometimes referred to as "fossil" groundwater sources.
Municipal Blue Water	Water provided by a municipality or other public provider that is generated by blue water.
Municipal Water (Origin Unknown)	Water provided by a municipality or other public provider with unknown origin (e.g., blue, or grey water)
Brackish surface water/seawater	Water in which the concentration of salts is relatively high (over 10,000 mg/l). For comparison, seawater has a typical concentration of salts above 35,000 mg/l. Brackish water is saltier than fresh water, but not as salty as seawater. It may result from mixing of seawater with freshwater, as in estuaries, but also certain human activities can produce brackish water. Brackish water is hostile to the growth of most terrestrial plant species.
Condensate from External Steam Source	Water that is generated from the condensate of steam sources that are not located at the facility.
Rainwater	Water in the form of precipitation (e.g., rain, snow) that is harvested within the facility either from the roof or other surfaces and stored for use.
Grey Water Sources Grey water is water that has been polluted by human activity (e.g., industrial, or domestic sources)	
Municipal Grey Water	Water provided by a municipality or other public provider that is generated by grey water.
Recycled Water	Wastewater that has been treated using physical, chemical, and/or any additional treatment processes to

	meet a quality which allows the water to be used again in a process. For example, wastewater that has gone through a membrane filtration process and used back in the industrial operation is considered recycled water. This does not include water cycled in operations such as cooling towers and non-contact heat exchange operations.
Reuse Water	Wastewater discharged from one process that is used directly in another process without treatment. This does not include water cycled in operations such as cooling towers and non-contact heat exchange operations.
Treated Wastewater from External Source	Wastewater that has been discharged and treated by an external source (e.g., other manufacturing facility) using physical, chemical, and/or any additional treatment processes to meet a quality which allows the water to be used again in a process. This does not include water cycled in operations such as cooling towers and non-contact heat exchange operations.
Untreated Wastewater from External Sources (treated internally)	Wastewater that has been discharged by an external source (e.g., other manufacturing facility) and treated at your facility using physical, chemical, and/or any additional treatment processes to meet a quality which allows the water to be used again in a process. This does not include water cycled in operations such as cooling towers and non-contact heat exchange operations.

Water Data Quality

Accurately tracking and reporting water use data overtime provides facilities and stakeholders with detailed insight into opportunities for improvement. If data is not accurate, this limits the ability to understand a facility's water use footprint and identify the specific actions that will help reduce environmental impacts and drive efficiencies.

When establishing a water tracking and reporting program, the following principles should be applied:

- **Completeness** – The tracking and reporting program should include all relevant sources (as listed in the FEM). Sources should not be excluded from data tracking and reporting should be based on materiality (e.g., small quantity exceptions).
- **Accuracy** – Ensure that the data input into the water tracking program is accurate and is derived from credible sources (e.g., calibrated meters, established scientific measurement principles or engineering estimates, etc.)
- **Consistency** – Use consistent methodologies to track water data that allows for comparisons of water use over time. If there are any changes in the tracking methods, water sources, or other operations that impact water use data, this should be documented.

- **Transparency** – All data sources (e.g., water bills, meter readings, etc.), assumptions used (e.g., estimation techniques), and calculation methodologies should be disclosed in data inventories and be readily verifiable via documented records and supporting evidence.
- **Data Quality Management** – Quality assurance activities (internal or external data quality checks) should be defined and performed on water data as well as the processes used to collect and track data to ensure reported data is accurate.

Applicability Questions

To determine which questions you will need to complete in the Water section, you will need to complete the applicability questions listed below.

Based on the response to the applicability questions, facilities will be classified as a high or low water user, and a facility in an area of high or low water risk as follows:

- Facilities with low water use (defined as using less than $35m^3$ per operating day)
- Facilities with high water use (defined as using more than $35m^3$ per operating day)
- Facility located in an area of low water risk (as defined by the WRI Aqueduct Tool or the WWF Water Risk Filter).
- Facility located in an area of high water risk (as defined by the WRI Aqueduct Tool or the WWF Water Risk Filter).

Facilities that are classified as either high water users or located in an area of high water risk (or both) will be asked to complete all FEM questions in the water section. Facilities classified as low water users that are located in areas of low water risk will only answer Level 1 questions.

1. How many days did your facility operate during this reporting year?

- List selection Options with any special notes

2. Select the tool used to assess your facility's water risk.

- WWF
- WRI

Facilities will be asked to evaluate their water risk using both the WRI Aqueduct Tool **and** the WWF Water Risk Filter.

Notes:

- Facilities must report their water risk based on the highest water risk ratings from the two tools (e.g., if the WRI tool shows low risk and the WWF tool shows high risk, the high risk must be reported).
- Facilities should capture screenshots and/or downloads of the risk assessment outcome and upload as evidence to show that the risk assessment was done within the FEM reporting year.

The WRI Aqueduct Tool and the WWF Water Risk Filter are simple and similar tools to assess water scarcity risks.

When using the WRI Aqueduct Tool go to the home page and select **explore global water risk maps** and select **Enter Address** at the bottom of the screen to search using your facility address. Facility should select the default weighing scheme.

When using WWF Water Risk Filter, scroll to your country and location, and look at the color-coding of the map. This link provides information on how to use the Risk Filter.

Note: "Low risk", "Low to medium risk" and "Medium to high risk" are defined as "Low risk" in FEM. "High risk" and "Extremely/Very high risk" are defined as "High risk" in FEM.

3. Is your facility location rated as high/very high for overall water risk using this tool?

- Yes
- No

4. Is your facility using water for production use?

- Yes
- No

Water Use - Level 1

1. Select all water sources used by your facility:

- Water Source Category
  - Blue Water
    - Surface Water
    - Groundwater
    - Municipal Blue Water
    - Municipal Water (Origin Unknown)
    - Brackish surface water/seawater
    - Condensate from External Steam Source
    - Rainwater
  - Grey Water
    - Municipal Grey Water
    - Recycled Water
    - Reuse Water
    - Treated Wastewater from External Source
    - Untreated Wastewater from External Sources (treated internally)

Note: For information on the definitions of the above water sources, please refer to the Introduction Section of the water guidance.

After selection your water sources and based on your water question applicability responses, you will be asked the following series of questions to provide additional details on your water sources and consumption tracking:

2. Does your facility track any of its water use?

a. Yes
b. No

Answer Yes If: Your facility tracks water use from one (1) or more of its water sources.

Note: If you answer No to this question, no further questions will be asked, and you will receive a score of zero (0) in the water section.

3. Does your facility track the consumption of water from all of the sources it utilizes?

a. Yes
b. Partial Yes
c. No

Answer Yes If: Your facility tracks water use from **all** water sources used.

Answer Partial Yes If: Your facility tracks water use from one (1) or more, but not all of its water sources.

Note: If you answer No to this question, this means that you do not track water use for any sources and the answer to the previous question should also No. In this case, no further questions will be asked, and you will receive a score of zero (0) in the water section.

4. **Does the water consumption you track and report include the rejected water quantity from pre-treatment?**
    a. Yes
    b. No

Answer Yes If: Your consumption tracking includes rejected water from onsite pre-treatment.

Note: This question only applies to facilities that have indicated that pre-treatment of water occurs onsite in the Site Info section of the FEM.
If you answer Yes to this question, you will be asked the following sub questions:

c. Please select the type/s of treatment.
d. Does your facility measure the quantity of water rejected from the pre-treatment?
e. What are the water sources that you send through pre-treatment?
f. Please indicate the annual quantity (m3).
g. What is the reject percentage (%)?
h. What is the method of disposal of the rejected water?
i. If Other, please describe.
j. Please upload your facility's freshwater pre-treatment process flow and hydraulic diagrams if you have one.

5. **Are you able to identify and track domestic and production water use separately?**
    a. Yes
    b. No

Answer Yes If: Your facility tracks water use tracks domestic and production water use separately.

Note: This question only applies to facilities that have indicated water is used for production in the applicability question on production water use.

If you answer Yes to this question, you will be asked to complete two (2) tables to provide details on your facility's domestic and production water use for each applicable water source.

Note: If your facility selects multiple facility types in the facility profile structure section of the FEM (e.g., Finished Product Assembler and Material Production), a separate table for production water use will be displayed for each selected facility type.

If you answer No to this question, you will be asked to complete a single table to provide details on your facility's total water use for each applicable water source.

The following question on your facility's water use will be asked for each applicable water source:

- Does your facility use this water source for Domestic/Production Use?
- Does your facility track its water use from this source?
- What quantity of water was used from this source for Domestic/Production Use during this reporting year?
- Unit of Measure
- Which method was used to track this water source?
- What was the frequency of measurement?
- Provide any additional comments.

Suggested Uploads:

- Documentation that demonstrates the facility has identified water sources and is tracking water consumption for applicable water sources. (e.g., an inventory and/or tracking records for water sources, samples of water purchase invoices or metering records, etc.)

Note: Uploading of all utility bills and/or metering records is not required, however they should be available for review at the time of verification.

What is the intent of these questions?

The intent of these questions is to help facilities understand the sources of the water they are using, and the quantity of water used from each source.

Technical Guidance

Identifying and measuring water use from all sources is the foundation of a water management program and the overall sustainability program for a company. Measurement of all water sources allows you to identify areas of significant water use, detect any abnormal consumption, and establish water use baselines and reduction targets. Additionally, tracking domestic and production water use separately can help facilities further identify specific areas for improvement and conservation efforts.

When establishing your water tracking and reporting program, start by doing the following:

- Mapping out business and operational processes to identify water sources, areas/processes that consume water.
- Establish procedures to collect and track water use data:
    - Use utility bills to determine the quantity of purchased water.
    - Determine methods to track water consumption from other applicable sources, such as rainwater, recycled water, etc.

- Install sub-meters to track the amount of water used on-site.
- If estimation techniques are used to determine water use, the calculation methodology should be clearly defined and be supported by verifiable data.
- Take inventory of how the site obtains water and gathers information on where the water comes from and who or what supplies the water.

- Record tracking data (e.g., daily, weekly, monthly consumption records) in a format that is easy to review [e.g., spreadsheet (e.g., Microsoft Excel) or similar data analytics program that allows export of data in a readable format (e.g., Excel, csv)] and maintain relevant supporting evidence for review during verification.

Reporting Water Use Data in Higg FEM:

Before reporting water use data in the FEM, data quality checks should be performed to ensure that the data AND the processes used to collect and record the data are effective at producing accurate data.

Do:

✓ Review source data (e.g., utility invoices, meter logs, etc) against aggregated totals to ensure it is accurate.
✓ Compare the current year with historical data. Any significant changes (e.g., an increase or decrease of over 10%) should be attributable to known changes. If not, further investigation may be warranted.
✓ Ensure the most recent and updated versions of data tracking spreadsheets are being used and that all automated calculations/formulas are correct.
✓ Ensure the proper units are reported and verify any unit conversions from source data to reported data.
✓ Review any assumption or estimation methodology/calculations to ensure accuracy.

Do Not:

X Report data that is not accurate (e.g., the data source is unknown or has not been verified).

X Report estimated data if it is not supported by verifiable and reasonably accurate estimation methodology and data (e.g., engineering calculations).

How This Will Be Verified:

When verifying a facility's water sources, Verifiers **must** review all aspects of the facility's water tracking program that could produce inaccuracies including:

- The initial data collection processes and data sources (e.g., invoices, on-site meters, metering logs, etc.); and
- The process and tools used to aggregate the data (e.g., spreadsheet calculations, unit conversions, etc.)

Full Points:

Full points will be awarded to facilities that track water use from **all** applicable water sources.

Documentation Required:

- Documentation that supports the reported water source and water use data which may include:
    - List of all water sources used at the facility.
    - Water consumption records (e.g., utility bills, metering records, etc)
        - **Note:** Annual consumption records compiled in a spreadsheet (e.g., Excel) is ok if detailed consumption records are available for review.
    - Water meter calibration records where applicable (e.g., as per manufacturer's specifications)
    - Documented estimation methodologies if applicable.
- Documentation that supports responses to the sub questions on water source. This may include:
    - Water treatment/reject quantity tracking from pre-treatment processes.
    - Records of tracking domestic and production water separately, if applicable.

Interview Questions to Ask:

- Staff responsible for managing water can explain the facility's water tracking program (e.g., how water sources are identified, and water use quantities are tracked).
- Key staff should understand:
    - The procedures in place for tracking water use.
    - How data quality of the water use tracking program is maintained.
    - Any estimation methodologies used to calculate annual water use.

Inspection - Things to Physically Look For:

- All water sources observed are properly identified and tracked.
- Appropriate equipment for water use measurement is present (e.g., meters) if applicable.

Partial Points:

- Partial Points will be awarded to facilities that fully track at least one (1), but not all water sources.

6. Are there any Legally Mandated Groundwater Abstraction Restrictions in your country?

Note: This question only applies to facilities that use groundwater as indicated in the water applicability questions.

Answer Yes if: There are legally mandated groundwater abstraction restrictions in the facility's country or jurisdiction of operation that apply to your facility (e.g., limits on the amount of water that can be extracted).

Answer Unknown if: You cannot confirm the presence or absence of legally mandated groundwater abstraction restrictions in the facility's country and/or jurisdiction of operation that apply to your facility.

If you select Yes, you will be asked the following sub question(s):

- Please upload the relevant legal regulation.
- Please provide the following information.
    - How much in m3/h is your facility allowed to abstract ground water? (m3/h)
    - How much in m3/day is your facility allowed to abstract ground water? (m3/day)
    - How much per unit time is your facility allowed to abstract ground water? (m3/unit time)
    - Are you abstracting within the legal limit?

Suggested Uploads:

- Copies of the applicable laws or regulations that specify groundwater abstraction restrictions in your country or jurisdiction of operation (e.g., water resource management acts, water use permits, or groundwater protection regulations, etc).
- Copy of the facility's groundwater abstraction permit showing the permissible extraction volume, restrictions, and any applicable monitoring or reporting requirements.
- Groundwater abstraction/consumption tracking records (e.g., metering logs).

What is the intent of the question?
The intent of this question is for facilities to ensure they understand and are complying with any applicable legal requirements related to groundwater abstraction.

Technical Guidance

Legally mandated groundwater abstraction restrictions are typically in place to prevent over-extraction, protect the environment, and maintain a balance between water supply and demand for various users, including the natural ecosystems and surrounding communities.

It is important that facilities understand any applicable legal requirements and/or restrictions related to groundwater abstraction and establish appropriate procedures and practices to ensure compliance. If your facility requires a permit or license for groundwater abstraction, facilities should review the permit and applicable regulations to ensure all requirements (e.g., permissible abstraction volumes, monitoring, and reporting requirements) are fully understood.

How This Will Be Verified:

Full Points:
Full points will be awarded if there are applicable legally mandated groundwater abstraction restrictions in the facility's country or jurisdiction of operation that apply to your facility and the facility is in compliance with these requirements.

Note: If there are no applicable legally mandated groundwater abstraction restrictions in the facility's country or jurisdiction of operation that apply to your facility. This question will be unscored and will not impact the overall Water section scoring.

Documentation Required:

- Documentation that demonstrates the facility is aware of and complying with any applicable legal requirements related to groundwater abstraction. This may include:
    - Copies of the applicable laws or regulations that specify groundwater abstraction restrictions in your country or jurisdiction of operation (e.g., water resource management acts, water use permits, or groundwater protection regulations, etc).
    - Copy of the facility's groundwater abstraction permit showing the permissible extraction volume, restrictions, and any applicable monitoring or reporting requirements.
    - Groundwater abstraction/consumption tracking records (e.g., metering logs).

Interview Questions to Ask:

- Staff responsible for water management and groundwater abstraction at the facility understand any applicable regulations and/or permitting requirements related to groundwater abstraction and can explain the facility's procedures for monitoring groundwater use and ensuring compliance with applicable requirements.

Inspection - Things to Physically Look For:

- Observations on site indicate that the facility is operating its groundwater wells in compliance with any applicable requirements (e.g., all wells have applicable permits, when required, abstraction/consumption records do not exceed the permissible volume).

Partial Points: N/A

7. Does your facility have a process to inspect and monitor its water supply network for leaks?

Answer Yes if: Your facility has a process in place to identify, prevent and monitor potential leaks that covers all components of your facility's water supply network (i.e. all infrastructure components that distribute/transfer water from its source to points of use within your facility).

If you select Yes, you will be asked the following sub question(s):

- If yes, please describe how you monitor.
- Please upload documentation.

Suggested Uploads:

- Documentation that shows the facility's process for inspecting and monitoring all water supply network components at your facility (e.g., preventative maintenance/inspection schedules or procedures, completed inspection checklists or maintenance records, etc.)

What is the intent of the question?
The intent of this question is to ensure that facilities have an established process in place to proactively identify and prevent leaks in the water supply network.

Technical Guidance

Leaks in the water supply network can lead to significant losses which can have both an environmental and financial impact. Preventative maintenance is maintenance that is regularly scheduled and performed on equipment to reduce the chance of water loss due to equipment/component failure and identify potential problems before they result in breakdowns or leaks. Regular inspections and maintenance should be planned and scheduled based on available information for each piece of equipment (e.g., manufacturer's recommendations for inspection/maintenance, past breakdowns or leaks, operating conditions, etc.)

The water supply network in a facility consists of interconnected infrastructure components designed to collect, store, and distribute water throughout the facility. Key elements that should be covered in a facility's inspection and maintenance program include:

- Water storage (e.g., tanks and reservoirs)
- Water distribution system (e.g., pipes, pumps, valves)
- Equipment/facilities that use water for production and domestic use.

It is also important to ensure responsible staff are properly trained on leak detection and response to ensure leaks are detected and fixed as soon as possible.

How This Will Be Verified:

Full Points:

Documentation Required:

- Inspection and/or maintenance plan that covers all water supply network components at the facility. This may include:
    - Inspection and maintenance schedule or procedures
    - Preventative maintenance procedures
    - Completed inspection checklists.
    - Service records or maintenance logs

Note: If the facility's equipment is inspected and maintained by a third-party service provider, copies of relevant inspection and maintenance documentation such as those listed above should be made available for verification.

Interview Questions to Ask:

- Staff responsible for the maintenance and/or inspection of the facility's water supply network understand and can explain the facility's inspection and maintenance procedures.

Inspection - Things to Physically Look For:

- All water supply network components (e.g., tanks, pumps, piping) are in good working repair and observations indicate that regular inspection and maintenance is conducted as per the facility's procedures.

Partial Points: N/A

Water use - Level 2

8. Has your facility set baselines for any of its water use?

Answer Yes if: Your facility has set a baseline for one (1) or more water sources.

If you answer Yes to this question, you will be asked to complete a series of question and tables based on your facility's water use applicability with the following questions to provide details on your baselines for each applicable water source (All applicable water sources will be pre-populated in the tables):

9. **Are you able to set a baseline separately for water use in domestic vs. production?**
    - **Note:** This question only applies to facilities that use water in production and track production and domestic water use separately.

10. **11. 12. Which water sources (for production use/for domestic use) does your facility set baseline on?**
    - Have you set a baseline for this water source?
    - Is this a normalized or absolute baseline?
    - If normalized, are you setting separate baselines based on your facility type?
        - **Notes**:
            - This only question applies to facilities that use water in production.
            - If your facility selected multiple facility types in the facility profile structure section of the FEM (e.g., Finished Product Assembler and Material Production), and you set baselines for each facility type, a separate table for baseline data will be displayed for each selected facility type.

Notes:

- Facilities that use water for production **and do not** separately track or set baselines for production and domestic water use will complete one (1) baseline table for combined production and domestic water use.
- Facilities that use water in production **and** separately track and have set baselines for production and domestic use separately will complete separate baseline tables for production and domestic water use.

For all water sources that have baselines, you will be asked to complete a table with the following questions based on whether the baseline is absolute or normalized:

Absolute Baselines	Normalized Baselines
What is the baseline quantity for this source?	What is the baseline quantity for this source?
Unit of Measure	Unit of Measure
Enter baseline year	What is your normalized baseline based on?
How was your baseline calculated?	Enter baseline year.
Was the baseline verified?	How was your baseline calculated?
Provide any additional comments	Was the baseline verified?
	Provide any additional comments

Note: From FEM2024 onwards, in the above table, baseline data can be auto populated or manually entered in the following ways:

- New FEM Users: Required to manually input baseline.
- Existing FEM Users without a baseline: Facility can choose to:
    - Enter the baseline manually OR
    - Have the FEM auto populate a baseline based on the data from the previous year's FEM.
- Existing FEM Users with an existing baseline: Baseline will auto populate based on the data from the previous year's FEM.

Suggested Uploads:

- Documentation that supports how the baseline was established for each water source (e.g., water use tracking data and production data from the baseline year, supporting calculations or assumptions used to determine the baseline).

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have established baselines for water use at the facility so that future reduction efforts can be quantified.

Technical Guidance:

A "baseline" is a starting point or benchmark that a facility can use to compare changes over time and quantify any reduction efforts.

Baselines can be absolute or normalized. For example:

- **Absolute**: The total amount of water used for a period of time. (e.g., 1,500,000 of municipal water used in the reporting year)
- **Normalized:** The amount of water used while making a unit of product (e.g., 0.15 m3 per pair of shoes produced).

Note: It is recommended to use the 'Normalized' method to account for operational fluctuations. Normalized baselines provide more accurate and useful comparisons over time.

When establishing a baseline, be sure to do the following:

- Confirm the water source data is stable, and sufficient to be used to determine a baseline. In the Higg FEM, a baseline should generally comprise of a full calendar year's data.
    - **Note:** If your factory has undergone major structural or operational changes such as acquisition or changes in product type, in general, you should establish or reset a baseline *after* those changes have been completed.
- Determine if the baseline will be Absolute or Normalized (Normalized baselines are preferred)
- Verify the source data and normalizing metrics data is accurate.
    - Water and production volume data from previous Higg FEM verifications, internal or external audits conducted by qualified personnel are acceptable sources of data verification.
- Apply the appropriate baseline metric (i.e., per year for absolute OR divide by the chosen normalizing metric 150,000 m3 per 1,000,000 pieces = 0.15m3/piece)
    - **Note:** For water consumption that is not related to production, other normalizing metrics should be used where appropriate (e.g., water consumption per worker).

Note: If the baseline is used to evaluate performance against a target, the baseline should remain unchanged.

Reporting baseline data in Higg FEM:

Do:

- ✓ Review source data and raw normalizing metric data (utility invoices, meter logs, production quantity, etc.) against aggregated totals used to determine the baseline(s) to ensure they are accurate. (e.g., double check monthly water consumption records to ensure they match the annual consumption quantities used to calculate the baseline).
- ✓ Select the appropriate baseline type in the FEM - Absolute or Normalized.
- ✓ Ensure the proper units are reported and verify any unit conversions from source data to reported data.
- ✓ Enter the baseline year. This is the year the baseline data represents.
- ✓ Provide sufficient details on how the baseline was calculated (e.g., water consumption was normalized per meter of fabric produced).
- ✓ Only select Yes to the question "Was the baseline verified?" if the baseline data was fully verified in a previous Higg FEM verification, or by an internal or external audit conducted by qualified personnel.

Do Not:

- X Report a baseline that is not accurate (e.g., the data source is unknown or has not been verified)
- X Report a baseline that is based on insufficient data (e.g., not a full year's data).
- X Report an estimated baseline if it is not supported by verifiable and accurate estimation methodology and data (e.g., engineering calculations).

How This Will Be Verified:

When verifying a facility's baselines, Verifiers **must** review:

- All source data (utility invoices, metering logs, production quantity) and aggregated data totals for the baseline year; and/or
- Records of baseline data verification where available (e.g., previous Higg Verification, data quality review, internal or external audits, etc.)

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points:
Full Points will be awarded if the facility has established baselines for **all** water applicable sources.

Documentation Required:
- Documentation that supports how the baseline was established for each water source. This may include:
    - Water use tracking and production data from the baseline year (separated by production and domestic use, if applicable).
    - Supporting calculations methodologies or assumptions used to determine the baseline.
- Supporting evidence to demonstrate how baseline data was validated (e.g., verified Higg FEM data for the baseline year, external or internal data validation process or report).

Interview Questions to Ask:
- Staff responsible for water management are able to describe how the baselines were determined including any normalizing metrics used or any assumption made in the calculation methodology.
- Relevant staff are able to describe the facility's process to validate the accuracy of baseline data.

Inspection – Things to Physically Look For:
- The observed water management practices on-site are consistent with the facility's reported methods for determining baselines (e.g., water sources used, water use tracking methods/equipment, etc.)

- Observations on-site do not indicate that there have been significant changes at the facility that could impact the appropriateness of the baseline (e.g., new production areas, changes to products, new buildings, etc.)

Partial Points:

- Partial points will be awarded if the facility has established baselines for one (1) or more, but not all applicable water sources.

13. Has your facility implemented a water balance or another analysis to evaluate and trace water intake against usage (i.e., which processes) and output (i.e., to wastewater treatment plant)?

Answer Yes if: Your facility has a current water balance or another analysis (e.g., water audit) that covers water intake, usage and output to evaluate water use at the facility.

Note: For this question "current" means that the water balance or other analysis accurately reflects facility operations and water use in the Higg FEM reporting year **and** was conducted no more than 5 years before the FEM reporting year (e.g., if the analysis was performed no more than 5 years before the reporting year and this reflects the facility operations and water use in the reporting year this analysis is considered acceptable).

If you select Yes, you will be asked the following sub question(s) to provide details on your water balance or other analysis:

- Which one of the below activities were conducted to evaluate and trace water intake against usage and output? Select all that apply.
    - Conduct water balance / analysis.
        - Please upload a copy of the water balance / analysis report
    - Conduct water audit in last 5 years.
        - Please upload a copy of the water audit report
    - Other
        - If Other, please describe.
    - Please upload the methodology used for the above analysis.
    - If you do not have a document to upload, describe your methodology here.

- From the above analysis, has your facility identified the highest water use processes or operations?
    - List down the highest water use processes or operations at your facility (from highest to lowest) that account for 80% of your water use?

Suggested Uploads:

- Documentation that demonstrates the facility has conducted a water balance or other analysis to evaluate water usage at the facility (e.g., water balance or audit report, other documented methodology for analysing the water use, etc)
- Supporting documentation that shows the ranking of processes or operations based on water consumption.

What is the intent of the question?
The intent of this question is for facilities to demonstrate that a formal analysis of water use has been conducted to identify and quantify areas of significant water use or potential loss.

Technical Guidance

Understanding the production and operational aspects that influence water use at a facility allows facilities to identify and prioritize actions to reduce water use. A water balance or other water use analysis along with historical water use data and water costs will help build a facility's understanding of overall water use factors at the facility and highlight water reduction and cost savings opportunities.

The steps below provide an overview of the key steps involved in analyzing water use at a facility:

- Data Collection: Collect information on water use (e.g., water meter readings, water bills records, process-specific water consumption data, etc.)
- Water Flow Mapping: Create a flow diagram of the facility's water system, including water intake, usage in domestic/production processes, and discharge to wastewater treatment. This helps visualize the flow of water through the facility and identify areas of potential water loss or inefficiency.
- Measurement and Verification: Confirm the accuracy of water meter readings and other data sources and identify any discrepancies that may indicate leaks or other issues.
- Water Use Analysis: Analyze the collected data to identify patterns and trends in water use, including high water-consuming processes/equipment, seasonal variations, and areas for improvement.

Common tools used to analyse water usage at a facility include a water balance or water audit. Similar in nature, these tools can be used to quantify water intake and outputs for a facility, process/operation and/or piece of equipment. To establish a full understanding of water usage (intake and outputs) at a facility the analysis should include a focus on :

- The incoming water in the facility (e.g., the quantity and water sources)
- The quantity of water used during the production processes.
- The quantity of water recycled/reused in the facility.
- The volume of water discharged to and from any treatment systems (incoming or wastewater).
- The frequency which the analysis is reviewed and/or updated to ensure water use variability is well understood.

- **Note**: The more frequently a water balance/analysis is reviewed, the greater understanding one can have on facility water use and variability.

In theory, the total quantity of water influent into a facility should be equal to the total quantity discharged minus any losses (e.g., influent – effluent = 0) However, in practice, the realized difference between influent and effluent upon analysis is rarely zero. This can be due to leakage, evaporation (intended or unintended), errors in measurement, etc. Differences of less than 10-15% of total water use may be normal depending on facility operations, analysis methodology, and/or measurement techniques used, however larger differences (e.g., greater than 25% of total water) or a water balance of exactly 0 or a negative amount is usually indicative of an error. This would typically indicate a problem in the analysis or potentially due to unknown sources of water loss and should be investigated.

Below is an example of a basic water analysis map that shows inflows and outflows of water in a facility:

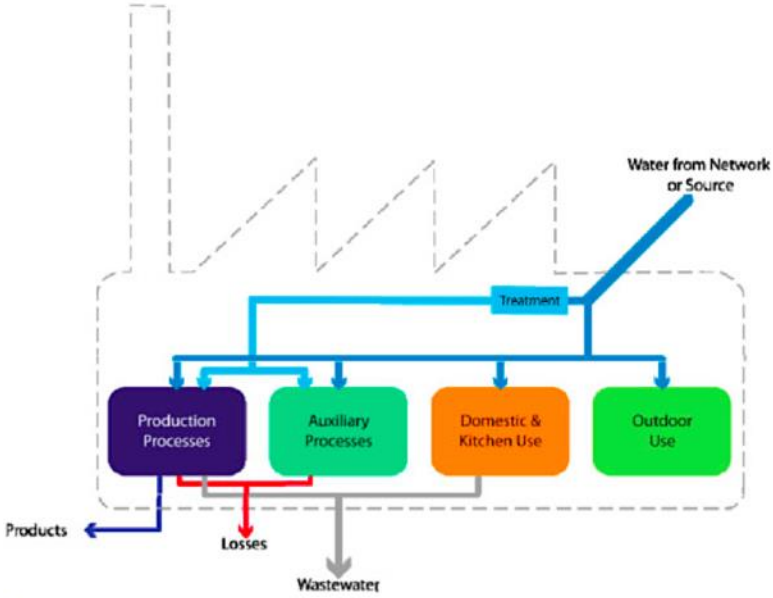

Fig. 4.
Water use in industrial plant.

Source: http://www.sciencedirect.com/science/article/pii/S2212371716300221

Resources:

- Steps in a Water Audit http://www.facilitiesnet.com/green/article/Steps-in-a-Water-Audit-Facilities-Management-Green-Feature--9364

- Water Audit Data Collection Sheet https://www.brewersassociation.org/attachments/0001/1518/Water_Water_Audit_Data_checklist.pdf
- Water calculation tool for the textile wet processing sector https://watercalculator.dnvgl.com
- American Water Works Association (AWWA) - Water Audit Software and Guidance: https://www.awwa.org/Resources-Tools/Resource-Topics/Water-Loss-Control

How This Will Be Verified:

Full Points:
Full points will be awarded to facilities that have current water balance or another analysis (e.g., water audit) that covers water intake, usage, and output to evaluate water use at the facility that was conducted within 5 years of the FEM reporting year.

Documentation Required:

- Documentation that demonstrates the facility has conducted a water balance or other analysis to evaluate water usage at the facility. This may include:
  - Water balance or water audit report
  - Other documented methodology for analysing the water use.
- If applicable, supporting documentation that shows the ranking of processes or operations based on water consumption quantity (e.g., highest to lowest).

Interview Questions to Ask:
- Staff responsible for water management at the facility can explain how water usage (intake, usage, and outputs) was analysed and how the facility identifies and ranks the highest water consumption processes or operations, if applicable.

Inspection - Things to Physically Look For:
- Observations indicate that the facility's water usage analysis (e.g., water balance or audit) is representative of current facility operations and water use observed onsite.

Partial Points: N/A

14. Has your facility set targets for reducing blue water use from any source, except rainwater?

Answer Yes if: Your facility has set a target to reduce blue water use for one (1) or more sources.

Notes:

- Targets for rainwater use reductions or increases should not be reported in this question.
- If your facility has not conducted a formal evaluation of water reduction opportunities and calculated how much blue water can be reduced to support your target, you should select No for this question.
- For the definition of blue water sources, please refer to the Introduction Section of the water guidance.

If you answer Yes to this question, you will be asked to complete a series of tables with the following questions to provide details on your targets for each applicable blue water source (All applicable blue water sources will be pre-populated in the tables):

- **Select all sources of blue water for which your facility has set a water reduction target.**
    - Have you set a target for this water source?
    - Is this a normalized or absolute target?
    - If normalized, are you setting separate targets based on your facility type?
        - **Note**: If your facility selected multiple facility types in the facility profile structure section of the FEM (e.g., Finished Product Assembler and Material Production), and you set targets for each facility type, a separate table for target data will be displayed for each selected facility type.

For all sources that have targets, you will be asked to complete a table with the following questions based on whether the target is absolute or normalized:

Absolute Targets	Normalized Targets
What is your target for change in water use from this source? (Enter negative value for reduction target or positive value for increased target)	What is your target for change (in %) in water use from this source? (Enter negative value for reduction target or positive value for increased target)
Enter the target year.	What is your normalized baseline based on?
Describe the measures planned to achieve this target.	Enter the target year.
	Describe the measures planned to achieve this target

Suggested Uploads:

- Documentation that supports how the target was established and demonstrates the target is based on a formal evaluation of reduction opportunities (e.g., water use data and baselines, new/proposed equipment specifications or work practices, etc.)

What is the intent of the question?
The intent of this question is for facilities to demonstrate that they have established formal targets to reduce blue water use at the facility.

Technical Guidance
Targets can use absolute or normalized metrics to drive quantifiable improvements by a set date compared to the baseline. For Higg FEM, reduction targets may be normalized to the production volume unit or another appropriate operational metric. A normalized target shows you when progress is real, rather than being a result of business changes such as reductions in production. An example of a normalized target is a reduction in the cubic metres of water used to produce one kilogram of sellable product (m^3/kg).

When establishing formal reduction targets, be sure to do the following:

- Base the target on a formal evaluation of improvement opportunities and actions (e.g., equipment replacement or upgrades) to calculate the amount of water that can be reduced.
    - For example: Setting a target based on an evaluation of installing a counter current rinsing system is expected to result in a 5% reduction in annual municipal water consumption per square meter of fabric produced that was calculated based on a formal review of the rinse system manufacturer's specifications and the expected production requirements. OR a 10% reduction target that will be achieved by the installation of low flow water taps in all lavatories that was calculated based on the facility's baseline water use data and the reduced flow rate of the taps to be installed.
- Define the exact target quantity, expressed as a percent (e.g., reduce normalized municipal water consumption per square meter of fabric by 5%). This **must** be based on a formal evaluation as noted above.
- Determine if the target will be Absolute or Normalized to a production or operating metric.
- Define the start date (i.e., "baseline") of the target.
- Define the end date of the target, meaning the intended completion date of the required improvements.
- Define the appropriate measurement units.
- Establish procedures to review the target. This review should include an evaluation of the actions taken and progress on reaching the defined target. Quarterly reviews are recommended.
- Ensure the target is relevant to reducing the site's water use (e.g., focuses on the most significant water uses at the site)

Reporting Targets in Higg FEM:

Do:

- ✓ Review the target to ensure all aspects noted above are covered and that the information is accurate.
- ✓ Enter the targeted reduction as a percentage. **Make sure to enter a <u>negative percentage for a reduction target (e.g. -5 for a 5% reduction).</u>**
- ✓ Provide sufficient details on how the target will be met in the "Describe the measures planned to achieve this target:" field (e.g., Achieve a 5% reduction in normalized municipal domestic water consumption per person by installing low flow fittings and self-closing taps on all taps in facility lavatories).

Do Not:

- X Report a target that is not accurate (e.g., the data source is unknown or has not been verified)
- X Report a target that is based on insufficient data. (e.g., a reduction target that is not based on a formal evaluation of options such as equipment upgrades to meet the stated target OR actions to meet the target have not been defined.)
- X Report an estimated target if it is not supported by verifiable and accurate estimation methodology and data (e.g., engineering calculations).

How This Will Be Verified:

When verifying a facility's targets, Verifiers **<u>must</u>** review:

- All supporting evidence (e.g., calculations, water use and baselines, new/proposed equipment specifications, etc) to verify the target is based on a formal evaluation of improvement opportunities.
- Facility operations in relation to its water sources and use to ensure targets and opportunities evaluated are relevant to the site's water use.

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points:
Full Points will be awarded if the facility has established targets for one (1) or more blue water sources and the targets cover greater than 90% (by total blue water use in m3) of blue water used at the facility.

Documentation Required:

- Documentation that supports how the target was established for each water source and are based on a formal evaluation of reduction opportunities. This may include:
    - Water tracking and production data.

- Documented evaluations of new/proposed equipment specifications, modifications to production processes or work practices that will result in water use reductions.
- Supporting calculations methodologies or assumptions used to determine the target.

Interview Questions to Ask:

- Staff responsible for water management can describe how the targets were determined including any calculations or assumptions made in the target setting methodology.
- Relevant staff can describe the facility's proposed actions to achieve the target and how progress is monitored and tracked.

Inspection – Things to Physically Look For:

- The observed water management practices on-site are appropriate in relation to the established targets (e.g., water sources and tracking of water use, etc.)

Partial Points:

- Partial points will be awarded if the facility has established targets for one (1) or more blue water source and the targets cover 50% to 89% (by total blue water use in m3) of blue water used at the facility.

15. Has your facility set targets for increasing grey water use from any source?

Answer Yes if: Your facility has set a target to increase grey water use for one (1) or more sources.

Notes:

- If your facility has not conducted a formal evaluation of opportunities to increase grey water use and calculated how much grey use can be increased to support your target, you should select No for this question.
- For the definition of grey water sources, please refer to the Introduction Section of the water guidance.

If you answer Yes to this question, you will be asked to complete a series of tables with the following questions to provide details on your targets for each applicable grey water source (All applicable grey water sources will be pre-populated in the tables):

- **Select all sources of grey water for which your facility has set a water target.**
    - Have you set a target for this water source?
    - Is this a normalized or absolute target?
    - If normalized, are you setting separate targets based on your facility type?
        - **Note**: If your facility selected multiple facility types in the facility profile structure section of the FEM (e.g., Finished Product Assembler and Material Production), and you set targets for each facility type, a separate table for target data will be displayed for each selected facility type.

For all sources that have targets, you will be asked to complete a table with the following questions based on whether the target is absolute or normalized:

Absolute Targets	Normalized Targets
What is your target for change in water use from this source? (Enter negative value for reduction target or positive value for increased target)	What is your target for change (in %) in water use from this source? (Enter negative value for reduction target or positive value for increased target)
Enter the target year.	What is your normalized baseline based on?
Describe the measures planned to achieve this target.	Enter the target year.
	Describe the measures planned to achieve this target

Suggested Uploads:

- Documentation that supports how the target was established and demonstrates the target is based on a formal evaluation of opportunities to increase grey water use (e.g., water use data and baselines, new/proposed equipment specifications or work practices, etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have established formal targets to increase grey water use at the facility.

Technical Guidance

Increasing the use of grey water through recycling and reuse programs allows a facility to reduce the amount of blue water used at the facility and supports efforts towards a closed loop system that reduces overall water consumption.

Targets can use absolute or normalized metrics to drive quantifiable improvements by a set date compared to the baseline. For Higg FEM, targets to increase grey water use may be normalized to the production volume unit or another appropriate operational metric. A normalized target shows you when progress is real, rather than being a result of business changes such as variation in production. An example of a normalized target is an increase in the cubic metres of grey water used per employee per day for domestic use (e.g., toilet flushing) (m^3/employee per day).

When establishing formal targets to increase grey water use, be sure to do the following:

- Base the target on a formal evaluation of improvement opportunities and actions (e.g., equipment replacement or upgrades) to calculate the increase in the amount of grey water used.
    - For example: Setting a target based on an evaluation of installing a grey water recycling system is expected to result in a 5% in grey water use per employee per day that was calculated based on a formal review of the system manufacturer's specifications and the grey water usage baseline.
- Define the exact target quantity, expressed as a percent (e.g., increase the amount of grey water recycled and used per piece in the screen washing department by 5%). This **must** be based on a formal evaluation as noted above.
- Determine if the target will be Absolute or Normalized to a production or operating metric.
- Define the start date (i.e., "baseline") of the target.
- Define the end date of the target, meaning the intended completion date of the required improvements.
- Define the appropriate measurement units.
- Establish procedures to review the target. This review should include an evaluation of the actions taken and progress on reaching the defined target. Quarterly reviews are recommended.
- Ensure the target is relevant to increasing the site's grey water use.

Reporting Targets in Higg FEM:

Do:

✓ Review the target to ensure all aspects noted above are covered and that the information is accurate.

✓ Enter the targeted increase as a percentage. **Make sure to enter a positive percentage for a target to increase use (e.g., 5 for a 5% increase).**

✓ Provide sufficient details on how the target will be met in the "Describe the measures planned to achieve this target:" field (e.g., Achieve a 20% increase in grey re-use per person by installing a grey water recycling system in facility lavatories).

Do Not:

X Report a target that is not accurate (e.g., the data source is unknown or has not been verified)

X Report a target that is based on insufficient data. (e.g., a target that is not based on a formal evaluation of options such as equipment upgrades to meet the stated target OR actions to meet the target have not been defined.)

X Report an estimated target if it is not supported by verifiable and accurate estimation methodology and data (e.g., engineering calculations).

How This Will Be Verified:

When verifying a facility's targets, Verifiers **must** review:

- All supporting evidence (e.g., calculations, grey water use and baselines, new/proposed equipment specifications, etc) to verify target is based on a formal evaluation of improvement opportunities.
- Facility operations in relation to its water sources and use to ensure targets and opportunities evaluated are relevant to the site's water use.

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points:
Full Points will be awarded if the facility has established targets for **all** grey water sources used at the facility.

Documentation Required:

- Documentation that supports how the target was established for each water source and can demonstrate that they are based on a formal evaluation of opportunities to increase grey water use. This may include:
    - Water tracking and production data.
    - Documented evaluations of new/proposed equipment specifications (e.g., grey water recycling systems), modifications to production processes or work practices that will result in increases in grey water use.
    - Supporting calculations methodologies or assumptions used to determine the target.

Interview Questions to Ask:

- Staff responsible for water management can describe how the targets were determined including any calculations or assumptions made in the target setting methodology.
- Relevant staff can describe the facility's proposed actions to achieve the target and how progress is monitored and tracked.

Inspection – Things to Physically Look For:

- The observed water management practices on-site are appropriate in relation to the established targets (e.g., grey water sources and tracking of water use, etc.)

Partial Points:

- Partial points will be awarded if the facility has established targets for one (1) or more, but not all grey water sources used at the facility.

16. Does your facility set targets to improve the rainwater harvesting capacity at your facility?

Answer Yes if: Your facility has set a target to increase the rainwater harvesting capacity at your facility.

Note: If your facility has not conducted a formal evaluation of opportunities to increase rainwater harvesting capacity and calculated how it can be increased to support your target, you should select No for this question.

If you answer Yes to this question, you will be asked the following sub question(s):

- What is your target for improving your rainwater harvesting capacity? (m3)
- What is your current rainwater harvesting tank capacity? (m3)
- What is the maximum roof/ground area that can be used for rainwater harvesting? (m2)
- What is the current rainwater harvesting area used? (m2)
- What is the average annual rainfall within your area (in mm)?
- Have you utilized the maximum roof /ground area that is feasible for rainwater harvesting for your facility?

If you answer No to this question, you will be asked the following sub question(s):

- What is your current rainwater harvesting tank capacity? (m3)
- What is the maximum roof/ground area that can be used for rainwater harvesting? (m2)
- What is the current rainwater harvesting area used? (m2)
- What is the average annual rainfall within your area (in mm)?
- Have you utilized the maximum roof /ground area that is feasible for rainwater harvesting for your facility?

Suggested Uploads:

- If applicable, documentation that supports how the target was established and demonstrates the target is based on a formal evaluation of opportunities to increase rainwater harvesting capacity (e.g., action plan to increase rain harvesting surface area at the facility, etc.)
- Documentation that supports the calculation of current/potential rain harvesting surface areas at the facility.

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have maximized rainwater harvesting capacity or have established targets to increase rainwater harvesting capacity.

Technical Guidance
Rainwater harvesting is the collection the run-off from a structure (e.g., roof) or other impervious surface in order to store it for later use. Rainwater harvesting helps facilities reduce water consumption from traditional water sources such as municipal sources groundwater reducing environmental impacts and can also help reduce water cost.

Every facility will have a finite amount of surface area that can be used for rainwater harvesting depending on the size (e.g., area in m2) of available surfaces that can be used to collect rainwater. Identifying the current and maximum amount of available area at the facility will allow facilities to determine if harvesting capacity can be increased. If so, formal targets and plans should be developed to increase capacity.

Additionally, to understand rainwater harvesting potential, facilities need to understand rainfall patterns to determine the amount of rainwater that can potentially be harvested. This information is often available from local weather or meteorological websites (e.g., average monthly or annual rainfall quantity)

To determine a facility's rainwater harvesting potential the total surface area at the facility used to collect rainwater is multiplied by the annual rainfall amount.

- For example, 200m2 of surface area x 0.5m of annual rainfall = 100m3 of rainwater will potentially be harvested.

Resources:

- US Department of Energy - Rainwater Harvesting Calculator https://www.energy.gov/femp/articles/rainwater-harvesting-calculator
- Greywater Action – Rainwater Harvesting Resources: https://greywateraction.org/rainwater-harvesting-resources/

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities that have a formal target to increase their rainwater harvesting capacity **or** are already utilizing the maximum available area at the facility (e.g., roof and ground area) to harvest rainwater.

Documentation Required:

- Documentation that supports how the target was established and demonstrates the target is based on a formal evaluation of opportunities to increase rainwater harvesting capacity (e.g., action plan to increase rain harvesting surface area at the facility, historical annual rainfall data, etc.)

- Documentation that supports the calculation of current and/or potential rain harvesting surface areas at the facility (e.g., a scaled facility diagrams showing rainwater harvesting area size)

Interview Questions to Ask:

- Staff responsible for managing the facility's rainwater harvesting program can explain the facility's current harvesting practices and how targets to increase rainwater harvesting capacity were established, or how the facility's harvesting system covers the maximum available area at the facility.

Inspection - Things to Physically Look For:

- Observations on site indicate the facility has accurately determined the available rainwater harvesting areas (current and maximum available area) and any established targets are consistent with potential harvesting capacity on site.

Partial Points: N/A

17. Does your facility have an implementation plan to improve water use?

Answer Yes if: Your facility has a current documented plan with defined actions that your facility is planning to implement to improve water use.

Answer Partial Yes if: Your facility has a documented plan in place with defined actions, however you have not started work on **all** of the listed actions in the plan.

If you answer Yes or Partial Yes to this question, you will be asked the following sub question(s):

- Please upload a copy of the plan.

Suggested Uploads:

- A copy of the implementation plan that includes details of the specific actions the facility plans to take to improve water use with implementation timelines.
- Documentation to support the calculated water use improvements from actions listed in the plan (e.g., specification from new equipment, process modifications, etc.)

What is the intent of the question?
The intent of this question is for facilities to demonstrate that they have identified and evaluated water use improvement opportunities and have established formal plans with defined actions to improve water use at the facility.

Technical Guidance:
Creating an implementation plan includes the process of reviewing and evaluating available options to improve water use. The key steps of creating an implementation plan should include the following:

- Identify improvement opportunities through internal assessment by qualified personnel or third-party experts.
- Evaluate improvement options to determine the most suitable options (e.g., feasibility studies, cost benefit analyses)
- Approve funds/budget for chosen options.
- Create a timeline and define the actions needed to implement the solution and realize reductions.
- Conduct regular reviews of the implementation plan check on progress.

Some examples of actions that can result in water use improvements include:

- Recycling and reusing water (e.g., condensate or cooling water).
- Collecting and reusing process or rinse water.
- Using low liquor dyeing machines.
- Using batch rinsing instead of continuous flow washes.
- Dye batch scheduling to reduce equipment cleaning/rinsing (group similar colours on dye machines).
- Dye fixation ratio optimization for fewer rinse cycles.
- Improved chemicals to reduce water usage.

Resources:

- Clean by Design Ten Best Practices: https://apparelimpact.org/case_study/best-practices/
- US EPA Lean & Water Toolkit: https://www.epa.gov/sustainability/lean-water-toolkit-chapter-2
- Implementation plan template: https://howtohigg.org/fem-landing/fem-templates/

How This Will Be Verified:

Full Points:
Full Points will be awarded if the facility has an implementation and has started work on all the action items listed in the plan.

Documentation Required:

- An implementation plan that includes details of the specific actions the facility plans to take to improve water use. This may include:
    - Documentation of the water consumption

- Specifications or calculated water improvements from proposed new equipment or process modifications in the implementation plan that show the expected improvements.
- Implementation timelines (i.e., the planned start and completion dates for actions listed in the plan).

Notes:

- Actions to improve water use should not consider improvements due to reductions in production volume or equipment operating time as these factors will not result in sustainable improvements.
- If the facility has completed all actions in the plan prior to reporting year and does not have an implementation plan for improvements in the reporting year and beyond, a No response should be selected (i.e., points are not awarded for historical plans that were implemented prior to the reporting year).

Interview Questions to Ask:

- Staff responsible for the implementation plan can explain the facility's process for evaluating improvement opportunities and the facility's implementation plans and actions to improve water use.

Inspection - Things to Physically Look For:

- The actions listed in the implementation plans directly relate to the observed water use onsite.

Partial Points:

- Partial Points will be awarded if the facility has an implementation plan that meets the above requirements but has not started on all action items in the plan.

18. Has your facility reduced blue water use for any sources, compared with your baseline?

Answer Yes if: Your Facility has reduced blue water use for one (1) or more of your blue water sources (except rainwater) compared with your baseline.

Note: Reductions in water use due to reductions in production volume should not be considered as improvements as this will not result in sustainable improvements.

If you answer Yes to this question, you will be asked to complete a table with the following questions to provide details on your reductions for each applicable blue water source:

- This is your reported baseline quantity.
- This is your reported unit of measure.
- This is your reported baseline year.
- **Note**: The above data will be auto populated in the table based on your reported baseline data.
- Has your facility reduced water consumption for this source compared with its baseline?
- What is your achievement for change (in %) in water use from this source compared to its baseline? (Enter a negative value for reduction and a positive value for increase)
- Describe the strategies used to achieve this improvement.

Note: If your facility selected multiple facility types in the facility profile structure section of the FEM (e.g., Finished Product Assembler and Material Production), a separate table for improvement data will be displayed for each selected facility type.

Suggested Uploads:

- Documentation that supports a reduction in blue water use was achieved and that the reduction was related to specific actions taken by the facility to reduce water use (e.g., water consumption data and baselines, evidence of process modifications, new equipment or work practices that resulted in improvements).

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have reduced blue water use at the facility.

Technical Guidance:

Reductions can be absolute or normalized, however it is recommended that you show normalized reductions such as "Groundwater use was reduced by 0.17 m3 per unit of production in the reporting year" This is because normalized metrics show real improvement rather than reductions from business changes such as reduced production.

When evaluating your water use reductions, be sure to do the following:

- Review the water source data and aggregated total to ensure the data and any automated calculations are accurate.
- Review the actions taken to make improvements and determine if they have resulted in measurable improvements by comparing the data with historical water use data to determine the improvement quantity. **Note:** Historical data accuracy should also be verified.
    - For example: Installation of a steam condensate recovery system produced a 2% year over year reduction in normalized water consumption per meter of fabric

produced. This was measured using sub meters installed in the condensate recovery system and the site's overall municipal water use data.

Reporting Improvements in Higg FEM:

Do:

- ✓ Review the improvement data to ensure all aspects noted above are covered and that the information is accurate.
- ✓ Input the percent (%) change in the water use from the baseline year. (e.g., -5 for a 5% reduction or 5% for a 5% increase)
- ✓ Provide sufficient details in the "Describe the strategies used to achieve this improvement:" field (e.g., Normalized water use was reduced by reusing rinse water in the washing process).

Do Not:

- X Report improvements that are not accurate (e.g., the data source is unknown or has not been verified)
- X Report an improvement that is absolute and relates to a decrease in production or reduced facility operations. This is why data normalization is important.
- X Report an improvement that is based on insufficient data. (e.g., an overall reduction was achieved but this was not related to measurable or defined actions taken to achieve the reduction). This is particularly important when the improvements are marginal (e.g., less than 1-2%) and possibly attributable to measurement/ tracking errors and/or operational variability.

How This Will Be Verified:

When verifying a facility's improvements, Verifiers **must** review:

- All supporting evidence (e.g., water use data and baselines, etc.) to verify the reported reduction quantity is accurate and attributable to measurable actions taken to reduce water use.
- The implemented changes or actions taken to achieve the improvements.

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points:
Full Points will be awarded if the facility has reduced blue water use compared with the baseline quantity **and** achieved year over year reductions for **all** blue water sources (except rainwater).

Note: Points are automatically calculated in the Higg FEM and awarded for an improvement of any amount (i.e., scoring is not based on the amount of the improvement achieved).

Documentation Required:

- Documentation that demonstrates reductions were achieved for each applicable water source and result from specific actions taken by the facility to reduce water use. This may include:
    - Water use tracking data showing reductions in water use.
    - Documented evidence of facility actions to reduce water use (e.g., evidence of process modifications, new equipment or work practices that resulted in reductions).
    - Supporting calculations methodologies or assumptions used to determine the improvements.

Interview Questions to Ask:

- Staff responsible for water management can describe how reductions were achieved including any calculations or assumptions made determining the reductions.

Inspection – Things to Physically Look For:

- Onsite observations that indicate the facility has implemented the noted actions to reduce water use (e.g., process modifications, new equipment, or work practices).

Partial Points:

- Partial Points will be awarded if the facility has achieved reductions in blue water use compared with the baseline quantity **or** achieved year over year reductions for one (1) or more, but not all blue water sources (except rainwater).

19. Has your facility increased grey water use for any sources, compared with your baseline?

Answer Yes if: Your Facility has increased grey water use for one (1) or more of your sources compared with your baseline.

If you answer Yes to this question, you will be asked to complete a table with the following questions to provide details on your reductions for each applicable grey water source:

- This is your reported baseline quantity.
- This is your reported unit of measure.
- This is your reported baseline year.
- **Note**: The above data will be auto populated in the table based on your reported baseline data.
- Has your facility increased water consumption for this source compared with its baseline?
- What is your achievement for change (in %) in water use from this source compared to its baseline? (Enter a negative value for reduction and a positive value for increase)

- Describe the strategies used to achieve this improvement.

Note: If your facility selected multiple facility types in the facility profile structure section of the FEM (e.g., Finished Product Assembler and Material Production), a separate table for improvement data will be displayed for each selected facility type.

Suggested Uploads:

- Documentation that supports an increase in grey water use was achieved and that the increase was related to specific actions taken by the facility to increase use (e.g., water consumption data and baselines, evidence of process modifications, new equipment or work practices that resulted in improvements).

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have increased grey water use at the facility.

Technical Guidance:

Increases in grey water use can be absolute or normalized, however it is recommended that you show normalized reductions such as "Grey use was increased by 0.05 m3 per unit of production in the reporting year" This is because normalized metrics show real improvement rather than reductions from business changes such as reduced production.

When evaluating your water use reductions, be sure to do the following:

- Review the water source data and aggregated total to ensure the data and any automated calculations are accurate.
- Review the actions taken to make improvements and determine if they have resulted in measurable improvements by comparing the data with historical water use data to determine the improvement quantity. **Note:** Historical data accuracy should also be verified.
    - For example: Installation of a grey water capture and recycling system produced a 15% year over year increase in normalized water consumption per meter of fabric produced. This was measured using sub meters installed on the recycling system and the site's overall grey water use data.

Reporting Improvements in Higg FEM:

Do:

✓ Review the improvement data to ensure all aspects noted above are covered and that the information is accurate.

- ✓ Input the percent (%) change in the water use from the baseline year. (e.g., 5 for a 5% increase)
- ✓ Provide sufficient details in the "Describe the strategies used to achieve this improvement:" field (e.g., Normalized water use was reduced by reusing rinse water in the washing process).

Do Not:

- X Report improvements that are not accurate (e.g., the data source is unknown or has not been verified)
- X Report an improvement that is absolute and relates to a decrease in production or reduced facility operations. This is why data normalization is important.
- X Report an improvement that is based on insufficient data. (e.g., an overall reduction was achieved but this was not related to measurable or defined actions taken to achieve the reduction). This is particularly important when the improvements are marginal (e.g., less than 1-2%) and possibly attributable to measurement/ tracking errors and/or operational variability.

How This Will Be Verified:

When verifying a facility's improvements, Verifiers **must** review:

- All supporting evidence (e.g., water use data and baselines, etc.) to verify the reported reduction quantity is accurate and attributable to measurable actions taken to reduce water use.
- The implemented changes or actions taken to achieve the improvements.

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points:
Full Points will be awarded if the facility has increased grey water use compared with the baseline quantity **and** achieved year over year increase for **all** grey water sources.

Note: Points are automatically calculated in the Higg FEM and awarded for an improvement of any amount (i.e., scoring is not based on the amount of the improvement achieved).

Documentation Required:

- Documentation that demonstrates increases were achieved for each applicable water source and result from specific actions taken by the facility to increase grey water use. This may include:
    - Water use tracking data showing increases in grey water use.

- Documented evidence of facility actions to increase grey water use (e.g., evidence of process modifications, new equipment or work practices that resulted in increases).
- Supporting calculations methodologies or assumptions used to determine the improvements.

Interview Questions to Ask:

- Staff responsible for water management can describe how increases were achieved including any calculations or assumptions made determining the reductions.

Inspection – Things to Physically Look For:

- Onsite observations that indicate the facility has implemented the noted actions to increase water use (e.g., process modifications, new equipment, or work practices).

Partial Points:

- Partial Points will be awarded if the facility has achieved increases in grey water use compared with the baseline quantity **or** achieved year over year increases for one (1) or more, but not all grey water sources.

20. Does your facility have a plan to reduce your absolute blue water use?

Answer Yes if: Your facility has a current documented plan with defined actions to reduce absolute blue water use.

Notes:

- Absolute blue water use refers the total amount of blue water used at the facility over a given period of time (e.g., 15,000m3 per year)
- Plans to reduce production volume to achieve this reduction should not be considered as this will not result in sustainable improvements.

If you select Yes to this question, you will be asked the following sub question(s):

- Which blue water source does your facility have a plan to reduce?
- What is your plan and /or what are the steps you plan to follow to reduce blue water use?
- Please upload your plan

Suggested Uploads:

- A copy of the plan that includes details of the specific actions the facility plans to take to reduce absolute blue water use with implementation timelines.
- Documentation to support the calculated water use reduction from actions listed in the plan (e.g., specification from new equipment, process modifications, work practices, etc.)

What is the intent of the question?
The intent of this question is for facilities to demonstrate that they have identified and evaluated water use improvement opportunities and have established formal plans with defined actions to reduce absolute water use at the facility.

Technical Guidance:
Creating an implementation plan includes the process of reviewing and evaluating available options to reduce blue water use. The key steps of creating an implementation plan should include the following:

- Identify improvement opportunities through internal assessment by qualified personnel or third-party experts.
- Evaluate improvement options to determine the most suitable options (e.g., feasibility studies, cost benefit analyses)
- Approve funds/budget for chosen options.
- Create a timeline and define the actions needed to implement the solution and realize reductions.
- Conduct regular reviews of the implementation plan to check on progress.

Some examples of actions that can results in reductions in blue water use include, but are not limited to:

- Recycling and reusing water (e.g., condensate or cooling water).
- Collecting and reusing process or rinse water.
- Using low liquor dyeing machines.
- Using batch rinsing instead of continuous flow washes.
- Dye batch scheduling to reduce equipment cleaning/rinsing (group similar colours on dye machines).
- Dye fixation ratio optimization for fewer rinse cycles.
- Improved chemicals to reduce water usage.

Resources:

- Clean by Design Ten Best Practices: https://apparelimpact.org/case_study/best-practices/
- US EPA Lean & Water Toolkit: https://www.epa.gov/sustainability/lean-water-toolkit-chapter-2
- Implementation plan template: https://howtohigg.org/fem-landing/fem-templates/

How This Will Be Verified:

Full Points:
Full Points will be awarded if the facility has a plan that includes details of the specific actions the facility plans to take to reduce absolute blue water use with implementation timelines.

Documentation Required:

- A documented plan that includes details of the specific actions the facility plans to take to reduce blue water use. This may include:
    - Documentation of the water consumption
    - Specifications or calculated water use reductions from proposed new equipment or process modifications in the implementation plan that show the expected reductions.
    - Implementation timelines (i.e., the planned start and completion dates for actions listed in the plan).

Notes:

- Actions to reduce water use should not consider improvements due to reductions in production volume or equipment operating time as these factors will not result in sustainable improvements.
- If the facility has completed all actions in the plan prior to reporting year and does not have a plan for reductions in the reporting year and beyond, a No response should be selected (i.e., points are not awarded for historical plans that were implemented prior to the reporting year).

Interview Questions to Ask:

- Staff responsible for the plan can explain the facility's process for evaluating improvement opportunities and the facility's plans and actions to reduce water use.

Inspection - Things to Physically Look For:

- The actions listed in the plans directly relate to the observed water use onsite.

Partial Points: N/A

Water use - Level 3

21. Have you eliminated (reduced more than 90%) the use of groundwater for your production processes?

Answer Yes if: Your facility used less than 10% of total groundwater use in the FEM reporting year for production processes.

Answer Not Applicable if: Your facility does not use groundwater for production processes.

Note: Production processes are defined as manufacturing processes used to make goods. This does not include groundwater use for domestic purposes (e.g., washrooms, food preparation, etc) or facility operational use (e.g., boilers).

If you answer Yes to this question, you will be asked the following sub question(s):

- Describe the strategies used to achieve this.

Suggested Uploads:

- Documentation that demonstrates the facility used less than 10% of its total groundwater for production processes in the FEM reporting year (e.g., groundwater consumption tracking that shows how much of total groundwater is used for production vs. other uses, meter records, etc.)

What is the intent of the question?
The intent of this question is for facilities to demonstrate they have taken action to eliminate or reduce (more than 90%) of groundwater that is used for production processes.

Technical Guidance
Excessive use of groundwater can have significant impacts on local water supply and availability. It can contribute to the depletion of local surface water sources (streams, lakes) and impact the capacity of aquifers to store water for future uses. Facilities should strive to eliminate the use of groundwater, when possible, to minimize these impacts and proactively strive to reduce overall water use to improve sustainability and environmental performance.

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that demonstrates the facility used less than 10% of its total groundwater for production processes in the FEM reporting year. This may include:
    - Groundwater consumption tracking that shows how much of total groundwater is used for production vs. other uses,
    - Ground water metering records.

Interview Questions to Ask:

- Staff responsible for water management can explain how the facility tracks groundwater use in production as well as any actions the facility has taken to reduce or eliminate ground water use in production processes.

Inspection - Things to Physically Look For:

- Observations onsite indicate that the reported amount of groundwater being used in production processes is consistent with the observed water use onsite.

Partial Points: N/A

22. Can your facility demonstrate you have reduced your overall absolute blue water use?

Answer Yes if: Your facility has reduced absolute blue water use (except rainwater) compared with your baseline.

Note:
- Absolute blue water use refers the total amount of blue water used at the facility over a given period of time (e.g., 15,000m3 per year)
- Reductions in water use due to reductions in production volume should not be considered as improvements as this will not result in sustainable improvements.

If you answer Yes to this question, you will be asked the following sub question(s):
- How much has your facility reduced (%)?
- What is your baseline absolute quantity?
- Describe the strategies used to achieve this improvement.

Suggested Uploads:
- Documentation that supports a reduction in absolute blue water use was achieved and that the reduction was related to specific actions taken by the facility to reduce water use (e.g., water consumption data and baselines, evidence of process modifications, new equipment or work practices that resulted in improvements).

What is the intent of the question?
The intent of this question is for facilities to demonstrate that they have reduced absolute blue water use at the facility.

Technical Guidance:
Reducing absolute blue water use at a facility means that less water in total is being used by the facility which can help reduce water stress and scarcity in the community and regions they operate. This should be achieved through driving improvements in water use efficiency to reduce the amount of water needed to operate the facility.

When evaluating your water use reductions, be sure to do the following:

- Review the water source data and aggregated total to ensure the data and any automated calculations are accurate.

- Review the actions taken to make improvements and determine if they have resulted in measurable improvements by comparing the data with historical water use data to determine the improvement quantity. **Note:** Historical data accuracy should also be verified.
    - For example: Installation of a steam condensate recovery system produced a 2% year over year reduction in normalized water consumption per meter of fabric produced. This was measured using sub meters installed in the condensate recovery system and the site's overall blue water use data.

Reporting Improvements in Higg FEM:

Do:

✓ Review the improvement data to ensure all aspects noted above are covered and that the information is accurate.
✓ Input the percent (%) change in the water use from the baseline year. (e.g., -5 for a 5% reduction)
✓ Provide sufficient details in the "Describe the strategies used to achieve this improvement:" field (e.g., absolute water use was reduced by reusing rinse water in the washing process).

Do Not:

X Report improvements that are not accurate (e.g., the data source is unknown or has not been verified)
X Report an improvement that is absolute and relates to a decrease in production or reduced facility operations as these are not sustainable improvements.
X Report an improvement that is based on insufficient data. (e.g., an overall reduction was achieved but this was not related to measurable or defined actions taken to achieve the reduction). This is particularly important when the improvements are marginal (e.g., less than 1-2%) and possibly attributable to measurement/ tracking errors and/or operational variability.

How This Will Be Verified:

When verifying a facility's improvements, Verifiers **must** review:

- All supporting evidence (e.g., water use data and baselines, etc.) to verify the reported reduction quantity is accurate and attributable to measurable actions taken to reduce water use.
- The implemented changes or actions taken to achieve the improvements.

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points:
Full Points will be awarded if the facility has reduced absolute blue water use (except rainwater) compared with the baseline.

Note: Points are awarded for a reduction of any amount (i.e., scoring is not based on the amount of the reduction achieved).

Documentation Required:

- Documentation that demonstrates reductions were achieved in absolute blue water use and result from specific actions taken by the facility to reduce water use. This may include:
    - Water use tracking data showing reductions in water use.
    - Documented evidence of facility actions to reduce water use (e.g., evidence of process modifications, new equipment or work practices that resulted in reductions).
    - Supporting calculations methodologies or assumptions used to determine the improvements.

Interview Questions to Ask:

- Staff responsible for water management can describe how reductions were achieved including any calculations or assumptions made determining the reductions.

Inspection – Things to Physically Look For:

- Onsite observations that indicate the facility has implemented the noted actions to reduce water use (e.g., process modifications, new equipment, or work practices).

Partial Points: N/A

23. Does your facility report or disclose water risk and consumption to an external reporting standard, i.e., GRI / CDP?

Answer Yes if: Your facility has reported water risk and consumption data using an external reporting standard or platform such as Global Reporting Initiative (GRI) or CDP **or** your facility is part of a manufacturing group/organization and your facility's water risk/consumption is included in the water use disclosure report of the manufacturing group/organization.

Note: The reported data must be from the current Higg FEM reporting year (e.g., For FEM 2023, water risk/consumption data from 2023 must be reported) **or** within the latest reporting cycle of the external reporting standard (e.g. if financial is required).

If you select Yes to this question, you will be asked the following sub question(s):

- Please provide a link to the report / disclosure.

Suggested Uploads:

- Documentation that supports your reported water risk and/or consumption data (e.g., Water risk/consumption data, copy of external report, etc.)

What is the intent of the question?
The intent of this question is for facilities to demonstrate that they have reported water risk and consumption data using an external standard or platform.

Technical Guidance
Reporting water risk and consumption data using a recognized standard or platform (e.g., GRI - Water and Effluent or CPD – Water Security reporting standards) provides a way for facilities to ensure data is reported using a consistent standardized methodology that defines accepted criteria for the scope and type of information that needs to be reported.

This can also benefit facilities in a number of ways including:

- Enhances a facility's reputation through transparent reporting of environmental data.
- Allows accurate information to be used internally and externally to support and measure sustainability efforts.
- Allows facilities to stay ahead of increasing requirements (legal and other) for reporting of environmental and sustainability data.

Resources:

- Global Reporting Initiative (GRI): https://www.globalreporting.org/
- CDP https://www.cdp.net/en

How This Will Be Verified:

Full Points:
Full points will be awarded if the facility has reported water risk and consumption data using an external reporting standard or platform **or** your facility is part of a manufacturing group/organization and your facility's water risk/consumption is included in the water use disclosure report of the manufacturing group/organization.

Documentation Required:

- Documentation that shows the facility has reported water risk/consumption data using an external standard or platform. This may include:
    - Copy or water use disclosure report or link to the relevant platform where the information was reported and is visible.
    - Water risk and consumption tracking data that confirms the reported data is accurate.

- If the facility's operations are included in water use disclosure reporting of a larger manufacturing group or organization, supporting documentation that shows the report includes the facility's operations.

Interview Questions to Ask:
- Staff responsible for water management can explain the facility's reporting methodology and external platform/standard used.

Inspection – Things to Physically Look For:
- Onsite observations are consistent with reported water risk and consumption at the facility.

Partial Points: N/A

24. Can your facility demonstrate positive impact onto the water catchment/basin area or water source in your community?

Answer Yes if: Your facility has taken action that has resulted in a positive impact on the water catchment/basin area or water source(s) in your community.

Note: The actions referred to in this question must include action outside of the facility's operational boundary that impact the larger water catchment/basin area in the community.

If you select Yes to this question, you will be asked the following sub question(s):
- Describe the strategies used to achieve this.

Suggested Uploads:

- Documentation that demonstrates the facility has taken action to support positive impacts on the water catchment/basin in the community (e.g., list of important water related areas and their current state, records of community engagement meetings on watershed management, list of improvement actions or initiatives the facility has taken or contributed to, etc.)

What is the intent of the question?
The intent of this question is for facilities to demonstrate that actions have been taken that resulted in a positive impact on the water catchment/basin area and/or water source(s) in the community.

Technical Guidance

A water catchment or basin area (sometimes referred to as a watershed or drainage basin) is a geographic area where all water flows to a common point or body of water, such as a lake, river, or aquifer. It consists of streams, rivers, springs or other water collection systems. The health of a water catchment or basin area is important because it serves as a natural area for the management of local water resources, the protection of ecosystems, and the planning of water use and development activities.

The Alliance for Water Stewardship (https://a4ws.org/) has created a certification framework and guidance to help facilities identify proactively work to improve water stewardship in the communities they operate in.

An important part of supporting improvements within a catchment/basin area is identifying Important Water-Related Areas (IWRA) which are areas that, if impaired or lost, would negatively impact the environmental, social, cultural, or economic benefits. When identifying IWRAs it is important work with stakeholders in the community to identify and consider the following aspects:

- Environmental Importance - The natural features supporting landscapes and ecosystems. Examples include:
    - Water features: river, stream, spring, waterfall, lake, ponds)
    - Wetlands
    - Recharge zones for aquifers
    - Designated conservation sites.
- Community Importance - Areas that provide resources and features essential to meeting basic needs. Examples include:
    - Water sources for drinking water (e.g., wells, springs, surface water)
    - Freshwater animals or plants relied on by communities for food or other benefits.
- Cultural Importance - Water-related features may have important cultural, religious, or spiritual value to the community or indigenous peoples. Examples include:
    - Waterfalls, springs, or lakes of special cultural significance
- Economic Importance - Water or areas that are essential for economic development and stability. Examples include:
    - Water/areas for drinking water, industrial or agricultural supply.
    - Water/areas that support ecosystem services such as climate regulation or flood mitigation. Or natural plant/animal food stocks.

Once IWRAs and their current state have been evaluated, actions can be evaluated through collaborative partnerships to determine where to focus efforts to support positive improvements which can include, but are not limited to:

- Working in partnership to reduce net water abstraction from the catchment/basin.
- Projects to replenish water elsewhere in the catchment to offset site water consumption. This allows for facilities to use the volume of water needed, but overall, the site is still improving the catchment water balance.
- Restoration or protection/conservation projects for IWRA.

- Provision or support for provision of a sufficient supply of safe drinking water for surrounding communities.
- Provision or support for the provision of sufficient and improved standard facilities for toilets and washrooms in the surrounding community.
- Provide training for local communities on good hygiene practices (related to water use and wastewater disposal)
- Where there is no strong case of the need for physical actions, facilities may work with community stakeholders to communicate the importance and good practices for water stewardship principles.

Resources:

- Alliance for Water Stewardship https://a4ws.org/
- The AWS International Water Stewardship Standard https://a4ws.org/the-aws-standard-2-0/

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that demonstrates the facility has taken action to support positive impacts on the water catchment/basin in the community. This may include:
    - List of Important Water-Related Areas (IWRA) and evaluation of their current state
    - List of improvements actions or initiatives the facility has taken or contributed to.
    - Records of community engagement meetings on watershed management.

Interview Questions to Ask:

- Staff responsible for managing projects on water catchment impacts and improvements can describe how the facility has identified the need for action, the actions the facility has taken or contributed to, and how the facility engages with the community on watershed management issues.

Inspection - Things to Physically Look For:

- If applicable, evidence onsite that the facility has taken action to support positive impacts on the water catchment/basin in the community (e.g., postings or community newsletters detailing the facility's actions).

Partial Points: N/A

25. Does your facility implement any "leading technology" practices to significantly reduce water use in the manufacturing process?

Answer Yes if: Your facility has implemented leading technology that resulted in a significant reduction of water use.

Note: For this question, the following terms are defined as follows:

- **Leading technology** - means the use of (including but not limited to) equipment or raw materials.
- **Significantly reduce water use** – means any technology has resulted in a demonstrable water use reduction of 50% or more when compared to conventional processing and methods.

If you select Yes to this question, you will be asked the following sub question(s):

- Describe the practices implemented.

Suggested Uploads:

- Documentation that demonstrates the facility has implemented leading technology that has resulted in significant reduction in water use (e.g., water consumption data and baselines, photos or documentation of process modifications, new equipment or raw materials that resulted in the reduced water use).

What is the intent of the question?
The intent of this question is for facilities to demonstrate that leading technology has been implemented to reduce water use.

Technical Guidance
New manufacturing techniques, equipment and raw materials are constantly evolving to support reductions in impacts on the environment. The use of leading technology can help facilities achieve significant reductions in water consumption and increase operational efficiency.

Some leading technology include, but are not limited to:

- Use of Water-efficient equipment/processes (e.g., waterless dyeing or treatment technologies, low liquor dyeing, laser finishing as opposed to water-based treatments for textiles).
- Use of alternative raw materials that require less water use (e.g., chemicals that require less water for fixation and rinses).
- Use of advanced treatment technology for reuse/recycling (e.g. membrane filtration, reverse osmosis, zero liquid discharge (ZLD) treatment systems)
- Digitization of water management (e.g., automation of water use optimization such as real-time monitoring and control systems for water flow and dosing control).

Resources:

- Apparel Impact Institute https://apparelimpact.org/

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities that have implemented any leading technology including but not limited to equipment or raw materials that has resulted in a water use reduction of 50% or more when compared to conventional processing and methods.

Documentation Required:

- Documentation that demonstrates the facility has implemented leading technology that has significantly reduced water use. This may include:
  - Water use tracking data showing reductions in water use.
  - Documented evidence of facility actions to reduce water use (e.g., evidence of process modifications, new equipment, or technology).
  - Supporting calculations methodologies or assumptions used to determine the water use reduced from new technology used.

Interview Questions to Ask:

- Staff responsible for water management can describe the leading technology implemented and how reductions were demonstrated including any calculations or assumptions made determining the reductions.

Inspection – Things to Physically Look For:

- Onsite observations that indicate the facility has implemented the noted technology to reduce water use (e.g., process modifications, new equipment, or technology).

Partial Points: N/A

26.Has your facility set a Science-Based Target on Water?

Answer Yes if: Your Facility has set a Science-Based Target for water use **or** if your facility is part of a manufacturing group/organization that has set a Science-Based Target for water use that specifically includes your facility's operations and impacts on your local water catchment/basin area.

Notes:

- Targets are considered ‘science-based’ if they are in line with what the latest hydrological science says is necessary to meet the sustainable freshwater quantity and quality targets for a water catchment/basin.
- If your facility has set water use targets, but these have not been formally evaluated to determine if they align with specific hydrological science for sustainable water use (quantity and quality) in your water catchment/basin area, you should answer No to this question.

If you answer Yes to this question, you will be asked to complete the following sub question(s):

- Please indicate which methodology you use to set the Science-Based Target:
  - SBTN
  - Other
- If Other, please specify.
- Has this Science-Based Target been approved?
- What is your Science-Based Target?

If you answer No to this question, you will be asked to complete the following sub question(s):

- Is your facility preparing to set a Science-Based Target?

Suggested Uploads:

- Documentation that supports your facility’s Science-Based Target for water (e.g., water risk evaluation for the facility's catchment/basin area, evaluations of the facility's baseline risk and contribution to water challenges in the catchment, water use target and/or impact evaluation, etc.).

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have established science-based targets for water use.

Technical Guidance:

Targets are considered ‘science-based’ if they are in line with what the latest hydrological science says is necessary to meet the sustainable freshwater quantity and quality targets for a water catchment/basin.

The process of setting a since based water target can be complex as there are many factors that need to be evaluated and understood. The key principles to consider and evaluate when setting a target include:

- Understand and evaluate the material challenges with the catchment (e.g., operational risks and impacts of facility operations).
- Determine the facility's special scope (e.g., the on and off site boundaries which the facility's water use and discharge has an impact on).
- Prioritize the challenges/risks within the catchment (e.g., by evaluating the catchment risks combined with the facility's operational risk).
- Determine the desired conditions for the priority challenges within the catchment. These can be qualitative or quantitative (e.g., eliminate fish kills in the local river due to high water temperature in warmer seasons, or maintaining stream temperature below 20 degrees Celsius to support natural fish habitat).
- Assess the gap between the current and desired conditions. Where possible scientific data should be used to quantify and evaluate these gaps (e.g., the difference in percentage of community members with access to safe drinking water, difference in the current and desired pollutant loading of local waterway)
- Determine the facility's contribution towards the desired conditions (e.g., does the facility's wastewater have a material impact on the catchment and can this be reduced).
- Identify other collaborative water stewardship efforts or initiatives that the facility can take part in.
- Set targets that will contribute to efforts to meet desired conditions.

Resources:

- Science Based Target for Nature – Initial guidance for Business https://sciencebasedtargetsnetwork.org/wp-content/uploads/2020/11/Science-Based-Targets-for-Nature-Initial-Guidance-for-Business.pdf
- CEO Water Mandate – Contextual Water Targets https://ceowatermandate.org/site-targets-guide/

How This Will Be Verified:

Note: This question is currently unscored.

Documentation Required:

- Documentation that shows the facility has set a Science-Based Target for water. This may include:
    - Water risk evaluation for facility's catchment/basin area,
    - Evaluations of facility's operational risk and contribution to water challenges in the catchment/basin.
    - Water use target and/or impact evaluation (e.g., desired conditions and gap analysis)

- Documentation to support the facility's planned actions and/or community engagement to meet the target.
- If the facility's operations are included in a Science-Based Target of a larger manufacturing group or organization, supporting documentation that shows the target includes the facility's operations.
- If the facility is planning to set a target, supporting information (such as those noted above) that is being used for target planning.

Interview Questions to Ask:

- Staff responsible for water management and stewardship are able to explain the facility's methodology for setting the Science-Based Target.

Inspection – Things to Physically Look For:

- Onsite observations are consistent with reported business activities or other supporting documentation associated with the target.

Partial Points: N/A

Wastewater

General Introduction

Wastewater can be a significant contributor to pollution and contamination of surrounding natural systems and communities if not managed, treated, and/or disposed of appropriately. The operational, environmental, and financial impacts of wastewater are key issues for facility operations. Driving efficient water use and reducing the amount of contaminants discharged to the environment from facility operations is an important area of focus for all factories.

In general, the Higg FEM wastewater section encourages you to:

- Identify and characterize wastewater sources at your facility (e.g., domestic, and industrial wastewater).
- Track the quantity of wastewater generated and discharged from your facility.
- If applicable, ensure that wastewater discharges adhere to all legal requirements for onsite or offsite treatment.
- Ensure that onsite wastewater treatment systems are designed and operated appropriately, and contingency plans are in place in case of treatment system failures.
- Identify, characterize, and track sludge generated onsite and ensure it is disposed of properly.
- Align with progressive industry wastewater standards that focus on eliminating or minimizing the discharge of hazardous chemicals.
- Implement leading practices and technology to improve wastewater treatment and increase reuse/recycling of wastewater.

Additional details on the intent and criteria for each Higg FEM Wastewater question is provided in the guidance below along with useful technical guidance and resources to support your facility with the management wastewater.

ZDHC Partnership and Resources

One of the SAC's partner organizations, the ZDHC group, has developed a variety of wastewater related standards and resources for wastewater management and discharge that are referenced throughout the Higg FEM Guidance. For more information on the ZDHC, its initiatives, and resources, we encourage you to visit the links throughout this guidance and/or visit their website here: https://www.roadmaptozero.com/?locale=en.

One of the foundational aspects of the ZDHC's Roadmap to Zero Programme is the ZDHC Wastewater Guidelines which is a living document that sets a single, globally unified expectation across the textile, leather and footwear industry supply chain for industrial wastewater and sludge. They define the guidelines for wastewater discharge, sludge quality and disposal pathways. The ZDHC Wastewater Guidelines and other relevant supporting guidelines and references can be found here: https://www.roadmaptozero.com/output#guidelines.

Guidance for Hardgoods facilities: Whilst the ZDHC Wastewater Guidelines are not directly applicable to hardgoods manufacturers, they are encouraged to align with the guidelines where appropriate and/or adopt equivalent industry best practices.

Wastewater at Your Facility

Wastewater can be generated from a variety of sources. In the Higg FEM, wastewater is categorized as follows:

- **Domestic Wastewater:** Wastewater originating from domestic/sanitary usage such as toilets, bathing, personal laundry and kitchens**.**

- **Industrial Wastewater:** Water that has been used for manufacturing processes and no longer meets the quality standard for beneficial use (e.g., wastewater from production, lubrication, cooling, maintenance, cleaning of production machines, etc.)

- **Stormwater:** Water that originates from precipitation (e.g., rainwater) that accumulates on and runs off **roofs**, hard standing surfaces, car parks, etc. (sometimes referred to as surface water run-off)

The table below provides examples of common wastewater sources that are characterized as either domestic or industrial wastewater in the FEM.

Domestic Wastewater	Industrial Wastewater
• Dormitory wastewater • Canteen/kitchen wastewater • Office wastewater • Non-contact cooling water	• Process Wastewater • Facility maintenance wastewater • Waste gas treatment facility wastewater • Coal/waste/Sludge pile leachate • Contact cooling water

Note: It is expected that facilities comply with all applicable legal requirements related to the classification and discharge of domestic and industrial wastewater.

Wastewater Treatment

The most appropriate or effective options to treat wastewater will depend on a number of factors, including, the composition and volume of the wastewater, applicable legal requirement, available external infrastructure (e.g., offsite treatment facilities). In the Higg FEM, a facility's wastewater treatment is categorized as one of the following:

- **On-site Wastewater Treatment Only**: This is treatment that is performed onsite at a facility in a wastewater treatment plant used managed/operated by the facility. After on-site treatment, the wastewater is discharged to the environment.

- **Zero-Liquid Discharge (ZLD):** ZLD is a type of onsite treatment that is designed so no water leaves a facility in liquid form. At a facility with on-site ZLD treatment system, almost all wastewater is treated and recovered such that the only water discharged from the facility exists by evaporation or as moisture in the sludge from treatment plant operations. A facility is not considered to have a ZLD treatment system if there is any industrial liquid discharge (Source: ZDHC Knowledgebase – Glossary: https://knowledge-base.roadmaptozero.com/hc/en-gb/sections/360002796277-Glossary).

- **On-site Wastewater Treatment + Offsite Treatment**: This is treatment that is initially performed onsite at a facility then discharged to an offsite 3rd party treatment plant for additional treatment (also referred to as partial onsite treatment).

- **Off-site Wastewater Treatment Only**: This is treatment that is performed offsite by a 3rd party wastewater treatment service provider that may be government or privately owned/operated. With offsite treatment, the facility's untreated wastewater is discharged directly to the off-site treatment facility.

- **Septic System**: Septic systems are underground wastewater treatment structures that use a combination of natural/primary processes to treat wastewater. The process typically involves solids settling within the septic tank and ends with wastewater being discharged to the soil via a drainfield.

Applicability Questions

To determine which questions you will need to complete in the wastewater section, you will need to complete the applicability questions listed below.

After completing the applicability questions, facilities will be classified based on the factors below and answer applicable questions relevant to their wastewater type and treatment location(s):

- The type of wastewater generated (i.e., domestic, industrial, or both); and
- The type and location of wastewater treatment for domestic, industrial, and/or combined treatment of both). Wastewater treatment location include:
    - Treated onsite only.
    - Treated onsite with Zero Liquid Discharge (ZLD) system.
    - Treated offsite only.
    - Treated onsite and then discharged to Offsite treatment centre for further treatment.
    - Sent to a Septic system onsite (applies domestic wastewater only)
    - Not Treated

27. Does your facility generate industrial wastewater?

- Yes
- No

Note: For the definition of industrial wastewater refer to the Introduction section of the Guidance.

28. **Does your facility have Zero Liquid Discharge?**

- Yes
- No

Note: For the definition of Zero Liquid Discharge (ZLD) refer to the Introduction section of the Guidance.

29. **Do you treat industrial and domestic wastewater together?**

- Yes
- No

30. **Where is your industrial/domestic/combined wastewater treated?**

- Treated Onsite Only and directly discharged to the environment after treatment.
- Treated Offsite Only.
- Treated Onsite and then discharge to Offsite for further treatment.
- Sent to a Septic system onsite (applies domestic wastewater only)
- Not Treated

Wastewater – Level 1

1. Does your facility track its wastewater volume?

Answer Yes If: Your facility tracked the volume of wastewater discharged from **all** sources (e.g., domestic, industrial and/or combined) in the FEM reporting year.

Answer Partial Yes If: Your facility tracked the volume of wastewater discharged from **one (1) or more, but not all** sources (e.g., domestic, industrial and/or combined) in the FEM reporting year.

If you answer Yes or Partial Yes to this question, you will be asked to complete a table with the following questions to provide details on your facility's wastewater discharge for each applicable wastewater type.

Note: If your facility operates a zero liquid discharge (ZLD) system, you will only be asked to report your domestic wastewater discharge volume if applicable.

- Does your facility track its wastewater volume for this wastewater type?
- What was the total quantity of wastewater discharged from your facility during this reporting year? (in cubic meters - m^3)
- Which method was used to track wastewater volume?
    - **Note:** If your facility does not track wastewater via metering or metered invoices and calculates your annual wastewater discharge volume using an estimation methodology, then you must select "Estimates" for this question.
- What was the frequency of measurement?
- How many wastewater discharge points do you have?
- Have you labelled all wastewater discharge points?
- Do you monitor all identified wastewater discharge points?
- What was the final discharge point for your facility's wastewater?
    - **Note:** This should be where the wastewater is discharged to after it leaves the facility.
- Provide any additional comments.
- Please upload documentation.

Suggested Uploads:

- Documentation that demonstrates the facility tracked the volume of wastewater discharged from applicable sources. (e.g., tracking records for wastewater discharge, metering records/logs, wastewater treatment invoices, etc.)

Note: Uploading of all metering records/logs or bills is not required, however they should be available for review at the time of verification.

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they are tracking the volume of wastewater discharged from the facility.

Technical Guidance:

Wastewater tracking allows visibility into daily operations and which operations impact wastewater volume. Knowing your wastewater volume is also linked to potential environmental impact and operational costs.

Wastewater tracking should include all wastewater generated from all manufacturing and/or commercial activities at the facility (domestic and industrial). Tracking should also include wastewater that is reused/recycled at the facility.

When establishing your water tracking and reporting program, start by doing the following:

- Mapping out facility areas and processes to identify where wastewater is generated and discharged.
- Establish procedures to collect and track wastewater data:
    - Install on-site meters or use metered invoices from off-site treatment facilities.
    - If estimation techniques are used to determine the amount of wastewater generated, the calculation methodology should be clearly defined and be supported by verifiable data.
- Record tracking data (e.g., daily, weekly, monthly records) in a format that is easy to review (e.g., Microsoft Excel or similar data analytics program that allows export of data in a human readable format) and maintain relevant supporting evidence for review during verification.

Tracking Wastewater Volume

The most accurate way to track wastewater volume is using a metering system. Mechanical meters and ultrasonic meters are widely used to track wastewater volume. Facilities should install meters at all wastewater discharge points before wastewater is discharged to the environment. If the facility has its own effluent treatment plant (ETP), the meter should be installed at the outlet of the wastewater treatment facility. Facilities should collect data from the meters regularly in order to track accurate wastewater discharge volumes. This method applies to both domestic and industrial wastewater.

If a facility does not have meters to track its wastewater discharge volume, an estimation method can be used which may include any of the following estimation techniques listed below.

Note: If your facility does not track wastewater via outlet metering or metered invoices and calculates your annual wastewater discharge volume using an estimation methodology, then you must select "Estimates" for the question "Which method was used to track wastewater volume?"

- If the facility has accurate data (meters or invoices) on incoming water volume for production process and domestic use, the facility may estimate wastewater discharge volume using the incoming water volume. The facility may need to account for water use or loss for things like cooling tower evaporation loss or irrigation when estimating wastewater volume.
- Use of any official environmental reports that contain data on wastewater discharge volume (e.g., Environmental Impact Assessment reports, Environmental permit applications, Government's compliance report or offsite wastewater treatment invoices).
    - **Note:** In some cases, wastewater treatment invoices from offsite wastewater treatment facilities may not provide the treated wastewater volume. Instead, the invoice would indicate the total treatment fee (e.g., 100 USD) with unit treatment cost ($1 USD/$m^3$). In this case, a facility may need to manually calculate and record wastewater volume with the total treatment fee and unit cost (e.g., total treatment fee ÷ unit treatment cost = wastewater volume).

- If the facility has no documentation which indicates the amount of incoming water, then they can estimate industrial wastewater volume based on different production processes and equipment specific consumption.
    - For example, in a dyeing mill, the dyeing recipe may have water needed for each dyeing batch, or the dyeing machine may also have specifications on how much water is required for each batch. Facility would need to collect the production volume of each dyeing recipe and production volume of each dyeing machine. Then the facility would be able to manually calculate using production water use of each recipe per machine and water needed of each recipe/machine, multiply by respective production volume. Lastly, sum up all production water use. This estimated production water volume could be considered as the estimated amount of industrial wastewater discharged. Facilities may also need to account for any loss due to evaporation during production processes.

A tool available to help calculate water use from different sources can be found here: http://waterplanner.gemi.org/calc-waterbalance.asp.

Domestic Wastewater Tracking (including Septic Systems):

Tracking the flow rate and discharge volume of domestic wastewater with on-site meters is not a common practice but it is highly encouraged to accurately track the volume and quantity of domestic wastewater discharged.

If domestic wastewater discharge metering data or actual discharge data is not available, the facility could consider estimating wastewater discharge based on the site's total water use, the estimated amount used for domestic purposes and then minus an estimated amount due to losses (e.g., evaporation).

- For example, a site with domestic only wastewater who used 150m^3 of municipal water per month estimates that 10% of the water is lost due to evaporation and leaks would report 135m^3 of wastewater discharged (150m^3 – 10%).

Water use in a facility can also be estimated by the number of persons, number and types of facilities, taps, toilets, shower, irrigation etc. based on any available local/regional data or manufacturer's specifications (e.g., rated litres per flush for toilet fixtures).

Note: If an estimation technique is used, this should be fully documented, applied consistently and based on reasonable estimation factors that are derived from relevant sources (e.g., manufacturer's specifications, regional data on sewerage volume per person/day, etc.)

Reporting wastewater data in the FEM:

Before reporting wastewater data in the FEM, data quality checks should be performed to ensure that the data AND the processes used to collect and record the data are effective at producing accurate data.

Do:

- ✓ Review source data (e.g., meter logs, invoices, etc) against aggregated totals to ensure it is accurate.
- ✓ Compare the current year with historical data. Any significant changes (e.g., an increase or decrease of over 10%) should be attributable to known changes. If not, further investigation may be warranted.
- ✓ Ensure the most recent and updated versions of data tracking spreadsheets are being used and that all automated calculations/formulas are correct.
- ✓ Ensure the proper units are reported and verify any unit conversions from source data to reported data. **Note:** The FEM requires that wastewater data be entered in cubic meters (m^3).
- ✓ Report the data source (e.g., meters, invoice, estimates) and frequency of measurement (e.g., daily, monthly, etc).
- ✓ Report the final discharge point (e.g., Offsite Wastewater Treatment Plant). **Note:** This should be where the wastewater is discharged to after it leaves the facility.
- ✓ Review any assumption or estimation methodology/calculations to ensure accuracy.
- ✓ Add notes in the "Provide any additional comments" field to describe any data assumptions, estimation methodology, or other relevant comments on the reported quantity.

Do Not:

- X Report data that is not accurate (e.g., the data source is unknown or has not been verified).
- X Report estimated data if it is not supported by verifiable and reasonably accurate estimation methodology and data (e.g., engineering calculations).

How This Will Be Verified:

When verifying a facility's wastewater data, Verifiers **must** review all aspects of the facility's wastewater tracking program that could produce inaccuracies including:

- The initial data collection processes and data sources (e.g., invoices, on-site meters, metering logs, etc.); and
- The process and tools used to aggregate the data (e.g., spreadsheet calculations, unit conversions, etc.)

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points:
Full points will be awarded for facilities that have tracked the volume of wastewater discharged from **all** sources (e.g., domestic, industrial and/or combined) in the FEM reporting year.

Documentation Required:

- Documentation that demonstrates the facility tracked the volume of wastewater discharged from applicable sources. This may include:
    - Wastewater discharge records (e.g., monthly bills and annual discharge records, metering records/logs, etc.)
        - **Note:** Annual discharge records compiled in a spreadsheet (e.g., Excel) are ok as long as detailed discharge tracking data is available for review.
- Meter calibration records where applicable (e.g., as per manufacturer's specifications).
- Estimation methodology documented where applicable.
- All wastewater sources at the facility are tracked in full. This means that all sources listed in the Level 1 table have complete answers in all columns that are accurate.

Interview Questions to Ask:

- Staff responsible for managing wastewater can explain the facility's wastewater tracking program (e.g., how wastewater sources are identified, and discharge quantities are tracked).
- Key staff should understand:
    - The procedures in place for tracking wastewater quantity.
    - How data quality of the wastewater tracking program is maintained.
    - Any estimation methodologies used to calculate annual wastewater discharge volume.

Inspection - Things to Physically Look For:

- All wastewater sources observed are properly identified and tracked.
- Appropriate equipment for wastewater measurement is present (e.g., meters) if applicable.

Partial Points:

- Partial points will be awarded for facilities that have tracked the volume of wastewater discharged from one (1) or more, but not all sources (e.g., domestic, industrial and/or combined) in the FEM reporting year.

2. Does your facility monitor the BOD5 Level of your wastewater?

Answer Yes if: If your facility tests wastewater for Biochemical Oxygen Demand 5-days concentration (BOD5) and at least one test has been conducted in the FEM reporting year.

If you answer Yes to this question, you will be asked the following sub question(s):

- How does your facility monitor the BOD5 Level of your wastewater?
    - Before Treatment only.

- After Treatment only.
- Before and After Treatment.
- All processes including sub process level.
- How many biological treatment subprocesses does your treatment plant(s) consist of?
    - **Note:** This question only applies to facilities that monitor BOD5 in all processes and sub processes of wastewater treatment.

Based on where your facility monitors BOD5, you will be asked to complete a table with the following questions to provide details on your wastewater treatment processes/subprocesses and BOD5 monitoring practices:

If BOD5 is Monitored Before and After Treatment	**If BOD5 is Monitored in All Processes and Subprocesses**
Wastewater Type (responses will be pre-populated based on wastewater sources)	Biological Treatment Sub Process (responses will be pre-populated based on number of sub processes reported)
Indicate whether each subprocess is Aerobic, Anaerobic or Facultative.	Wastewater Type
What is your BOD5 level prior to treatment? (mg/L)	Indicate whether each subprocess is Aerobic, Anaerobic or Facultative.
What is your BOD5 level after treatment? (mg/L)	What is your BOD5 level immediately prior to the biological treatment sub process? (mg/L)
How was the BOD5 value obtained?	What is your BOD5 level immediately after the biological treatment sub process? (mg/L)
	How was the BOD5 value obtained?

Suggested Uploads:

- Documentation that shows the facility monitors BOD5 in wastewater (e.g., sampling and analysis reports, onsite monitoring records/logs, sampling plan/schedule that shows BOD5 sampling practices).

What is the intent of the question?

The intent of this question is for facilities to demonstrate that the concentration of BOD5 in wastewater is being monitored.

Technical Guidance

Biochemical oxygen demand (BOD) is a characteristic of wastewater that represents the amount of oxygen required by bacteria and other microorganisms to remove waste organic matter from water under aerobic conditions (where oxygen is present) at a specified temperature. High levels of BOD can impact water quality by depleting the amount of dissolved oxygen to levels that are harmful to aquatic life. BOD is commonly reported as BOD5, which is the amount of oxygen consumed over a 5-day period of incubation during testing.

In most cases limits for the BOD concentration in discharged wastewater are regulated by local laws or other requirements (e.g., brand or industry standards). At minimum, facilities should ensure that processes are in place to monitor BOD and ensure compliance as required, however additional monitoring of BOD throughout a facility's treatment processes (and sub processes) can provide valuable information on BOD loading into the treatment systems processes and the effectiveness of treatment.

It is also important to ensure that testing is performed in accordance with recognized testing methods that comply with any applicable legal requirements (e.g. ISO 5815-1, USEPA 405.1, SM 5210-B, HJ 505, IS 3025 (Part 44)).

Resources:

- ZDHC Wastewater Guidelines https://www.roadmaptozero.com/output#guidelines
- ZDHC Wastewater and Sludge Sampling and Analysis Plan https://www.roadmaptozero.com/output#Sampling
- ZDHC Wastewater Treatment Technologies https://www.roadmaptozero.com/output#Wastewater-Treatment-Technologies

How This Will Be Verified:

Note: This question is unscored.

Documentation Required:

- Documentation that demonstrates the facility has tested/monitored BOD5 in wastewater. This may include:
    - Sampling and analysis reports or onsite monitoring records/logs from the FEM reporting year.
    - Wastewater sampling procedures (e.g., sampling plan/schedule that shows BOD5 sampling practices).

Interview Questions to Ask:

- Staff responsible for wastewater management/treatment can explain how the facility monitors BOD5 in wastewater.

Inspection - Things to Physically Look For:

- Observations on site are consistent with the facility's reported practices for monitoring BOD5 in wastewater (e.g., wastewater sampling locations, presence of onsite sampling and analysis equipment if applicable).

3. Does your facility have a mechanism to prevent stormwater from being contaminated before it is discharged into the environment?

Answer Yes If: Your facility has a mechanism to ensure stormwater is not being contaminated before being discharged to the environment from the facility.

Note: For this question the term "mechanism" refers to procedures, practices and/or protections that are in place to prevent stormwater contamination.

Answer Not Applicable If: Your facility is located in a multi-storey building and stormwater runoff does not accumulate in the areas owned or controlled by your facility.

If you answer Yes to this question, you will be asked the following sub question(s):

- How do you prevent stormwater pollution at your facility?
    - Please upload documentation, if available.

If you answer No to this question, you will be asked the following sub question(s):

- Can you please confirm that contaminated stormwater is not directly discharged into the environment?
    - How do you manage contaminated stormwater if it occurs at your facility?
    - Please upload documentation, if available

Suggested Uploads:

- Documentation that demonstrates the facility has mechanisms in place to prevent the contamination of stormwater (e.g., facility diagram showing stormwater flow/drainage network and storage, photos of any protection devices such as drain covers, berms, stormwater management or monitoring procedures, etc.)

What is the intent of the question?

The intent of this question is to ensure that mechanisms are in place to prevent the contamination of stormwater through appropriate stormwater collection and drainage and ensure that any contaminated stormwater is properly treated before being discharged to the environment.

Technical Guidance:

It is considered a good practice to separate stormwater collection and drainage systems from wastewater or other sources of potential contamination. This provides greater control over waste volume surges and pollutant loading on wastewater treatment systems as well as prevention of

overflows that release sewage and/or untreated industrial wastewaters to the environment. Facilities should ensure that stormwater and industrial/domestic wastewater collection and drainage systems are separated throughout the facility, however facilities are expected to adhere to any applicable legal requirements related to stormwater management.

Good practices to prevent contamination of stormwater may include:

- Coding and labelling of all the stormwater and wastewater collection points, drains, and drainage systems to prevent unintended contamination.
- Develop a stormwater and wastewater drainage network map with the information of location, uses, code and responsible person.
    - Post the drainage map in a location where it is accessible for most of the employees. **Note:** The facility's wastewater collection and stormwater drainage system may be included on facility structural engineering/utility drawings.
- Ensuring there is sufficient collection and storage capacity for surges in stormwater (e.g., precipitation) to avoid overflow.
- Install and maintain protections (e.g., drain covers, berms) in areas where there is a risk of contamination.
- Ensure staff are aware of the facility's stormwater protection and management practices.
- Ensure procedures are in place for the proper storage of hazardous materials and effective spills response procedures are in place to prevent contamination of stormwater drains.
- Regularly check (e.g., daily, monthly, etc) all stormwater and wastewater collection points and drainage systems to ensure there is no mixing or damage to the systems.

Note: If there are no mechanisms in place to prevent stormwater from being contaminated, procedures should be in place to ensure that if contamination occurs that the stormwater is collected and appropriately treated (to levels that comply with legal or other applicable requirements) before being discharged to the environment.

Resources:

Note: The resources below are provided for reference only and include links to external service provider websites. The SAC does not endorse the products or services offered or provided.

- Examples of stormwater protection equipment
    - https://www.newpig.com/drain-protection-stormwater-management/c/111
    - https://www.grainger.com/category/safety/sorbents-spill-control-spill-containment/drain-protection-stormwater-filtration?brandName=PIG&filters=brandName

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities that have mechanism(s) in place to prevent the contamination of stormwater.

Documentation Required:

- Documentation that demonstrates the facility has mechanisms in place to prevent the contamination of stormwater. This may include:
    - Stormwater management procedures.
    - Facility diagram showing stormwater flow/drainage network and storage.
    - Stormwater drainage system inspection and maintenance records.
    - If applicable, documentation that shows contaminated stormwater is treated before being discharged to the environment.
    - If applicable, any required permit or discharge requirements related to stormwater or combined stormwater/wastewater discharge.

Interview Questions to Ask:

- Staff responsible for stormwater management can explain the facility's procedures to prevent the contamination of stormwater and maintain the stormwater collection and drainage system at the facility.
- Staff responsible for inspection and maintenance of the stormwater collection and drainage system understand the facility's procedures to prevent contamination and maintain the stormwater system.

Inspection - Things to Physically Look For:

- Observations indicate that appropriate infrastructure (e.g., collection, storage, and drainage systems) and protections are in place to prevent the contamination of stormwater.
- Observations do not indicate the presence of stormwater contamination (e.g., untreated wastewater flowing to stormwater drainage).

Partial Points:
- Partial points will be awarded to facilities that do not have mechanisms in place to prevent the contamination of stormwater but can demonstrate that an effective process is in place to manage and treat contaminated stormwater if needed.

4. Does your facility maintain a copy of the current contract, permit, agreement or invoices regarding wastewater discharge regulatory

compliance requirements for your facility to the offsite wastewater treatment plant?

Answer Yes If: Your facility has a current/valid copy of the current contract, permit, agreement, or invoices that demonstrate compliance with applicable requirements for wastewater discharge to the offsite wastewater treatment plant.

If you answer Yes to this question, you will be asked the following sub question(s):

- Please upload documentation, if available.
- If you cannot upload the documents, please describe here.
- Please provide the name and contact information of the offsite wastewater treatment plant
    - Name
    - Address
    - Ownership

Suggested Uploads:

- A copy of the permit, contract, agreements, invoices, or other supporting documentation (e.g., payment terms, wastewater quality standards, volume / flow rate thresholds, etc.) that demonstrates compliance with applicable requirements for discharge to an offsite wastewater treatment facility.

What is the intent of the question?
The intent of this question is for facilities to demonstrate that they maintain the required documentation to demonstrate compliance with applicable requirements for discharge to the offsite wastewater treatment plant.

Technical Guidance
It is important that facilities understand the requirements related to discharging wastewater to an offsite treatment plant. Requirements may be outlined in contractual agreements, permits relating to the quantity and quality of wastewater that can be discharged, or established fee structures for accepting wastewater discharges.

These requirements allow facilities to establish the required procedures, monitoring, and reporting practices to ensure wastewater discharged complies with applicable requirements and does not negatively impact the operations of the offsite treatment facility.

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that demonstrates the facility is in compliance with applicable requirements for discharge to the offsite wastewater treatment facility. This may include:

- A current/valid copy of the permit, contract, agreements, invoices, or other supporting documentation (e.g., payment terms, wastewater quality standards, volume / flow rate thresholds, etc.).

Interview Questions to Ask:

- Staff responsible for wastewater management can explain any contractual or permit requirements related to wastewater discharge to the offsite plant and how the facility ensures compliance.

Inspection - Things to Physically Look For:

- Observations onsite indicate that the facility's wastewater management and discharge practices align with the applicable requirements for discharge to the offsite treatment plant.

Partial Points: N/A

5. Does your facility have a mechanism or process to monitor whether your wastewater treatment plant is functioning as per the design parameters (Volume, Flow Rate, Input /Output Quality)?

Answer Yes If: If your facility has established procedures to ensure your water treatment plant is operating as per the design parameters and the documented procedures or processes must cover **all** of the following aspects:

- Standard Operating Procedures
- Training
- Communication
- Continuous monitoring
- Continuous Sampling & Testing
- Ongoing Maintenance

Answer Partial Yes If: If your facility has established procedures to ensure your water treatment plant is operating as per the design parameters and your documented procedures or processes, at minimum, cover the following aspects:

- Standard Operating Procedures
- Continuous monitoring
- Ongoing Maintenance

If you answer Yes or Partial Yes to this question, you will be asked the following sub question(s):

- If yes, which of the following activities do you have and are being conducted?

- Standard Operating Procedures
- Training
- Communication
- Continuous monitoring
- Continuous Sampling & Testing
- Ongoing Maintenance

- What is the design capacity of your onsite wastewater treatment plant (m^3/h)?
- What is the average volume of wastewater treated by your wastewater treatment plant per day (m^3/day)?
- Do you monitor process control parameters with your wastewater treatment plant?
  - If yes, how frequently do you monitor them?
  - Please upload documentation.

Suggested Uploads:

- Documentation that demonstrates the facility's wastewater treatment plant is being operated as per the design parameters (e.g., treatment plant design specifications, drawings, or manufacturers operating specifications, wastewater treatment plant operating procedures, records of process monitoring, testing).

What is the intent of the question?

The intent of this question is for facilities to demonstrate that the wastewater treatment plant is being operated and maintained as per the design specification/parameters.

Technical Guidance:

Wastewater treatment systems are highly engineered systems that are specifically designed based on the wastewater characteristics they are intended to treat (e.g., the types and concentrations of pollutants, volume of wastewater, level of treatment required, etc). It is crucial that the wastewater treatment system is operated within its design specifications and operating parameters to ensure the effective treatment of wastewater.

Facilities should have established procedures to ensure that the system is operated, monitored, and maintained in accordance with the design specifications and manufacturer's specifications for all system equipment and components (e.g., pumps and valves, flowmeters, motoring/sampling equipment, etc.)

It is also important that staff who operate and maintain the treatment system are appropriately trained to understand the operating/monitoring requirements, limitations, and troubleshooting of the system to ensure its continuous and effective operation.

Resources:

- ZDHC Wastewater Treatment System Operator Minimum Qualifications Guidelines https://www.roadmaptozero.com/output#Qualification
- ZDHC Wastewater Treatment Technologies https://www.roadmaptozero.com/output#Wastewater-Treatment-Technologies

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities that have established procedures to ensure the water treatment plant is operating as per the design parameters and the documented procedures or processes cover **all** of the following aspects:

- Standard Operating Procedures
- Training
- Communication
- Continuous monitoring
- Continuous Sampling & Testing
- Ongoing Maintenance

Documentation Required:

- Documentation that demonstrates the facility's wastewater treatment plant is being operated and maintained per the design parameters. This may include:
    - Treatment plant design specifications, drawings, or manufacturers operating specifications
    - The facility's wastewater treatment plant operating procedures
    - Process monitoring/testing records to ensure plant is operating within the designed operating parameters (e.g., flow rates, temperature, pH, suspended solids and/or heavy metals concentrations, etc)
    - Training records for operators.
    - Maintenance records that show equipment and components are maintained and calibrated per the design and manufacturer's specifications.

Interview Questions to Ask:

- Staff responsible for wastewater management can explain the facility's procedures for ensuring the wastewater treatment system is operated and maintained as per the design specifications and operating parameters.
- Operators and staff responsible treatment system maintenance understand the facility's procedures as well as the design/operating parameters and troubleshooting/maintenance procedures.

Inspection - Things to Physically Look For:

- Observations indicate that the treatment system is being operated and maintained in accordance with the facility's procedures and the systems design parameters (e.g., equipment is observed to be in good working order, proper process monitoring/testing activities are being conducted, etc.)

Partial Points:

- Partial points will be awarded for facilities that have established procedures to ensure the water treatment plant is operating as per the design parameters and the documented procedures or processes, at minimum, cover the following aspects:
    - Standard Operating Procedures
    - Continuous monitoring
    - Ongoing Maintenance

6. Does your facility have a back-up plan if there is an emergency related to wastewater?

Answer Yes If: Your Facility has a back-up plan, process, and/or onsite and/or offsite facilities to respond to emergencies related to wastewater that is capable of handling the average daily volume of wastewater discharged by the facility.

If you answer Yes to this question, you will be asked the following sub question(s):

- Does your facility have a process to contact appropriate government authorities or agencies as legally required in case of accidental discharge?
    - Please upload documentation, if available
    - If you cannot upload the documents, please describe here.

Note: If your facility is not legally required to notify relevant government authorities or agencies of any accidental discharge, you should select "Not Legally Required" for this question.

- Select all strategies included in your facility's back-up plan for wastewater:
    - Emergency Production Shutdown
        - **Note**: This action must be backed up by additional emergency response actions or processes rather than stating simply that the facility will stop production.
    - Holding Tank
        - What is the size of your facility's holding tank (in m^3)?
    - Availability of additional pumps, blowers, dosing pumps and critical equipment for the specific treatment plant, that are not used for day to day running of the plant.
    - Discharge to Offsite Water Treatment Plant
        - **Note:** Discharge of untreated wastewater that cannot be treated onsite due to emergency must be directed authorized offsite wastewater treatment service provider (public or private) with prior consent.
    - Other Backup Process
        - If other, please describe.
- Please upload your backup plan
- What is your facility's wastewater treatment plant maximum holding capacity (in m^3) if the treatment plant is shut down in an emergency?

- Does your facility provide training to all relevant employees regarding the backup plan?
    - If yes, how many employees were trained?
    - If yes, how frequently do you train your employees?
    - Do you evaluate your employees after the training?
        - How do you evaluate the knowledge of your employees after the training?
    - Please upload documentation.

Suggested Uploads:

- Documentation that shows emergency backup processes are in place that are sufficient to treat the average daily volume of wastewater discharged by the facility site (e.g., wastewater treatment flow diagram, documented back-up plan, back -up equipment inventory, agreement with offsite treatment plant to receive wastewater in an emergency, etc.).

What is the intent of the question?

The intent of this question is to confirm that facilities have a contingency plan in the event the treatment process fails to prevent untreated effluent from being discharged.

Technical Guidance:

It is crucial that facilities evaluate the risk of wastewater treatment system failures (e.g., failures in treatment processes or equipment, natural disasters, power outages). Facilities should establish a documented contingency plan to respond to potential emergencies. It is important to know the wastewater treatment systems handling capacity (per day) and compare this information with the quantity of wastewater generated to determine what actions or onsite facilities are required to effectively manage any treatment system failures.

It is also important that facilities ensure the relevant staff members and teams are trained and understand the facility's back-up plan to ensure that emergency response actions are effective.

Some examples of actions that can be taken in the event of an emergency include, but are not limited to:

- Emergency shutdown of production or treatment system until the situation is rectified.
    - **Note**: This action must be backed up by additional emergency response actions or processes rather than stating simply that the facility will stop production.
- Back-up holding tank capacity which temporarily stores the quantity of wastewater equal to one day's production.
    - **Note:** Holding tanks should not be considered as an exclusive backup measure.
- Maintaining a sufficient amount of back up equipment to ensure broken/damaged equipment can be timely replaced.
- Establish agreement and procedures for alternative offsite treatment with a licensed third-party wastewater treatment plant or service provider.

Resources:

Note: The resources provided below are for reference only and may contain reference to legal requirements that do not apply to your facility. It is expected that facilities comply with all applicable legal requirements related to wastewater emergency planning and procedures.

- New Hampshire Department of Environmental Services - Emergency Response Planning Guide Developed for Insertion into Wastewater Treatment Facility O&M Manuals https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/2020-01/ww-emergency-response-guide.pdf
- ICS Effluent Treatment Plant (ETP) – Emergency response plan Fact Sheet https://ics-asso.org/wp-content/uploads/2018/04/Chap-4_Wastewater_Effluent-treatment-plant-emergency-response-plan_factsheet.pdf

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities that have a back-up plan, process, and/or onsite an/or offsite facilities to respond to emergencies related to wastewater that is capable of handling the average daily volume of wastewater discharged by the facility **and** have a process to notify relevant government authorities or agencies of any accidental discharge, if it is legally required.

Documentation Required:

- Documentation that shows emergency backup processes are in place that are sufficient to treat the average daily volume of wastewater discharged by the facility site. This may include:
    - Wastewater treatment flow diagram showing additional emergency holding or treatment capacity if applicable.
    - Documented back-up plan and/or procedures (e.g., emergency shutdown procedures).
    - Back -up equipment inventory
    - Agreement with an offsite treatment plant to receive wastewater in an emergency.
    - List of emergency contacts/responsible parties (internal and external).

Interview Questions to Ask:

- Staff responsible for wastewater management can explain the facilities back-up plan and/or procedures to respond to any type of wastewater emergency.
- Responsible staff (treatment plant operators, maintenance staff) understand the facility's emergency response procedures.

Inspection - Things to Physically Look For:

- Observations indicate the appropriate equipment and facilities are in place as per the facility's back up plan.

Partial Points:

- Partial points will be awarded for facilities that have a back-up plan, process, and/or onsite and/or facilities to respond to emergencies related to wastewater that is capable of handling the average daily volume of wastewater discharged by the facility, but **do not** have a process to notify relevant government authorities or agencies of any accidental discharge, if it is legally required.

7. Can you please confirm that, wastewater generated by the facility is not discharged to the environment through leaking and/or bypassing?

Answer Yes If: Your facility has processes in place to ensure that untreated wastewater is not discharged to the environment from leaks or bypassing of the wastewater treatment system.

If you answer Yes to this question, you will be asked the following sub question(s):

- If yes, please describe how you monitor.
- Please upload documentation.

Suggested Uploads:

- Documentation that shows no wastewater is discharged through leaks or bypassing the facility's treatment system (e.g., wastewater flow/piping diagram, records of effluent volume monitoring against the volume of wastewater generated, leak inspection records)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that untreated wastewater is not being discharged to the environment from leaks or bypassing of the wastewater treatment system.

Technical Guidance

Ensuring that the facility's wastewater collection and treatment system network (e.g., collection and transfer piping, and storage) is properly designed and capable of appropriately directing wastewater to treatment is crucial to ensure that no untreated wastewater is able to bypass treatment. It is also important to ensure that this network is inspected and maintained to prevent unintended discharge from leaks or overflow.

Factories should have an established process to monitor the volume of wastewater generated from production or other operations in relation to the volume of water that is treated and discharged. Any significant or unknown difference should be investigated to determine the cause.

Examples of actions that can be taken to prevent this include, but are not limited to:

- Review the facility's wastewater collection and treatment system network (e.g., construction or utility drawings) to ensure all wastewater is being properly collected and directed to treatment.
- Identify and characterize all wastewater streams to ensure they are directed to treatment before being discharged to the environment.
- Install and maintain appropriately sized wastewater treatment systems that account for the expected volume of wastewater generated on site.
- Conduct regular inspections of wastewater piping systems and tanks to monitor for leaks.
- Prepare for emergencies and implement emergency response actions in case the on-site wastewater treatment plant exceeds its capacity or if it malfunctions.

How This Will Be Verified:

Full points:

Documentation Required:

- Documentation that demonstrates the facility has processes in place to ensure that untreated wastewater is not discharged to the environment from leaks or bypassing of the wastewater treatment system. This may include:
    - Wastewater flow/piping diagram.
    - Wastewater volume monitoring records that show the difference between volume of wastewater generated and discharged is acceptable.
    - Records of inspections for of wastewater piping systems and tanks that the facility uses to monitor for leaks (e.g., inspection schedule, and completed checklists)

Interview Questions to Ask:

- Staff responsible for wastewater management can describe how the facility ensures that all wastewater is directed to appropriate treatment and the system is monitored for leaks.
- Staff responsible for inspecting and monitoring the system for leaks understand the facility's inspection procedures and how to effectively identify leaks.

Inspection – Things to Physically Look For:

- Observations indicate that all wastewater is appropriately directed to treatment (e.g., no observed bypassing of wastewater collection or treatment) and the wastewater piping network and tanks are maintained in good condition (e.g., there are no observed leaks).

Partial Points: N/A

8. How many separate and distinct sources of wastewater sludge are managed and disposed of?

If you indicate that your facility has one (1) or more sources of sludge, you will be asked the following sub question(s):

- Please describe the source of each type of wastewater sludge generated at your facility.
- Do you know the % solids of your wastewater sludge you generated?
    - What are the % solids of this wastewater sludge you have generated?

Notes:

- The % solids of sludge should be reported as the average % solids value for that sludge type if multiple samples were analysed.
- The formula for determining the % solids is:
    - weight of dry sludge / weight of wet sludge x 100
- If you have not conducted % solids analysis in accordance with a recognized test method (e.g., EPA 160.3 or SM 2540G), you should answer No to the Question. Do you know the % solids of your wastewater sludge you generated?

Suggested Uploads:

- Documentation that shows your facility has identified all sources of sludge and conducted an analysis to determine the % solids of the sludge (e.g., a list/inventory of the types of sludge, internal or external sludge analysis results/reports).

What is the intent of the question?

The intent of this question is for facilities to identify the different sources of sludge generated at the facility and understand the % solids content of each sludge type.

Technical Guidance:

It is important for facilities to know the different sources (e.g., types) of sludge and the general composition of sludge to ensure the most effective treatment and disposal options are used. The compositions of can vary depending on the composition of wastewater and the processes used for its treatment. In general, sludge contains water, organic and inorganic materials, and solids.

A key basic sludge quality parameter that is important to understand is the % of dry solids content. The % solids indicate the moisture content or sludge after its generated at the facility and can impact the cost and type of disposal that is available. In general, reducing sludge moisture content (e.g., drying, dewatering) as much as possible can help reduce sludge volume and the associated transportation/disposal costs.

Resources:

- ZDHC Sludge Reference Document. **Note:** This guidance is not applicable for domestic only sludge. https://downloads.roadmaptozero.com/output/Sludge-Reference-Document
- ZDHC Wastewater and Sludge Laboratory Sampling and Analysis Plan https://downloads.roadmaptozero.com/output/Sampling-and-Analysis-Plan

How This Will Be Verified:

Note: This question is unscored.

Documentation Required:

- Documentation that shows your facility has identified all sources of sludge and conducted an analysis to determine the % solids of the sludge. This may include:
    - A list/inventory of the types of sludge.
    - Internal or external sludge analysis results/reports.
    - Supporting data and calculations to that shows the average % solids content for sludge (where multiple analyses have been performed).

Interview Questions to Ask:

- Staff responsible for wastewater and sludge management can explain how the facility identified its sludge sources and the methodology used for determining the % solids content of sludge.

Inspection - Things to Physically Look For:

- Observations indicate that sources of sludge reported are consistent with sludge generation at the facility.

9. Does your facility track its industrial wastewater sludge generated in the reporting year?

Answer Yes if: Your facility tracked the annual quantity of industrial wastewater sludge generated at the facility in the FEM reporting year.

If you answer Yes to this question, you will be asked the following sub question(s):

- If yes, how much industrial wastewater sludge (in Metric Tons) did you generate in the reporting year?
    - **Note:** If domestic sludge is combined with industrial sludge, it should be reported here.

Suggested Uploads

- Sludge quantity/disposal tracking records that show the quantity of sludge generated of in the reporting year (e.g., waste manifests, internal tracking records)

What is the intent of the question?
The intent of this question is for facilities to demonstrate the annual quantity of industrial wastewater sludge was tracked in the reporting year.

Technical Guidance:
Tracking the quantity of sludge provides important information that can be used to identify opportunities to reduce sludge and quantify these reductions.

Procedures to track the annual quantity of sludge generated generally align with the practices used to track the quantity any waste stream and include the following:

- Determine what types of waste are generated.
- Determine where (location and processes) where sludge is being generated.
- Establish procedures to collect and track waste data:
    - Examples include on-site scales, waste invoices/manifests.
    - If estimation techniques are used to calculate the quantity of sludge, the methodology should be clearly defined and be supported by verifiable data.
- Record the data (e.g., daily, weekly, monthly sludge quantities) in a format that is easy to use and review such as Microsoft Excel or another data analytics program.

Estimating Sludge Quantity Data

In some cases, calculating annual sludge quantities may require estimation. Any estimation methodology used should include documented and verifiable processes that include details on the calculation methodology and any data or assumptions used.

Note: If an estimation technique is used, the methodology should be applied consistently and based on reasonable estimation factors that are derived from relevant data (e.g., actual weights of a representative sample of the sludge).

An example of how waste quantity data can be estimated is provided below:

- A facility generates a specific quantity of sludge every time the filter press is unloaded. Weighing the sludge every time is not practical. Therefore, the average weight of each filter press load can be determined by weighing a representative sample of sludge from multiple loads and then multiplying this average weight by the number of filter press loads each week or month as shown below:
    - Average weight of a load = 50kg (based on representative weights of loads from different days, months, production scenarios, etc.)
    - Number of loads in 1 month = 45
    - Total estimated sludge quantity for the month = 2,250kg (50kg x 45 loads)

Resources:

- ZDHC Sludge Reference Document
  https://downloads.roadmaptozero.com/output/Sludge-Reference-Document

How This Will Be Verified:

Note: This question is unscored.

Documentation Required:

- Documentation that supports the reported sludge quantity. This may include:
  - Tracking records for annual sludge quantities (e.g., invoices from waste contractors, weighing records, etc.).
  - Scale calibration records if applicable (e.g., as per manufacturer's specifications)
  - Documented estimation methodologies if applicable.

Interview Questions to Ask:

- Staff responsible for managing sludge and/or wastes can explain how sludge quantity is tracked.
- Key staff should understand:
  - How data quality of the sludge tracking program is maintained.
  - Any estimation methodologies used to calculate annual sludge quantity.

Inspection - Things to Physically Look For:

- Observations are consistent with the facility reported procedures to track and measure sludge quantity (e.g., appropriate equipment is available for sludge quantity measurement if applicable).

10. Does your facility track its domestic wastewater sludge generated in the reporting year?

Answer Yes if: Your facility tracked the annual quantity of domestic wastewater sludge generated at the facility in the FEM reporting year.

If you answer Yes to this question, you will be asked the following sub question(s):

- If yes, how much domestic wastewater sludge (in Metric Tons) did you generate in the reporting year?

Suggested Uploads

- Sludge quantity/disposal tracking records that show the quantity of sludge generated of in the reporting year (e.g., waste manifests, internal tracking records)

What is the intent of the question?
The intent of this question is for facilities to demonstrate the annual quantity of domestic wastewater sludge was tracked in the reporting year.

Technical Guidance:
Tracking the quantity of sludge provides important information that can be used to identify opportunities to reduce sludge and quantify these reductions.

Procedures to track the annual quantity of sludge generated generally align with the practices used to track the quantity any waste stream and include the following:

- Determine what types of waste are generated.
- Determine where (location and processes) where sludge is being generated.
- Establish procedures to collect and track waste data:
    - Examples include on-site scales, waste invoices/manifests.
    - If estimation techniques are used to calculate the quantity of sludge, the methodology should be clearly defined and be supported by verifiable data.
- Record the data (e.g., daily, weekly, monthly sludge quantities) in a format that is easy to use and review such as Microsoft Excel or another data analytics program.

Estimating Sludge Quantity Data

In some cases, calculating annual sludge quantities may require estimation. Any estimation methodology used should include documented and verifiable processes that include details on the calculation methodology and any data or assumptions used.

Note: If an estimation technique is used, the methodology should be applied consistently and based on reasonable estimation factors that are derived from relevant data (e.g., actual weights of a representative sample of the sludge).

An example of how waste quantity data can be estimated is provided below:

- A facility generates a specific quantity of sludge every time the filter press is unloaded. Weighing the sludge every time is not practical. Therefore, the average weight of each filter press load can be determined by weighing a representative sample of sludge from multiple loads and then multiplying this average weight by the number of filter press loads each week or month as shown below:
    - Average weight of a load = 50kg (based on representative weights of loads from different days, months, production scenarios, etc.)
    - Number of loads in 1 month = 45
    - Total estimated sludge quantity for the month = 2,250kg (50kg x 45 loads)

Resources:

- ZDHC Sludge Reference Document
  https://downloads.roadmaptozero.com/output/Sludge-Reference-Document

How This Will Be Verified:

Note: This question is unscored.

Documentation Required:

- Documentation that supports the reported sludge quantity. This may include:
  - Tracking records for annual sludge quantities (e.g., invoices from waste contractors, weighing records, etc.).
  - Scale calibration records if applicable (e.g., as per manufacturer's specifications)
  - Documented estimation methodologies if applicable.

Interview Questions to Ask:

- Staff responsible for managing sludge and/or wastes can explain how sludge quantity is tracked.
- Key staff should understand:
  - How data quality of the sludge tracking program is maintained.
  - Any estimation methodologies used to calculate annual sludge quantity.

Inspection - Things to Physically Look For:

- Observations are consistent with the facility reported procedures to track and measure sludge quantity (e.g., appropriate equipment is available for sludge quantity measurement if applicable).

11. Does your facility have well-marked, designated wastewater sludge storage areas?

Answer Yes if: Your facility has designated wastewater sludge storage areas.

If you answer Yes to this question, you will be asked a set of sub questions to indicate which of the following practices your facility has in place for sludge storage areas:

- Does your facility have the following practices in place in the wastewater sludge storage area?
  - The surface of the wastewater sludge storage area prevents permeability into the ground and is inert in nature.
  - The wastewater sludge storage area is protected from exposure to precipitation and stormwater runoff.
  - The industrial and domestic wastewater sludge are kept and stored separately.
    - If only Domestic wastewater sludge is generated, Not Applicable should be selected for this question.

- The industrial wastewater sludge storage area is protected from unauthorized employees.

Suggested Upload:

- Photos of sludge storage areas.

What is the intent of the question?

The intent of this question is to ensure that sludge is stored in a way that is safe for employees, the environment, and the local community.

Technical Guidance:

The proper storage of sludge is important to prevent unintended contamination of other wastes, the surrounding environment and to reduce exposure risks to employees. Facilities should have dedicated storage areas for sludge and implement appropriate controls practices based on the hazardous characteristics of the sludge such as those listed in the sub questions.

Information on the hazardous characteristics of sludge should be evaluated using analysis data from sludge samples or in the Safety Data Sheets (SDS) of the hazardous raw materials used in the processes that generate the sludge. For example, if heavy metals are used in any process chemistry, these contaminants will likely be present in sludge generated.

Sludge storage areas should also be inspected regularly to ensure good storage and housekeeping practices are continuously implemented.

Resources:

- ZDHC Sludge Reference Document
  https://downloads.roadmaptozero.com/output/Sludge-Reference-Document

How This Will Be Verified:

Full Points:

Facilities will receive full points for having dedicated sludge storage areas, and have implemented **all** the applicable control measures listed in the sub question.

Documentation Required:

- Documentation to support the facilities procedures to ensure that sludge is stored appropriately. This may include:
  - Procedures or work instructions for sludge/waste storage areas
  - Hazardous waste area inspection records

Interview Questions to Ask:

- Staff responsible for sludge/waste management handling and storage understand risks associated with sludge stored and how to properly store sludge (e.g., which containers to use, required segregation, etc.)

Inspection - Things to Physically Look For:

- Observations indicate that sludge is being stored in designated areas with appropriate controls.

Partial Points:

- Partial Points will be awarded to facilities that have dedicated sludge storage areas and have implemented some, but not all, the applicable control measures listed in the sub questions.

12.Is industrial wastewater sludge disposed of properly?

Answer Yes if: Your facility is disposing of industrial wastewater sludge in accordance with all legal requirements based on the hazardous characteristic of the sludge.

Note: This question refers to the final treatment/disposal method of the sludge. This can be onsite or offsite depending on the final treatment/disposal location.

If you answer Yes to this question, you will be asked the following sub question(s):

- Which disposal pathway(s) does your facility dispose of your industrial wastewater sludge?
    - Hazardous Waste Treatment
    - Open burning
        - **Note**: The use of open burning of sludge is strongly discouraged unless specific regulatory approval is obtained and complied with.
    - Onsite Incineration at ≥1000 °C
    - Onsite Incineration at <1000 °C
    - Offsite Incineration at ≥1000 °C
    - Landfill with Significant Control Measures
    - Building Products Processed at ≥1000 °C
    - Landfill with Limited Control Measures
    - Offsite Incineration and Building Products Processed at <1000 °C
    - Landfills with No Control Measures
    - Land Application
        - E.g., Compost, fertilizer.

    - Non-disclose method by authorized third party (final disposal method not disclosed)
- Please upload documentation.

Note: In the Higg FEM, the definition of landfills (e.g., with significant, limited, or no control measures) and disposal pathways aligns with the ZDHC Disposal Pathway definitions listed in the ZDHC Sludge Management Document available at the link below. FEM users should reference this document to ensure proper selection of their sludge disposal pathway. https://downloads.roadmaptozero.com/output/Sludge-Reference-Document

Suggested Uploads:

- Documentation that demonstrates industrial wastewater sludge is being disposed of properly (sludge analysis/test showing hazardous properties, sludge disposal manifests, permit/license of waste vendor accepting and treating the sludge, evidence of the final treatment/disposal method being used, etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that industrial wastewater sludge is being disposed of responsibly to minimize environmental impacts.

Technical Guidance:

The hazardous properties and proper disposal method of sludge depend on the specific hazardous properties of the sludge (e.g., the type and concentration of hazardous chemicals). Facilities should ensure that sludge is properly characterized (e.g., via laboratory testing) to identify its hazardous properties and any specific disposal requirements or limitations.

At minimum, sludge should be disposed of in accordance with all applicable legal requirements related to sludge and waste disposal. This includes the use of qualified waste disposal vendors who are licensed/permitted to treat the sludge based on its hazardous characteristics as required.

As part of a facilities waste management program, it is important for facilities to understand how wastes (including sludge) are treated and/or disposed of after leaving the facility. Facilities should have processes in place to communicate with waste vendors and verify the final treatment disposal methods for sludge.

If sludge is treated and/or disposed of onsite, this should be done with proper permission (e.g., approvals/permits) from government authorities when required.

Resources:

- ZDHC Sludge Reference Document https://downloads.roadmaptozero.com/output/Sludge-Reference-Document
- ZDHC Wastewater and Sludge Laboratory Sampling and Analysis Plan https://downloads.roadmaptozero.com/output/Sampling-and-Analysis-Plan

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that demonstrates industrial wastewater sludge is being disposed of in accordance with all legal requirements based on the hazardous characteristic of the sludge. This may include:
  - Sludge analysis/test showing hazardous properties.
  - Sludge disposal manifests
  - Where applicable, permit/license of waste vendor accepting and treating the sludge.
  - Evidence of the final treatment/disposal method being used by the waste vendor.
  - Legal approvals/permits for any onsite treatment/disposal of sludge if applicable.

Interview Questions to Ask:

- Staff responsible for wastewater/waste management understand the hazardous composition of the facility's sludge and the final disposal method used to treat/dispose of the sludge.

Inspection - Things to Physically Look For:

- Observations indicate that sludge is being collected and treated per the methods reported by the facility (e.g., onsite treatment/disposal conditions, sludge storage conditions, etc.)

Partial Points: N/A

13. Does your facility maintain manifests or similar documentation of the handling, transportation, processing, and disposal of sludge, accounting for all industrial wastewater sludge generated at the facility?

Answer Yes if: Your facility has a process to obtain and retain waste manifests or similar documentation related to the handling, transportation, processing, and disposal of industrial wastewater sludge and **all** of the following conditions are met:

- Documentation has been obtained that accounts for **all** sludge disposals.
- The documentation contains all of the information noted below:
    - Shipper (the facility generating the sludge).
    - Mass or volume of the shipment.
    - Transporter's company name.
    - Shipment/Receiving dates
    - Name of the disposal or processing facility that the sludge was shipped to.

Answer Partial Yes if: Your facility has a process to obtain and retain waste manifests or similar documentation related to the handling, transportation, processing, and disposal of industrial wastewater sludge, **and** documentation has been obtained for all sludge disposals; **however**

- The documentation does not contain one or more of the pieces of information noted below:
    - Shipper (the facility generating the sludge).
    - Mass or volume of the shipment.
    - Transporter's company name.
    - Shipment/Receiving dates
    - Name of the disposal or processing facility that the sludge was shipped to.

If you answer Yes or Partial Yes to this question, you will be asked the following sub question(s):

- Does your facility use authorized third party for legal disposal of Industrial wastewater sludge?
- Does your facility retain documentation of all wastewater sludge transportation and disposal/treatment companies?
    - **Note:** This refers to the legally required amount of time that documentation must be retained, which may vary by jurisdiction. If there are no legal requirements documentation must be retained for at least two (2) years.
- Are all Industrial wastewater sludge transporters, treatment, and disposal facilities licensed and permitted?
- Please upload documentation.

Suggested Uploads:

- Samples of waste manifests or similar documentation related to the handling, transportation, processing, and disposal of industrial wastewater sludge.
- Copies of sludge handling/treatment/disposal vendor licenses and/or permits that show they are authorized to receive, process and dispose of the sludge.

Note: Uploading of all manifest or other documentation is not required, however they should be available for review at the time of verification.

What is the intent of the question?
The intent of this question is for facilities to demonstrate that processes are in place to obtain and retain information related to the handling, transportation, processing, and disposal of industrial wastewater sludge and to ensure that any third-party waste vendors have the required legal approvals to receive, process and dispose of the facility's sludge.

Technical Guidance:

To ensure proper accountability, facilities should have established processes in place to maintain documentation related to the handling, transportation, processing, and disposal of industrial wastewater sludge. Often the minimum requirements for generating and maintaining documentation related to waste disposal is governed by legal requirements (particularly for hazardous wastes) and all applicable requirements should be met by facilities.

In addition to any legal requirements, facilities should ensure that a waste manifest or a similar local transport document that contains the following information is obtained and maintained for each sludge shipment as a good practice. If needed this additional information can be requested from waste vendors:

- Shipper (the facility generating the sludge).
- Mass or volume of net shipment.
- Transporter's company name.
- Shipment/Receiving dates
- Name of the disposal or processing facility that the sludge was shipped to.

Facilities should also ensure that any third-party waste vendors used have the required legal approvals to receive, process and dispose of the facility's sludge. Facilities should ensure that part of the waste vendor approvals process include the verification of all legally required approvals (e.g., licenses and permits). It is considered a good practice (if not legally required) for facilities to request and maintain up-to-date and valid copies of vendor approvals onsite.

Resources:

- ZDHC Sludge Reference Document
  https://downloads.roadmaptozero.com/output/Sludge-Reference-Document

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities that have established processes to obtain and retain waste manifests or similar documentation related to the handling, transportation, processing, and disposal of industrial wastewater sludge and **all** of the following conditions are met:

- Documentation has been obtained that accounts for **all** sludge disposals and contains all of the required information.
- Documentation is retained onsite for at least the legally minimum required length of time. If there are no legal requirements documentation must be retained for at least two (2) years.
- Any third-party waste vendors used have the required legal approvals (e.g., licenses and permits) to receive, process and dispose of the facility's sludge.

Note: Points will be awarded automatically in the Higg FEM based on the responses to the main and sub questions.

Documentation Required:

- Documentation that shows the facility has obtained and maintains waste manifests or similar documentation related to the handling, transportation, processing, and disposal of industrial wastewater sludge and that sludge is being received by authorized vendors. This may include:
    - Waste manifests or other transport documentation.
    - Waste vendor licenses and/or permits that show they are authorized to receive, process and dispose of the facility's sludge.

Interview Questions to Ask:

- Staff responsible for managing wastes can explain the facilities procedures to obtain and maintain manifests and/or other transport information related to sludge disposal and how the facility ensures that waste vendors have the required approvals to collect, receive, or process the facility's sludge.

Inspection - Things to Physically Look For:

- Observations indicate that sludge is being collected and treated per the process reported by the facility (e.g., sludge disposal records, sludge storage conditions, presence of waste contractors onsite during verification, etc.)

Partial Points:
Partial points will be awarded for facilities that have established processes to obtain and retain waste manifests or similar documentation related to the handling, transportation, processing, and disposal of industrial wastewater sludge, and documentation has been obtained for **all** sludge disposals, however:

- Documentation does not include the required information; **and/or**

- Documentation is not retained onsite for at least the legally minimum required length of time or if there are no legal requirements, documentation has not been retained for two (2) years; **and/or**
- Any third-party waste vendors used do not have the required legal approvals (e.g., licenses and permits) to receive, process and dispose of the facility's sludge.

Note: Points will be awarded automatically in the Higg FEM based on the responses to the main and sub questions.

14. Does your facility provide training to all employees whose work involves wastewater sludge handling (such as maintenance and custodial staff)?

Answer Yes if: Your facility provides training to all employees who handle wastewater sludge **and** the training covers safe handling, storage, and disposal of sludge.

If you answer Yes to this question, you will be asked the following sub question(s):

- How many employees were trained?
- How frequently do you train your employees?
- Do you evaluate your employees after the training?
    - How do you evaluate the knowledge of your employees after the training?
- Please upload documentation.

Suggested Upload:

- Records of sludge handling training or general waste handling training if sludge is included in this.
- Copies of training material used.
- Employee training plans or procedures that demonstrate training is provided to all employees who handle sludge.

What is the intent of the question?
The intent of this question is to ensure facilities have procedures in place to train all employees who handle wastewater sludge on practices to minimize environmental and health risks associated with sludge.

Technical Guidance:
Wastewater sludge can pose significant risks to the environment and human health. Employees who handle sludge on-site should understand these risks and know how to safely, handle, store, and dispose of sludge to minimize environmental and health and safety impacts.

Additionally, having procedures to collect information to evaluate the effectiveness of training programs (e.g., trainee feedback questionnaires or test, observation, or reviews of trainer

performance, etc) will help facilities ensure the effectiveness of trainings and knowledge retention.

Resources:

- ZDHC Wastewater Treatment System Operator Qualification Training Course - I : Basic Physical/Chemical Treatment
  https://academy.roadmaptozero.com/courses/group/3#category-18

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that demonstrates that all employees who handle sludge are trained on safe handling, storage, and disposal of sludge. This may include:
  - Records of sludge or general waste training if sludge handling is included in this.
  - Training material used.
  - Employee training plans or procedures that demonstrate sludge handling training is provided to **all** employees who handle sludge.

Interview Questions to Ask:

- Staff responsible for sludge/waste management can explain the facility's sludge handling procedures and how all relevant employees are trained.
- Relevant employees understand the facility's sludge handling procedures and have received training.

Inspection - Things to Physically Look For:

- On-site observations indicate that sludge is being handled in accordance with the facility's waste handling procedures.

Partial Points: N/A

15.Is domestic wastewater sludge disposed of properly?

Answer Yes if: Your facility is disposing of domestic wastewater sludge in accordance with all legal requirements based on the hazardous characteristic of the sludge.

Note: This question refers to the final treatment/disposal method of the sludge. This can be onsite or offsite depending on the final treatment/disposal location.

If you answer Yes to this question, you will be asked the following sub question(s):

- Which disposal pathway(s) does your facility dispose of your domestic wastewater sludge?

- Hazardous Waste Treatment
- Open burning
  - **Note**: The use of open burning of sludge is strongly discouraged unless specific regulatory approval is obtained and complied with.
- Onsite Incineration at ≥1000 °C
- Onsite Incineration at <1000 °C
- Offsite Incineration at ≥1000 °C
- Landfill with Significant Control Measures
- Building Products Processed at ≥1000 °C
- Landfill with Limited Control Measures
- Offsite Incineration and Building Products Processed at <1000 °C
- Landfills with No Control Measures
- Land Application
  - E.g., Compost, fertilizer.
- Non-disclose method by authorized third party (final disposal method not disclosed)

- Please upload documentation.

Note: In the Higg FEM, the definition of landfills (e.g., with significant, limited, or no control measures) and disposal pathways aligns with the ZDHC Disposal Pathway definitions listed in the ZDHC Sludge Management Document available at the link below. FEM users should reference this document to ensure proper selection of their sludge disposal pathway.
https://downloads.roadmaptozero.com/output/Sludge-Reference-Document

Suggested Uploads:

- Documentation that demonstrates domestic wastewater sludge is being disposed of properly (sludge analysis/test showing hazardous properties, sludge disposal manifests, permit/license of waste vendor accepting and treating the sludge, evidence of the final treatment/disposal method being used, etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that domestic wastewater sludge is being disposed of responsibly to minimize environmental impacts.

Technical Guidance:

The hazardous properties and proper disposal method of sludge depend on the specific hazardous properties of the sludge (e.g., the type and concentration of hazardous chemicals). Facilities should ensure that sludge is properly characterized (e.g., via laboratory testing) to identify its hazardous properties and any specific disposal requirements or limitations.

At minimum, sludge should be disposed of in accordance with all applicable legal requirements related to sludge and waste disposal. This includes the use of qualified waste disposal vendors who are licensed/permitted to treat the sludge based on its hazardous characteristics as required.

As part of a facilities waste management program, it is important for facilities to understand how wastes (including sludge) are treated and/or disposed of after leaving the facility. Facilities should have processes in place to communicate with waste vendors and verify the final treatment disposal methods for sludge.

If sludge is treated and/or disposed of onsite, this should be done with proper permission (e.g., approvals/permits) from government authorities when required.

Resources:

- ZDHC Sludge Reference Document. **Note:** This guidance is not applicable for domestic only sludgehttps://downloads.roadmaptozero.com/output/Sludge-Reference-Document
- ZDHC Wastewater and Sludge Laboratory Sampling and Analysis Plan https://downloads.roadmaptozero.com/output/Sampling-and-Analysis-Plan

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that demonstrates domestic wastewater sludge is being disposed of properly. This may include:
    - Sludge analysis/test showing hazardous properties.
    - Sludge disposal manifests.
    - Where applicable, permit/license of waste vendor accepting and treating the sludge.
    - Evidence of the final treatment/disposal method being used by the waste vendor.
    - Legal approvals/permits for any onsite treatment/disposal of sludge if applicable.

Interview Questions to Ask:

- Staff responsible for wastewater/waste management understand the hazardous composition of the facility's sludge and the final disposal method used to treat/dispose of the sludge.

Inspection - Things to Physically Look For:

- Observations indicate that sludge is being collected and treated per the methods reported by the facility (e.g., onsite treatment/disposal conditions, sludge storage conditions, etc.)

Partial Points: N/A

16.Does your facility manage the residue of the Septic System?

Answer Yes if: Your facility has procedures or processes to manage the residue (e.g., sludge) from your septic system in accordance with the design and operating specifications of the septic system.

If you answer Yes to this question, you will be asked the following sub question(s):

- Is your Septic System adequately designed for the septic wastewater volume generated at your facility?
- Please upload the Septic system design.
    - If you cannot upload the design document, please describe here:
- How frequently does your facility unload your septic tank(s)?
- How did your facility dispose of the solids after unloading from your septic tank?
    - Sent to Municipal plant for further treatment.
    - Hazardous Waste Treatment
    - Open burning
    - Onsite Incineration at ≥1000 °C
    - Onsite Incineration at <1000 °C
    - Offsite Incineration at ≥1000 °C
    - Landfill with Significant Control Measures
    - Building Products Processed at ≥1000 °C
    - Landfill with Limited Control Measures
    - Offsite Incineration and Building Products Processed at <1000 °C
    - Landfills with No Control Measures
    - Land Application
    - Non-disclose method by authorized third party (final disposal method not disclosed)
- Does your facility obtain shipment manifest / record for offloading septic waste?
- Please upload documentation if available.

Note: In the Higg FEM, the definition of landfills (e.g., with significant, limited, or no control measures) and disposal pathways aligns with the ZDHC Disposal Pathway definitions listed in

the ZDHC Sludge Management Document available at the link below. FEM users should reference this document to ensure proper selection of their sludge disposal pathway.
https://downloads.roadmaptozero.com/output/Sludge-Reference-Document

Suggested Uploads:

- Documentation that shows how the facility manages residue (e.g., sludge) from the septic system (e.g., the septic system design drawings showing capacity, tracking records of volume of wastewater sent to the septic system, septic system cleaning schedule and records, records of sludge generation, collection and disposal manifests, records of the final treatment/disposal method being used by the waste vendor.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that wastes (e.g., sludge) from the septic system are being managed in accordance with the design and operating specifications of the septic system.

Technical Guidance:

Septic systems are engineered systems that are specifically designed based on the wastewater characteristics they are intended to treat (e.g., the volume of wastewater and pollutant loading). It is crucial septic systems are operated within their design specifications and operating parameters to ensure the effective treatment of wastewater.

Facilities should have established procedures to ensure that the system is operated, monitored, and maintained in accordance with the design specifications and manufacturer's specifications for all system equipment and components (e.g., pumps, flowmeters, motoring/sampling, frequency for cleaning out sludge, etc.)

At minimum, residue (e.g., sludge) from the system should be disposed of in accordance with all applicable legal requirements related to sludge and waste disposal. This includes the use of qualified waste disposal vendors who are licensed/permitted to treat the sludge based on its hazardous characteristics.

As part of a facilities waste management program, it is important for facilities to understand how wastes (including septic system sludge) are treated and/or disposed of after leaving the facility. Facilities should have processes in place to communicate with waste vendors and verify the final treatment disposal methods for septic system sludge.

If sludge is treated and/or disposed of onsite, this should be done with proper permission (e.g., approvals/permits) from government authorities when required.

Resources:

- ZDHC Sludge Reference Document. **Note:** This guidance is not applicable for domestic only sludge https://downloads.roadmaptozero.com/output/Sludge-Reference-Document

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that shows how the facility manages residue (e.g., sludge) from the septic system and how the system is being operated in accordance with its design capacity and operating specifications. This may include:
    - The septic system design drawings showing capacity.
    - Tracking records of volume of wastewater sent to the septic system (e.g., showing that the system is not being overloaded)
    - Septic system cleaning schedule and records.
    - Records of sludge generation, collection.
    - Septic system waste manifests.
    - Evidence of the final treatment/disposal method being used by the waste vendor.

Interview Questions to Ask:

- Staff responsible for managing wastewater and/or the septic system can explain how the facility ensures that it is being operated in accordance with the design capacity, how the system is maintained (e.g., cleaning frequency) and how wastes from the septic site are disposed of

Inspection - Things to Physically Look For:

- Observations indicate that the specific system is being operated and maintained properly (e.g., no standing water, damp spots or strong odours near the septic tank or drainfield)

Partial Points: N/A

17. Have you tested your wastewater against the legal requirements that apply to your facility?

Answer Yes if: Your facility has conducted wastewater testing at the frequency required by local law and for all the legally required parameters.

Answer Not Applicable if: There are no applicable legal requirements for your facility to test its wastewater.

If you answer Yes to this question, you will be asked the following sub question(s):

- Do the results show compliance against the requirement?
- Please upload your test report(s) (Multiple reports as per legal testing frequency)

Note: The question "Do the results show compliance against the requirement?" Should be answered based on the guidance below:

- **Answer Yes if:** Testing results in **all** tests meet the legal requirements for **all** parameters.
- **Answer Partial Yes if:** Testing results show one parameter did not meet the legal requirements. If there are multiple test reports, there must be no more than one parameter exceedance in one (1) report.
- **Answer No if:** Testing results show one (1) or more parameters have not been met in multiple test reports, **or** more than one parameter have not been met in at least one report.

Suggested Uploads:

- Copies of wastewater testing report.
- Wastewater discharge permit or approvals that show the testing parameters and discharge limits that are applicable to the facility.

What is the intent of the question?

The intent of this question is for facilities to demonstrate that wastewater has been tested against applicable legal requirements.

Technical Guidance:

Testing wastewater in accordance with legal requirements is a fundamental practice to determine if the facility's wastewater meets the applicable discharge limits. Facilities should ensure that all applicable testing requirements are understood and that procedures to test wastewater per the applicable legal requirements are implemented. This information should be used to monitor compliance and identify issues that require action to achieve and maintain compliance (if non-compliance is detected).

How This Will Be Verified:

Note: This question is unscored.

Documentation Required:

- Wastewater testing results showing results of testing against all legally required parameters.
- Wastewater discharge permit or approvals that show the testing parameters and discharge limits that are applicable to the facility.

Interview Questions to Ask:

- Staff responsible for wastewater management and legal compliance can explain how the facility's wastewater testing covers all applicable legal requirements.

Inspection - Things to Physically Look For:

- Observations indicate that all wastewater is being tested in accordance with legal requirements (e.g., the facility has identified and tested all wastewater discharge points as per applicable legal requirements).

18. Are you reporting against any wastewater standard (additional to the legal requirement)?

Answer Yes if: Your facility is testing wastewater and reporting results against a wastewater standard in addition to legally required testing.

Note: If your facility has only tested wastewater in accordance with legal requirements, you should answer No to this question.

Answer Not Applicable if: There are no applicable industry wastewater standards (in addition to legal testing requirements) that apply to your facility.

If you select Yes, you will be asked the following sub question(s):

- Please indicate which wastewater standard(s) you are reporting against:
    - ZDHC Wastewater Guidelines (for Leather & Textile) (WWG)
    - ZDHC MMCF Guidelines
    - ZDHC Sludge Reference Document
    - BSR
    - bluesign Wastewater Standard
    - Customer/Brand
    - Other
        - If other, please describe.

Suggested Uploads:

- Copies of wastewater testing results conducted in accordance with the applicable standard.

What is the intent of the question?

The intent of this question is for facilities to demonstrate that their wastewater is being tested against a wastewater standard in addition to any legally required testing.

Technical Guidance

The standards referred to in this question refer to industry standards, and the intention is to evaluate compliance beyond basic legal discharge requirements.

Industry standards and tools are developed to support facilities in the proper management and reduction of hazardous pollutants discharged in wastewater to the environment. These tools intend to provide consistent methodologies to identify, monitor and report discharge of hazardous pollutants. They also strive to support facilities in managing and reducing hazardous discharges by establishing progressive discharge limits that go beyond basic legal compliance.

Different standards or tools may have different requirements for monitoring and reporting of wastewater data (e.g., the type and frequency of reporting, types of pollutants that must be monitored/reported, or testing methodologies, etc.) When adopting an industry standard, facilities should review the guideline to determine the monitoring and reporting requirements that apply to their operations and put in place procedures to meet the required monitoring and reporting requirements.

Examples of industry guidance/tools for wastewater include:

- The ZDHC suite of guidelines which can be downloaded here: https://www.roadmaptozero.com/output
    - ZDHC Wastewater Guidelines for Leather & Textile
    - ZDHC Man-Made Cellulosic Fibres (MMCF) Guidelines
    - ZDHC Sludge Reference Document

- bluesign® CRITERIA for production sites (and its Annexes) which can be downloaded here: https://www.bluesign.com/en/downloads

How This Will Be Verified:

Note: This question is unscored.

Documentation Required:

- Documentation that demonstrates the facility is monitoring and reporting wastewater in accordance with the applicable standard(s) selected. This may include:

- Wastewater test report showing the parameters tracked by the facility.
  - **Note**: Testing should be conducted in accordance with the applicable standard (e.g., frequency or testing, test parameters, sampling and analysis methods, etc.)
- If applicable, internal procedures used to ensure the requirements of the standard are being met.

Note: Required documentation may vary by standard being reported against. All wastewater reporting documentation required by the standard should be available for verification.

Interview Questions to Ask:

- Staff responsible for managing wastewater understand and can describe the monitoring and reporting requirements of the standard the facility is reporting against.

Inspection - Things to Physically Look For:

- The relevant wastewater sources observed at the facility are included in the facility's monitoring/reporting procedures as required by the standard used to report wastewater data.

Wastewater – Level 2

19. Are you reporting against any wastewater standard (additional to the legal requirement)?

Note: The response to this Level 2 question will be pre-populated based on the response to the wastewater standard question in Level 1. The Level 1 question is unscored, and scoring will be applied in Level 2 as follows:

- **Full Points:** will be awarded for a Yes response.
- **No Points:** will be awarded for a No response.
- **Unscored:** This question will be unscored if the response is Not Applicable.

How This Will Be Verified:

This question will be verified in accordance with the criteria set forth in the Level 1 question.

20. Are you in compliance/conformance with the reported wastewater standard?

Note: This question will only be applicable to facilities that have a Yes response to the question: Are you reporting against any wastewater standard (additional to the legal requirement)?

In this question, you will be asked to complete a table with the following questions to provide details on your facility's compliance/conformance status with the wastewater standard(s) your facility reports against.

- Reported Wastewater standard (this will be pre-populated with the applicable standard(s) the facility is reporting against).
- Frequency of Sampling
- Are you in compliance with this wastewater standard?
    - If not, please provide additional information of why you are not compliant with this wastewater standard.
- Are your parameter results available on the standard's platform?
    - Please provide a direct link to the standard's platform to access results.
- Please upload documentation to demonstrate you are compliant with the standard.

Note: The question "Are you in compliance with this wastewater standard?" Should be answered based on the guidance below:

- **Answer Yes, all parameters are compliant if**: Testing is conducted at the frequency required by the standard **and** the most recent testing results from the FEM reporting year meet the requirements of the standard for **all** parameters.
- **Answer Partial Yes, at least one or more parameters are not compliant if:** Testing is not conducted at the frequency required by the standards **and/or** the most recent testing results from the FEM reporting year show one (1) or more parameters did not meet the requirements of the standard.
- **Answer No, I did not test, or all parameters are not compliant if:** Testing was not conducted in the FEM reporting year, **or** all parameters did not meet the requirements of the standard.

Suggested Uploads

- Copies of wastewater testing results and data reporting that demonstrates the facility is meeting the requirements of the standard.

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they are meeting all of the requirements of the wastewater standard that goes beyond basic legal compliance monitoring and reporting.

Technical Guidance:
Different standards or tools may have different requirements for monitoring and reporting of wastewater data (e.g., the type and frequency of reporting, types of pollutants that must be monitored/reported, or testing methodologies, etc.) When adopting an industry standard, facilities should review the guideline to determine the monitoring and reporting requirements that apply to their operations and put in place procedures to meet the required monitoring and reporting requirements.

Supporting documentation that shows the facility is meeting these requirements such as wastewater monitoring data, testing results, etc. should be maintained.

Examples of industry guidance/tools for wastewater include:

- The ZDHC suite of guidelines which can be downloaded here: https://www.roadmaptozero.com/output
    - ZDHC Wastewater Guidelines for Leather & Textile
    - ZDHC Man-Made Cellulosic Fibres (MMCF) Guidelines
    - ZDHC Sludge Reference Document

- bluesign® CRITERIA for production sites (and its Annexes) which can be downloaded here: https://www.bluesign.com/en/downloads

How This Will Be Verified:

Full Points:
Full points will be awarded if testing is conducted at the frequency required by the standard **and** testing results of **all** the most recent testing results from the FEM reporting year meet the requirements of the standard for **all** parameters.

Documentation Required:

- Documentation that demonstrates the facility is monitoring and reporting wastewater in accordance with the applicable standard(s) selected. This may include:
    - Wastewater test report showing the parameters tracked by the facility.
        - **Note**: Testing should be conducted in accordance with the applicable standard (e.g., frequency or testing, test parameters, sampling and analysis methods, etc.)
    - External links to the facility's wastewater data on the standard's platform
    - If applicable, internal procedures used to ensure the requirements of the standard are being met.
    - If applicable supporting documentation of investigations to identify the cause of any non-conformances.

Note: Required documentation may vary by standard being reported against. All wastewater reporting documentation required by the standard to demonstrate compliance should be available for verification.

Interview Questions to Ask:

- Staff responsible for managing wastewater understand and can describe the monitoring and reporting requirements of the standard the facility is reporting against.

Inspection - Things to Physically Look For:

- The relevant wastewater sources observed at the facility are included in the facility's monitoring/reporting procedures as required by the standard used to report wastewater data.

Partial Points:

- Partial points will be awarded if testing is not conducted at the frequency required by the standards **and/or** the most recent testing results from the FEM reporting year show one (1) or more parameters did not meet the requirements of the standard.

21. If you reported against ZDHC wastewater guidelines, did your facility test your wastewater and meet foundational level conventional parameters and Anion in the reporting year?

Note: This question will only be applicable to facilities that are reporting against ZDHC Wastewater Guidelines.

Answer Yes, I tested and meet foundational level if: The most recent ZDHC testing results from the FEM reporting year show all conventional parameters and Anions met the foundational level of the standard.

Answer Partial Yes, I have tested and did not meet foundational level if: The most recent ZDHC testing results from the FEM reporting year show one (1) or more conventional parameters or anions did not meet the foundational level of the standard.

Answer Not Applicable if: Conventional parameters and anions are not required to be tested per the ZDHC Wastewater Guidelines based on your facility's wastewater volume and/or the location or type of wastewater treatment.

If you answer Partial Yes to this question, you will be asked to complete a table with the following questions for ZDHC conventional parameters and anions :

- Did this parameter exceed the foundational limit?
    - **Note:** If you answer Yes to the above question, you will be asked to complete the following questions in the table:

- Quantity Detected
- Unit of measure
- What is the limit quantity?
- Unit of measure
- How long have you had this problem?
- Upload your action plan for the substance detected.
- If you don't have a document to upload, describe your plan.

Technical Guidance:
For detailed information on the ZDHC wastewater guidelines (e.g., sampling and analysis requirements, parameter limits, etc.) FEM users should refer to the most recent versions of the ZDHC Wastewater Guidelines and related supporting documentation available on the ZDHC website here: https://www.roadmaptozero.com/output

How This Will Be Verified:

Documentation Required:

- Documentation that demonstrates the facility is monitoring and reporting wastewater in accordance with the ZDHC Wastewater Guidelines. This may include:
    - Wastewater test report showing the parameters tracked by the facility.
        - **Note**: Testing should be conducted in accordance with the ZDHC program requirements (e.g., frequency or testing, test parameters, sampling and analysis methods, etc.)
    - External links to the facility's wastewater data on the standard's platform
    - If applicable, supporting documentation of planned actions to address any non-conformances.

Interview Questions to Ask:

- Staff responsible for managing wastewater understand and can describe the facility's procedures to test wastewater in accordance with the ZDHC Wastewater Guidelines.

Inspection - Things to Physically Look For:

- The relevant wastewater sources observed at the facility are included in the facility's ZDHC testing/reporting procedures.

22. If you reported against ZDHC wastewater guidelines, did your facility test your wastewater and meet foundational level heavy metal limits in the reporting year?

Note: This question will only be applicable to facilities that are reporting against ZDHC Wastewater Guidelines.

Answer Yes, I tested and meet foundational level if: The most recent ZDHC testing results from the FEM reporting year show all heavy metals met the foundational level of the standard.

Answer Partial Yes, I have tested and did not meet foundational level if: The most recent ZDHC testing results from the FEM reporting year show one (1) or more heavy metals did not meet the foundational level of the standard.

Answer Not Applicable if: Heavy metals are not required to be tested per the ZDHC Wastewater Guidelines based on your facility's wastewater volume and/or the location or type of wastewater treatment.

If you answer Partial Yes to this question, you will be asked to complete a table with the following questions for ZDHC heavy metals parameters :

- Did this parameter exceed the foundational limit?
    - **Note:** If you answer Yes to the above question, you will be asked to complete the following questions in the table:

- Quantity Detected
- Unit of measure
- What is the limit quantity?
- Unit of measure
- How long have you had this problem?
- Upload your action plan for the substance detected.
- If you don't have a document to upload, describe your plan.

Technical Guidance:
For detailed information on the ZDHC Wastewater Guidelines (e.g., sampling and analysis requirements, parameter limits, etc.) FEM users should refer to the most recent versions of the ZDHC Wastewater Guidelines and related supporting documentation available on the ZDHC website here: https://www.roadmaptozero.com/output

How This Will Be Verified:

Documentation Required:

- Documentation that demonstrates the facility is monitoring and reporting wastewater in accordance with the ZDHC Wastewater Guidelines. This may include:
    - Wastewater test report showing the parameters tracked by the facility.
        - **Note**: Testing should be conducted in accordance with the ZDHC program requirements (e.g., frequency or testing, test parameters, sampling and analysis methods, etc.)
    - External links to the facility's wastewater data on the standard's platform
    - If applicable, supporting documentation of planned actions to address any non-conformances.

Interview Questions to Ask:

- Staff responsible for managing wastewater understand and can describe the facility's procedures to test wastewater in accordance with the ZDHC Wastewater Guidelines.

Inspection - Things to Physically Look For:

- The relevant wastewater sources observed at the facility are included in the facility's ZDHC testing/reporting procedures.

23. If you reported against ZDHC wastewater guidelines, did your facility test your wastewater and detect any MRSL parameters in the reporting year?

Note: This question will only be applicable to facilities that are reporting against ZDHC Wastewater Guidelines.

Answer Yes, I tested and meet parameter limits if: The most recent ZDHC testing results from the FEM reporting year show no MRSL parameters were detected including raw wastewater samples.

Answer Partial Yes, I have tested and did not meet all parameter limits if: The most recent ZDHC testing results from the FEM reporting year show one (1) or more MRSL parameters was detected including raw wastewater samples.

Answer Not Applicable if: MRSL parameters are not required to be tested per the ZDHC Wastewater Guidelines based on your facility's wastewater volume and/or the location or type of wastewater treatment.

Note: No detection means that the parameter was not detected above the specified reporting limit listed in the ZDHC Wastewater Guideline.

If you answer Partial Yes to this question, you will be asked to complete a table with the following questions for ZDHC MRSL parameters :

- Was a chemical in this MRSL Parameter Category Detected?
    - **Note:** If you answer Yes to the above question, you will be asked to complete the following questions in the table:

- Quantity Detected
- Unit of measure
- What is the limit quantity?
- Unit of measure
- How long have you had this problem?
- Upload your action plan for the substance detected.
- If you don't have a document to upload, describe your plan.

Technical Guidance:
For detailed information on the ZDHC Wastewater Guidelines (e.g., sampling and analysis requirements, parameter limits, etc.) FEM users should refer to the most recent versions of the ZDHC Wastewater Guidelines and related supporting documentation available on the ZDHC website here: https://www.roadmaptozero.com/output

How This Will Be Verified:

Documentation Required:

- Documentation that demonstrates the facility is monitoring and reporting wastewater in accordance with the ZDHC Wastewater Guidelines. This may include:
    - Wastewater test report showing the parameters tracked by the facility.
        - **Note**: Testing should be conducted in accordance with the ZDHC program requirements (e.g., frequency or testing, test parameters, sampling and analysis methods, etc.)
    - External links to the facility's wastewater data on the standard's platform
    - If applicable, supporting documentation of planned actions to address any non-conformances.

Interview Questions to Ask:

- Staff responsible for managing wastewater understand and can describe the facility's procedures to test wastewater in accordance with the ZDHC wastewater guidelines.

Inspection - Things to Physically Look For:

- The relevant wastewater sources observed at the facility are included in the facility's ZDHC testing/reporting procedures.

24. Does your facility track wastewater sludge by each source which includes all sludge generated onsite and its disposition in your sludge inventory?

Answer Yes if: Your facility tracks wastewater sludge and the disposal method for at least one (1) source of sludge generated at the facility.

If you answer Yes to this question, you will be asked to complete a table with the following questions to provide details on your wastewater sludge generated by each source during this reporting year.

- Source of Wastewater Sludge (This will be pre-populated based on the facility's reported sources of sludge)
- How is this wastewater sludge generated classified for this source?
    - Domestic
    - Industrial
    - Combined Domestic and Industrial
- Does your facility track how much wastewater sludge it generates from this source in the reporting year?
- How much wastewater sludge (in Metric Ton) do you generate from this source in the reporting year (after any drying process is conducted, if any)?
- How does your facility dispose of this wastewater sludge?
    - How does your facility dispose of ash generated from onsite incineration? (Applies if onsite incineration is selected)
    - If Other, please describe your disposal pathway.
- Did you test the wastewater sludge of this source?
    - Were MRSLs detected in the sludge?
        - If MRSLs is detected, please select which one (Select all that apply)
    - Were Heavy Metal (Total Metal) and conventional parameters tested?
        - If Heavy Metal (Total Metal) and conventional parameters were above allowable limits, please select which one (Select all that apply)
- Provide any additional comments.
- Please upload documentation.

Note: In the Higg FEM, the definition of landfills (e.g., with significant, limited, or no control measures) and disposal pathways aligns with the ZDHC Disposal Pathway definitions listed in

the ZDHC Sludge Management Document available at the link below. FEM users should reference this document to ensure proper selection of their sludge disposal pathway.
https://downloads.roadmaptozero.com/output/Sludge-Reference-Document

Suggested Uploads:

- Documentation that demonstrates wastewater sludge quantity, composition, and disposal method(s) are being tracked (e.g., sludge inventory/tracking, sludge analysis/test showing hazardous properties, sludge disposal manifests, evidence of the final treatment/disposal method being used, etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that wastewater sludge generated at the facility is being tracked (e.g., sludge quantity, composition, and disposal method).

Technical Guidance:

It is important for facilities to know and track the different sources (e.g., types) of sludge and the general composition of sludge to ensure the most effective treatment and disposal options are used. Tracking the properties and volume of sludge generated at the facility can also provide insight into the effectiveness of wastewater treatment processes, the presence of undesired chemicals (e.g., MRSL compounds) as well as disposal costs.

The hazardous properties and proper disposal method of sludge depend on the specific hazardous properties of the sludge (e.g., the type and concentration of hazardous chemicals). Facilities should ensure that sludge is properly characterized (e.g., via laboratory testing) to identify its hazardous properties and any specific disposal requirements or limitations.

At minimum, sludge should be disposed of in accordance with all applicable legal requirements related to sludge and waste disposal. This includes the use of qualified waste disposal vendors who are licensed/permitted to treat the sludge based on its hazardous characteristics.

Additionally, as part of a facilities waste management program, it is important for facilities to understand how wastes (including sludge) are treated and/or disposed of after leaving the facility. Facilities should have processes in place to communicate with waste vendors and verify the final treatment disposal methods for sludge.

If sludge is treated and/or disposed of onsite, this should be done with proper permission (e.g., approvals/permits) from government authorities when required.

Resources:

- ZDHC Sludge Reference Document https://downloads.roadmaptozero.com/output/Sludge-Reference-Document
- ZDHC Wastewater and Sludge Laboratory Sampling and Analysis Plan https://downloads.roadmaptozero.com/output/Sampling-and-Analysis-Plan

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that demonstrates wastewater sludge is being tracked. This may include:
  - Sludge inventory showing the quantity, composition, and disposal method(s) for sludge generated at the facility.
  - Sludge analysis/test showing hazardous properties.
  - Sludge disposal manifests
  - Evidence of the final treatment/disposal method being used onsite or by the waste vendor.

Interview Questions to Ask:

- Staff responsible for wastewater/waste management can explain how sludge is tracked at the facility including tracking of sludge volume, composition, and the final disposal method used to treat/dispose of sludge.

Inspection - Things to Physically Look For:

- Observations indicate that sludge is being tracked in accordance with the facility's reported procedures for tracking sludge.

Partial Points: N/A

25. Does your facility maintain manifests or similar documentation of the handling, transportation, processing, and disposal of sludge, accounting for all domestic wastewater sludge generated at the facility?

Answer Yes if: Your facility has a process to obtain and retain waste manifests or similar documentation related to the handling, transportation, processing, and disposal of domestic wastewater sludge and **all** of the following conditions are met:

- Documentation has been obtained that accounts for **all** sludge disposals.

- The documentation contains all of the information noted below:
    - Shipper (the facility generating the sludge).
    - Mass or volume of the shipment.
    - Transporter name.
    - Shipment/Receiving dates.
    - Name of the disposal or processing facility that the sludge was shipped to.

Answer Partial Yes if: Your facility has a process to obtain and retain waste manifests or similar documentation related to the handling, transportation, processing, and disposal of domestic wastewater sludge, and documentation is available, however:

- The documentation has not been obtained for **all** sludge disposals; **and/or**
- The documentation does not contain all of the information noted below:
    - Shipper (the facility generating the sludge).
    - Mass or volume of the shipment.
    - Transporter name.
    - Shipment/Receiving dates.
    - Name of the disposal or processing facility that the sludge was shipped to.

If you answer Yes or Partial Yes to this question, you will be asked the following sub question(s):

- Does your facility use authorized third party for legal disposal of domestic wastewater sludge?
- Does your facility retain documentation of all wastewater sludge transportation and disposal/treatment companies?
    - **Note:** This refers to the legally required amount of time that documentation must be retained, which may vary by jurisdiction. If there are no legal requirements, documentation must be retained for at least two (2) years.
- Are all domestic wastewater sludge transporters, treatment, and disposal facilities licensed and permitted?
- Please upload documentation.

Suggested Uploads:

- Samples of waste manifests or similar documentation related to the handling, transportation, processing, and disposal of domestic wastewater sludge.
- Copies of sludge handling/treatment/disposal vendor licenses and/or permits that show they are authorized to receive, process and dispose of the sludge.

Note: Uploading of all manifest or other documentation is not required, however they should be available for review at the time of verification.

What is the intent of the question?

The intent of this question is for facilities to demonstrate that processes are in place to obtain and retain information related to the handling, transportation, processing, and disposal of domestic

wastewater sludge and to ensure that any third-party waste vendors have the required legal approvals to receive, process and dispose of the facility's sludge.

Technical Guidance:

To ensure proper accountability, facilities should have established processes in place to maintain documentation related to the handling, transportation, processing, and disposal of domestic wastewater sludge. Often the minimum requirements for generating and maintaining documentation related to waste disposal are governed by legal requirements and all applicable requirements should be met by facilities.

In addition to any legal requirements, facilities should ensure that a waste manifest or a similar local transport document that contains the following information is obtained and maintained for each sludge shipment as a good practice. If needed this additional information can be requested from waste vendors:

- Shipper (the facility generating the sludge).
- Mass or volume of net shipment.
- Transporter name.
- Driver's name/signature.
- Name of the disposal or processing facility that the sludge was shipped to.
- Name/signature of personnel at the disposal or processing facility certifying acceptance of the sludge.

Facilities should also ensure that any third-party waste vendors used have the required legal approvals to receive, process and dispose of the facility's sludge. Facilities should ensure that part of the waste vendor approvals process include the verification of all legally required approvals (e.g., licenses and permits). It is considered a good practice (if not legally required) for facilities to request and maintain up-to-date and valid copies of vendor approvals onsite.

Resources:

- ZDHC Sludge Reference Document
  https://downloads.roadmaptozero.com/output/Sludge-Reference-Document

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities that have established processes to obtain and retain waste manifests or similar documentation related to the handling, transportation, processing, and disposal of domestic wastewater sludge and **all** of the following conditions are met:

- Documentation has been obtained that accounts for **all** sludge disposals and contains all of the required information.
- Documentation is retained onsite for at least the legally minimum required length of time.If there are no legal requirements, documentation must be retained for at least two (2) years.
- Any third-party waste vendors used have the required legal approvals (e.g., licenses and permits) to receive, process and dispose of the facility's sludge.

Note: Points will be awarded automatically in the Higg FEM based on the responses to the main and sub questions.

Documentation Required:

- Documentation that shows the facility has obtained and maintains waste manifests or similar documentation related to the handling, transportation, processing, and disposal of domestic wastewater sludge and that sludge is being received by authorized vendors. This may include:
    - Waste manifests or other transport documentation.
    - Waste vendor licenses and/or permits that show they are authorized to receive, process and dispose of the facility's sludge.

Interview Questions to Ask:

- Staff responsible for managing wastes can explain the facilities procedures to obtain and maintain manifests and/or other transport information related to sludge disposal and how the facility ensures that waste vendors have the required approvals to collect, receive, or process the facility's sludge.

Inspection - Things to Physically Look For:

- Observations indicate that sludge is being collected and treated per the process reported by the facility (e.g., sludge disposal records, sludge storage conditions, presence of waste contractors onsite during verification, etc.)

Partial Points:
Partial points will be awarded for facilities that have established processes to obtain and retain waste manifests or similar documentation related to the handling, transportation, processing, and disposal of domestic wastewater sludge, and documentation is available, however one (1) or more of the following conditions exist:

- Documentation has been obtained but **does not** account for **all** sludge disposals or does not include the required information; **and/or**
- Documentation is not retained onsite for at least the legally minimum required length of time .If there are no legal requirements, documentation has not been retained for two (2) years; **and/or**

- Any third-party waste vendors used do not have the required legal approvals (e.g., licenses and permits) to receive, process and dispose of the facility's sludge.

Note: Points will be awarded automatically in the Higg FEM based on the responses to the main and sub questions.

26. Do you have a plan to upgrade your septic tank to a more modern wastewater treatment approach?

Answer Yes if: Your facility has a documented plan with a defined timeline to upgrade your septic system to a more advanced treatment system or discontinue the use of septic system and direct wastewater to an authorized offsite wastewater treatment facility.

If you answer Yes to this question, you will be asked the following sub question(s):
- If yes, when do you plan on having the upgrade completed?
- If yes, please upload documentation.

If you answer No to this question, you will be asked the following sub question(s):
- If no, please describe why you do not plan to upgrade your septic tank?

Suggested Uploads:
- Documentation that supports the facility's plans to upgrade the septic system or discontinue the use of septic system and direct wastewater to an authorized offsite wastewater treatment facility (e.g., records of purchase of wastewater treatment system, contract for planned construction of new treatment facility or removal of septic system, agreement with offsite wastewater treatment facility to begin receiving the facility's wastewater, etc.)

What is the intent of the question?
The intent of this question is for facilities to demonstrate that there is an established plan in place to upgrade the septic system to a more advanced treatment system or discontinue the use of septic system and direct wastewater to an authorized offsite wastewater treatment facility.

Technical Guidance:
Septic systems provide a basic level of treatment for wastewater that are often not capable of providing a sufficient level of treatment before discharging wastewater directly to the environment. Additionally, in most cases it is not practical to effectively monitor effluent from the septic system to ensure that potential environmental impacts are being minimized. Effluent from septic systems can often contain levels of pathogens (e.g., E. coli), chemicals, and nutrients (e.g., nitrogen and phosphorus) that can contaminate groundwater or nearby surface water.

Upgrading a septic system to a more advanced type of treatment system (e.g., primary, secondary, and tertiary treatment) can reduce the risk of adverse impacts to the environment and allow facilities to ensure wastewater is appropriately treated before being discharged.

An alternative solution to a septic system upgrade could also include discontinuing the use of the septic system and directing wastewater to an authorized offsite wastewater treatment facility for treatment.

How This Will Be Verified:

Note: This question is unscored.

Documentation Required:

- Documentation that demonstrates the facility has an established plan to upgrade the septic system or discontinue the use of septic system and direct wastewater to an authorized offsite wastewater treatment facility. This may include:
    - Records of purchase of new wastewater treatment system.
    - Contract for planned construction of new treatment facility or removal of septic system.
    - Agreement with offsite wastewater treatment facility to begin receiving the facility's wastewater.
    - Documented timelines for project completion if available.

Interview Questions to Ask:

- Staff responsible wastewater management can explain the facility's plans to upgrade the septic system or discontinue the use of septic system and direct wastewater to an authorized offsite wastewater treatment facility.

Inspection - Things to Physically Look For:

- If applicable, observations are consistent with the facility's reported plans (e.g., observed onsite construction activities or preparations for system upgrades)

27. Have you requested wastewater quality test results from the offsite wastewater treatment plant?

Answer Yes if: Your facility obtained wastewater results from the offsite wastewater treatment plant in the Higg FEM reporting year **or** your facility has formally requested the offsite wastewater treatment plant to provide these results, **or** the wastewater treatment plant posts their effluent testing data online and the facility has access to this.

Notes:

- Formally requested means that the facility has contacted the wastewater treatment plant or operator (via email, letter, or other means of communication) to request wastewater quality test results.
- If results have formally been requested and the facility has documentation of this request and results are not provided, and there is supporting evidence of the refusal, Yes can be selected for this question.

If you answer Yes to this question, you will be asked the following sub question(s):

- How / What action did you take to make the request?
    - Request Permit / compliance status of offsite Wastewater treatment plant.
    - Email
    - Research online record.
    - Send official request to offsite Wastewater treatment plant.
    - Other
        - If Other, please describe.
- Please upload documentation, if available.
- If you cannot upload the documents, please describe here.

Suggested Uploads:

- Offsite wastewater treatment plant quality test records for the FEM reporting year (if provided).
- Documentation of your request to the offsite wastewater treatment plant for wastewater quality records in the FEM reporting year.

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they are proactively seeking to verify that wastewater from the offsite treatment plant is compliant with applicable legal and understand any potential impacts the facility's wastewater may have on the offsite treatment plants operations.

Technical Guidance:

The objective of requesting wastewater quality test results from the offsite treatment plant is for a facility to proactively verify that treated wastewater effluent discharged from the offsite facility to the environment is compliant.

Although facilities do not have operational control over the third-party treatment provider, it is important to be aware of any non-compliances and to what extent the facility may be contributing to non-compliances. This information is useful to help understand your situation and identify risk factors and/or opportunities for improvement.

It is recommended that facilities establish procedures to obtain (when possible), verify, and track this data on a regular basis (e.g., monthly, quarterly, etc) to monitor compliance as part of their environmental management program.

How This Will Be Verified:

Full Points:

Documentation Required:

- Offsite wastewater treatment plant quality test records for the FEM reporting year (if provided).
- Documentation of your request to the offsite wastewater treatment plant for wastewater quality records in the FEM reporting year.

Interview Questions to Ask:

- Staff responsible for wastewater management at the facility can explain how wastewater treatment plant quality test records are obtained and/or requested from the offsite treatment plant.

Inspection - Things to Physically Look For:

- Observations indicate that the wastewater test results or requests made are for the offsite treatment plant used by the facility.

Partial Points: N/A

Wastewater – Level 3

28. Does your facility engage/collaborate with your off-site wastewater treatment plant to improve their wastewater treatment and/or engage in recycling?

Answer Yes if: Your facility proactively engages/collaborates with your offsite wastewater treatment provider to improve their wastewater treatment and/or increase wastewater recycling.

If you answer Yes to this question, you will be asked the following sub question(s):

- Please describe your engagement/collaboration activity.

Suggested Uploads:

- Documentation that demonstrates how your facility has engaged with the offsite wastewater treatment plant in the Higg FEM reporting year (e.g., lists of activities and with dates of engagement, meeting records, completed audits or surveys etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they are actively engaging with their offsite wastewater treatment plant to improve treatment and increase wastewater recycling.

Technical Guidance:

Engaging with your offsite wastewater treatment plant is important because your facility often has a direct impact on their operations and working collaboratively with them as well as other relevant stakeholders can create a shared focus and dedicate resources to making improvements.

Examples of engagement can include, but are not limited to:

- Audits or surveys of treatment plant operations with the objective of identifying and providing feedback on opportunities for improvement.
- Regularly scheduled (e.g., annual) collaborative meetings with wastewater treatment provider and other relevant stakeholders to evaluate and plan for improvements (e.g., evaluate the feasibility of new or best available technologies for wastewater treatment and/or recycling, development of improvement plans or road map).

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that demonstrates how your facility has engaged with the offsite wastewater treatment plant in the Higg FEM reporting year. This may include:
    - List of engagement activities and stakeholders with dates of engagement.
    - Records of collaborative meetings to evaluate and plan for improvements.
    - Completed audits or surveys of offsite treatment plant operations.
    - Other relevant documentation of engagement and/or improvements resulting from engagement with the offsite treatment plant.

Interview Questions to Ask:

- Staff responsible for managing/participating in the engagement can explain how and who they engage with on improvements for wastewater treatment and/or recycling.

Inspection - Things to Physically Look For:

- Where applicable, observations onsite are consistent with the reported engagement activities.

Partial Points: N/A

29.Does your facility reuse process wastewater as process water?

Answer Yes if: Your facility reuses process wastewater as process water and tracks the quantity of water reused.

Note: Process wastewater reuse is defined as the act of taking wastewater discharged from one process from which it no longer has beneficial use and using it in other processes **without treatment**. This does not include water cycled in operations such as cooling towers and non-contact heat exchange operations or water that is reused for domestic uses such as landscape irrigation.

If you answer Yes to this question, you will be asked the following sub question(s):

- How much (in m^3) of process wastewater was reused back into your production processes?
    - **Note:** The annual quantity of process water reused in the FEM reporting year should be input here.

- Enter the percentage of process wastewater reused back into your production processes.
    - **Note:** The annual percentage of process water reused in the FEM reporting year should be input here. This is calculated as follows:
        - % of water reused = Total Annual Water Reused (m^3) / Total Annual Production Water (m^3) x 100%
        - If production and domestic water use cannot be separated, the total annual water use should be used.

- Please briefly describe how the reuse process is conducted within your facility.
- Please upload documentation.

Suggested Uploads:

- Tracking records of the quantity of process water reuse (e.g., meter logs, data tracking worksheets/charts, calculations).
- Water reuse system design drawings or water flow diagrams that show where and how process water is reused.

What is the intent of the question?
The intent of this question is to incentivise the use of innovative technology or solutions to reuse process wastewater to reduce the facility's water use footprint.

Technical Guidance:

Water reuse is an effective solution to reduce overall water use. This utilizes wastewater from a process as the water source for another process without the need for treatment. The quality of this wastewater and requirements for reuse are key factors that will dictate if and where the process wastewater can be reused.

Facilities should evaluate the process wastewater from all processes to determine if it is suitable for reuse and what will be needed to reuse the wastewater (e.g., retrofits to the water collection and supply network).

Facilities should also establish procedures to track the volume of water reused so this can be monitored and used to demonstrate reductions in the facility's water use footprint. Direct Measurement (e.g., with meters) is the preferred tracking method, however in some cases the volume of water reused may need to be calculated using an established estimation methodology. Any estimation methodology should be established or evaluated by a qualified individual (e.g., an environmental or process engineer) to ensure that the methodology is as accurate as possible and representative of facility operating conditions.

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities that reuse process wastewater as process water and track the quantity of water reused. Points are not allocated based on the percentage reused.

Documentation Required:

- Tracking records of the quantity of process water reuse (e.g., meter logs, data tracking worksheets/charts, calculations).
- Water reuse system design drawings or water flow diagrams that show where and how process water is reused.
- Documented calculation/estimation methodology if applicable.

Interview Questions to Ask:

- Staff responsible for water/wastewater management can describe how process wastewater is reused as process water, how this is tracked and how the accuracy of the water reuse data is ensured.

Inspection - Things to Physically Look For:

- Observations indicate that the reported process water is being reused as process water (e.g., observe the equipment/water source network facilities in place to facilitate the water reuse).

30.Does your facility recycle industrial wastewater for production processes?

Answer Yes if: Your facility recycles industrial wastewater for production processes and tracks the quantity of water recycled.

Note: Recycled industrial wastewater is defined as process wastewater that has been treated using physical, chemical, and/or any additional treatment processes to meet a quality which allows the water to be used again in a production process. For example, wastewater that has gone through a membrane filtration process and used back in the industrial operations is considered recycled water. This does not include water cycled in operations such as cooling towers and non-contact heat exchange operations or water that is recycled and used for domestic uses such as landscape irrigation.

If you select Yes, you will be asked the following sub question(s):

- How much (in m^3) of treated industrial wastewater was recycled back into your production processes?
    - **Note:** The annual quantity of recycled industrial wastewater in the FEM reporting year should be input here.

- Enter the percentage of treated industrial wastewater that was recycled back into your production processes.
    - **Note:** The annual percentage of industrial wastewater recycled in the FEM reporting year should be input here. This is calculated as follows:
        - % Recycle Rate = Recycled used / (Recycle used + Wastewater Discharge) x 100%
        - If production and domestic water use cannot be separated, the total annual water use should be used.

- Please briefly describe how the recycling process is conducted within your facility.
- Please upload documentation.

Suggested Uploads:

- Tracking records of the quantity of industrial wastewater recycled (e.g., meter logs, data tracking worksheets/charts, calculations).
- Water recycling system design drawings or water flow diagrams that show where and how industrial wastewater is recycled and used.

What is the intent of the question?
The intent of this question is to incentivise the use of innovative technology or solutions to recycled industrial wastewater back into production processes to reduce the facility's water use footprint.

Technical Guidance:

Water recycling is an effective solution to reduce overall water use. If industrial wastewater does not meet the quality requirements to be reused in production processes, it can be treated (either chemically or biologically) to meet the required quality specifications and be recycled. The quality of the wastewater, and level of treatment that can be achieved are key factors that will dictate if and where the wastewater can be recycled for use again in the facility.

Facilities should evaluate the quality of industrial wastewater and treatment capabilities to determine if it is suitable to be recycled and used again and what will be needed to reuse the wastewater (e.g., retrofits to the water treatment system or collection and supply network).

Facilities should also establish procedures to track the volume of water recycled so this can be monitored and used to demonstrate reductions in the facility's water use footprint. Direct Measurement (e.g., with meters) is the preferred tracking method, however in some cases the volume of water recycled may need to be calculated using an established estimation methodology. Any estimation methodology should be established or evaluated by a qualified individual (e.g., an environmental or process engineer) to ensure that the methodology is as accurate as possible and representative of facility operating conditions.

How This Will Be Verified:

Full Points:
Full points will be awarded if the facility recycled 50% or more of its industrial wastewater back into production processes in the FEM reporting year.

Documentation Required:

- Tracking records of the quantity of industrial wastewater recycled (e.g., meter logs, data tracking worksheets/charts, calculations).
- Water recycling system design drawings or water flow diagrams that show where and how industrial wastewater is recycled and used in production processes.
- Documented calculation/estimation methodology if applicable.

Interview Questions to Ask:

- Staff responsible for water/wastewater management can describe how industrial wastewater is recycled and used in production processes, how this is tracked and how the accuracy of the water recycling data is ensured.

Inspection - Things to Physically Look For:

- Observations indicate that the reported industrial wastewater is being recycled back into production processes (e.g., observe the equipment/water source network facilities in place to facilitate the water recycling and reuse).

Partial Points:

- Partial points will be awarded if the facility recycled 20% to 49% of its industrial wastewater back into production processes in the FEM reporting year. No points are awarded if less than 20% of industrial wastewater is being recycled.

31. Does your facility recycle domestic wastewater for domestic use (i.e., landscape irrigation, toilets)?

Answer Yes if: Your facility recycles domestic wastewater for domestic use and tracks the quantity of water recycled.

Answer Not Applicable if: Your facility is not permitted by law to reuse domestic wastewater as domestic water.

Note: Recycled domestic wastewater is defined as domestic wastewater that has been treated using physical, chemical, and/or any additional treatment processes to meet a quality which allows the water to be used again for domestic uses such as landscape irrigation, toilets.

If you select Yes, you will be asked the following sub question(s):

- How much (in m^3) of treated domestic wastewater was recycled back as domestic water?
    - **Note:** The annual quantity of recycled domestic wastewater in the FEM reporting year should be input here.

- Enter the percentage of wastewater treated and recycled back as domestic water
    - **Note:** The annual percentage of domestic wastewater recycled in the FEM reporting year should be input here. This is calculated as follows:
        - % of water recycled = Total Annual Domestic Water Recycled (m^3) / Total Annual Domestic Water (m^3) x 100%

- Please briefly describe how the recycling process is conducted within your facility.
- Please upload documentation.

Suggested Uploads:

- Tracking records of the quantity of domestic wastewater recycled (e.g., meter logs, data tracking worksheets/charts, calculations).
- Water recycling system design drawings or water flow diagrams that show where and how domestic wastewater is recycled and used.

What is the intent of the question?

The intent of this question is to incentivise the use of innovative technology or solutions to recycled domestic wastewater for domestic use to reduce the facility's water use footprint.

Technical Guidance:

Water recycling is an effective solution to reduce overall water use. Domestic wastewater can be treated (either chemically or biologically) to meet the required quality specifications and be recycled to use again for domestic use. The level of treatment that can be achieved and any applicable legal requirements for reuse of domestic water for land applications are key factors that will dictate if and where the wastewater can be recycled for use again.

Facilities should evaluate the quality of domestic wastewater and treatment capabilities to determine if it is suitable to be recycled and used again and what will be needed to reuse the wastewater (e.g., retrofits to the water treatment system or collection and supply network).

Facilities should also establish procedures to track the volume of water recycled so this can be monitored and used to demonstrate reductions in the facility's water use footprint. Direct Measurement (e.g., with meters) is the preferred tracking method, however in some cases the volume of water recycled may need to be calculated using an established estimation methodology. Any estimation methodology should be established or evaluated by a qualified individual (e.g., an environmental or process engineer) to ensure that the methodology is as accurate as possible and representative of facility operating conditions.

How This Will Be Verified:

Full Points:

Documentation Required:

- Tracking records of the quantity of domestic wastewater (e.g., meter logs, data tracking worksheets/charts, calculations).
- Water recycling system design drawings or water flow diagrams that show where and how domestic wastewater is recycled and used for domestic purposes.
- Documented calculation/estimation methodology if applicable.

Interview Questions to Ask:

- Staff responsible for water/wastewater management can describe how domestic wastewater is recycled and used for domestic purposes, how this is tracked and how the accuracy of the water recycling data is ensured.

Inspection - Things to Physically Look For:

- Observations indicate that the reported domestic wastewater is being recycled and used again for domestic use (e.g., observe the equipment/water source network facilities in place to facilitate the water recycling and reuse).

Partial Points: N/A

Air Emissions

General Introduction

Air emissions from industrial processes and manufacturing operations have the potential to emit pollutants into the air that impact the environment, human health and contribute to climate change.

As governments and industry stakeholders continue to focus on reducing environmental impacts, more stringent requirements and regulations may be imposed. By proactively managing and working to reduce impacts of your facility's air emissions, you can reduce your exposure to regulatory risks or new requirements from business partners.

In general, the Higg FEM Air Emissions section encourages you to:

- Identify and understand the types of emission sources and pollutants that are emitted from your facility.
- Understand and comply with all applicable legal requirements relating to air emissions including all permitting, reporting, and testing requirements.
- Track and report emissions of key pollutants associated with facility operations and production.
- Evaluate, plan for, and adopt best available technologies (BAT) including materials, processes, and equipment to minimize emissions to air.

Additional details on the intent and criteria for each Higg FEM Air Emissions question is provided in the guidance below along with useful technical guidance and resources to support your facility in the management and reduction of emission to the air.

Air Emissions at your Facility

Pollutants are typically emitting from the one of the following types of emission sources:

- **Point Source:** air flow which is actively controlled and directed (e.g., by fan and exhaust ducting) into the atmosphere from a single stationary fixed source such as stack or vent. Examples include boiler exhaust stack, the exhaust stack of a local ventilation system used to capture emissions from processes that emit volatile organic compounds (VOCs).

- **Fugitive Emissions Source**: for the Higg FEM, fugitive emission sources are those that are passively released into the outdoor environment and are **not** actively directed through a single exhaust point (e.g., stack or vent). Examples include screen printing, spot cleaning or dyeing areas with only general ventilation (e.g. passive sidewall ventilation or windows).

- **Mobile Emissions Source**: for the Higg FEM, mobile emission sources are those that are non-stationary sources of emission. Examples include powered motor vehicles (e.g., forklifts, trucks, passenger vehicles), heavy machinery (e.g., mobile cranes or lifts), small engines (e.g., landscaping equipment).

The Higg FEM also further categorizes emissions based on the nature of the emission source as follows:

- **Emission from Facility Operations:** for the Higg FEM, these include emissions from sources that support facility operations and are not the direct result of production processes. Emissions from facility operations are typically emitted through point source

or mobile emissions sources. Examples include boilers, generators, heating and cooling systems (e.g., combustion heating, refrigerant-containing cooling equipment), and combustion engines.

- **Emissions from Production:** for the Higg FEM, these include emissions from sources that are related to production processes. Emissions from production are typically emitted through point sources or as fugitive emissions. Examples include production processes that use chemicals (e.g., solvents, adhesives, printing, dyeing) processes that emit dust/particulates, products of combustion, or other hazardous or toxic air pollutants.

Reportable Pollutants in the FEM

The Higg FEM requires that facilities track and report emission data for refrigerants used onsite and several key pollutants listed below. Additional details on reporting pollutant quantities in the FEM are provided in the relevant questions.

Pollutants Emitted from Operations	Pollutants Emitted from Production Processes
● Particulate Matter ● Nitrogen Oxides (NOx) ● Sulfur Oxides (SOx) ● Carbon Monoxide (CO) ● Volatile Organic Compounds (VOC) or Total Organic Carbon (TOC) ● Hazardous or Toxic Air Pollutants (HAP/TAP)	Particulate Matter Nitrogen Oxides (NOx) Sulfur Oxides (SOx) Carbon Monoxide (CO) Volatile Organic Compounds (VOC) or Total Organic Carbon (TOC) Hazardous or Toxic Air Pollutants (HAP/TAP) Ammonia (NH_3) Ozone (O_3) Ozone Depleting Substances (ODS) Carbon disulfide (CS_2) Hydrogen sulfide (H_2S)

Volatile Organic Compounds (VOC)
VOC are defined as organic chemical compounds that under normal conditions are gaseous or can vaporise and enter the atmosphere. The general criteria for determining whether a pollutant is considered a VOC is provided below:

- It contains carbon.
- Vapor Pressure is > or = 0.01 kPa (~0.075 mmHg) at 20C
- Boiling point is < or = 250C at standard pressure of 101.3 kPa

Hazardous or Toxic Air Pollutants (HAP/TAP)
Are defined as compounds that are known or suspected to cause significant harmful impacts to human health or the environment.

Country-specific regulation may define which air pollutants are designated as HAPs/TAPs within a specific jurisdiction. Where country-specific definitions or regulations do not define HAPs/TAPs, recognized lists from other jurisdictions may be referenced when determining if pollutants from facility operations should be included in the reported quantity for HAPs/TAPs. For example, information on HAPs from the US EPA can be found here https://www.epa.gov/haps. A current list of HAPs (as defined by the US EPA can be found here: https://www.epa.gov/haps/initial-list-hazardous-air-pollutants-modifications

Best Available Technology (BAT)

In the FEM, the concept of Best Available Technology (BAT) is defined as the most effective and advanced technology including materials, processes, and equipment that is currently available that will result in reduction of pollutants emitted and minimizing impacts to the environment. This is further defined as follows:

- **Best** in relation to technology means the most effective method in achieving a high level of protection of the environment.
- **Available** means technology that is developed on a scale that allows for economically and technically viable implementation taking into consideration the costs and benefit and that the technology reasonably accessible to the business carrying on the activity regardless of whether the technology is developed or widely implemented locally.
- **Technology** refers to materials, processes, and equipment, and the way it is designed, built, maintained, operated.

The adoption of BAT often depends on the specific operations, emission source and pollutant characteristics at a facility. For example:

- In some cases, the most effective current solution for reducing particulate emission may be an Electrostatic precipitator (ESP) and in other cases a form of wet scrubbing or cyclone filtration may be more effective.
- In some cases, the most effective current solution for reducing emission of organic compounds (e.g., formaldehyde) may be substitution for an alternative chemical input or the use of a control technology such as thermal oxidation.

The adoption of BAT often requires actions such as process/equipment modifications, the installation of control equipment, research into alternative raw material/chemical inputs that requires planning and evaluation of available solutions and capital allocation. Facilities should have processes in place to stay up to date with emerging technologies and regularly review these to determine viable options for both new and existing emission sources to determine the most effective means to reduce the emissions to the air. These evaluations should be included in the long-term planning to reduce emissions.

Evaluation of BAT must be conducted by qualified professionals such as process or environmental engineers who understand the facility's emissions and pollutant characteristics (e.g., pollutant loading, emission source operational parameters such as temperature and moisture content, etc) and the design and operational characteristics of any controls or alternative technologies being evaluated in order to determine potential air emission reductions through engineering estimates or other air emission calculation methodology.

Note: In some countries, requirements to adopt BAT or procedures to determine BAT may be defined by local regulations or directives, which should be complied with, however facilities should strive to conduct a detailed evaluation of all available technologies to reduce environmental impacts to the lowest achievable level.

Air Emissions Data Quality

Accurately tracking and reporting air emissions data over time provides facilities and stakeholders with detailed insight into opportunities for improvement. If data is not accurate, this limits the ability to understand the facility's air emissions and identify the specific actions that will help reduce environmental impacts.

When establishing an air emissions tracking and reporting program, the following principles should be applied:

- **Completeness** – The tracking and reporting program should include all emission sources.
- **Accuracy -** Ensure that the data input into the air emissions tracking program is accurate and is derived from credible sources (e.g., emissions testing/monitoring or emissions calculations are based on established scientific measurement principles or established emissions estimation methodologies, etc.)
- **Consistency -** Use consistent methodologies to track air emissions data that allows for comparisons of emissions over time. If there are any changes in the tracking methods, sources, or other operations that impact air emissions data, this should be documented.
- **Transparency** – All data sources (e.g., testing reports), assumptions used (e.g., estimation techniques), and calculation methodologies should be disclosed in data inventories and be readily verifiable via documented records and supporting evidence.
- **Data Quality Management** – Quality assurance activities (internal or external) should be defined and performed on air emissions data as well as the processes used to collect and track data to ensure reported data is accurate.

Applicability Questions

To determine which questions you will need to complete in the Air Emissions section, you will need to complete the applicability questions listed below. You will be asked to select which air-emitting equipment, processes, and potential pollutants you have on-site. Your selections will direct you to complete the questions that are most applicable for your facility. If you don't have

any facility air emissions from operations or production, you will not need to answer any additional questions in this section.

Notes:

- If you have air emissions from facility operations (e.g., boilers, generators), you will answer relevant questions about emissions to air from facility operations sources.
- If you have air emissions from production processes (e.g., solvents or adhesives), you will answer relevant questions about emissions to air from production sources.

1. Does your facility contain any of the following operations equipment?

- Boiler
- Generators
- Combustion Engines (e.g., gasoline powered pumps)
- Industrial Ovens (for heating/drying/curing)
- Heating and Ventilation (Combustion Heating (Furnace))
- Refrigerant containing device (other than air conditioning system)
- Air conditioning (Cooling)
- Other sources of known air emissions from facility operations
- Other sources of volatile organic compounds (VOCs)

2. Does your facility conduct any of the following processes or use any of the following substances?

- Yarn spinning or synthetic fiber manufacturing
- Finishes (i.e. any mechanical or chemical process that occurs after dying to affect the look, performance, or feel of the product)
- Solvents
- Adhesives/ cementing
- Printing
- Dyeing
- Tenterframes or other heating processes
- Spot cleaners (*Spot cleaners are chemicals used to remove contaminated spots from final products such as garments, bed covers, shoes etc. In many cases, acetone-based chemicals are used as spot cleaners. Spot cleaning activity may be done onsite during production processes, or a facility may have a dedicated room for spot cleaning.)
- Sprayed chemicals or paints
- Other sources of ozone depleting substances (ODSs)
- Other sources of particulate matter (PM)
- Other sources of volatile organic compounds (VOCs)
- Hazardous or Toxic Air Pollutants (HAPs/ TAPs)

3. Does your facility produce Man-made Cellulose Fibre (MMCF)?

- Yes should be selected only if your facility manufactures MMCF. Facilities that use MMCF to make final products should select No.

Air Emissions - Level 1

1. Has your facility created an inventory of all point source air emissions sources at your facility?

Answer Yes if: Your facility has a documented inventory of all point source emission sources at your facility including point sources from facility operations and production emission sources.

If you select Yes, you will be asked the following sub question(s):

- Does your facility's point source air emissions inventory include the following information? Select all that apply.
    - Unique source identifier (emission point name or number)
    - Process or Equipment the source is linked to
    - List of pollutants emitted from the source
    - Legal or other emissions testing or reporting requirements if required (testing parameters and frequency), if applicable
    - Control devices installed on the source, if applicable
        - **Note**: The intent of this inventory item is to indicate the presence or absence of a control device for the source. If there is no control device for this source and this is indicated on the inventory, this option should be selected.
- Please upload a copy of the inventory

Suggested Uploads:

- A copy of the facilities inventory of point source air emission sources.

What is the intent of the question?
The intent of this question is for facilities to establish an inventory (i.e. a list) of all possible point sources of emissions to air on-site. This includes point sources from facility operations and production emissions. The intent is also for facilities to understand which pollutants are emitted or have the potential to be emitted from each point source.

Technical Guidance
An air emission source inventory is needed for facilities to identify, track, and manage emission sources onsite. To prepare a comprehensive inventory, all point sources of facility emissions from operations and production should be included. Regular review should be carried out to

make sure the inventory is up-to-date and accurate. This inventory should include emissions sources regulated by permits as well as those not currently regulated.

Emission source inventories can contain varying levels of detail and information, however the following basic information should be included in the inventory

- Unique source identifier (emission point name or number)
- Process or Equipment the source is linked to.
- List of pollutants emitted from the source.
- Legal or other emissions testing or reporting requirements if required (testing parameters and frequency), if applicable
- Control devices installed on the source, if applicable
    - **Note**: The intent of this inventory item is to indicate the presence or absence of a control device for the source. If there is no control device for this source and this is indicated on the inventory, this option should be selected.

An example inventory can be downloaded here: https://www.sumerra.com/wp-content/uploads/Air-Emissions-Inventory.xlsx

Examples of common sources of emission sources and pollutants that can be emitted through point sources are provided below. Note that this is not an exhaustive list and facilities may require the support of qualified environmental experts to identify air emission point sources and all potential pollutants emitted.

- Particulate Matter (PM) – e.g., from fuel combustion, yarn spinning, slashing, weaving, synthetic fiber manufacturing, casting
- Oxides of Sulphur and Nitrogen (SOx and NOx) – typically associated with fuel combustion.
- Volatile organic compounds (VOCs) – e.g., from fabric finishes, solvents, adhesives, fabric printing, tenterframes, degreasing operations.
- Ozone depleting substances (ODS) – commonly found in refrigerants, many apparel spot cleaners, and some adhesives and solvents.
- Ammonia (NH3) – e.g., from fabric finishing, tanning processes.
- Ozone (O3) – e.g., from denim finishing
- Carbon disulfide (CS_2) – from Man-Made Cellulosic Fibres (MMCF) Production
- Hydrogen Sulfide (H_2S) - from Man-Made Cellulosic Fibres (MMCF) Production
- Hazardous or toxic air pollutants (HAPs/TAPs) - e.g., from fuel combustion, solvents, adhesives, and finishing processes (e.g., printing, potassium permanganate spray), anti-fungal/bacterial agents, metal plating, injection moulding, etc.

Country-specific regulation may define which air pollutants are designated as HAPs/TAPs within a specific jurisdiction. Where country-specific definitions or regulations do not define HAPs/TAPs, recognized lists from other jurisdictions may be referenced when determining if pollutants from facility operation are considered HAPs/TAPs. For example, information on HAPs from the US EPA can be found here https://www.epa.gov/haps. A current list of HAPs (as

defined by the US EPA can be found here: https://www.epa.gov/haps/initial-list-hazardous-air-pollutants-modifications

How This Will Be Verified:

Full Points:

Documentation Required:

- An up-to-date inventory of all point source emission sources from the facility including operational and production emission sources.
- The inventory contains all the basic information listed in the sub-question and this information is accurate and complete.

Note: This information may be maintained in several different documents. For example, if the facility has a list of all point sources and pollutants emitted from each source but maintains a separate legal register with all emission related regulatory requirements that can be linked to the inventory, this would be acceptable.

Interview Questions to Ask:

- Staff responsible for managing air emissions are able to explain the information in the inventory and how emission sources and pollutants are identified.

Inspection - Things to Physically Look For:

- All point source emission sources and potential pollutants from each source are properly identified and this is consistent with onsite observations.

Partial Points:

- Partial points will be awarded if all the requirements above are met, however the facility's inventory does not contain all the basic inventory information listed in the sub question "Does your facility's point source air emissions inventory include the following information? Select all that apply".

2. Has your facility created an inventory of all mobile and fugitive emission sources at your facility?

Answer Yes if: Your facility has a documented inventory of all mobile and fugitive emission sources at your facility including mobile and fugitive sources from facility operations and production sources.

Note: Mobile and fugitive sources may be included in a facility wide emissions source inventory that includes all emissions sources (i.e., point source, mobile and fugitive emission sources) or this can be maintained separately. For example, if the facility has a list of all mobile and fugitive sources and pollutants emitted from each source but maintains this information in separate documentation that can be linked to the inventory, this would be acceptable.

If you select Yes, you will be asked the following sub question(s):

- Does your facility's mobile and fugitive air emissions inventory include the following information? Select all that apply.
    - Unique source identifier (emission point name or number)
    - Process or Equipment the source is linked to.
    - List of pollutants emitted from the source.
    - Legal or other emissions testing or reporting requirements if required (testing parameters and frequency), if applicable
    - Abatement process for the source, if applicable
        - **Note**: The intent of this inventory item is to indicate the presence or absence of an abatement process for the source. If there is no abatement process for this source and this is indicated on the inventory, this option should be selected.
- Please upload a copy of the inventory

Suggested Uploads:

- A copy of the facilities inventory of mobile and fugitive air emission sources.

What is the intent of the question?

The intent of this question is for facilities to establish an inventory (i.e., a list) of all possible mobile and fugitive sources of emissions to air on-site. This includes mobile and fugitive sources from facility operations and production sources. The intent is also for facilities to understand which pollutants are emitted or have the potential to be emitted from each mobile and fugitive source.

Technical Guidance

An air emission source inventory is needed for facilities to identify, track, and manage emission sources onsite. To prepare a comprehensive inventory, all mobile and fugitive sources of emissions from operations and production should be included. Regular review should be carried out to make sure the inventory is up-to-date and accurate. This inventory should include emissions sources regulated by permits as well as those not currently regulated.

Emission Inventories can contain varying levels of detail and information, however the following basic information should be included in the inventory

- Unique source identifier (emission point name or number)
- Process or Equipment the source is linked to.
- List of pollutants emitted from the source.

- Legal or other emissions testing or reporting requirements if required (testing parameters and frequency), if applicable
- Abatement processes for the source, if applicable
    - **Note**: The intent of this inventory item is to indicate the presence or absence of an abatement process for the source. If there is no abatement process for this source and this is indicated on the inventory, this option should be selected.

Mobile and fugitive emission sources are defined in the introduction of the air emissions guidance. Common examples of emission sources and pollutants that can be emitted from mobile and fugitive sources are provided below. Note that this is not an exhaustive list and facilities may require the support of qualified environmental experts to identify air emission sources and all potential pollutants emitted.

Mobile Sources:

- Powered motor vehicles (e.g., forklifts, trucks, passenger vehicles), heavy machinery (e.g., mobile cranes or lifts) small engines (lawnmowers or other landscaping equipment) can emit particulate matter (PM) and oxides of sulphur and nitrogen (SOx and NOx) from fuel combustion.

Fugitive Sources:

- Printing, solvent/adhesive application, spot cleaning or dyeing areas with only general ventilation systems or no ventilation systems at all can emit volatile organic compounds (VOCs) and/or HAPs/TAPs from chemicals applied or used in the process.

How This Will Be Verified:

Full Points:

Documentation Required:

- An up-to-date inventory of mobile and fugitive emission sources from the facility including operational and production emission sources.
- The inventory contains all the basic information listed in the sub-question and this information is accurate and complete.

Note: Mobile and fugitive sources may be included in a facility wide emissions source inventory that includes all emissions sources (i.e., point source, mobile and fugitive emission sources) or this can be maintained separately. For example, if the facility has a list of all mobile and fugitive sources and pollutants emitted from each source but maintains this information in separate documentation that can be linked to the inventory, this would be acceptable.

Interview Questions to Ask:

- Staff responsible for managing air emissions are able to explain the information in the inventory and how emission sources and pollutants are identified and managed.

Inspection – Things to Physically Look For:

- All mobile and fugitive emission sources and potential pollutants from each source are properly identified and this is consistent with onsite observations.

Partial Points:

- Partial points will be awarded if all the requirements above are met, however the facility's inventory does not contain all the basic inventory information listed in the sub question "Does your facility's mobile and fugitive air emissions inventory include the following information? Select all that apply".

3. Is your facility in compliance with all applicable legal requirements relating to air emissions including all permitting, reporting and testing requirements?

Answer Yes if: Your facility is in compliance with all applicable legal requirements relating to air emissions including all permitting, reporting and testing requirements.

Note: If your facility does not have one or more of the legally required permits noted in the Permits Section of the FEM, you should select No for this question.

If you answer No, you will be asked the following sub questions:

- Does your facility have an action plan to address the non-compliance?
- Please upload the action plan to correct the non-compliance.
- If you cannot upload a copy, please describe the action plan.

Suggested Uploads

- Action plan to address the non-compliance. If no, is selected to the main question.

What is the intent of the question?

The intent of this question is to ensure that facilities are operating in compliance with all applicable legal requirements relating to air emissions including any permitting, reporting, and testing requirements.

Technical Guidance

Aspects related to air emissions at facilities may be regulated in multiple ways depending on several factors such as the type(s) of emission sources, pollutants, industry category, or the jurisdiction in which the facility operates.

Requirements may include:

- Discharge permits or approvals for facility emissions to air or specific facility operations or equipment.
- Source testing (also known as stack testing) of specific sources at frequencies defined by local law(s) to determine compliance with in-stack or emission rate concentrations of specific pollutants (e.g., ppm or mg/m3)
- Calculating or measuring annualized mass emission quantities of specific pollutants to demonstrate compliance with permits or other regulatory requirements (e.g., tons or kg per year)
- Calculating the offsite concentration of specific pollutants using air dispersion modelling to demonstrate compliance with ambient air quality guidelines or standards.
- Legally mandated control devices for emission sources.

Being in compliance means that all legally required permits are valid and up to date and any testing and/or reporting are performed in accordance with all applicable legal requirements.

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that demonstrates the facility is meeting all applicable legal requirements relating to air emissions including all permitting, reporting and testing. This may include, but is not limited to the following:
    - Permits, licenses, or other approval documentation.
    - Testing reports
    - Legally required emissions and/or pollutant reporting documentation

Note – Required documentation may vary by facility as this will depend on the specific legal requirements that apply to each facility.

Interview Questions to Ask:

- Staff responsible for managing air emissions understand and can describe legal requirements relating to the facility's air emissions and the processes in place to ensure compliance.

Inspection - Things to Physically Look For:

- All legally required permits are valid and up to date and any testing and/or reporting are performed in accordance with all applicable legal requirements.

Partial Points:

- Partial points will be awarded if your facility is not currently in compliance with one or more legal requirements and you have established an action plan to address the non-compliance(s).
- The action plan must contain the following information:
    - The specific action that the facility is taking to address the non-compliance.
    - The responsible person(s), role or department that is responsible for implementing the actions.
    - The expected timeline to achieve compliance.

4. Do you know what refrigerants your facility uses?

Answer Yes if: Your facility knows which specific refrigerants are used at your facility.

If you answer Yes, you will be asked the following sub questions:

- What type of refrigerant do you use in your facility? (Select all that apply)
    - Answer Options: CFC, CFO, HCFC, HCFO, HFC, HFO, HCC, HCO, HC, HO, PFC, PFO, PCC, PCO, H.
- Which specific refrigerant do you use in your facility?
    - Answer Options: A list of specific refrigerants will be available for you to select based on the types of refrigerants selected in the sub question above.

Suggested Uploads

- An inventory or list of refrigerants used onsite.

What is the intent of the question?

The intent of this question is to ensure that facilities understand which refrigerants are used at their facilities.

Technical Guidance

Refrigerants such as CFCs and HCFCs commonly used in air conditioning, cooling and refrigeration equipment can contain ODS that are contributors to GHG emissions and climate change due to their relatively high global warming potentials (GWPs). Refrigerants are often emitted to the air through equipment leaks or during servicing or disposal of refrigerant containing equipment.

Knowing which refrigerants are used onsite will help facilities plan for phasing out the use of ozone depleting substances (ODS) at their facility in accordance with good environmental practices and current or future regulatory requirements. More information on phasing out Ozone Depleting Substances can be found here: https://www.epa.gov/ods-phaseout

How This Will Be Verified:

Full Points:

Documentation Required:

- An inventory or list of refrigerants used onsite with supporting evidence such as:
    - Equipment specifications or technical manuals that show which refrigerants the equipment contains.
    - Records of refrigerant purchases or equipment service or maintenance that shows which refrigerants are used in equipment onsite.

Interview Questions to Ask:

- Staff responsible for managing environmental matters or refrigerant containing equipment understand and can explain which refrigerants are used onsite and how refrigerant use is identified and managed at the facility.

Inspection - Things to Physically Look For:

- All refrigerant use has been properly identified and this is consistent with onsite observations.

Partial Points: N/A

5. Does your facility have preventative maintenance procedures in place to avoid refrigerant leakage from your equipment?

Answer Yes if: Your facility has a documented preventative maintenance program that covers all refrigerant containing equipment at your facility.

If you answer Yes, you will be asked the following sub questions:

- Please upload your preventative maintenance procedures.
- If you can't upload your procedures, please describe them here.

Suggested Uploads

- Copies of your preventative maintenance plan or program documentation that covers all refrigerant containing equipment at your facility (e.g., preventative maintenance schedules or procedures, completed inspection checklists or service records, etc.)

What is the intent of the question?
The intent of this question is to ensure that facilities have preventive maintenance procedures in place to proactively identify and minimize the release of refrigerant gases to the environment.

Technical Guidance

Preventative maintenance is maintenance that is regularly scheduled and performed on equipment to reduce the chances of equipment failure and identify potential problems before they result in breakdowns or leaks. Preventive maintenance should be planned and scheduled based on available information for each piece of equipment (e.g., manufacturer's recommendations, past breakdowns or leaks from equipment, operating conditions, etc.)

Refrigerants are commonly emitted to the air through equipment leaks and although leaks do occur, preventative maintenance can help facilities prevent or detect leaks early and minimize releases to the environment. Preventative maintenance actions may include:

- Inspecting compressor operation
- Checking refrigerant levels
- Refrigerant leak testing
- Inspecting motor operation and motor mounts
- Checking electrical connections
- Inspecting all pipes and fittings
- Examining all other parts for wear and tear
- Testing and recalibrate temperature settings and thermometers.
- Cleaning the equipment (e.g., motors, fans, cooling coils, drain lines, etc.)
- **Note** - Inspection and maintenance of refrigerant containing devices should only be conducted by trained and qualified individuals.

Resources:
Additional resources for inspecting, maintaining, and managing refrigerant containing equipment are provided below.

Note - The resources are provided for reference only and may contain legal references that do not apply to your facility. Facilities are expected to understand and comply with any applicable local regulations related to the use and management of refrigerants.

- California Air Resources Board Leak/Inspection checklist - https://ww2.arb.ca.gov/sites/default/files/2020-08/rmp_leak_inspection_flyer.pdf

- US EPA Stationary Refrigeration - Resources for Businesses https://www.epa.gov/section608/stationary-refrigeration-resources-businesses

How This Will Be Verified:

Full Points:

Documentation Required:

- Preventative maintenance plan that covers all refrigerant containing equipment at the facility. This may include:

- Preventative maintenance schedule or procedures
- Completed inspection checklists.
- Service records or maintenance logs

Note: If the facilities equipment is maintained by third-party service providers, copies of relevant preventive maintenance documentation such as those listed above should be made available for verification.

Interview Questions to Ask:

- Staff responsible for the maintenance and/or inspection of refrigerant containing equipment understand and can explain the facility's preventive maintenance procedures.

Inspection - Things to Physically Look For:

- All refrigerant containing equipment is in good working repair and observations indicate that preventive maintenance is conducted as per the facility's plan.

Partial Points: N/A

6. Does your facility track refrigerant usage?

Answer Yes if: Your facility tracks the quantity of all refrigerants used in all equipment onsite.

Answer Partial Yes if your facility tracks the usage of at least one (1) refrigerant but does not yet track all refrigerants used onsite.

If you answer Yes or Partial Yes, you will be asked the following sub questions:

- Refrigerant (list of refrigerants will pre-populate based on refrigerants used)
- Did you add this refrigerant to existing equipment in the reporting year?
- Quantity of refrigerant added to existing equipment during the reporting year
- Unit of measure
- What method was used to track refrigerant use?
- Did you fix the leak associated with this refrigerant?
- How did you fix the leak/ What is your plan for fixing this leak?
- Please upload your action plan or methods fixing the leak that you had fixed the leak

Suggested Uploads

- An inventory of refrigerants used onsite with the quantity of each refrigerant added to existing equipment for the reporting year.
- Documentation of the methodology used to track refrigerant use (e.g., leakage rate or consumption calculation methodology)

- Documented plans or actions taken to fix refrigerant leaks, if applicable.

What is the intent of the question?
The intent of this question is for facilities to enter quantitative data that shows how much refrigerant(s) your facility emitted in the reporting year.

Note: This question will contribute to your GHG-emissions calculation so it's important for you to enter accurate data about refrigerant use onsite.

Technical Guidance
Refrigerants are often emitted through equipment leaks and servicing. Most modern equipment is designed to minimize leaks however over time, leaks do occur. Having to add refrigerants to existing equipment generally indicates the system has a leak.

Tracking refrigerant use is an important part of managing refrigerants use onsite. Tracking refrigerant use allows facilities to monitor how much refrigerant has been released to the environment as well as identify problematic or leaking equipment.

It is also important to have an action plan to fix the leaks and/or upgrade equipment to eliminate refrigerant leakage.

When establishing your tracking and reporting program, start by doing the following:

- Map out all facility equipment (production and operational equipment) to identify equipment that contain refrigerants.
    - This should include identifying the specific refrigerant type that is used in the equipment (e.g., R-22).
- Establish procedures to determine how much refrigerant is released (e.g., through leaks, disposal, etc) from each piece of equipment.
    - In general, the amount of refrigerant released is equal to the amount of refrigerant that is added to the equipment (see Calculating Leak Rate below)
    - Refrigerant purchase invoices, or service records may also be helpful in determining quantities released.
    - If estimation techniques are used, the calculation methodology should be clearly defined and be supported by verifiable data.
- Record tracking data (e.g., monthly, annual leakage or top-up records) in a format that is easy to review [e.g., spreadsheet or similar data analytics program that allows export of data in a human readable format (e.g., Microsoft Excel)] and maintain relevant supporting evidence for review during verification.

Calculating a Leakage Rate
When determining the quantity of refrigerants emitted from a piece of equipment, it is generally considered that the amount of refrigerant emitted is equal to the amount that was added to the equipment after a period of time to return the equipment back to a full charge.

- For example, if you recharge the refrigerant in a Chiller unit to a full charge, then after one year of operation you need to add 0.5kg to fully recharge the unit, then it is assumed that the 0.5kg was emitted due to leaks or servicing throughout the year.

When tracking refrigerant emissions, a facility can directly measure and record the amount of refrigerant added to a piece of equipment in the reporting year or a leakage rate can be determined and used to estimate emissions.

The leakage rate is typically expressed as the percentage of a full charge that would be lost in a 12-month period. The example below is one way to calculate a leak rate.

1. Take the kilograms (kg) of refrigerant you added to recharge the system to a full charge and divide it by the kg of refrigerant in the normal full charge for the system.
2. Determine the number of days that have passed between charges (e.g., how many days between the last time refrigerant was added and this time refrigerant was added), then divide by 365 (the number of days in a year).
3. Take the kg of refrigerant determined in step 1 and divide it by the number of days determined in step 2.
4. Lastly, multiply by 100% (to determine a percentage).

For example:

Chiller #1

- Refrigerant Added = 1kg
- Full charge = 5kg
- Days between charges = 275

Leakage rate = (1kg ÷ 5kg) ÷ (275 ÷ 365) x 100% = 26.5%

Therefore, this Chiller unit loses/emits 1.33kg (26.5% of a full charge) of refrigerant in a year.

Note: Leakage rates may also be used to determine preventative maintenance schedules or when equipment may need additional service or replacement.

Reporting Refrigerant Data in the FEM:

Before reporting refrigerant data in the FEM, data quality checks should be performed to ensure that the data AND the processes used to collect and record the data are effective at producing accurate energy data.

Do:

- ✓ Review source data (e.g., equipment maintenance records, servicing logs, refrigerant purchase invoices, etc.) against aggregated totals to ensure it is accurate.
- ✓ Ensure the most recent and updated versions of data tracking spreadsheets are being used and that all automated calculations/formulas are correct.

- ✓ Ensure the proper units are reported and verify any unit conversions from source data to reported data.
- ✓ Review any assumption or estimation methodology/calculations to ensure accuracy.
- ✓ Report the proper tracking method in the FEM (e.g., measured, leakage rate, estimate)

Do Not:

- X Report data that is not accurate (e.g., the data source is unknown or has not been verified).
- X Report estimated data if it is not supported by verifiable and reasonably accurate estimation methodology and data (e.g., leakage rate or other engineering calculations).

How This Will Be Verified:

When verifying a facility's refrigerant data, Verifiers **must** review all aspects of the facility's tracking program that could produce inaccuracies including:

- The initial data collection processes and data sources (e.g., equipment maintenance records, servicing logs, refrigerant purchase invoices, etc.); and
- The process and tools used to aggregate the data (e.g., spreadsheet calculations, leakage rate calculations, etc.)

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points

Documentation Required:

- All refrigerant containing equipment has a log of equipment servicing including refrigerant replacement that is kept up to date (e.g., monthly, annual leakage rates or top-up records)
- Records of the quantity of each refrigerant added to existing equipment for the reporting year.
- Documentation of the methodology used to track refrigerant use (e.g., leakage rate or other consumption calculations and methodology)
- Documented plans or actions taken to fix refrigerant leaks, if applicable.

Note: If the facilities equipment is maintained by third-party service providers, copies of relevant documentation (e.g., service records, maintenance logs, quantities of refrigerants added) should be made available for verification.

Interview Questions to Ask:

- Staff responsible for maintaining the refrigeration equipment and tracking usage should understand and be able to describe the process and frequency for tracking refrigerant and the methodology to determine refrigerant usage.

Inspection - Things to Physically Look For:

- Evidence the facility is tracking refrigerant use and this is consistent with onsite observations (e.g. service tags or record on equipment that match maintenance records)

Partial Points:

- Partial points will be awarded if your facility tracks the usage of at least one (1) refrigerant but does not yet track all refrigerants used onsite.

7. Are you monitoring or reporting against any industry guidelines or tools for air emissions (additional to the legal requirement)?

Answer Yes if: You are monitoring or reporting your facility's air emissions against industry guidelines or tools for air emissions. The standard must be in addition to any local law monitoring or reporting requirements.

Answer Not Applicable if your facility does not have any relevant emission from operational or production sources that are covered under inquiry guidelines or tools (i.e., if your facility only has refrigerant emissions)

Note: If your facility is only monitoring, reporting, or testing your facility emissions in accordance with local law requirements, you should select No for this question.

If you answer Yes, you will be asked the following sub questions:

- Please indicate which Air standard you are reporting against:
  - ZDHC Air Position Paper/Guideline
  - ZDHC MMCF Air Guidelines
  - Other
- If other, please describe.

Suggested Uploads

- Copies of emissions calculations or reporting that demonstrate facility emissions are being monitored or reported against the selected standards.

Note: This question is unscored, and your responses will be used to pre-populate applicable scored questions on industry air emission guidelines/tools in Level 2.

What is the intent of the question?

The intent of this question is to encourage facilities to monitor and report their air emissions against industry developed guidance or tools that go beyond basic legal compliance monitoring and reporting.

Technical Guidance
Industry guidance and tools are developed to support facilities in the proper management and reduction of emissions to the environment. These tools intend to provide consistent methodologies to identify, monitor and report emissions of hazardous pollutants. They also strive to support facilities in managing and reducing emissions by establishing progressive emission thresholds that go beyond basic compliance.

Different guidelines or tools may have different requirements for monitoring and reporting of air emissions (e.g., the type and frequency of emission reporting, types of pollutants that must be monitored/reported, emission calculation or testing methodologies, etc.) When adopting an industry standard, facilities should review the guideline to determine the monitoring and reporting requirements that apply to their operations and put in place procedures to meet the required monitoring and reporting requirements.

Examples of industry guidance/tools for air emissions are the ZDHC Air Position Paper/Guidelines and the ZDHC MMCF Air Guidelines - Air Emissions of the ZDHC MMCF Guidelines. Both of these guidance documents can be found and downloaded here https://www.roadmaptozero.com/output

How This Will Be Verified:

Note: This question is currently unscored.

Documentation Required:

- Documentation that demonstrates the facility is monitoring and reporting air emissions in accordance with the applicable guideline(s)/tool(s) selected. This may include:
    - Air emissions inventory or report with reported emission quantities or emission rates.
    - Air emissions calculation methodology and supporting documentation (e.g., facility operating data, consumption quantities of chemicals and/or fuels emission factors or assumptions used for determining the emitted quantity of specific pollutants, etc)
    - ZDHC Supplier Platform- MMCF module certificate

Note: Required documentation may vary by guideline or tool being reported against. All air emission reporting documentation required by the standard should be available for verification.

Interview Questions to Ask:

- Staff responsible for managing air emissions understand and can describe the monitoring and reporting requirements of the guidelines/tools the facility is reporting emissions against.

Inspection - Things to Physically Look For:

- The relevant emission sources observed at the facility are included in the facility's emissions monitoring/reporting procedures as required by the guideline or tool used to report emissions.

Air Emissions - Level 2

8. Does your facility track the total annual emissions quantities of key pollutants from all point source emissions from facility operations?

Answer Yes if: Your facility has calculated the annual emission quantity of all the applicable key pollutants listed in the FEM from all point source emission sources from facility operations.

Note: If your facility only conducts emission testing and has not calculated annualized air emission quantities of all the applicable pollutants listed in the FEM, you should select No for this question.

If you select Yes, you will need to complete a table with the following questions to provide details on your air emissions from all point source emissions from facility operations during the reporting year.

- Pollutant – Reportable pollutants for facility operations include:
    - Particulate Matter (PM) – This must be reported as the total quantity of PM including all fractions (e.g., PM2.5, PM10).
    - Nitrogen Oxides (NOx)
    - Sulfur Oxides (SOx)
    - Carbon Monoxide (CO)
    - Volatile Organic Compounds (VOC) or Total Organic Carbon (TOC) – This must be reported as total quantity of VOC.
    - Hazardous or Toxic Air Pollutants (HAP/TAP) – This must be reported as total quantity of HAP/TAP
- Is this pollutant emitted from the facility?
- Is this pollutant regulated by a government agency?
- Was the total annual emission quantity of this pollutant from all point sources calculated for the reporting year?
- What is your annual emission quantity (in kg) of the pollutant?

- Describe the methodology used to determine the annual emissions quantity of this pollutant.

Suggested Uploads:

- Documentation that supports emission reporting calculations and methodology which may include:
    - Annual emission inventory with quantities of applicable pollutants
    - Emission source operational data (i.e., operating time, flow/emission rates)
    - Records of fuel consumption
    - Emission factors or assumptions used in emissions calculations.

What is the intent of the question?
The intent of this question is for facilities to track the total quantity of key pollutants emitted from point sources related to facility operations in the FEM reporting year (e.g., boilers, generators, combustion heating, etc) to be able to demonstrate reductions in the amount of pollutants emitted to the environment.

Technical Guidance
Calculating the annual emission quantities of pollutants emitted from operations allows facilities to have a baseline of emission quantities that can be used to identify opportunities to reduce the amount of pollutants emitted to the air and quantify these improvements.

Reporting Air Emissions from Operations in the FEM:
Before reporting air emissions data in the FEM, data quality checks should be performed to ensure that the data and the methodologies used to calculate emissions quantities are effective at producing accurate air emissions data.

The reported quantity of each pollutant must be facility-wide and include emissions from all point sources from facility operations. For example, in the FEM reporting year, if a facility has a natural gas boiler that emitted 450kg of PM and a diesel generator that emitted 650kg of PM, the reported emission quantity would be 1,100kg (450kg + 650kg) of PM for the reporting year.

For the FEM, this methodology of reporting the combined total of the pollutant/pollutant group from all point sources is applied to all reported pollutants (e.g., VOC are reported as the total quantity of all VOC from all point sources of emissions from facility operations)

Volatile Organic Compounds (VOC)
VOC are defined as organic chemical compounds that under normal conditions are gaseous or can vaporise and enter the atmosphere. The general criteria for determining whether a pollutant is considered a VOC is provided below:

- It contains carbon.
- Vapor Pressure is > or = 0.01 kPa (~0.075 mmHg) at 20C

- Boiling point is < or = 250C at standard pressure of 101.3 kPa

Hazardous or Toxic Air Pollutants (HAP/TAP)
Are defined as compounds that are known or suspected to cause significant harmful impacts to human health or the environment.

Country-specific regulation may define which air pollutants are designated as HAPs/TAPs within a specific jurisdiction. Where country-specific definitions or regulations do not define HAPs/TAPs, recognized lists from other jurisdictions may be referenced when determining if pollutants from facility operations should be included in the reported quantity for HAPs/TAPs. For example, information on HAPs from the US EPA can be found here https://www.epa.gov/haps. A current list of HAPs (as defined by the US EPA can be found here: https://www.epa.gov/haps/initial-list-hazardous-air-pollutants-modifications

Calculating Annual Air Emissions Quantities from Operations:

Note: The methodology used to calculate emissions from each source should be selected and applied by qualified individuals such as a process or environmental engineer who understand the technical principles and methodologies for determining emissions from operations sources (e.g., boilers, generators, combustion heating equipment, etc).

There are several methodologies and techniques that can be used to calculate emission quantities of pollutants from operations. These can include:

- Direct Measurement or Sampling – Through the use of continuous emission monitoring systems (CEMS) or testing results that are used to calculate annual emission quantities based on the sources operating parameters (e.g., operating time, flow rate, pollutant emission rates, etc).
- Engineering Calculations – That utilizes established emission factors for specific fuel types, equipment or processes.
- Fuels Analysis/Mass Balance – That uses the known or estimated content of pollutants in the fuel source and fuel consumption data to calculate emission quantities for specific pollutants.

To calculate the annual emissions from a source, there are several critical pieces of information that must be known. This can depend on the specific methodology used to calculate emissions, however these typically include the following for each point source:

- Air flow rate of the source (e.g., m3/hr)
- Operating time in the reporting year (e.g., hrs)
- Emission concentration - from direct measurements or emission factors (e.g., kg/m3)

Once these are known the basic equation is as follows:

- *Emission Quantity = emission concentration x air flow x operating time*

If sources have control technologies installed (e.g., scrubbers, catalytic reduction systems, electrostatic precipitator, etc), the pollutant destruction or removal efficiency of the control can be factored into the emissions calculations. For example, if 1,000 kg of NOx was emitted from a source and the exhaust stack was fitted with a catalytic reduction system which has a 90% removal/destruction efficiency, the calculated quantity of NOx emitted would be 100kg (1,000kg x 10%).

Do:

- ✓ Review source data (e.g., records of fuel consumption, emission factors, operating time, flow/emission rates, etc.) to ensure calculated emission total are accurate.
- ✓ Ensure the most recent and updated versions of data tracking spreadsheets are being used and that all automated calculations/formulas are correct.
- ✓ Ensure the proper units are reported and verify any unit conversions from source data to reported data.
- ✓ Review any assumption or estimation methodology/calculations to ensure accuracy.
- ✓ Report the proper tracking method in the FEM (e.g., Estimated if annual emissions are calculated using emission factors, or measured if using continuous emission monitoring systems (CEMS)).

Do Not:

- X Report data that is not accurate (e.g., the data source is unknown or has not been verified).
- X Report estimated data if it is not supported by verifiable and reasonably accurate estimation methodology and data (e.g., emission factors, fuel consumption, or other engineering calculations).

Resources:
Several publicly available resources that contain examples of the methodologies and information required to calculate emission from point sources are provided below.

Note: The emissions calculation methods and information (e.g., emission factors) in these resources are provided for reference and may contain regulatory requirements that do not apply to your facility. If country specific calculation methodologies (e.g., emission factors, fuel composition data, etc) are available, they should be used when calculating your facility's emissions.

- Estimating Emissions from Boilers
  https://www.dcceew.gov.au/sites/default/files/documents/boilers.pdf
  https://www.epa.gov/sites/default/files/2015-08/documents/ii02.pdf

- National Pollutant Inventory (NPI) Emission Estimation Technique Manual for Textile and Clothing Industry https://www.dcceew.gov.au/sites/default/files/documents/ftextile.pdf

- US EPA air Emission factors and quantification main page: https://www.epa.gov/air-emissions-factors-and-quantification

- US EPA AP42 Compilation of Air Emissions Factors: https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors

How This Will Be Verified:

When verifying a facility's air emissions data, Verifiers **must** review all aspects of the facility's emissions tracking and reporting program that could produce inaccuracies including:

- Emissions data sources (e.g., testing reports, emission factors, emissions calculation methodology or other engineering estimates); and
- The process and tools used to aggregate the data (e.g., spreadsheet calculations, unit conversions, etc.)

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points:

Documentation Required:

- Documentation that supports emission reporting calculations and methodology for each point source from facility operations and the applicable pollutant(s). This may include:
    - Annual emission inventory with quantities of applicable pollutants
    - Spreadsheets or other documentation showing emission calculations including:
        - Emission source operational data (i.e., operating time, air flow rates).
        - List of emission factors and/or other assumptions used in emissions calculations.
        - Records of fuel consumption used in emissions calculations.
        - Emission testing results used to determine emission rates from sources.

Note: If the facility utilizes a third-party service provider to calculate emission quantities, documentation to support the data and methodology used should be made available for verification.

Interview Questions to Ask:

- Staff responsible for reporting the facility's emission data is knowledgeable and can explain how source data (e.g., pollutants, operating time, emission source flow rate, etc) is identified and collected and the methodology used to calculate emissions.

Inspection - Things to Physically Look For:

- All point source emission sources and potential pollutants from facility operations source are properly identified and this is consistent with onsite observations of the facility's operational emission sources.

Partial Points: N/A

9. Does your facility track the total annual emissions quantities of key pollutants from all emissions from production?

Answer Yes if: Your facility has calculated the annual emission quantity of all the applicable key pollutants listed in the FEM from all emission sources (point source and fugitive sources) from facility production.

Note: If your facility only conducts emission testing and has not calculated annualized air emission quantities of all the applicable pollutants listed in the FEM, you should select No for this question.

If you select Yes, you will need to complete a table with the following questions to provide details on your air emissions from all point source emissions from production during the reporting year**.**

- Pollutant - Reportable pollutants for facility production include:
    - Particulate Matter (PM) – This must be reported as the total quantity of PM including all fractions (e.g., PM2.5, PM10).
    - Nitrogen Oxides (NOx)
    - Sulfur Oxides (SOx)
    - Carbon Monoxide (CO)
    - Volatile Organic Compounds (VOC) or Total Organic Carbon (TOC) – This must be reported as total quantity of VOC.
    - Hazardous or Toxic Air Pollutants (HAP/TAP) – This must be reported as total quantity of HAP/TAP
    - Ammonia (NH_3)
    - Ozone (O_3)
    - Ozone Depleting Substances (other than refrigerants reported in Question 6)
    - Carbon disulfide (CS_2) – Applicable only to facilities that produce Man-made Cellulose Fibre (MMCF).

- Hydrogen Sulfide (H_2S) - Applicable only to facilities that produce Man-made Cellulose Fibre (MMCF).
- Is this pollutant emitted from the facility?
- Is this pollutant regulated by a government agency?
- Was the total annual emission quantity of this pollutant from all point sources calculated for the reporting year?
- What is your annual emission quantity (in kg) of the pollutant?
- Describe the methodology used to determine the annual emissions quantity of this pollutant.

Suggested Uploads:

- Documentation that supports emission reporting calculations and methodology which may include:
  - Annual emission inventory with quantities of applicable pollutants
  - Emission source operational data (i.e., operating time, flow/emission rates)
  - Records of raw material/chemical consumption
  - Emission factors or assumptions used in emissions calculations.

What is the intent of the question?
The intent of this question is for facilities to track the total quantity of key pollutants emitted from all sources (point source and fugitive sources) related to facility production processes in the FEM reporting year to be able to demonstrate reductions in the amount of pollutants emitted to the environment.

Technical Guidance
Calculating the annual emission quantities of pollutants emitted from production allows facilities to have a baseline of emission quantities that can be used to identify opportunities to reduce the amount of pollutants emitted to the air and quantify these improvements.

Reporting Air Emissions from Production in the FEM:
Before reporting air emissions data in the FEM, data quality checks should be performed to ensure that the data and the methodologies used to calculate emissions quantities are effective at producing accurate air emissions data.

The reported quantity of each pollutant must be facility-wide and include emissions from all point sources and fugitive sources from production. For example, in the FEM reporting year, if a facility emitted 750kg of VOC from screen printing and 250kg of VOC from spot cleaning operations, the reported emission quantity would be 1,000kg (750kg + 250kg) of VOC for the reporting year.

For the FEM, this methodology of reporting the combined total of the pollutant/pollutant group from all point sources is applied to all reported pollutants (e.g., VOC are reported as the total quantity of all VOC from all sources of emissions from production)

Volatile Organic Compounds (VOC)
VOC are defined as organic chemical compounds that under normal conditions are gaseous or can vaporise and enter the atmosphere. The general criteria for determining whether a pollutant is considered a VOC is provided below:

- It contains carbon.
- Vapor Pressure is > or = 0.01 kPa (~0.075 mmHg) at 20C
- Boiling point is < or = 250C at standard pressure of 101.3 kPa

Hazardous or Toxic Air Pollutants (HAP/TAP)
Are defined as compounds that are known or suspected to cause significant harmful impacts to human health or the environment.

Country-specific regulation may define which air pollutants are designated as HAPs/TAPs within a specific jurisdiction. Where country-specific definitions or regulations do not define HAPs/TAPs, recognized lists from other jurisdictions may be referenced when determining if pollutants from production should be included in the reported quantity for HAPs/TAPs. For example, information on HAPs from the US EPA can be found here https://www.epa.gov/haps. A current list of HAPs (as defined by the US EPA can be found here: https://www.epa.gov/haps/initial-list-hazardous-air-pollutants-modifications

Calculating Annual Air Emissions Quantities from Production:

Note: The methodology used to calculate emissions from each source should be selected and applied by qualified individuals such as a process or environmental engineer who understand the technical principles and methodologies for determining emissions from production sources including point source and fugitive emissions sources.

There are several methodologies and techniques that can be used to calculate emission quantities of pollutants from production. These can include:

- Direct Measurement or Sampling – Through the use of continuous emission monitoring systems (CEMS) or testing results that are used to calculate annual emission quantities based on the sources operating parameters (e.g., operating time, flow rate, pollutant emission rates, etc).
- Engineering Calculations – That utilizes established emission factors for specific chemicals/pollutants, equipment, or processes.
- Mass Balance/Potential to emit (PTE) – That uses the known or estimated content of pollutants in the chemicals used and the consumption data or purchased volume of the chemicals to calculate emission quantities for specific pollutants.

To calculate the annual emissions from point sources, there are several critical pieces of information that must be known. This can depend on the specific methodology used to calculate emissions, however these typically include the following for each point source:

- Air flow rate of the source (e.g., m3/hr)
- Operating time in the reporting year (e.g., hrs)
- Emission concentration - from direct measurements or emission factors (e.g., kg/m3)

Once these are known the basic equation is as follows:

- *Emission Quantity = emission concentration x air flow x operating time*

If sources have control technologies installed (e.g., scrubbers, activated carbon filtration, dust collectors, regenerative thermal oxidizers, etc), the pollutant destruction or removal efficiency of the control technology can be factored into the emissions calculations. For example, if 1,000 kg of VOC was emitted from a source and the exhaust stack was fitted with a thermal oxidizer which has a 90% removal/destruction efficiency, the calculated quantity of VOC emitted would be 100kg (1,000kg x 10%).

To calculate the annual emissions from fugitive emissions (e.g., emissions that are not emitted through a fixed exhaust stack), different methodologies are often required. Some examples of how emissions can be determined from fugitive sources are provided below:

- Potential to Emit (PTE)
    - Potential to Emit calculation uses the inventory of process chemistry purchased to calculate the maximum amount of pollutants that could be emitted from that facility.
    - For example, if 500kg of IPA was purchased, 500kg of IPA could potentially be emitted to the air. This is generally a very conservative assumption and gives the maximum potential emissions for the pollutant from the facility.

- Mass Balance
    - Emissions may be calculated based on the amount of a particular chemical used annually and the chemicals composition (i.e., percentage of VOC content or individual pollutant of that chemical).
    - For example, if a total of 0.5m3 of acetone is used for spot cleaning on an annual basis and the density of acetone is 784 kg/m3. The annual emission quantity of acetone would be 392 kg (0.5m3 x 784 kg/m3).
    - Another example, if the VOC content in a chemical was 5g/L and the facility used 2,500L annually, the annual emission quantity of VOC for this chemical would be 12,500g (or 12.5kg) (2,500L x 5g/L)

Note: To provide a conservative estimate when calculating emissions quantities from uncontrolled fugitive sources, it is often estimated that 100% of the volatile pollutants will be emitted to the environment. If a percent composition range is provided (i.e., on and SDS) the upper part of the range should be used.

Do:

- ✓ Review source data (e.g., records of chemical consumption, emission factors, operating time, flow/emission rates, etc.) to ensure calculated emission total are accurate.

- ✓ Ensure the most recent and updated versions of data tracking spreadsheets are being used and that all automated calculations/formulas are correct.
- ✓ Ensure the proper units are reported and verify any unit conversions from source data to reported data.
- ✓ Review any assumption or estimation methodology/calculations to ensure accuracy.
- ✓ Report the proper tracking method in the FEM (e.g., Estimated if annual emissions are calculated using emission factors, or measured if using continuous emission monitoring systems (CEMS)).

Do Not:

- X Report data that is not accurate (e.g., the data source is unknown or has not been verified).
- X Report estimated data if it is not supported by verifiable and reasonably accurate estimation methodology and data (e.g., emission factors, fuel consumption, or other engineering calculations).

Resources:
Several publicly available resources that contain examples of the methodologies and information required to calculate emission sources are provided below.

Note: The emissions calculation methods and information (e.g., emission factors) in these resources are provided for reference and may contain regulatory requirements that do not apply to your facility. If country specific calculation methodologies (e.g., emission factors, fuel composition data, etc) are available, they should be used when calculating your facility's emissions.

- National Pollutant Inventory (NPI) Emission Estimation Technique Manual for Textile and Clothing Industry: https://www.dcceew.gov.au/sites/default/files/documents/ftextile.pdf

- US EPA air Emission factors and quantification main page: https://www.epa.gov/air-emissions-factors-and-quantification

- US EPA Emission Modelling: https://www.epa.gov/air-emissions-modeling

- Clearinghouse for Inventories and Emissions Factors (CHIEF): https://www.epa.gov/chief

- US EPA AP42 Compilation of Air Emissions Factors: https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors

How This Will Be Verified:

When verifying a facility's air emissions data, Verifiers **must** review all aspects of the facility's emissions tracking and reporting program that could produce inaccuracies including:

- Emissions data sources (e.g., testing reports, emission factors, emissions calculation methodology or other engineering estimates); and
- The process and tools used to aggregate the data (e.g., spreadsheet calculations, unit conversions, etc.)

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points:

Documentation Required:

- Documentation that supports emission reporting calculations and methodology for all emission sources from production (point source and fugitive sources) and the applicable pollutant(s). This may include:
    - Annual emission inventory with quantities of applicable pollutants
    - Spreadsheets or other documentation showing emission calculations including:
        - Emission source operational data (i.e., operating time, air flow rates).
        - List of emission factors and/or other assumptions used in emissions calculations.
        - Records of chemical consumption and composition used for emissions calculations.
        - Emission testing results used to determine emission rates from sources.

Note: If the facility utilizes a third-party service provider to calculate emission quantities, documentation to support the data and methodology used should be made available for verification.

Interview Questions to Ask:

- Staff responsible for reporting the facility's emission data is knowledgeable and can explain how source data (e.g., pollutants, operating time, emission source flow rate, etc) is identified and collected and the methodology used to calculate emissions.

Inspection - Things to Physically Look For:

- All emission sources and potential pollutants from production are properly identified and this is consistent with onsite observations of the facility's production emission sources.

Partial Points: N/A

10. Has your facility established an implementation plan to reduce air emissions from facility operations?

Answer Yes if: Your facility has a current documented plan with defined actions that your facility is planning to implement to reduce the quantity of pollutants emitted from emissions sources related to facility operations (e.g., boilers, generators, combustion heating, etc)

If you answer Yes, you will be asked the following sub questions:

- What control devices, process modifications, or raw material/fuel/equipment substitutions will be implemented to reduce air emissions?
- Which pollutants are targeted for reduction?
- Please upload your plan.

Suggested Uploads

- A copy of the implementation plan that includes details of the specific actions the facility plans to take to reduce air emissions from facility operations equipment (e.g., boilers, generators, etc) with implementation timelines.
- Emissions specifications or calculated emissions reduction estimates from proposed new equipment or alternative fuel sources included in the implementation plan.
- Specifications (e.g., pollutant destruction/removal efficiency) of control devices that are included in the implementation plan.

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have identified and evaluated emission reduction opportunities and have established formal plans with defined actions to reduce air emission from facility operations.

Technical Guidance

Creating an implementation plan includes the process of reviewing and evaluating available options to reduce air emissions. The key steps of creating an implementation plan should include the following:

- Identify emission reduction opportunities through internal assessment by qualified personnel or third-party experts.
- Evaluate reduction options to determine the most suitable options (e.g., feasibility studies, cost benefit analyses)
- Approve funds/budget for chosen options.
- Create a timeline and define the actions needed to implement the solution and realize reductions.
- Conduct regular reviews of the implementation plan check on progress.

Emissions from facility operations can be reduced in several ways including the following:

- Installation of control equipment (e.g., scrubbers or catalytic reduction systems on exhaust stacks etc)
- New technology or equipment modifications (e.g., upgrading to a new boiler that produces cleaner emissions)
- Alternative fuel inputs (e.g., switching to a natural gas boiler from a coal-fired boiler)

When evaluating options to reduce emissions, priority should be given to utilizing the Best Available Technology (BAT), which may include any, or a combination of the above listed methods depending on the emission source. For the definition of BAT in the FEM, please refer to the introduction section of this guidance.

Resources:
Several publicly available resources that contain examples and guidance on emission control techniques and an implementation plan template are provided below.

- Best Available Techniques (BAT) Reference Document for Large Combustion Plants https://publications.jrc.ec.europa.eu/repository/bitstream/JRC107769/jrc107769_lcp_bref 2017(1).pdf

- US EPA Clean Air Technology Center https://www.epa.gov/catc/clean-air-technology-center-products

- Implementation plan template: https://howtohigg.org/resources/resources-library/#templates

How This Will Be Verified:

Full Points:

Documentation Required:

- An implementation plan that includes details of the specific actions the facility plans to take to reduce air emission from facility operations equipment (e.g., boilers, generators, etc) which may include including:
    - Documentation of the emissions specifications or calculated emissions estimates from proposed new equipment or alternative fuel sources included in the implementation plan that show the expected emissions reductions.
    - Specifications (e.g., pollutant destruction/removal efficiency) of control devices included in the implementation plan.
    - Implementation timelines (i.e., the planned start and completion dates for actions listed in the plan).

Notes:

- Actions to reduce pollutant quantities should not consider emission reductions due to reductions in production volume or equipment operating time as these factors will not result in sustainable improvements.
- If the facility has completed all actions in the plan prior to reporting year and does not have an implementation plan for reductions the reporting year and beyond, a No response should be selected (i.e., points are not awarded for historical plans that were implemented prior to the reporting year).

Interview Questions to Ask:

- Staff responsible for the implementation plan can explain the facility's process for evaluating emission reduction opportunities and the facility's implementation plans and actions to reduce air emissions.

Inspection - Things to Physically Look For:

- The actions listed in the implementation plans directly relate to the observed facility operations sources onsite.

Partial Points: N/A

11. Has your facility established an implementation plan to reduce air emissions from production processes?

Answer Yes if: Your facility has a current documented plan with defined actions that your facility is planning to implement to reduce the quantity of pollutants emitted from emissions sources related to production processes (e.g., solvent/adhesive use, printing, dyeing, etc.)

If you answer Yes, you will be asked the following sub questions:

- What control devices, process modifications, or raw material/fuel/equipment substitutions will be implemented to reduce air emissions?
- Which pollutants are targeted for reduction?
- Please upload your plan.

Suggested Uploads

- A copy of the implementation plan that includes details of the specific actions the facility plans to take to reduce air emissions from production emissions with implementation timelines.
- Emissions specifications or calculated emissions reduction estimates from proposed new equipment, process modifications, raw materials substitutions or control devices included in the implementation plan.

- Specifications (e.g., pollutant destruction/removal efficiency) of control devices included in the implementation plan.

What is the intent of the question?
The intent of this question is for facilities to demonstrate that they have identified and evaluated emission reduction opportunities and have established formal plans with defined actions to reduce air emission from facility production.

Technical Guidance
Creating an implementation plan includes the process of reviewing and evaluating available options to reduce air emissions. The key steps of creating an implementation plan should include the following:

- Identify emission reduction opportunities through internal assessment by qualified personnel or third-party experts.
- Evaluate reduction options to determine the most suitable options (e.g., feasibility studies, cost benefit analyses)
- Approve funds/budget for chosen options.
- Create a timeline and define the actions needed to implement the solution and realize reductions.
- Conduct regular reviews of the implementation plan check on progress.

Emissions from facility operations can be reduced in several ways including the following:

- Installation of control equipment (e.g., dust collectors/baghouse filtration systems, wet scrubbers, activated carbon filtration, regenerative thermal oxidizers (RTO), etc.).
- New technology or equipment modifications (e.g., alternative dyeing/printing technologies, installation of local ventilation systems equipped with additional controls to capture and treat emissions).
- Alternative raw material inputs (e.g., chemicals substitutions for less hazardous alternatives, using water-based chemistries or chemicals with a lower VOC content)

When evaluating options to reduce emissions, priority should be given to utilizing the Best Available Technology (BAT), which may include any, or a combination of the above listed methods depending on the emission source and process. For the definition of BAT in the FEM, please refer to the introduction section of this guidance.

Resources:
Several publicly available resources that contain examples and guidance on emission control techniques and an implementation plan template are provided below.

- US EPA - Clean Air Technology Center https://www.epa.gov/catc/clean-air-technology-center-products

- Industrial Emissions Directive 2010/75/EU (Integrated Pollution Prevention and Control) - Best Available Techniques (BAT) Reference Document for the Textiles Industry https://publications.jrc.ec.europa.eu/repository/handle/JRC131874

- Implementation plan template: https://howtohigg.org/resources/resources-library/#templates

How This Will Be Verified:

Full Points:

Documentation Required:

- An implementation plan that includes details of the specific actions the facility plans to take to reduce air emission from production emissions (e.g., printing/dyeing or other finishing processes, application of chemicals such as solvent or adhesives, etc.) which may include including:
    - Documentation of the emissions specifications or calculated emissions estimates from proposed new equipment or alternative raw materials included in the implementation plan that show the expected emissions reductions.
    - Specifications (e.g., pollutant destruction/removal efficiency) of control devices included in the implementation plan.
    - Implementation timelines (i.e., the planned start and completion dates for actions listed in the plan).

Notes:

- Actions to reduce pollutant quantities should not consider emission reductions due to reductions in production volume or equipment operating time as these factors will not result in sustainable improvements.
- If the facility has completed all actions in the plan prior to reporting year and does not have an implementation plan for reductions the reporting year and beyond, a No response should be selected (i.e., points are not awarded for historical plans that were implemented prior to the reporting year).

Interview Questions to Ask:

- Staff responsible for the implementation plan can explain the facility's process for evaluating emission reduction opportunities and the facility's implementation plans and actions to reduce air emissions.

Inspection - Things to Physically Look For:

- The actions listed in the implementation plans directly relate to the observed production emission sources onsite.

Partial Points: N/A

12. Are you monitoring or reporting against any industry guidelines or tools for air emissions (additional to the legal requirement)?

Note: This response to this Level 2 question will be pre-populated based on the response to this question in Level 1. The Level 1 question is unscored, and scoring will be applied in Level 2 as follows:

- **Full Points** will be awarded for a Yes response.
- **No Points** will be awarded for a No response.

How This Will Be Verified:

This question will be verified in accordance with the criteria set forth in the Level 1 question (Question 7).

13. Are you meeting / conforming to the requirements of the industry guideline(s) on air emissions?

Answer Yes if: Your facility is meeting all the requirements of the industry guideline you are reporting against. This must include all testing and emission limit criteria.

Note: This question will only be applicable to facilities that have a Yes response to the question: Are you monitoring or reporting against any industry guidelines or tools for air emissions (additional to the legal requirement)?

If you answer Yes and are reporting against a ZDHC guideline, you will be asked the following sub question:

- which level of air performance have you achieved:
    - Level 1: Foundational
    - Level 2: Progressive
    - Level 3: Aspirational

Suggested Uploads

- Copies of emissions calculations or reporting, and any emission testing that demonstrates the facility is meeting the requirements of the guideline.
- ZDHC Supplier Platform- MMCF Module certificate

What is the intent of the question?
The intent of this question is for facilities to demonstrate that they are meeting all of the requirements of industry developed guidance or tools that go beyond basic legal compliance monitoring and reporting.

Technical Guidance
Different guidelines or tools may have different requirements for monitoring and reporting of air emissions (e.g., the type and frequency of emission reporting, types of pollutants that must be monitored/reported, emission calculation or testing methodologies and frequencies, etc.) To demonstrate a facility is meeting these requirements, facilities should have procedures in place to determine the monitoring and reporting requirements that apply to their operations and meet the required monitoring and reporting requirements.

Supporting documentation that shows the facility is meeting these requirements such as emissions calculations/reports, testing results should be maintained.

Examples of industry guidance/tools for air emissions are the ZDHC Air Position Paper/Guidelines and the ZDHC MMCF Air Emissions Guidelines of the ZDHC MMCF Guidelines. Both of these guidance documents can be found and downloaded here https://www.roadmaptozero.com/output

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that demonstrates the facility is monitoring and reporting air emissions in accordance with the applicable guidelines/tools. This may include:
    - Air emissions inventory or report with reported emission quantities or emission rates that show compliance with the limits in the guideline.
    - Air emissions calculation methodology and supporting documentation (e.g., facility operating data, consumption quantities of chemicals and/or fuels emission factors or assumptions used for determining the emitted quantity of specific pollutants, etc)
    - ZDHC Supplier Platform- MMCF Module certificate

  Note – Required documentation may vary by guideline or tool being reported against. All air emission reporting documentation required by the standard should be available for verification.

Interview Questions to Ask:

- Staff responsible for managing air emissions understand and can describe the monitoring and reporting requirements of the guidelines/tools the facility is reporting emissions against and be able to explain the facility's procedures for meeting the requirements of the guideline/tool.

Inspection - Things to Physically Look For:

- The relevant emission sources observed at the facility are included in the facility's emissions monitoring/reporting procedures as required by the guideline or tool used to report emissions.

Partial Points:

- Partial Points will be awarded for facilities who are reporting against a ZDHC Guideline and meeting the Foundational Limits.

14. Do you have a plan to or have you already replaced your current refrigerant with low ODP / low GWP refrigerant gasses that goes beyond current legal requirements?

Answer Yes if: Your facility has replaced or has an established plan to replace one (1) or more refrigerants with refrigerants/coolants with a lower Ozone Depletion Potential (ODP) **and** Global Warming Potential (GWP) that is not currently required by local law.

Notes:

- The intent of this question is that both ODP and GWP of the refrigerant/coolant are reduced. If the alternative refrigerant/coolant has a higher ODP or GWP, you should answer No to this question.
- If your plan is to only comply with legal requirements with regard to the phase out or substitution of refrigerants, you should answer No this question.

Suggested Uploads

- Documentation that shows refrigerants have been replaced with alternative refrigerant gases that have a lower ODP and GWP (e.g., refrigerant purchase receipts, maintenance logs)
- The documented replacement plan with timelines for replacement of current refrigerants.
- The referenced ODP and GWP data that was used to determine that the alternative refrigerants used, or planned to be used, have lower ODP and GWP values.

What is the intent of the question?

The intent of this question is for facilities to go beyond current legal requirements to replace refrigerant gases used onsite with alternative refrigerant/coolants that have a reduced impact on the environment.

Technical Guidance
Country specific regulations may be implemented to support national commitments to international treaties (e.g., the Montreal Protocol) on the phase out of ozone depleting substances (ODS) such as those commonly found in refrigerants used for cooling devices or air conditioning equipment. To proactively support this, facilities should have a clear understanding of the refrigerants used onsite and any current applicable regulatory requirements with regards to their phase out. Facilities should also be taking steps to eliminate the use of these in advance of any regulatory requirements to do so.

When planning to proactively phase out refrigerants, facilities can do the following:

- Establish procedures to stay current on applicable regulatory requirements for the phase out of ODS/refrigerants.
- Identify which refrigerant(s) are used onsite that are targeted for future phase out.
- Establish plans with defined actions to phase out targeted refrigerants before the onset of regulatory requirements for phase out.

Where it is not required by local regulations or not possible to discontinue the use of harmful refrigerants completely, environmental impact can be reduced by switching to alternative refrigerants that have lower Ozone Depletion Potential (ODP) and Global Warming Potential (GWP) or alternative coolants. For example, HCFC-22, commonly known as R-22 (ODP0.05, GWP 1,810) can be replaced with a refrigerant gas with a lower ODP and GWP such as R-134a (ODP 0, GWP 1,430) or R134a can be replaced with R-32 (ODP 0, GWP 675).

In some cases, alternative refrigerant gases can be directly used in equipment, and in other cases the equipment may need to be retrofitted to be able to operate with different refrigerant gases. When evaluating an alternative refrigerant for use or retrofitting a system, facilities should follow the manufacturer's suggested handling and installation guidelines and also consider possible impacts on the system's energy consumption.

Resources:
Several publicly available resources that contain information on replacing refrigerants with preferred alternatives are provided below.

Note: Information in these resources is provided for reference and may contain regulatory requirements that do not apply to your facility (e.g., country specific phase out requirements or approved alternatives). If country specific requirements or information are available, it should be referenced when considering the phase out or substitution of refrigerants.

- US EPA Significant New Alternatives Policy (SNAP) Program https://www.epa.gov/snap
- US EPA Significant New Alternatives Policy (SNAP) Program - Substitutes in Refrigeration and Air Conditioning https://www.epa.gov/snap/substitutes-refrigeration-and-air-conditioning

- EU Climate-friendly alternatives to HFCs https://climate.ec.europa.eu/eu-action/fluorinated-greenhouse-gases/climate-friendly-alternatives-hfcs_en

How This Will Be Verified:

Full Points

Documentation Required:

- Documentation that shows one (1) or more refrigerants have been phased out or replaced with alternative refrigerant gases that have a lower ODP **and** GWP (e.g., refrigerant purchase receipts, maintenance logs) that are not already required to be phased out/replaced per local regulatory requirements.
- The referenced ODP and GWP data that was used to determine that the alternative refrigerants used, or planned to be used, have lower ODP and GWP values.
- If the facility has not replaced current refrigerants used onsite, but has an established plan to replace one (1) or more refrigerants, the plan should include:
    - List of refrigerants to be phased out/replaced with a list of the alternative refrigerants to be used, where applicable.
    - A defined timeline for phase out/replacement of current refrigerants that shows the facility is planning to phase out/replace the refrigerant before they are legally required to do so.

Interview Questions to Ask:

- Staff responsible for managing refrigerant use at the site should be able to explain any refrigerant replacement that has taken place or the facility's plan for refrigerant replacement.

Inspection - Things to Physically Look For:

- All reported refrigerant replacements or replacement plans are consistent with observations of the refrigerant containing equipment onsite.

Partial Points: N/A

15. Does the facility have business policies or procedures in effect that ensure that all Best Available Technologies (BAT) for air emissions reductions are considered in the long-term environmental plans of the facility?

Answer Yes if: Your facility has documented business policies or procedures in place to evaluate and plan for the implementation of BAT to reduce air emission from the facility. This must cover all emission sources (e.g., facility operations and production sources).

Suggested Uploads

- Copies of your business policies or procedures to evaluate and plan for the implementation of BAT to reduce air emission.
- If available, documentation to show that the policies/procedures are being followed (e.g., records of evaluation of BAT, proposals/quotations or equipment specifications for technologies being considered, proposed emission reductions resulting from the evaluated technologies, etc)

What is the intent of the question?

The intent of this question is to encourage facilities to establish business practices to evaluate and plan for the implementation of BAT to reduce air emissions from the facility.

Technical Guidance

In the FEM, the concept of Best Available Technology (BAT) is defined as the most effective and advanced technology including materials, processes, and equipment that is currently available that will result in reduction of pollutants emitted and minimizing impacts to the environment. This is further defined as follows:

- **Best** in relation to technology means the most effective method in achieving a high level of protection of the environment.
- **Available** means technology that is developed on a scale that allows for economically and technically viable implementation taking into consideration the costs and benefit and that the technology reasonably accessible to the business carrying on the activity regardless of whether the technology is developed or widely implemented locally.
- **Technology** refers to materials, processes, and equipment, and the way it is designed, built, maintained, operated.

Procedures for evaluating BAT should be incorporated into the facility's environmental management system which focuses on reducing impacts on the environment and be included as part of the ongoing review of environmental impacts and technology to reduce them.

The adoption of BAT often requires actions such as process/equipment modifications, the installation of control equipment, research into alternative raw material/chemical inputs that requires long term planning and capital allocation. Facilities should have processes in place to stay up to date with emerging technologies and regularly review these to determine viable options for both new and existing emission sources to determine the most effective means to reduce the emissions to the air. These evaluations should be included in the long-term planning to reduce emissions.

Additionally, the adoption of BAT often depends on the specific operations, emission source and pollutant characteristics at a facility. For example:

- In some cases, the most effective current solution for reducing particulate emission may be an Electrostatic precipitator (ESP) and in other cases a form of wet scrubbing or cyclone filtration may be more effective.
- In some cases, the most effective current solution for reducing emission of organic compounds (e.g., formaldehyde) may be substitution for an alternative chemical input or the use of a control technology such as thermal oxidation.

Evaluation of BAT must be conducted by qualified professionals such as process or environmental engineers who understand the facility's emissions and pollutant characteristics (e.g., pollutant loading, emission source operational parameters such as temperature and moisture content, etc) and the design and operational characteristics of any controls or alternative technologies being evaluated in order to determine potential air emission reductions through engineering estimates or other air emission calculation methodology.

Note: In some countries, requirements to adopt BAT or procedures to determine BAT may be defined by local regulations or directives, which should be complied with, however facilities should strive to conduct a detailed evaluation of all available technologies to reduce environmental impacts to the lowest achievable level.

Resources:
Resources that include guidance on the determination of selection of BAT as well as examples of BAT are provided below.

Note - The resources below are provided for reference only. Facilities are expected to understand and comply with any applicable local regulations related to the determination of BAT for control of emission to air.

- US EPA - Technology Transfer Network - Clean Air Technology Center - RACT/BACT/LAER Clearinghouse RACT/BACT/LAER Clearinghouse (RBLC) https://cfpub.epa.gov/rblc/index.cfm?action=Home.Home&lang=en

- EU - Establishing the best available techniques (BAT) conclusions, under Directive 2010/75/EU on industrial emissions, for the textiles industry.
- https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022D2508&qid=1671517820694

- Industrial Emissions Directive 2010/75/EU (Integrated Pollution Prevention and Control) - Best Available Techniques (BAT) Reference Document for the Textiles Industry https://publications.jrc.ec.europa.eu/repository/handle/JRC131874

How This Will Be Verified:

Full Points:

Documentation Required:

- Business policies or procedures to evaluate and plan for the implementation of BAT to reduce air emissions including all facility operations and production sources of emissions. These processes must be considered and included in the facility's long term environmental plans (e.g., 3–5-year environmental strategy)
    - Procedures should include processes for environmental reviews of existing or any new operations at the facility (e.g., new production processes or equipment, new raw material/chemical inputs, etc.) and include an evaluation of BAT with regards to reducing emission to air
    - Procedures must define the timeline and scope for these reviews. Note that the frequency and scope can be established by the facility but should not exceed three years and should cover all significant emission sources at the facility (i.e., both operational sources (e.g., boilers, generators) and production related emission sources)
- Supporting documentation to show that the policies/procedures are being followed (e.g., records of evaluation of BAT for new or existing operations, proposals/quotations or equipment specifications for technologies being considered, proposed emission reductions resulting from the evaluated technologies, etc)

Interview Questions to Ask:

- Staff responsible for the facility's environmental management system and other relevant staff involved in the implementation of procedures related to environmental planning and evaluation of BAT can explain the facility's planning and review process for evaluating BAT to reduce air emissions.

Inspection - Things to Physically Look For:

- Emissions sources observed onsite are included in the facility's procedures to review and plan for the adoption of BAT.

Partial Points: N/A

Air Emissions - Level 3

16. Has your facility made progress on your implementation plan to reduce air emissions from facility operations in the reporting year?

Answer Yes if: Your facility has an established implementation plan to reduce air emissions from facility operations sources (e.g., boilers, generators, etc) and has completed one (1) or more actions on the plan to reduce air emissions in the reporting year.

Note: A Yes response can be provided for this question if the facility is able to demonstrate that they have implemented the best available control technologies (BAT) for all significant source of emission to air from facility operations **and** the facility is:

- Operating/maintaining equipment and control devices, where applicable in accordance with manufacturers recommendations.
- Consistently implementing the BAT in daily operations.

If you answer Yes, you will be asked the following sub questions:

- Describe the actions completed in the reporting year.

Suggested Uploads

- Supporting evidence to demonstrate the actions implemented which may include:
    - Emissions specifications (e.g., pollutant destruction/removal efficiency) of control devices or new/modified equipment installations.
    - Evidence of fuel substitutions (e.g., purchase or consumption records)
    - Emissions specifications or calculated emissions reduction estimates from actions or alternative fuel sources that show emissions have been reduced.
- Supporting evidence to demonstrate BAT adopted at the facility for facility operations is being operated/maintained in accordance with manufacturers recommendations (e.g., maintenance schedules/inspection records, operating parameter monitoring, manufacturers specifications for operation and maintenance)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have made progress (i.e., implemented actions) on their implementation plans to reduce air emission in the reporting year **OR** that the facility has implemented BAT for facility operations emission sources and are operating/ maintaining these appropriately.

Technical Guidance

In the FEM, making progress on your implementation plan means that the facility has completed one (1) or more of the actions listed in their implementation plan to reduce the amount of pollutants emitted to the air in the reporting year.

The FEM does not specify the types of actions that need to be completed as these can vary by facility and emission source type, however the actions should result in demonstrable reductions in air emissions. This should be demonstrated through emissions calculations or engineering estimates that demonstrate the implemented actions have or will result in the reduction of pollutants emitted to the air from facility operations sources at the facility.

Note: Actions to reduce pollutant quantities should not consider emission reductions due to reductions in production volume or equipment operating time as these factors will not result in sustainable improvements.

Facilities that have implemented BAT should ensure that the technologies implemented are properly maintained and monitored. For example, if a facility has determined the use of a natural gas boiler with flue gas recirculation or low NOx burners is the BAT for reducing NOx emissions, there should be processes in place to maintain and monitor these controls to ensure that the equipment is operating effectively. Typically recommended operation conditions and maintenance requirements will be provided in the equipment manufacturers specifications. Similarly, if a facility is operating a coal fired boiler and has determined that a wet limestone scrubber to reduce SO2, particulate and acid gases is the BAT, the same monitoring and maintenance procedures outlined above should be applied.

Resources:
Several publicly available resources that contain examples and guidance on emission control techniques and BAT are provided below.

- Best Available Techniques (BAT) Reference Document for Large Combustion Plants
- https://publications.jrc.ec.europa.eu/repository/bitstream/JRC107769/jrc107769_lcp_bref 2017(1).pdf

- US EPA Clean Air Technology Center https://www.epa.gov/catc/clean-air-technology-center-products

How This Will Be Verified:

Full Points:

Documentation Required:

- Supporting documentation that demonstrates that one (1) or more actions were implemented which may include:
    - Emissions specifications (e.g., pollutant destruction/removal efficiency) of control devices or new/modified equipment installations.
    - Evidence of fuel substitutions (e.g., purchase or consumption records)
    - Calculated emissions reduction estimates from actions or alternative fuel sources that show emissions have been reduced.
- Supporting documentation to demonstrate BAT implemented at the facility for facility operations is being operated/maintained in accordance with manufacturers recommendations (e.g., maintenance schedules/inspection records, operating parameter monitoring, manufacturers specifications for operation and maintenance)

Note: Will be provided for this question if the facility is able to demonstrate that they have implemented the best available control technologies (BAT) for all significant source of emission to air from facility operations **and** the facility is:

- Operating/maintaining equipment and control devices, where applicable in accordance with manufacturers recommendations.
- Consistently implementing the BAT in daily operations.

Interview Questions to Ask:

- Staff responsible for implementing the action(s) to reduce emissions to air or operating/maintaining BAT are able to describe the action(s) taken.

Inspection - Things to Physically Look For:

- The actions reported directly relate to the observed facility operations sources onsite.

Partial Points: N/A

17. Has your facility made progress on your implementation plan to reduce air emissions from production processes in the reporting year?

Answer Yes if: Your facility has an established implementation plan to reduce air emissions from production sources and has completed one (1) or more actions on the plan to reduce air emissions in the reporting year.

Note: A Yes response can be provided for this question if the facility is able to demonstrate that they have implemented the best available control technologies (BAT) for all significant source of emission to air from production processes **and** the facility is:

- Operating/maintaining equipment and control devices, where applicable in accordance with manufacturers recommendations.
- Consistently implementing the BAT in daily operations.

If you answer Yes, you will be asked the following sub questions:

- Describe the actions completed in the reporting year.

Suggested Uploads

- Supporting evidence to demonstrate the actions implemented which may include:
    - Emissions specifications (e.g., pollutant destruction/removal efficiency) of control devices or new/modified equipment installations.
    - Evidence of raw material or chemical substitutions (e.g., purchase or consumption records)

- Emissions specifications or calculated emissions reduction estimates from actions or alternative raw materials/chemicals that show emissions have been reduced.

- Supporting evidence to demonstrate BAT adopted at the facility for production process is being operated/maintained in accordance with manufacturers recommendations (e.g., maintenance schedules/inspection records, operating parameter monitoring, manufacturers specifications for operation and maintenance)

What is the intent of the question?
The intent of this question is for facilities to demonstrate that they have made progress (i.e., implemented actions) on their implementation plans to reduce air emission in the reporting year **OR** that the facility has implemented BAT for facility production sources and are operating/maintaining these appropriately.

Technical Guidance
In the FEM, making progress on your implementation plan means that the facility has completed one (1) or more of the actions listed in their implementation plan to reduce the amount of pollutants emitted to the air in the reporting year.

The FEM does not specify the types of actions that need to be completed as these can vary by facility and emission source type, however the actions should result in demonstrable reductions in air emissions. This should be demonstrated through emissions calculations or engineering estimates that demonstrate the implemented actions have or will result in the reduction of pollutants emitted to the air from production processes sources at the facility.

Note: Actions to reduce pollutant quantities should not consider emission reductions due to reductions in production volume or equipment operating time as these factors will not result in sustainable improvements.

Facilities that have implemented BAT should ensure that the technologies implemented are properly maintained and monitored. For example, if a facility has determined the BAT for reducing VOC emission from the screen-printing process is channelling all emission through a local ventilation system that is fitted with activated carbon adsorption, there should be processes in place to maintain and monitor these controls to ensure that the equipment is operating effectively (e.g., ventilation capture/flow rates, carbon change out schedules, etc). Typically recommended operating conditions and maintenance requirements will be provided in the equipment manufacturers specifications. Similarly, if a facility has determined a wet scrubber to reduce Ammonia (NH_3) from coating or finishing emissions is the BAT, the same monitoring and maintenance procedures outlined above should be applied.

Resources:
Several publicly available resources that contain examples and guidance on emission control techniques and BAT are provided below.

- US EPA - Technology Transfer Network - Clean Air Technology Center - RACT/BACT/LAER Clearinghouse RACT/BACT/LAER Clearinghouse (RBLC) https://cfpub.epa.gov/rblc/index.cfm?action=Home.Home&lang=en

- EU - Establishing the best available techniques (BAT) conclusions, under Directive 2010/75/EU on industrial emissions, for the textiles industry.
- https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022D2508&qid=1671517820694

- Industrial Emissions Directive 2010/75/EU (Integrated Pollution Prevention and Control) - Best Available Techniques (BAT) Reference Document for the Textiles Industry https://publications.jrc.ec.europa.eu/repository/handle/JRC131874

How This Will Be Verified:

Full Points:

Documentation Required:

- Supporting documentation that demonstrates that one (1) or more actions were implemented which may include:
    - Emissions specifications (e.g., pollutant destruction/removal efficiency) of control devices or new/modified equipment installations.
    - Evidence of raw material or chemical substitutions (e.g., purchase or consumption records)
    - Calculated emissions reduction estimates from actions or alternative raw materials/chemicals that show emissions have been reduced.
- Supporting documentation to demonstrate BAT implemented at the facility for production emissions is being operated/maintained in accordance with manufacturers recommendations (e.g., maintenance schedules/inspection records, operating parameter monitoring, manufacturers specifications for operation and maintenance)

Note: Will be provided for this question if the facility is able to demonstrate that they have implemented the best available control technologies (BAT) for all significant source of emission to air from production processes **and** the facility is:

- Operating/maintaining equipment and control devices, where applicable in accordance with manufacturers recommendations.
- Consistently implementing the BAT in daily operations.

Interview Questions to Ask:

- Staff responsible for implementing the action(s) to reduce emissions to air or operating/maintaining BAT are able to describe the action(s) taken.

Inspection - Things to Physically Look For:

- The actions reported directly relate to the observed production emission sources onsite.

Partial Points: N/A

18. Have you replaced your current refrigerant with low ODP / low GWP refrigerant gasses that goes beyond current legal requirements?

Answer Yes if: Your facility has replaced one (1) or more refrigerants with alternative refrigerants/coolants with a lower Ozone Depletion Potential (ODP) **and** Global Warming Potential (GWP) that is not currently required by local law.

Notes:

- If you have answered Yes to question 14 on the basis that you have already replaced one (1) or more refrigerants with alternative refrigerants/coolants, you should select Yes.
- The intent of this question is that both ODP and GWP of the refrigerant/coolant are reduced. If the replacement refrigerant/coolant has a higher ODP or GWP, you should answer No to this question.
- If your plan is to only comply with legal requirements with regard to the phase out or substitution of refrigerants, you should select No.

Suggested Uploads

- Documentation that shows refrigerants have been replaced with alternative refrigerant gases that have a lower ODP and GWP (e.g., refrigerant purchase receipts, maintenance logs)
- The referenced ODP and GWP data that was used to determine that the alternative refrigerants used have lower ODP and GWP values.

What is the intent of the question?

The intent of this question is for facilities to go beyond current legal requirements to replace refrigerant gases used onsite with alternative refrigerants/coolants that have a reduced impact on the environment.

Technical Guidance

Country specific regulations may be implemented to support national commitments to international treaties (e.g., the Montreal Protocol) on the phase out of ozone depleting substances (ODS) such as those commonly found in refrigerants used for cooling devices or air conditioning equipment. To proactively support this, facilities should have a clear understanding of the refrigerants used onsite and any current applicable regulatory requirements with regards to their phase out. Facilities should also be taking steps to eliminate the use of these in advance of any regulatory requirements to do so.

Where it is not required by local regulations or not possible to discontinue the use of harmful refrigerants completely, environmental impact can be reduced by switching to alternative refrigerants that have lower Ozone Depletion Potential (ODP) and Global Warming Potential (GWP) or alternative coolants. For example, HCFC-22, commonly known as R-22 (ODP0.05, GWP 1,810) can be replaced with a refrigerant gas with a lower ODP and GWP such as R-134a (ODP 0, GWP 1,430) or R134a can be replaced with R-32 (ODP 0, GWP 675).

In some cases, alternative refrigerant gases can be directly used in equipment, and in other cases the equipment may need to be retrofitted to be able to operate with different refrigerant gases. When evaluating an alternative refrigerant for use or retrofitting a system, facilities should follow the manufacturer's suggested handling and installation guidelines and also consider possible impacts on the system's energy consumption.

Resources:
Several publicly available resources that contain information on replacing refrigerants with preferred alternatives are provided below.

Note: Information in these resources is provided for reference and may contain regulatory requirements that do not apply to your facility (e.g., country specific phase out requirements or approved alternatives). If country specific requirements or information are available, it should be referenced when considering the phase out or substitution of refrigerants.

- US EPA Significant New Alternatives Policy (SNAP) Program https://www.epa.gov/snap
- US EPA Significant New Alternatives Policy (SNAP) Program - Substitutes in Refrigeration and Air Conditioning https://www.epa.gov/snap/substitutes-refrigeration-and-air-conditioning
- EU Climate-friendly alternatives to HFCs https://climate.ec.europa.eu/eu-action/fluorinated-greenhouse-gases/climate-friendly-alternatives-hfcs_en

How This Will Be Verified:

Full Points

Documentation Required:

- Documentation that shows one (1) or more refrigerants have been phased out or replaced with alternative refrigerant gases that have a lower ODP **and** GWP (e.g., refrigerant purchase receipts, maintenance logs) that are not already required to be phased out/replaced per local regulatory requirements.
- The referenced ODP and GWP data that was used to determine that the alternative refrigerants used, or planned to be used, have lower ODP and GWP values.

Interview Questions to Ask:

- Staff responsible for managing refrigerant use at the site should be able to explain any refrigerant replacement that has taken place.

Inspection - Things to Physically Look For:

- All reported refrigerant replacements are consistent with observations of the refrigerant containing equipment onsite.

Partial Points: N/A

19. Have you utilized the best available technology (BAT) for the major air emissions from your facility?

Answer Yes if: Your facility has conducted a review of the best available control technology (BAT) and implemented the BAT for **all** significant emission sources at the facility. This must cover all of the facility's major emission sources from both facility operations and production sources.

Note: Significant emissions sources are defined as the sources at the facility that are determined to be the most significant contributors to facility emissions as determined by a formal evaluation and review of facility emissions/sources by a qualified individual.

If you answer Yes, you will be asked the following sub questions:

- Describe the technology currently being utilized.
- Please upload supporting documentation if available.

Suggested Uploads

- Documentation of the BAT evaluations for each source that identifies the BAT for each emission source which may include:
    - Equipment/emission specifications for technologies considered.
    - Alternative raw material/fuel/chemical inputs evaluated.
    - The estimated/calculated emissions of the evaluated technologies used to determine BAT.
- Supporting evidence to demonstrate that the BAT has been implemented for all emission sources which may include:
    - Photos of control technologies or new/modified equipment installations,
    - evidence of raw material or chemical substitutions (e.g., purchase or consumption records)
    - Calculated emissions after BAT implementation to confirm emission reductions have been achieved.
    - Documentation to demonstrate BAT implemented at the facility is being operated/maintained in accordance with manufacturers recommendations (e.g., maintenance schedules/inspection records, operating parameter monitoring, manufacturers specifications for operation and maintenance)

What is the intent of the question?
The intent of this question is for facilities to demonstrate that they have implemented BAT to minimize emissions to air from all significant emissions sources at the facility.

Technical Guidance
In the FEM, the concept of Best Available Technology (BAT) is defined as the most effective and advanced technology including materials, processes, and equipment that is currently available that will result in reduction of pollutants emitted and minimizing impacts to the environment. This is further defined as follows:

- **Best** in relation to technology means the most effective method in achieving a high level of protection of the environment.
- **Available** means technology that is developed on a scale that allows for economically and technically viable implementation taking into consideration the costs and benefit and that the technology reasonably accessible to the business carrying on the activity regardless of whether the technology is developed or widely implemented locally.
- **Technology** refers to materials, processes, and equipment, and the way it is designed, built, maintained, operated.

Evaluation of BAT to determine the most effective solutions must be conducted by qualified professionals such as process or environmental engineers who understand the facility's emissions and pollutant characteristics (e.g., pollutant loading, emission source operational parameters such as temperature and moisture content, etc) and the design and operational characteristics of any controls or alternative technologies being evaluated in order to determine potential air emission reductions through engineering estimates or other air emission calculation methodology.

The adoption of BAT often depends on the specific operations, emission source and pollutant characteristics at a facility. For example:

- In some cases, the most effective current solution for reducing particulate emission may be an Electrostatic precipitator (ESP) and in other cases a form of wet scrubbing or cyclone filtration may be more effective.
- In some cases, the most effective current solution for reducing emission of organic compounds (e.g., formaldehyde) may be substitution for an alternative chemical input or the use of a control technology such as thermal oxidation.

BAT is also something that can evolve overtime. To ensure BAT is currently being used, facilities should have processes to conduct regular reviews of emerging technologies (e.g., alternative raw material/fuel/chemical inputs, process or emission control equipment) to ensure that current BAT is being used.

Note: In some countries, requirements to adopt BAT or procedures to determine BAT may be defined by local regulations or directives, which should be complied with, however facilities should strive to conduct a detailed evaluation of all available technologies to reduce environmental impacts to the lowest achievable level.

Resources:
Resources that include guidance on the determination of selection of BAT as well as examples of BAT are provided below.

Note - The resources below are provided for reference only. Facilities are expected to understand and comply with any applicable local regulations related to the determination of BAT for control of emission to air.

- US EPA - Technology Transfer Network - Clean Air Technology Center - RACT/BACT/LAER Clearinghouse RACT/BACT/LAER Clearinghouse (RBLC) https://cfpub.epa.gov/rblc/index.cfm?action=Home.Home&lang=en

- EU - Establishing the best available techniques (BAT) conclusions, under Directive 2010/75/EU on industrial emissions, for the textiles industry.
- https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022D2508&qid=1671517820694

- Industrial Emissions Directive 2010/75/EU (Integrated Pollution Prevention and Control) - Best Available Techniques (BAT) Reference Document for the Textiles Industry https://publications.jrc.ec.europa.eu/repository/handle/JRC131874

How This Will Be Verified:

Full Points:

Documentation Required:

- Documented BAT evaluations that identify the BAT for each emission source which may include:
    - Equipment/emission specifications for technologies considered.
    - Alternative raw material/fuel/chemical inputs evaluated.
    - The estimated/calculated emissions of the evaluated technologies used to determine BAT.
    - **Note:** BAT evaluations must be conducted at least every 3 years for each source.
- Supporting evidence to demonstrate that the BAT has been implemented for all emission sources which may include:
    - Photos of control technologies or new/modified equipment installations,
    - evidence of raw material or chemical substitutions (e.g., purchase or consumption records)
    - Calculated emissions after BAT implementation to confirm emission reductions have been achieved.
    - Documentation to demonstrate BAT implemented at the facility is being operated/maintained in accordance with manufacturers recommendations (e.g.,

maintenance schedules/inspection records, operating parameter monitoring, manufacturers specifications for operation and maintenance)

Interview Questions to Ask:

- Staff responsible for implementing, operating, or maintaining BAT are able to describe the facility's processes to ensure BAT is consistently used and all associated equipment is operated appropriately.

Inspection - Things to Physically Look For:

- BAT implemented at the facility is consistently used and all associated equipment is operated appropriately.

Partial Points: N/A

Waste

General Introduction

Waste from industrial processes and manufacturing operations have the potential to impact the environment, human health, and local ecosystem.

As governments and industry stakeholders continue to focus on reducing waste and promoting more sustainable manufacturing practices, more stringent requirements and regulations may be imposed. New materials and technologies are also being developed to reduce and recapture waste and work towards a circular economy that is more sustainable. By proactively managing and working to minimize waste generated from your facility, you can reduce impacts on the environment, exposure to regulatory risks or new requirements from business partners and contribute to a more sustainable future.

In general, the Higg FEM Waste section encourages you to:

- Identify and understand the types of wastes that are generated at your facility.
- Ensure all wastes are appropriately managed onsite (e.g., storage and disposal)
- Understand how your wastes are treated/disposed of after leaving your facility.
- Track and report the quantity of wastes generated at your facility.
- Evaluate, plan for, and adopt solutions to reduce waste through better manufacturing practices, recycling/reuse, and preferred waste treatment solutions.
- Implement leading practices to divert wastes from landfill and into the circular economy.

Additional details on the intent and criteria for each Higg FEM waste question is provided in the guidance below along with useful technical guidance and resources to support your facility in the management and reduction of waste.

Waste at Your Facility

Waste is any material or substance that has no further use and is discarded from a facility which can pollute or contaminate the environment and surrounding communities.

In the FEM, wastes are categorized as follows:

- **Non-hazardous Waste:** is any waste that causes no harm to human or environmental health. Non-hazardous waste usually includes both non-hazardous production waste as well as domestic waste. Examples of non-hazardous waste include:
    - Non-hazardous production waste such as textile, leather, plastic, paper, metal, or packaging waste, etc.
    - Domestic waste such as food waste and sanitary wastes including household waste from the office and/or dormitory areas (e.g., toilet paper, yard/garden waste, glass, and food packaging), etc.

- **Hazardous Waste:** is any waste that could cause harm to public health and/or the environment because of its chemical, physical, or biological characteristics (e.g., it is flammable, explosive, toxic, radioactive, or infectious). Hazardous wastes can be liquids, solids, or gases. Examples of hazardous waste include:
    - Hazardous production waste such as used chemicals, chemical containers/drums, waste oils, contaminated materials (e.g. materials that contain other substances that are hazardous waste such as rags containing solvents), etc.
    - Waste from facility operations such as wastewater treatment sludge if hazardous, fly ash, fluorescent light bulbs, electronic waste, batteries, etc.

Note: For all companies manufacturing or distributing in or to the European Union, the WEEE (Waste from Electrical and Electronic Equipment) directive is an important directive to follow. The WEEE directive governs the reduction and separation of electronic waste.

Reportable Wastes in the FEM

The Higg FEM requires that facilities track and report waste generation data for several specific waste categories listed below. Additional details on reporting waste quantities in the FEM are provided in the relevant questions.

Non-hazardous Wastes	Hazardous Wastes
• Textile Waste • Leather Waste • Rubber Waste • Metal (broken needles, metal swarf, etc.) • Plastic	• Empty chemical drums and containers (without proper cleaning) • Film and Printing Frame • Pre-water treatment sludge (Hazardous) • Expired/unused/used chemicals (waste oil, solvents, reactants, etc.)

• Paper • Cans • Wood • Food Waste • Glass • Cartons • Foams (EVA, etc.) • Pre-Water treatment sludge (Non-Hazardous) • General or unspecified waste • Slag (Non-Hazardous) • Other	• Compressed gas cylinders (refrigerants, etc.) • Contaminated materials • Batteries • Fluorescent light bulb • Ink cartridges • Waste oil and grease (from cooking) • Waste oil and grease (from production, maintenance, etc. - not cooking) • Metal sludge • Empty containers (cleaning, sanitizing, pesticides, etc.) • Electronic Waste • Coal combustion residuals (fly ash and bottom ash/coal slag) • Slag (Hazardous) • Other

Note: The legal classification of hazardous waste may differ from one country or jurisdiction to another. Facilities should, at minimum, follow local regulatory requirements and definitions for classifying wastes as hazardous or non-hazardous. If legal requirements do not exist, it is recommended that facilities use industry guidelines or internationally recognized definitions of hazards wastes (such as those listed in the Basel Convention http://www.basel.int/TheConvention/Overview/TextoftheConvention/tabid/1275/Default.aspx). Additionally, where industry guidelines are more stringent than local requirements, it is recommended that facilities follow industry guidelines.

Waste to be Excluded from the Higg FEM Reporting Scope:
The following waste materials should not be reported in the FEM, as these types of waste are not generated from a "business as usual" situation**:**

- Medical waste
- Major construction and demolition projects waste
- Waste from natural disasters such as flood, fire, tornado, hurricane.

Waste Disposal Methods in the Higg FEM

The Higg FEM requires facilities to indicate how their wastes are currently being disposed of and plans or targets for improving waste disposal methods. The FEM includes several predefined waste disposal methods that can be selected. The table below provides a description of the available waste disposal method options in the FEM. These are categorized into Preferred, Less Preferred and Least Preferred options based on their associated environmental impacts.

Waste Disposal Method	Description

Preferred Options (Material Recovery)	
Reuse	Pre or post-consumer wastes are reused to make new or second hand products without modification or additional manufacturing steps before using the waste.
Recycle (including Upcycle)	Pre or post-consumer wastes are reprocessed to produce new items of equal (or better) quality (e.g., textile to textile recycling or processing plastic bottles into fabric).
Downcycle	Pre or post-consumer wastes are recycled and processed to produce material or products of lesser economic value (e.g., recycled textiles used for rags, carpet padding, or sound insulation products).
Less Preferred Options (Energy Recovery or Non-valorized Disposal)	
Incineration with energy recovery for Non-Recyclables only	Energy recovery from the process of incinerating non-recyclable waste. **Note:** Recycling infrastructure and capabilities may differ among regions and countries.
Energy Recovery - Residual Management (e.g., Physical / Chemical / Biological Treatment)	Energy Recovery as a form of residual management, ie. Sludge Treatment that leads to Biogas Generation, heat generation from biological treatment (composting), energy generation from any such activity that does not include "Incineration"
Onsite incineration without energy recovery for Non-Recyclables	Incineration of non-recyclable wastes onsite at the facility that does not recover energy from the incineration process.
Offsite incineration without energy recovery for Non-Recyclables	Incineration of non-recyclable wastes offsite at a third-party facility that does not recover energy from the incineration process.
Non-valorized disposal - Other Treatment	Any disposal method that does not recover usable materials or attributes of the waste such as converting them into more useful by products like raw materials, fuels, or other sources of energy.
Non-valorized disposal - Responsibly Managed Landfills (for waste that cannot be managed in any of the options under Preferred options or Less Preferred Options)	In the Higg FEM, responsibly managed landfills aligns with the ZDHC Disposal Pathways definitions for landfills with significant control measures as defined in the ZDHC Sludge Management Document Version 1.0. available here: https://www.roadmaptozero.com/output, and as described below: Landfills with **Significant Control Measures** are landfills that control both leachate and gas produced from the materials placed in the landfill and are engineered to store waste in a manner that is safe to the surrounding environment. For purposes of the WW Guideline, significant control measures are defined as:

	• Lined landfill such that the permeability of no more than 1 x 10-7 cm/sec is achieved. This is most often achieved using a synthetic composite liner on top of a packed natural clay liner but can also be achieved through two synthetic liners. • Leachate is collected above the liner and removed for proper treatment and disposal. Leak detection and collection is implemented beneath the primary liner and above the secondary liner. • Gas produced from aerobic and anaerobic decomposition is collected and safely used or disposed of. This gas is primarily carbon dioxide or methane but can include sulphurous compounds. Depending on the content of the gas, carbon dioxide can be vented directly to the atmosphere or collected, filtered, and used beneficially. • Monitoring and documentation are maintained for the life of the landfill. Landfills with **Limited Control Measures** are landfill types that do not meet the description requirements specified in the Landfill with Significant Control Measures section. The permeability, leachate and gas control, and documentation are generally less restrictive. Leachate control may be non-existent or consist of simple collection and drain to local sewer lines. Gases may be vented versus stored, treated and used. Monitoring requirements for these types of landfills are less stringent – requiring less frequent sampling, inspections, and records for a shorter time depending on the local laws and regulations.
Least Preferred Options	
Energy Recovery (e.g., Incineration with energy recovery for Recyclables)	Energy recovery from the process of incinerating of recyclable waste. **Note:** Material recovery is the preferred method for recyclable wastes. **Note:** Recycling infrastructure and capabilities may differ among regions and countries.
Landfill/Dumping with No Control Measures	In the Higg FEM, landfill/dumping with no controls aligns with the ZDHC Disposal Pathways definitions for landfills with limited or no control measures as defined in the ZDHC Sludge Management Document Version 1.0. available here: https://www.roadmaptozero.com/output, and as described below:

	Landfills with **Limited Control Measures** are landfill types that do not meet the description requirements specified in the Landfill with Significant Control Measures section. The permeability, leachate and gas control, and documentation are generally less restrictive. Leachate control may be non-existent or consist of simple collection and drain to local sewer lines. Gases may be vented versus stored, treated and used. Monitoring requirements for these types of landfills are less stringent – requiring less frequent sampling, inspections, and records for a shorter time depending on the local laws and regulations. Landfills with **No Control Measures** are landfills constructed with no control measures. Any landfill that has not been designed to contain waste, limit percolation, or control leachates from exposure or entering the environment is considered a landfill with no control measure. This includes dump piles and holes with no lining or packing to limit waste exposure to the ground and/or groundwater. There may be few or no monitoring requirements for these types of landfills. In many cases, these types of landfills are constructed by simply digging a hole and then filling the hole with waste, or it may consist of filling a naturally occurring depression with waste.
Onsite Incineration without energy recovery for Recyclables	Incineration of recyclable wastes onsite at the facility that does not recover energy from the incineration process.
Offsite incineration without energy recovery for Recyclables	Incineration of recyclable wastes offsite at a third-party facility that does not recover energy from the incineration process.
Other	Any other waste disposal method that does not fit the description of the above noted methods. **Note**: A detailed description of the other methods should be provided.

Waste Data Quality

Accurately tracking and reporting waste data over time provides facilities and stakeholders with detailed insight into opportunities for improvement. If data is not accurate, this limits the ability to understand a facility's wastes and identify the specific actions that will help reduce environmental impacts and drive efficiencies.

When establishing a waste tracking and reporting program, the following principles should be applied:

- **Completeness** – The tracking and reporting program should include all relevant sources (as listed in the FEM). Sources should not be excluded from data tracking and reporting should be based on materiality (e.g., small quantity exceptions).
- **Accuracy** – Ensure that the data input into the waste tracking program is accurate and is derived from credible sources (e.g., calibrated scales, invoices, established scientific measurement principles or engineering estimates, etc.).
- **Consistency** – Use consistent methodologies to track waste data that allows for comparisons of waste quantities over time. If there are any changes in the tracking methods, waste sources, or other operations that impact waste data, this should be documented.
- **Transparency** – All data sources (e.g., invoices, weighing records, etc.), assumptions used (e.g., estimation techniques), and calculation methodologies should be disclosed in data inventories and be readily verifiable via documented records and supporting evidence.
- **Data Quality Management** – Quality assurance activities (internal or external data quality checks) should be defined and performed on waste data as well as the processes used to collect and track data to ensure reported data is accurate.

Waste - Level 1

20. **Which non-hazardous waste streams does your site produce? Select all that apply:**
    - Textile Waste
    - Leather Waste
    - Rubber Waste
    - Metal
    - Plastic
    - Paper
    - Cans
    - Wood
    - Food Waste
    - Glass
    - Cartons
    - Foams (EVA, etc.)
    - Pre-water treatment sludge (Non-Hazardous)
    - Slag (Non-Hazardous)
    - General or unspecified waste
    - Other

If you select textile waste, you will be asked the following sub question:

- **Does your facility segregate textile waste on material composition?**

- **Answer Yes if:** Your facility separates textile waste based on its composition which is defined as separating textile wastes that are made up of different raw materials or fibres. For example, natural fibres from plants, animals, or minerals (e.g., cotton, wool, silk), synthetic fibres from man-made materials (e.g., polyester, nylon), or blended fibres (e.g., a mix of natural and synthetic fibres).
- **Note:** If all textiles waste your facility generates is the same composition you should answer Yes to this question.

After selecting your waste streams, you will be asked the following questions related to tracking of your waste generation data:

21. Does your facility track any of its non-hazardous waste streams?

- **Answer Yes if**: You track the quantity of at least one (1) non-hazardous waste stream generated at your facility**.**

22. 4. Does your facility track each non-hazardous waste stream your facility generates?

- **Answer Yes if:** You track the quantity of all waste streams generated at your facility.
- **Answer Partial Yes if:** You track the quantity of at least one (1) non-hazardous waste stream generated at your facility**.**

Note: If your facility does not track any of its waste streams, the answer to both questions above should be No.

If you answer Yes or Partial Yes to the questions above, you will need to complete a table with the following questions to provide details on your annual non-hazardous waste generation for each waste type during the reporting year:

- Do you track this waste stream?
- Description (of the waste)
- What quantity of this waste stream did you generate during the reporting year?
- Unit of Measure
- Which method was used to track this waste stream?
- How was this waste disposed of?
  - **Note**: If the waste stream is disposed of using more than one method, please select the method that represents how the majority of the waste stream is disposed of and provide comments in the sub questions below.
- Describe your waste management and disposal processes for this waste stream.

Suggested Uploads

- A waste inventory of all non-hazardous waste streams generated at the facility.
- Waste quantity/disposal tracking records that show the quantity of wastes disposed of in the reporting year (e.g., waste manifests, internal tracking records)
- Documentation that shows the final disposal method for each waste (e.g., contracts with waste disposal carriers or facilities)

What is the intent of the question?
The intent is to ensure facilities are aware of all non-hazardous waste types (both production and domestic waste) produced at the facility and track the quantity and disposal methods of each waste type.

Technical Guidance:
Identifying all of the facility's waste streams and tracking waste quantities, provides facilities important information that can be used to identify opportunities to reduce waste and quantify these reductions.

Note: This guidance also generally applies to hazardous waste management covered in the Higg FEM questions related to hazardous waste.

Creating a Waste Inventory:
Developing a waste inventory is an important first step in waste management. When establishing your waste tracking and reporting program, start by doing the following:

- Determine what types of waste are generated.
- Determine where (location and processes) waste is being generated.
- Establish procedures to collect and track waste data:
    - Examples include on-site scales, waste invoices/manifests, receipts for waste materials that are sold, etc.
    - If estimation techniques are used to calculate the amount of waste, the methodology should be clearly defined and be supported by verifiable data.
- Record data (e.g., daily, weekly, monthly waste quantities) in a format that is easy to use and review such as Microsoft Excel

Note: Waste materials that are not generated from a "business as usual" situation should **not** be reported in the FEM. Examples include:

- Medical waste
- Major construction and demolition projects waste
- Waste from natural disasters such as flood, fire, tornado, hurricane.

Selecting Waste Disposal Method

The table provided in the Introduction section provides a description of the waste disposal method options that can be selected in the FEM.

Estimating Waste Quantity Data

In some cases, calculating annual waste quantities may require estimation. Any estimation methodology used should include documented and verifiable processes that includes details on the following:

- The calculation methodology and any data or assumptions used.

- Any production volume or facility operating data used in the calculations.
- Description of any updates or changes to the calculation methodology

Note: If an estimation technique is used, the methodology should be applied consistently and based on reasonable estimation factors that are derived from relevant data (e.g., actual weights of a representative sample of the waste).

An example of how waste quantity data can be estimated is provided below:

- A facility generates waste in barrels which are sealed when full and sent weekly for disposal. Weighing every barrel may not be possible. Therefore, the average weight of a full barrel can be determined by weighing a representative sample of barrels and then multiplying this average weight by the number of barrels disposed each week or month as shown below:
    - Average weight of a barrel = 25kg (based on representative weights of barrels from different days, months, production scenarios, etc.)
    - Number of barrels disposed of in 1 month = 65
    - Total waste for this source in 1 month = 1,625kg (25kg x 65 barrels)

- Similarly, the same methodology above could be used to estimate food or sanitary waste from a canteen or dormitory by collecting representative weight measurements of the average bag or bin and then multiplying the average weight by the number of bags or bins disposed of per month.

Reporting Waste Data in the FEM

Do:

- ✓ Review source data (e.g., weighing records, invoices/manifests, etc) against aggregated totals.
- ✓ Compare the current year with historical data. Any significant changes (e.g., an increase or decrease of over 10%) should be attributable to known changes.
- ✓ Ensure the most recent and updated versions of data tracking spreadsheets are being used and that all automated calculations/formulas are correct.
- ✓ Ensure the proper units are reported and verify any unit conversions.
- ✓ Review any assumption or estimation methodology/calculations to ensure accuracy.
- ✓ Verify how waste is disposed and ensure reported the disposal method (e.g., landfill, recycle, incineration) is accurate.
- ✓ Ensure waste vendors have the appropriate licenses to handle each waste type.

Do Not:

- X Report data that is not accurate or if data is unknown or has not been verified.

X Report estimated data that is not supported by verifiable and reasonably accurate estimation methodology and data (e.g., engineering calculations).

How This Will Be Verified:

When verifying a facility's waste data, Verifiers **must** review all aspects of the facility's waste tracking program that could produce inaccuracies including:

- The initial data collection processes and data sources (e.g., weighing records, manifest/invoices/receipts, etc.)
- The process and tools used to aggregate the data (e.g., spreadsheet calculations, unit conversions, etc.)

If any inconsistencies or errors are noted, the reported information must be corrected, where possible, and detailed comments should be included in the Verification Data field.

Full Points:
Facilities will receive full points for completely tracking **all** non-hazardous waste streams generated at the facility including the quantity and the disposal method of each waste stream.

Documentation Required:

- List of all non-hazardous waste produced by the facility, including but not limited to:
  - Production Waste
  - Packaging waste
  - Domestic Waste
- Documentation that supports the reported waste quantity and final disposal destination which may include:
  - Tacking records for all non-hazardous waste quantities (e.g., invoices from waste contractors, weighing records, etc.).
  - Contracts or agreements with waste disposal carriers or facilities that indicate how waste is treated.
  - Scale calibration records if applicable (e.g., as per manufacturer's specifications)
  - Documented estimation methodologies if applicable.

Interview Questions to Ask:

- Staff responsible for managing wastes are able to explain the information in the waste inventory, how waste sources are identified, and waste quantities are tracked.
- Key staff should understand:
  - The procedures in place for tracking non-hazardous waste, including tracking the waste collection process, quantity measurement and type of disposal.
  - How data quality of the waste data tracking program is maintained.
  - Any estimation methodologies used to calculate annual waste quantities.

Inspection - Things to Physically Look For:

- All non-hazardous waste streams observed are properly identified and tracked.
- Appropriate equipment for waste quantity measurement if applicable.
- Collection site(s) for waste disposal.

Partial Points:

- Partial Points will be awarded if at least one (1) non-hazardous waste source is tracked in full (e.g., quantity is accurately measured, and final disposal method is known) and there is evidence to support these responses.

23. Which <u>hazardous</u> waste streams does your site produce? Select all that apply:

- Empty chemical drums and containers (without proper cleaning)
- Film and Printing Frame
- Pre-water treatment sludge (Hazardous)
- Expired/unused/used chemicals (waste oil, solvents, reactants, etc.)
- Compressed gas cylinders (refrigerants, etc.)
- Contaminated materials
- Batteries
- Fluorescent light bulb
- Ink cartridges
- Waste oil and grease (from cooking)
- Waste oil and grease (from production, maintenance, etc. - not cooking)
- Metal Sludge
- Empty containers (cleaning, sanitizing, pesticides, etc.)
- Electronic Waste
- Coal combustion residuals (fly ash and bottom ash/coal slag)
- Slag (Hazardous)
- Other

After selecting your waste streams, you will be asked the following questions related to tracking of your waste generation data:

24. Does your facility track any of its hazardous waste streams?

- **Answer Yes**, if you track the quantity of at least one (1) hazardous waste stream generated at your facility**.**

25. 8. Does your facility track each hazardous waste stream your facility generates?

- **Answer Yes,** if you track the quantity of all hazardous waste streams generated at your facility.
- **Answer Partial Yes,** if you track the quantity of at least one (1) hazardous waste stream generated at your facility**.**

Note: If your facility does not track any of its hazardous waste streams, the answer to both questions above should be No.

If you answer Yes or Partial Yes to the questions above, you will need to complete a table with the following questions to provide details on your annual hazardous waste generation during the reporting year:

- Do you track this waste stream?
- Description (of the waste)
- What quantity of this waste stream did you generate during the reporting year?
- Unit of Measure
- Which method was used to track this waste stream?
- How was this waste disposed of?
- Is this hazardous waste transporter, treatment, and disposal facility licensed and permitted?
- Upload a copy of the permit.
- Describe your waste management and disposal processes for this waste stream.

Suggested Uploads

- A waste inventory of all -hazardous waste streams generated at the facility.
- Waste quantity/disposal tracking records that show the quantity of wastes disposed of in the reporting year (e.g., waste manifests, internal tracking records)
- Documentation that shows the final disposal method for each waste (e.g., contracts with waste disposal carriers or facilities)

What is the intent of the question?

The intent is to ensure facilities are aware of all hazardous waste types produced at the facility and track the quantity and disposal methods of each waste type.

Technical Guidance:

Identifying all of the facility's hazardous waste streams and tracking waste quantities, provides facilities important information to ensure compliance with applicable regulations and information that can be used to identify opportunities to reduce waste and quantify these reductions.

Note: The legal classification of hazardous waste may differ from one country or jurisdiction to another. Facilities should, at minimum, follow local regulatory requirements and definitions for classifying wastes as hazardous or non-hazardous.

Reporting Hazardous Waste Data in the FEM

The guidance provided in the Technical Guidance section of Question 1 for non-hazardous wastes should be applied to hazardous waste tracking and reporting.

Estimating Waste Quantity Data

In most cases, local laws require the detailed tracking and reporting of hazardous waste quantities, however in some cases, calculating annual waste quantities may require estimation. Any estimation methodology used should include documented and verifiable processes that includes details on the following:

- The calculation methodology and any data or assumptions used.
- Any production volume or facility operating data used in the calculations.
- Description of any updates or changes to the calculation methodology

Note: If an estimation technique is used, the methodology should be applied consistently and based on reasonable estimation factors that are derived from relevant data (e.g., actual weights of a representative sample of the waste).

An example of how waste quantity data can be estimated is provided below:

- A facility disposes of empty chemical drums or full drums (containing liquid hazardous waste) Weighing every drum may not be possible. Therefore, the average weight of an empty or full drum can be determined by weighing a representative sample of drums and then multiplying this average weight by the number of drum disposed each week or month as shown below:
    - Average weight of a drum = 20kg (based on representative weights of drums from different days, months, production scenarios, etc.)
    - Number of drums disposed of in 1 month = 10
    - Total waste for this source in 1 month = 200kg (20kg x 10 drums)

- Similarity, the same methodology above could be used to estimate other hazardous waste quantities such as printing screens or fluorescent light bulbs.

Selecting Waste Disposal Method

The table provided in the Introduction section provides a description of the waste disposal method options that can be selected in the FEM.

How This Will Be Verified:

When verifying a facility's waste data, Verifiers **must** review all aspects of the facility's waste tracking program including:

- The data collection processes and data sources (e.g., weighing records, manifest/invoices/receipts, etc.)
- The process and tools used to aggregate the data (e.g., spreadsheet calculations, unit conversions, etc.)

If any inconsistencies or errors are noted, the reported information must be corrected, where possible, and detailed comments should be included in the Verification Data field.

Full Points:

Facilities will receive full points for completely tracking **all** hazardous waste streams generated at the facility including the quantity and the disposal method of each waste stream, and the waste is being transported and disposed of by licensed vendors.

Documentation Required:

- List of all hazardous waste produced by the facility, including but not limited to:
  - Production Waste
  - Facility Operations waste
- Documentation that supports the reported waste quantity and final disposal destination which may include:
  - Tracking records for all hazardous waste quantities (e.g., hazardous waste manifests, invoices from waste contractors, weighing records, etc.).
  - Permits for hazardous waste handling if applicable.
  - Contracts or agreements with waste disposal carriers or facilities that indicate how waste is treated.
  - Scale calibration records if applicable (e.g., as per manufacturer's specifications)
  - Documented estimation methodologies if applicable.

Interview Questions to Ask:

- Staff responsible for managing hazardous wastes are able to explain the information in the waste inventory, how waste sources are identified, and waste quantities are tracked.
- Key staff should understand:
  - The procedures in place for tracking hazardous waste, including tracking the waste collection process, quantity measurement and type of disposal.
  - How data quality of the waste data tracking program is maintained.
  - Any estimation methodologies used to calculate annual waste quantities.

Inspection - Things to Physically Look For:

- All hazardous waste streams observed are properly identified and tracked.
- Appropriate equipment for waste quantity measurement if applicable.
- Collection site(s) for waste disposal.

Partial Points:

- Partial Points will be awarded if at least one (1) hazardous waste source is tracked in full (e.g., quantity is accurately measured, and final disposal method is known) and there is evidence to support these responses.

9. Does your facility both segregate waste (hazardous and non-hazardous) and store these wastes separately?

Answer Yes if: Your facility segregates hazardous and non-hazardous wastes for appropriate management and disposal.

Suggested Uploads:

- Photos of segregated storage areas

- Photos of segregated waste streams at waste collection points

What is the intent of the question?
The intent is for facilities to segregate hazardous and non-hazardous waste for appropriate management and disposal.

Technical Guidance:
The segregation of waste streams is important because different wastes (e.g., hazardous and non-hazardous wastes) often require different storage, handling and disposal methods. Segregating hazardous and non-hazardous waste can also:

- Prevent unwanted reactions between incompatible waste streams.
- Reduce pollution, harm to environment, and waste disposal costs (e.g., mixing wastes can increase the volume of waste classified as hazardous which costs more to dispose of).
- Reduce exposure risk for employees.

Additionally, facilities should:

- Have established procedures for the management of hazardous and non-hazardous waste including collection, segregation, handling, and storage of wastes .
- Provide sufficient working instructions and training to employees that handle wastes (e.g., formal training, awareness campaigns).
- Provide clear and consistent signage in the workplace directing employees where and how to segregate and dispose of each waste type (e.g., waste container labelling, posters, etc.)

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that supports the facility's waste segregation program for hazardous and non-hazardous wastes. This may include:
    - Work instructions or operating procedures for the segregation of waste streams.
    - Training materials and records of waste management, handling and disposal training.
    - Awareness campaign documentation (e.g., posters, signage for segregating waste)

Interview Questions to Ask:

- Staff responsible for waste management and the handling, disposal and storage of wastes understand and are knowledgeable on the facilities waste segregation procedures.

Inspection - Things to Physically Look For:

- On-site observations demonstrate that the facility is appropriately segregating wastes.

- Waste collection, storage and disposal areas have appropriate signage and waste disposal instructions (e.g., labelling, posters).

Partial Points: N/A

10. Does your facility have well-marked, designated hazardous waste storage areas and proper containers for all hazardous waste?

Answer Yes if: Your facility has designated hazardous waste storage areas and hazardous wastes are stored in appropriate containers.

If you answer Yes to this question, you will be asked a set of sub questions to indicate which of the following practices your facility has in place for hazardous waste storage areas and containers:

Hazardous waste storage areas:

- The hazardous waste storage area is ventilated, dry and protected from the weather and fire risk.
- The hazardous waste storage area is protected from unauthorized employees Eating, smoking and drinking are not permitted in these areas.
- The hazardous waste storage area is clearly marked.
- Where liquid wastes are stored, the floor is solid and non-porous, containers have lids, there are no water drains that the liquid could spill into, and there is no evidence of spilled liquid.
- Flammable substances are kept away from sources of heat or ignition, including the use of grounding and explosion-proof lighting.
- Incompatible waste must be segregated.
- Spill response equipment including necessary personal protective equipment (PPE) must be located near storage areas including accessible emergency eyewash and/or shower stations.
- Employees must use appropriate personal protective equipment (PPE) when in these areas.
- Adequate aisle space must be maintained between containers.
- Instructions for safe handling of hazardous waste and other appropriate signage should be displayed.

Hazardous waste storage containers:

- Storage containers are in good condition, appropriate for their contents, closed and clearly labelled with their contents.
- Containers must have lids.
- Containers must be secured to prevent falling and safely stacked.

Suggested Upload:

- Photos of hazardous waste storage areas and containers

What is the intent of the question?
The intent of this question is to ensure that hazardous waste is stored in a way that is safe for employees, the environment, and the local community.

Technical Guidance:
The proper storage of hazardous wastes is important to prevent unintended contamination of other wastes, the surrounding environment and to reduce exposure risks to employees. Facilities should have dedicated storage areas for hazardous waste storage and implement appropriate controls practices based on the hazardous characteristics of the waste such as those listed in the sub questions.

Information on the hazardous characteristics of waste can sometimes be found in Safety Data Sheets (SDS) of the hazardous raw materials used in the processes that generate the waste. For example, if flammable cleaning solvents are used, any waste that is contaminated with these solvents will likely have the same hazardous characteristics as the solvent (i.e., the raw material used).

Facilities should refer to material SDS for important information on the storage and handling requirements and any chemical incompatibilities which can be found in Sections 8 and 10, respectively on a GHS compliant SDS. Other important information such as measures to take in the event of fire, accidental release/spill, or employee exposure can also be found on the materials SDS.

Hazardous waste storage areas should also be inspected regularly to ensure good storage and housekeeping practices are continuously implemented.

How This Will Be Verified:

Full Points:
Facilities will receive full points for having dedicated hazardous waste storage areas and implemented **all** the control measures listed in the sub question.

Documentation Required:
- Documentation to support the facilities procedures to ensure that hazardous wastes are stored appropriately. This may include:
    - Procedures or work instructions for hazardous waste storage areas
    - Safety Data Sheets, if relevant to the waste material(s).
    - Hazardous waste area inspection records

Interview Questions to Ask:

- Staff responsible for hazardous waste management handling and storage understand risks associated with the materials stored in the waste storage areas and how to properly store waste materials (which containers to use, chemical segregation, etc.)

Inspection - Things to Physically Look For:

- On-site observations indicate that wastes are being stored in designated areas with appropriate controls.

Partial Points:

- Partial Points will be awarded to facilities that have dedicated hazardous waste storage areas and have implemented some, but not all, the control measures listed in the sub questions.

11. Does your facility have well-marked, designated non-hazardous waste storage area(s) and containers?

Answer Yes if: Your facility has designated waste storage areas and wastes are stored in appropriate containers.

If you answer Yes to this question, you will be asked a set of sub questions to indicate which of the following practices your facility has in place for non-hazardous waste storage areas and containers:

Non-hazardous waste storage areas:

- The non-hazardous waste storage area is ventilated, dry and protected from the weather and fire risk, and must be stored on impervious surfaces.
- The non-hazardous waste storage area is clearly marked.
- Flammable substances are kept away from sources of heat or ignition, including the use of grounding and explosion-proof lighting.
- Waste must be segregated by type.
- Employees must use appropriate personal protective equipment (PPE) when in these areas.

Non-Hazardous waste storage containers:

- Storage containers are in good condition, appropriate for their contents, closed and clearly labelled with their contents.
- Containers must be secured to prevent falling and safely stacked.

Suggested Upload:

- Photos of non-hazardous waste storage areas and containers

What is the intent of the question?

The intent of this question is to ensure that non-hazardous waste is stored in a way that is safe for employees, the environment, and the local community.

Technical Guidance:
The proper storage of hazardous wastes is important to prevent unintended contamination of other wastes, the surrounding environment and to reduce exposure risks to employees as well as the risks of fires. Facilities should have dedicated storage areas for non-hazardous waste storage and implement appropriate control practices based on the characteristics of the waste such as those listed in the sub questions.

Non-hazardous waste storage areas should also be inspected regularly to ensure good storage and housekeeping practices are continuously implemented.

How This Will Be Verified:

Full Points:
Facilities will receive full points for having dedicated non-hazardous waste storage areas and implementing **all** the control measures listed in the sub question.

Documentation Required:

- Documentation to support the facilities procedures to ensure that non-hazardous wastes are stored appropriately. This may include:
    - Procedures or work instructions for non-hazardous waste storage areas
    - Non-hazardous waste area inspection records

Interview Questions to Ask:

- Staff responsible for non-hazardous waste management handling and storage understand risks associated with the materials stored in the waste storage areas and how to properly store waste materials (which containers to use, waste segregation, etc.)

Inspection - Things to Physically Look For:

- On-site observations indicate that wastes are being stored in designated areas with appropriate controls.

Partial Points:

- Partial Points will be awarded to facilities that have dedicated waste storage areas and have implemented some, but not all, the control measures listed in the sub questions.

12. Does your facility forbid all irresponsible waste disposal actions including open burning, open dumping, burying waste and intentional release into soil and/or water?

Answer Yes if: Your facility has policies and procedures in place to forbid all irresponsible waste disposal practices.

If you answer No to this question, you will be asked the following sub questions on your facility's waste disposal practices:

- Which of the following have your facility not yet forbidden? (Select all that apply)
  - Open burning
  - Open dumping
  - Burying waste
  - Intentional release into soil and/or water
- If open burning is not forbidden, please describe your current practice.
- If open dumping is not forbidden, please describe your current practice.
- If burying waste is not forbidden, please describe your current practice.
- If intentional release into soil and/or water is not forbidden, please describe your current practice.

Suggested Upload:

- Documented policies and procedures in place that forbid all irresponsible waste disposal practices at your facility.

What is the intent of the question?

The Intent of this question is to ensure that facilities have policies and procedures in place to forbid all irresponsible waste disposal practices.

Technical Guidance:

Unauthorized or Irresponsible waste disposal practices including on-site open burning, landfilling, burying of waste can contaminate the surrounding environment and pose significant environmental and human health risks.

Facilities should strictly prohibit these practices and have appropriate policies and procedures in place that are communicated to all staff.

If waste disposal activities occur on-site, facilities must have the required approvals and permits in accordance with local law (e.g., for incineration of textile wastes).

How This Will Be Verified:

Full Points:

Documentation Required:

- Documented policies and procedures that demonstrate the facility has prohibited all forms of irresponsible waste disposal.
- Supporting evidence that policies and procedures have been communicated to all relevant staff (e.g., training records)
- If waste is disposed of onsite, all required legal permits and approvals.

Interview Questions to Ask:

- Staff responsible for waste management and handling understand the facility's policies and procedures for responsible waste disposal which practices are prohibited.

Inspection - Things to Physically Look For:

- On-site observations confirm that there are no irresponsible waste disposal practices (e.g. burying, open burning, or dumping) at the facility ground or into the surrounding environment.

Partial Points: N/A

13. Does your facility provide awareness training to employees regarding segregation of waste?

Answer Yes if: Your facility provides awareness training to **all** employees on waste segregation.

Answer Parital Yes if: Your facility provides awareness training to employees on waste segregation and this training has been provided to 50% or more, but not all employees.

Suggested Upload:

- Records of waste segregation training.
- Copies of waste segregation training material used.
- Employee training plans or procedures that demonstrate waste segregation training is provided to all employees.

What is the intent of the question?
The intent of this question is to ensure training is provided to employees on proper waste segregation practices at the facility.

Technical Guidance:
Separating wastes into different waste streams (i.e., waste segregation) allows facilities to understand and quantify the amount of each waste type that facilities produce. This also helps identify opportunities to reduce waste and increase recycling rates which can lower waste disposal costs.

To ensure that wastes are effectively segregated it is important that all employees are trained and understand how to properly separate wastes in the workplace. In addition to providing training, it is equally as important to have the proper waste disposal facilities in place such as colour-coding of bins and having clear and consistent signage throughout the facility to make it easy for staff to dispose of waste appropriately.

How This Will Be Verified:

Full Points:
Full Points will be awarded to facilities that provide awareness training to **all** employees on waste segregation.

Documentation Required:

- Documentation that demonstrates that employees are trained on waste segregation at the facility. This may include:
    - Records of waste segregation training
    - Copies of waste segregation training material used.
    - Employee training plans or procedures that demonstrate waste segregation training is provided to employees.

Interview Questions to Ask:

- Staff responsible for waste management and handling can explain the facility's waste segregation program and how employees are trained.
- Employees throughout the facility understand the facility's waste segregation program and have received training.

Inspection - Things to Physically Look For:

- On-site observations indicate that wastes are being separated in accordance with the facility's waste segregation program.

Partial Points:

- Partial points will be awarded to facilities that provide awareness training to 50% or more, but not all employees on waste segregation

14. Does your facility provide training to all employees whose work involves hazardous waste handling (such as maintenance and custodial staff) within the facility?

Answer Yes if: Your facility provides training to all employees who handle hazardous waste **and** the training covers proper handling, storage and disposal, waste minimization, and the use of personal protective equipment (PPE).

Answer Partial Yes if: Your facility provides training to all employees who handle hazardous waste, but the training does not cover all of the topics listed above.

If you answer Yes or Partial Yes to this question, you will be asked the following sub questions on your training program:

- Select all topics included in your training:
    - Proper handling
    - Storage and disposal techniques and procedures
    - Specific operational procedures for waste minimization
    - Use of personal protective equipment
    - Other
- How many employees were trained?
- How frequently do you train your employees?
- Do you evaluate your employees after the training?
- How do you evaluate the knowledge of your employees after the training?
- Please upload documentation.

Suggested Upload:

- Records of hazardous waste training.
- Copies of training material used.
- Employee training plans or procedures that demonstrate hazardous training is provided to all employees who handle hazardous wastes.

What is the intent of the question?

The intent of this question is to ensure facilities have procedures in place to train all employees who handle hazardous waste on practices to minimize environmental and health risks associated with hazardous waste.

Technical Guidance:

Hazardous waste can pose significant risks to the environment and human health. Employees who handle hazardous wastes on-site should understand these risks and know how to effectively minimize, handle, and dispose of hazardous wastes. Employees should also understand how to properly protect themselves when there is risk of exposure (e.g., through the use of appropriate PPE).

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that demonstrates that all employees who handle hazardous waste are trained on proper handling, storage and disposal, waste minimization, and the use of personal protective equipment (PPE). This may include:
    - Records of hazardous waste training.
    - Copies of training material used.

- Employee training plans or procedures that demonstrate hazardous training is provided to **all** employees who handle hazardous wastes.
- List of PPE required for handling of hazardous wastes generated at the facility.

Interview Questions to Ask:

- Staff responsible for hazardous waste management can explain the facility's hazardous waste handling procedures and how all relevant employees are trained.
- Relevant employees understand the facility's hazardous waste handling procedures and have received training.

Inspection - Things to Physically Look For:

- On-site observations indicate that hazardous wastes are being handled in accordance with the facility's hazardous waste handling procedures.
- Appropriate PPE is available and being used by employees.

Partial Points:

- Partial Points will be awarded to facilities that provide training to all employees who handle hazardous waste, but the training does not cover all of the topics listed above.

Waste - Level 2

15. Has your facility set baselines for non-hazardous waste?

Answer Yes if: Your Facility has set a baseline for one (1) or more of your non-hazardous waste streams.

If you answer Yes to this question, you will be asked to complete a series of tables to provide details on your non-hazardous waste baselines for each applicable waste stream (All applicable waste streams selected in the applicability questions will be pre-populated in the table):

- Complete the following questions to provide details on your non-hazardous waste baseline during this reporting year.
  - Have you set a baseline for this non-hazardous waste stream?
  - Is this a normalized or absolute baseline?

For all wastes streams that have baselines, you will be asked to complete a table with the following questions based on whether the baseline is absolute or normalized:

Absolute Baselines	Normalized Baselines
What is the baseline quantity for this non-hazardous waste stream?	What is the baseline quantity for this non-hazardous waste stream?
Unit of Measure	Unit of Measure
Enter baseline year.	What is your normalized baseline based on?

How was your baseline calculated?	Enter baseline year.
Was the baseline verified?	How was your baseline calculated?
Provide any additional comments	Was the baseline verified?
	Provide any additional comments

Note: From FEM2024 onwards, in the above table, baseline data can be auto populated or manually entered in the following ways:

- New FEM Users: Required to manually input baseline.
- Existing FEM Users without a baseline: Facility can choose to:
    - Enter the baseline manually OR
    - Have the FEM auto populate a baseline based on the data from the previous year's FEM.
- Existing FEM Users with an existing baseline: Baseline will auto populate based on the data from the previous year's FEM.

Suggested Uploads:

- Documentation that supports how the baseline was established for each waste stream (e.g., waste quantity tracking and production data from the baseline year, supporting calculations or assumptions used to determine the baseline).

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have established baselines for non-hazardous wastes generated at the facility so that future reduction efforts can be quantified.

Technical Guidance:

A "baseline" is a starting point or benchmark that a facility can use to compare changes over time and quantify any reduction efforts.

Baselines can be absolute or normalized. For example:

- **Absolute**: The total amount of waste produced over a period of time (for example, 1,500 tons per year)
- **Normalized:** The amount of waste produced while making a unit of product (for example, 0.15 kg per pair of shoes produced or the amount of food waste per worker).

Note: It is recommended to use the 'Normalized' method to account for operational fluctuations. Normalized baselines provide more accurate and useful comparisons over time.

When establishing a baseline, be sure to do the following:

- Confirm the waste source data is stable, and sufficient to be used to determine a baseline. In the Higg FEM, a baseline should generally comprise of a full calendar year's data.
    - **Note:** If your factory has undergone major structural or operational changes such as acquisitions, new buildings or production areas, or significant changes in production, equipment or materials used, the baseline should be reviewed and revised, if needed, after the changes have been completed.
- Determine if the baseline is Absolute or Normalized (normalized baselines are preferred).
- Verify the source data and normalizing metric data is accurate.
    - Waste quantities and production volume data from previous Higg FEM verifications, internal or external audits conducted by qualified personnel are acceptable sources of data verification.
- Apply the appropriate baseline metric (i.e., per year for absolute OR divide by the chosen normalizing metric 1,500,000 kg per 1,000,000 pieces = 1.5kg/piece)
    - **Note:** For waste sources that is not related to production, other normalizing metrics should be used where appropriate (e.g., food or other domestic wastes can be normalized per meal served or per worker)
    - **Hardgoods guidance:** For hardgoods production, normalizing metrics per product piece, or per kg of product may be relevant.

Note: If the baseline is used to evaluate performance against a target, the baseline should remain unchanged.

Reporting baseline data in the Higg FEM:

Do:

- ✓ Review source data and raw normalizing metric data (manifests/invoices, weighing records, production quantity, etc.) against aggregated totals to ensure they are accurate.
- ✓ Select the appropriate baseline type in the FEM - Absolute or Normalized.
- ✓ Ensure the proper units are reported and verify any unit conversions from source data to reported data (e.g., converting kg to tons).
- ✓ Enter the baseline year. This is the year the baseline data represents.
- ✓ Provide sufficient details on how the baseline was calculated (e.g., waste quantity is normalized per meter of fabric produced or per kg of product).
- ✓ Only select 'Yes' to the question "Was the baseline verified?" if the baseline data was fully verified in a previous Higg FEM verification or by an internal or external audit conducted by qualified personnel.

Do Not:

- X Report inaccurate data (including if the data has not been verified).
- X Report a baseline that is based on insufficient data (e.g., not a full year's data).
- X Report an estimated baseline if it is not supported by verifiable and accurate estimation methodology and data.

How This Will Be Verified:

When verifying a facility's baselines, Verifiers must review:

- Source data (e.g., manifests, invoices, weighing records, production quantities, etc.) and aggregated data totals for the baseline year.
- Records of baseline data verification where available (e.g., previous Higg Verification, data quality review, internal or external audits, etc.)

If any inconsistencies or errors are noted, the reported information must be corrected, where possible, and detailed comments should be included in the Verification Data field.

Full Points:
Full Points will be awarded if the facility has established baselines for all non-hazardous waste streams.

Documentation Required:

- Documentation that supports how the baseline was established for each waste stream. This may include:
    - Waste quantity tracking and production data from the baseline year
    - Supporting calculations methodologies or assumptions used to determine the baseline.
- Supporting evidence to demonstrate how baseline data was validated (e.g., verified Higg FEM data for the baseline year, external or internal data validation process or report).

Interview Questions to Ask:

- Staff responsible for waste management are able to describe how the baselines were determined including any normalizing metrics used or any assumption made in the calculation methodology.
- Relevant staff are able to describe the facility's process to validate the accuracy of baseline data.

Inspection – Things to Physically Look For:

- The observed waste management practices on-site are consistent with the facility's reported methods for determining baselines (e.g., weighing of wastes if applicable, waste segregation, etc.)
- Observations on-site do not indicate that there have been significant changes at the facility that could impact the appropriateness of the baseline (e.g., new production areas, changes to products, new buildings, etc.)

Partial Points:

- Partial points will be awarded if the facility has established baselines for one (1) or more non-hazardous waste stream.

16. Has your facility set baselines for hazardous waste?

Answer Yes if: Your Facility has set a baseline for one (1) or more of your hazardous waste streams.

If you answer Yes to this question, you will be asked to complete a series of tables to provide details on your hazardous waste baselines for each applicable waste stream (All applicable waste streams selected in the applicability questions will be pre-populated in the table):

- Complete the following questions to provide details on your hazardous waste baseline during this reporting year.
    - Have you set a baseline for this hazardous waste stream?
    - Is this a normalized or absolute baseline?

For all wastes streams that have baselines, you will be asked to complete a table with the following questions based on whether the baseline is absolute or normalized:

Absolute Baselines	**Normalized Baselines**
What is the baseline quantity for this hazardous waste stream?	What is the baseline quantity for this hazardous waste stream?
Unit of Measure	Unit of Measure
Enter baseline year.	What is your normalized baseline based on?
How was your baseline calculated?	Enter baseline year.
Was the baseline verified?	How was your baseline calculated?
Provide any additional comments	Was the baseline verified?
	Provide any additional comments

Note: From FEM2024 onwards, in the above table, baseline data can be auto populated or manually entered in the following ways:

- New FEM Users: Required to manually input baseline.
- Existing FEM Users without a baseline: Facility can choose to:
    - Enter the baseline manually OR
    - Have the FEM auto populate a baseline based on the data from the previous year's FEM.
- Existing FEM Users with an existing baseline: Baseline will auto populate based on the data from the previous year's FEM.

Suggested Uploads:

- Documentation that supports how the baseline was established for each waste stream (e.g., waste quantity tracking and production data from the baseline year, supporting calculations or assumptions used to determine the baseline).

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have established baselines for hazardous wastes generated at the facility so that future reduction efforts can be quantified.

Technical Guidance:

A "baseline" is a starting point or benchmark that a facility can use to compare changes over time and quantify any reduction efforts.

Baselines can be absolute or normalized. For example:

- **Absolute**: The total amount of waste produced over a period of time (for example, 1,500 tons per year)
- **Normalized:** The amount of waste produced while making a unit of product (for example, 0.15 kg per pair of shoes produced).

Note: It is recommended to use the 'Normalized' method to account for operational fluctuations. Normalized baselines provide more accurate and useful comparisons over time.

When establishing a baseline, be sure to do the following:

- Confirm the waste source data is stable, and sufficient to be used to determine a baseline. In the Higg FEM, a baseline should generally comprise of a full calendar year's data.
    - **Note:** If your factory has undergone major structural or operational changes such as acquisitions, new buildings or production areas, or significant changes in production, equipment or materials used, the baseline should be reviewed and revised, if needed, after the changes have been completed.
- Determine if the baseline is Absolute or Normalized (normalized baselines are preferred).
- Verify the source data and normalizing metric data is accurate.
    - Waste quantities and production volume data from previous Higg FEM verifications, internal or external audits conducted by qualified personnel are acceptable sources of data verification.
- Apply the appropriate baseline metric (i.e., per year for absolute OR divide by the chosen normalizing metric 1,500,000 kg per 1,000,000 pieces = 1.5kg/piece)
    - **Note:** For waste sources that are not related to production, other normalizing metrics should be used where appropriate.

Note: If the baseline is used to evaluate performance against a target, the baseline should remain unchanged.

Reporting baseline data in the Higg FEM:

Do:

✓ Review source data and raw normalizing metric data (manifests/invoices, weighing records, production quantity, etc.) against aggregated totals to ensure they are accurate.

- ✓ Select the appropriate baseline type in the FEM - Absolute or Normalized.
- ✓ Ensure the proper units are reported and verify any unit conversions from source data to reported data (e.g., converting kg to tons).
- ✓ Enter the baseline year. This is the year the baseline data represents.
- ✓ Provide sufficient details on how the baseline was calculated (e.g., waste quantity is normalized per meter of fabric produced or per kg of product).
- ✓ Only select 'Yes' to the question "Was the baseline verified?" if the baseline data was fully verified in a previous Higg FEM verification or by an internal or external audit conducted by qualified personnel.

Do Not:

- X Report inaccurate data (including if the data has not been verified).
- X Report a baseline that is based on insufficient data (e.g., not a full year's data).
- X Report an estimated baseline if it is not supported by verifiable and accurate estimation methodology and data.

How This Will Be Verified:

When verifying a facility's baselines, Verifiers must review:

- Source data (e.g., manifests, invoices, weighing records, production quantities, etc.) and aggregated data totals for the baseline year.
- Records of baseline data verification where available (e.g., previous Higg Verification, data quality review, internal or external audits, etc.)

If any inconsistencies or errors are noted, the reported information must be corrected, where possible, and detailed comments should be included in the Verification Data field.

Full Points:
Full Points will be awarded if the facility has established baselines for all hazardous waste streams.

Documentation Required:

- Documentation that supports how the baseline was established for each waste stream. This may include:
  - Waste quantity tracking and production data from the baseline year.
  - Supporting calculations methodologies or assumptions used to determine the baseline.
- Supporting evidence to demonstrate how baseline data was validated (e.g., verified Higg FEM data for the baseline year, external or internal data validation process or report).

Interview Questions to Ask:

- Staff responsible for waste management are able to describe how the baselines were determined including any normalizing metrics used or any assumption made in the calculation methodology.
- Relevant staff are able to describe the facility's process to validate the accuracy of baseline data.

Inspection – Things to Physically Look For:

- The observed waste management practices on-site are consistent with the facility's reported methods for determining baselines (e.g., weighing of wastes if applicable, waste segregation, etc.)
- Observations on-site do not indicate that there have been significant changes at the facility that could impact the appropriateness of the baseline (e.g., new production areas, changes to products, new buildings, etc.)

Partial Points:

- Partial points will be awarded if the facility has established baselines for one (1) or more hazardous waste stream.

17. Which waste disposal methods are used for your facility's wastes (Select all that apply)?

For this question you will be required to select all of the waste disposal methods that are used for your facility's waste.

Notes:

- The listed methods refer to the final disposal/treatment method.
- For a description of the waste disposal methods refer to the in the Introduction section which provides a description of each method.

- **Preferred Options**
  - Material Recovery - Reuse
  - Material Recovery - Recycle (including Upcycle)
  - Material Recovery - Downcycle
- **Less Preferred Options**
  - Energy Recovery - Incineration with energy recovery for Non-Recyclables only
  - Energy Recovery - Residual Management (e.g., Physical / Chemical / Biological Treatment)
  - Non-valorized disposal - Onsite incineration without energy recovery for Non-Recyclables
  - Non-valorized disposal - Offsite incineration without energy recovery for Non-Recyclables
  - Non-valorized disposal - Other Treatment

- Non-valorized disposal - Responsibly Managed Landfills (for waste that cannot be managed in any of the options under Preferred options or Less Preferred Options)

- **Least Preferred Options**
  - Energy Recovery (e.g., Incineration with energy recovery for Recyclables)
    - **Note:** Recycling infrastructure and capabilities may differ among regions and countries.
  - Landfill/Dumping with No Control Measures
  - Onsite Incineration without energy recovery for Recyclables
  - Offsite incineration without energy recovery for Recyclables
  - Other

What is the intent of the question?
The intent is to ensure facilities understand how their wastes are being disposed of or treated, and to encourage the selection of preferred options to treat wastes.

Technical Guidance:

The method used to dispose of or treat wastes can have varying impacts on the environment. Facilities should evaluate available options with waste service providers and strive to utilize options that result in the least amount of environmental impacts as possible.

How This Will Be Verified:

This question is unscored.

Documentation Required:
- Documentation that demonstrates how the facility's wastes are being disposed of or treated. This may include:
  - Contracts or agreements with waste service providers that indicate the final disposal methods of wastes.
  - Permits or approvals from local government authorities for onsite waste disposal or treatment, if applicable.
  - Inspection reports of offsite waste disposal or treatment facilities

Interview Questions to Ask:
- Staff responsible for waste management are able to describe how they have verified the final disposal methods of all facility wastes.

Inspection – Things to Physically Look For:
- Observations on-site are consistent with the facility's reported disposal methods for any onsite disposal/treatment.

18. Did you set a baseline for waste disposal methods for your facility's overall waste?

Answer Yes if: Your Facility has set a baseline for one (1) or more of your waste disposal methods.

If you answer Yes to this question, you will be asked to complete a table with the following questions to provide details on your waste disposal method baselines for each applicable method:

- Have you set a baseline for this method?
- What is the baseline quantity?
- Unit of Measure.
- Enter baseline year.
- How was your baseline calculated?
- Was the baseline verified?
- Provide any additional comments.

Note: From FEM2024 onwards, in the above table, baseline data can be auto populated or manually entered in the following ways:

- New FEM Users: Required to manually input baseline.
- Existing FEM Users without a baseline: Facility can choose to:
    - Enter the baseline manually OR
    - Have the FEM auto populate a baseline based on the data from the previous year's FEM.
- Existing FEM Users with an existing baseline: Baseline will auto populate based on the data from the previous year's FEM.

Suggested Uploads:

- Documentation that supports how the baseline was established for each waste disposal method (e.g., waste disposal and quantity tracking data from the baseline year, supporting calculations or assumptions used to determine the baseline).

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have established baselines for waste disposal methods for facility wastes so that future improvement efforts can be quantified.

Technical Guidance:

A "baseline" is a starting point or benchmark that a facility can use to compare changes over time and quantify any improvement efforts. Waste disposal method baselines are different from the waste source baselines. Disposal methods baselines focus on the percentage of total facility

wastes being disposed of by a specific method (e.g., 60% of all waste generated at the facility is disposed of by landfill with significant controls or 40% sent for recycling).

When establishing a baseline, be sure to do the following:

- Confirm the waste disposal method data is stable, and sufficient to be used to determine a baseline. In the Higg FEM, a baseline should generally comprise of a full calendar year's data.
    - **Note:** If your factory has undergone major structural or operational changes such as acquisitions, new buildings or production areas, or significant changes in production, equipment or materials used, the baseline should be reviewed and revised, if needed, after the changes have been completed.
- Calculate the total amount of waste generated at the facility (from all sources) including hazardous and non-hazardous sources.
- Calculate the total amount of wastes being disposed of using a particular disposal method (e.g., landfill, recycling, incineration)
- Divide the total amount of waste disposed of using the same method by the total amount of waste generated. For example:
    - Total waste generated from all sources: 460,555 kg per year.
    - Baseline quantity of waste recycled: 255,000kg/year.
    - Baseline percentage of recycled waste: 55.3% (255,000kg/460,555kg)
- Verify the baseline data accuracy.
    - Waste disposal method data from previous Higg FEM verifications, internal or external audits conducted by qualified personnel are acceptable sources of data verification.

Note: If the baseline is used to evaluate performance against a target, the baseline should remain unchanged.

Reporting baseline data in the Higg FEM:

Do:

- ✓ Review source data (manifests/invoices, weighing or disposal records, etc.) against aggregated totals to ensure they are accurate.
- ✓ Ensure the proper units are reported and verify any unit conversions from source data to reported data (e.g., converting kg to tons).
- ✓ Enter the baseline year. This is the year the baseline data represents.
- ✓ Provide sufficient details on how the baseline was calculated.
- ✓ Only select 'Yes' to the question "Was the baseline verified?" if the baseline data was fully verified in a previous Higg FEM verification or by an internal or external audit conducted by qualified personnel.

Do Not:

X Report inaccurate data (including if the data has not been verified).
X Report a baseline that is based on insufficient data (e.g., not a full year's data).
X Report an estimated baseline if it is not supported by verifiable and accurate estimation methodology and data.

How This Will Be Verified:

When verifying a facility's baselines, Verifiers must review:

- Source data (e.g., manifests, invoices, weighing or disposal records, etc.) and aggregated data totals for the baseline year.
- Records of baseline data verification where available (e.g., previous Higg Verification, data quality review, internal or external audits, etc.)

If any inconsistencies or errors are noted, the reported information must be corrected, where possible, and detailed comments should be included in the Verification Data field.

Full Points:
Full Points will be awarded if the facility has established baselines for one (1) or more waste disposal methods.

Documentation Required:
- Documentation that supports how the baseline was established for each waste disposal method. This may include:
    - Waste quantity tracking and total quantities of waste for each disposal method from the baseline year.
    - Supporting calculations methodologies or assumptions used to determine the baseline.
- Supporting evidence to demonstrate how baseline data was validated (e.g., verified Higg FEM data for the baseline year, external or internal data validation process or report).

Interview Questions to Ask:
- Staff responsible for waste management are able to describe how the baselines were determined including any assumption made in the calculation methodology.
- Relevant staff are able to describe the facility's process to validate the accuracy of baseline data.

Inspection – Things to Physically Look For:
- The observed waste management practices on-site are consistent with the facility's reported methods for determining baselines (e.g., weighing of wastes if applicable, waste segregation, etc.)
- Observations on-site do not indicate that there have been significant changes at the facility that could impact the appropriateness of the baseline (e.g., new production areas, changes to products, new buildings, etc.)

Partial Points: N/A

19. Does your facility set formal targets to reduce non-hazardous waste generation?

Answer Yes if: Your Facility has set a target to reduce waste generation for one (1) or more of your non-hazardous waste streams.

Note: If your facility has not conducted a formal evaluation of waste reduction opportunities and calculated how much waste can be reduced to support your target, you should select No for this question.

If you answer Yes to this question, you will be asked to complete a series of tables with the following questions to provide details on your non-hazardous waste targets for each applicable waste stream:

- Does your facility set formal targets to reduce non-hazardous waste generation?
    - Have you set a target for this non-hazardous waste?
    - Is this a normalized or absolute target?

For all wastes streams that have targets, you will be asked to complete a table with the following questions based on whether the target is absolute or normalized:

Absolute Targets	Normalized Targets
What is your target for change (in %) in reducing generation from this waste stream? (Enter negative for reduction target)	What is your target for change (in %) in reducing generation from this waste stream? (Enter negative for reduction target)
Enter the target year	What is your normalized target based on?
Describe the measures planned to achieve this target	Enter the target year
	Describe the measures planned to achieve this target

Suggested Uploads:

- Documentation that supports how the target was established and demonstrates the target is based on a formal evaluation of improvement opportunities (e.g., calculations, waste quantity data and baselines, new/proposed equipment specifications or work practices, etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have established formal targets to reduce non-hazardous wastes generated at the facility.

Technical Guidance:
Targets can use absolute or normalized metrics to drive quantifiable improvements by a set date compared to the baseline. For Higg FEM, reduction targets may be normalized to the production volume unit or another appropriate operational metric. A normalized target shows you when progress is real, rather than being a result of business changes such as reductions in production. An example of a normalized target is kilograms (kg) of a waste generated for the production of one unit of sellable product (kg/unit).

When establishing formal improvement targets, be sure to do the following:

- Base the target on a formal evaluation of improvement opportunities and actions (e.g., change of raw materials/packaging, process modifications or equipment replacement) to calculate the amount of waste that can be reduced.
    - For example: Setting a target based on an evaluation of the purchase of laser cutting machines that is expected to reduce fabric or metal waste by 15% per meter of fabric or metal that was calculated based on a formal review of equipment specifications and planned operations.
- Define the exact target quantity, expressed as a percent (e.g., reduce normalized fabric waste per piece by 5%). This **must** be based on a formal evaluation as noted above.
- Determine if the target will be Absolute or Normalized to a production or operating metric.
- Define the start date (i.e., "baseline") of the target.
- Define the end date of the target, meaning the intended completion date of the required improvements.
- Define the appropriate measurement units.
- Establish procedures to review the target. This review should include an evaluation of the actions taken and progress on reaching the defined target. Quarterly reviews are recommended.
- Ensure the target is relevant to reducing the site's waste (e.g., focuses on the most significant waste sources at the site)

Reporting Targets in the Higg FEM:

Do:

- ✓ Review the target to ensure all aspects noted above are covered and that the information is accurate.
- ✓ Enter the targeted reduction as a percentage. **Make sure to enter a negative percentage for a reduction target (e.g., -5 for a 5% reduction)**
- ✓ Provide sufficient details on how the target will be met in the "Describe the measures planned to achieve this target:" field (e.g., Achieve a 3% reduction in normalized cardboard waste generated by switching to reusable cartons for raw material deliveries).

Do Not:

X Report a target that is not accurate (e.g., the data source is unknown or has not been verified)
X Report a target that is based on insufficient data. (e.g., a reduction target that is not based on a formal evaluation of options such as process/equipment modifications or change of materials used to meet the stated target OR actions to meet the target have not been defined.)
X Report an estimated target if it is not supported by verifiable and accurate estimation methodology and data (e.g., engineering calculations).

How This Will Be Verified:

When verifying a facility's targets, Verifiers **must** review:

- All supporting evidence (e.g., calculations, waste quantity data and baselines, new/proposed equipment specifications, etc) to verify target is based on a formal evaluation of improvement opportunities.
- Facility operations in relation to its waste sources to ensure targets and opportunities evaluated are relevant to the site's wastes.

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points:
Full Points will be awarded if the facility has established targets for all waste streams and the targets cover greater than 90% (by total waste volume) of all non-hazardous wastes generated at the facility.

Documentation Required:
- Documentation that supports how the target was established for each waste stream and is based on a formal evaluation of reduction opportunities. This may include:
    - Waste quantity tracking and production data.
    - Documented evaluations of new/proposed equipment specifications, modifications to production processes or work practices that will result in waste reduction.
    - Supporting calculations methodologies or assumptions used to determine the target.

Interview Questions to Ask:
- Staff responsible for waste management are able to describe how the targets were determined including any calculations or assumptions made in the target setting methodology.
- Relevant staff are able to describe the facility's proposed actions to achieve the target and how progress is monitored and tracked.

Inspection – Things to Physically Look For:

- The observed waste management practices on-site are appropriate in relation to the established targets (e.g., tracking of waste quantity if applicable, waste segregation, etc.)

Partial Points:

- Partial points will be awarded if the facility has established targets for one (1) or more waste streams and the targets cover 50% to 89% (by total waste volume) of all non-hazardous wastes generated at the facility.

20. Does your facility set formal targets to reduce hazardous waste generation?

Answer Yes if: Your Facility has set a target to reduce hazardous waste generation for one (1) or more of your hazardous waste streams.

Note: If your facility has not conducted a formal evaluation of waste reduction opportunities and calculated how much waste can be reduced to support your target, you should select No for this question.

If you answer Yes to this question, you will be asked to complete a series of tables with the following questions to provide details on your hazardous waste targets for each applicable waste stream:

- Does your facility set formal targets to reduce hazardous waste generation?
    - Have you set a target for this hazardous waste?
    - Is this a normalized or absolute target?

For all wastes streams that have targets, you will be asked to complete a table with the following questions based on whether the target is absolute or normalized:

Absolute Targets	**Normalized Targets**
What is your target for change (in %) in reducing generation from this waste stream? (Enter negative for reduction target)	What is your target for change (in %) in reducing generation from this waste stream? (Enter negative for reduction target)
Enter the target year	What is your normalized target based on?
Describe the measures planned to achieve this target	Enter the target year
	Describe the measures planned to achieve this target

Suggested Uploads:

- Documentation that supports how the target was established and demonstrates the target is based on a formal evaluation of improvement opportunities (e.g., calculations, waste quantity data and baselines, new/proposed equipment specifications or work practices, etc.)

What is the intent of the question?
The intent of this question is for facilities to demonstrate that they have established formal targets to reduce hazardous wastes generated at the facility.

Technical Guidance:
Targets can use absolute or normalized metrics to drive quantifiable improvements by a set date compared to the baseline. For Higg FEM, reduction targets may be normalized to the production volume unit or another appropriate operational metric. A normalized target shows you when progress is real, rather than being a result of business changes such as reductions in production. An example of a normalized target is kilograms (kg) of a waste generated for the production of one unit of sellable product (kg/unit).

When establishing formal improvement targets, be sure to do the following:

- Base the target on a formal evaluation of improvement opportunities and actions (e.g., process modifications or equipment replacement) to calculate the amount of waste that can be reduced.
    - For example: Setting a target based on an evaluation of the purchase of automated printing machines that is expected to reduce chemical waste by 15% per unit of production that was calculated based on a formal review of equipment specifications and planned operations. OR
    - Setting a target based on an evaluation of the substitution with water-based solvents to reduce solvent usage and thereby hazardous waste generation by 10%; calculated based on a formal review of equipment specifications and planned operations.
- Define the exact target quantity, expressed as a percent (e.g., reduce normalized chemical waste per piece by 5%). This **must** be based on a formal evaluation as noted above.
- Determine if the target will be Absolute or Normalized to a production or operating metric.
- Define the start date (i.e., "baseline") of the target.
- Define the end date of the target, meaning the intended completion date of the required improvements.
- Define the appropriate measurement units.
- Establish procedures to review the target. This review should include an evaluation of the actions taken and progress on reaching the defined target. Quarterly reviews are recommended.
- Ensure the target is relevant to reducing the site's waste (e.g., focuses on the most significant waste sources at the site)

Reporting Targets in the Higg FEM:

Do:

- ✓ Review the target to ensure all aspects noted above are covered and that the information is accurate.
- ✓ Enter the targeted reduction as a percentage. **Make sure to enter a <u>negative percentage for a reduction target (e.g., -5 for a 5% reduction)</u>**
- ✓ Provide sufficient details on how the target will be met in the "Describe the measures planned to achieve this target:" field (e.g., Achieve a 10% reduction in normalized chemical waste generated by switching laser finishing for denim instead of potassium permanganate spray).

Do Not:

- X Report a target that is not accurate (e.g., the data source is unknown or has not been verified)
- X Report a target that is based on insufficient data. (e.g., a reduction target that is not based on a formal evaluation of options such as process/equipment modifications or change of materials used to meet the stated target OR actions to meet the target have not been defined.)
- X Report an estimated target if it is not supported by verifiable and accurate estimation methodology and data (e.g., engineering calculations).

How This Will Be Verified:

When verifying a facility's targets, Verifiers **<u>must</u>** review:

- All supporting evidence (e.g., calculations, waste quantity data and baselines, new/proposed equipment specifications, etc) to verify target is based on a formal evaluation of improvement opportunities.
- Facility operations in relation to its waste sources to ensure targets and opportunities evaluated are relevant to the site's wastes.

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points:
Full Points will be awarded if the facility has established targets that cover greater than 90% (by total waste volume) of all hazardous wastes generated at the facility.

Documentation Required:

- Documentation that supports how the target was established for each waste stream and is based on a formal evaluation of reduction opportunities. This may include:
    - Waste quantity tracking and production data.

- Documented evaluations of new/proposed equipment specifications, modifications to production processes or work practices that will result in waste reduction.
- Supporting calculations methodologies or assumptions used to determine the target.

Interview Questions to Ask:

- Staff responsible for waste management are able to describe how the targets were determined including any calculations or assumptions made in the target setting methodology.
- Relevant staff are able to describe the facility's proposed actions to achieve the target and how progress is monitored and tracked.

Inspection – Things to Physically Look For:

- The observed waste management practices on-site are appropriate in relation to the established targets (e.g., tracking of waste quantity if applicable, waste segregation, etc.)

Partial Points:

- Partial points will be awarded if the facility has established targets that cover 50% to 89% (by total waste volume) of all hazardous wastes generated at the facility.

21. Does your facility set a target for improving waste disposal methods for your facility's overall waste? For example, by switching from least preferred to less preferred or preferred options, or by switching from less preferred options to preferred options.

Answer Yes if: If your Facility has set a formal target to improve the waste disposal methods used by your facility.

Answer Not Applicable if: Your facility disposes of all wastes using the preferred methods of waste disposal. These are: reuse, recycle (including upcycle) or downcycle.

Note: If your facility has not conducted a formal evaluation of waste disposal improvement opportunities to support your target, you should select No for this question.

If you answer Yes to this question, you will be asked to complete a series of tables with the following questions to provide details on your waste disposal method targets:

- Have you set a target to switch from this waste disposal method?
- Which waste disposal method under Preferred or Less Preferred options your facility will switch to?
- What is your target for change (in %) in improving this disposal method? (Enter negative for reduction target ; Enter positive for increasing target)

- Enter the target year.
- Describe the measures planned to achieve this target:
- Provide any additional comments.

Suggested Uploads:

- Documentation that supports how the target was established and demonstrates the target is based on a formal evaluation of improvement opportunities (e.g., review of local waste disposal options, waste quantity data and baselines, etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have established formal targets to improve the waste disposal method for wastes generated at the facility.

Technical Guidance:

Minimizing the environmental impact of waste can be achieved by using a disposal method results in less environmental impact. Examples of improvements to disposal methods can include:

- Increasing the quantity of waste sent to external recycling contractors and biological treatment (e.g., non-hazardous production waste recycling and food waste biological treatment) to divert waste from landfill or incineration without energy recovery.
- Switching to a disposal/treatment method that recovers usable aspects of the waste (e.g., using incineration with energy recovery as opposed to landfilling)

Note: Improving waste disposal methods will often require collaboration with waste treatment vendors to evaluate which preferred disposal methods are available.

When evaluating opportunities to improve waste disposal or treatment methods the list of Preferred and Less Preferred methods listed in the Introduction section of this guidance can be referenced to evaluate which options are likely to reduce environmental impacts.

When establishing formal improvement targets, be sure to do the following:

- Base the target on a formal evaluation of improvement opportunities and actions (e.g., a review of the available disposal alternatives with waste treatment vendors) to calculate the amount and types of wastes that can be treated by the preferred method.
    - For example: Setting a target based on an evaluation of sending all fabric and plastic packaging to a recycling vendor as opposed to sending it to landfill is expected to result in a 25% increase in waste sent for recycling. OR
    - Setting a target to send metal sludge to recycling as opposed to landfill, resulting in a 10% increase in waste sent for recycling.
    - **Note**: It should be confirmed that the vendor is able to recycle the materials and has applicable technology and operating permits to do so.

- Define the exact target quantity, expressed as a percent (e.g., Increase waste treated by incineration with energy recovery by 15%). This must be based on a formal evaluation as noted above.
- Define the start date (i.e., "baseline") of the target.
- Define the end date of the target, meaning the intended completion date of the required improvements.
- Establish procedures to review the target. This review should include an evaluation of the actions taken and progress on reaching the defined target. Quarterly reviews are recommended.
- Ensure the target is relevant to improving the facility's waste disposal methods (e.g., new disposal methods result in less environmental impact)

Reporting Targets in the Higg FEM:

Do:

✓ Review the target to ensure all aspects noted above are covered and that the information is accurate.
✓ Enter the targeted reduction as a percentage. Make sure to enter a negative percentage for a reduction target (e.g. -5 for a 5% decrease in disposal method), and a positive percentage for an increased target (e.g. 5 for a 5% increase in disposal method)
✓ Provide sufficient details on how the target will be met in the "Describe the measures planned to achieve this target:" field (e.g. Achieve a 10% increase in waste being recycled by sending fabric scrap to a verified fibre recycling vendor).

Do Not:

X Report a target that is not accurate (e.g., the data source is unknown or has not been verified)
X Report a target that is based on insufficient data. (e.g., a reduction target that is not based on a formal evaluation of options such as new waste treatment vendors OR actions to meet the target have not been defined.)
X Report an estimated target if it is not supported by verifiable and accurate estimation methodology and data (e.g., engineering calculations).

How This Will Be Verified:

When verifying a facility's targets, Verifiers **must** review:

- All supporting evidence (e.g., calculations, waste quantity data and baselines, new/proposed waste treatment methods, etc) to verify the target is based on a formal evaluation of improvement opportunities.
- Facility operations in relation to its waste disposal to ensure targets and opportunities evaluated are relevant to the site's wastes.

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points:
Full Points will be awarded if the facility has established targets to improve one (1) or more of its waste disposal methods.

If the criteria for Not Applicable is met, meaning the facility disposes of all wastes using preferred disposal methods, full points will be awarded for this question.

Documentation Required:

- Documentation that supports how the target was established for each waste disposal method and is based on a formal evaluation of improvement opportunities. This may include:
    - Waste quantity tracking and production data.
    - Documented evaluations of new/proposed waste treatment methods (e.g. waste vendor capacity evaluations).
    - Supporting calculations methodologies or assumptions used to determine the target.

Interview Questions to Ask:

- Staff responsible for waste management are able to describe how the targets were determined including any calculations or assumptions made in the target setting methodology.
- Relevant staff are able to describe the facility's proposed actions to achieve the target and how progress is monitored and tracked.

Inspection – Things to Physically Look For:

- The observed waste management practices on-site are appropriate in relation to the established targets (e.g., tracking of waste quantity if applicable, waste segregation, etc.)

Partial Points: N/A

22. Which of the following are you doing to manage your waste? (Select All That Apply)

- Waste mapping – understanding waste flows from different processes. Includes: textile waste, sludge, emissions, discharge, etc.
- Waste segregation – segregate waste materials so they are clean/controlled. For textile waste: separate into different material types, such as cotton / nylon / polyester / specific blend/ specific metal types/sludge or blends.

- Waste training – training specific team members to correctly segregate (textile or any other material) waste so it remains clean and retains value for recycling.
- Waste storing – store waste materials separately
- Waste labelling/bagging – label/bag separate waste materials
- Waste tracking & digitized reporting – to offer information/insights to waste solution providers and traceability.
- Waste matching to solution providers for recycling/upcycling/downcycling/service providers that can valorize the waste streams.
- Working with stakeholders, such as recyclers and product creators to create fully circular business models. Such as re-introducing (recycled) waste streams back into new products.

Suggested Uploads:

- Documentation that supports your facility is performing the action selected (e.g., waste maps, processes for handling wastes onsite and training workers, waste tracking, evaluation or collaborative assessments with waste solution providers etc.)

What is the intent of the question?

The intent of this question is for facilities to indicate which practices are included in their waste management programs and processes.

Technical Guidance:

Adopting good practices, such as those listed in this question, for managing wastes will support your facility in accurately identifying and tracking waste streams to better understand waste generation as well as help with identifying opportunities to prevent or reduce wastes and evaluate preferred solutions for waste treatment or disposal.

Full Points:

Full Points will be awarded if the facility has implemented all of the listed practices.

Documentation Required:

- Documentation that supports the action(s) selected by the facility. This may include:
    - Waste maps.
    - Processes for handling wastes and storage and training workers.
    - waste tracking records and digital/online platforms used to manage or find solutions for waste.
    - Evaluation or collaborative assessments with waste solution providers to identify alternative waste solutions that reduce impacts to the environment.

Interview Questions to Ask:

- Staff responsible for waste management are able to describe how the facility implements the selected actions.

Inspection – Things to Physically Look For:

- The observed waste management practices on-site are consistent with the facility's selected actions.

Partial Points:

- Partial Points will be awarded if the facility has implemented one (1) or more of the listed practices.

23. Does your facility have an implementation plan to switch to a more preferred waste disposal method?

Answer Yes if: Your facility has a current documented plan and are working on all defined actions in the plan to switch one of the Preferred or Less Preferred waste disposal methods listed in the Higg FEM.

Answer Partial Yes if: Your facility has a documented plan in place with defined actions, however you have not started work on all of the listed actions in the plan.

Answer Not Applicable if: Your facility disposes of all wastes using the preferred methods of waste disposal.

Note: If your facility has not conducted a formal evaluation of waste disposal improvement opportunities to support your plan, you should select No for this question.

If you answer Yes or Partial Yes to this question, you will be asked to upload a copy of your plan.

Suggested Uploads:

- Documentation that supports how the plan was established and demonstrates the plan is based on a formal evaluation of improvement opportunities (e.g., review of local waste disposal options, waste quantity data and baselines, etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have established formal plans to improve the waste disposal method for wastes generated at the facility.

Technical Guidance

Creating an implementation plan includes the process of reviewing and evaluating available options to switch to a more preferred method of waste disposal. The key steps of creating an implementation plan should include the following:

- Identify available options for switching waste disposal methods through engaging with waste service providers or other parties that may be able to utilize waste generated at the facility (e.g., recyclers, other industry that could utilize waste materials)
- Evaluate available options to determine the most suitable options (e.g., feasibility studies, cost benefit analyses)
- Approve funds/budget for chosen options.
- Create a timeline and define the actions needed to switch the waste disposal method (e.g., additional segregation or onsite waste processes measures)

Resources:
A link to an implementation plan template that can be used is provided below:

- Implementation plan template: https://howtohigg.org/resources/resources-library/#templates

How This Will Be Verified:

Full Points:
Full Points will be awarded if the facility has an implementation and has started work on all the action items listed in the plan.

Documentation Required:

- An implementation plan that includes details of the specific actions the facility plans to take to switch to a preferred disposal method. This may include:
    - Documentation of the calculated waste volume that will be switched to the preferred disposal method.
    - Supporting documentation that confirms the waste will be disposed of or treated with a preferred treatment method (e.g., evaluation report or proposal/agreement with third party who will accept and treat or utilize the waste, if available).
    - Implementation timelines (i.e., the planned start and completion dates for actions listed in the plan).

Note: If the facility has completed all actions in the plan prior to reporting year and does not have an implementation plan switching to a preferred waste disposal method in the reporting year and beyond, a No response should be selected (i.e., points are not awarded for historical plans that were implemented prior to the reporting year).

Interview Questions to Ask:

- Staff responsible for the implementation plan can explain the facility's process for evaluating waste disposal opportunities and the facility's implementation plan to switch to a preferred waste disposal method.

Inspection - Things to Physically Look For:

- The actions listed in the implementation plans directly relate to the observed waste sources at the facility.

Partial Points:

- Partial Points will be awarded if the facility has an implementation plan that meets the above requirements but has not started on all action items in the plan.

24. Has your facility reduced non-hazardous waste generation in the reporting year, compared with your baseline?

Answer Yes if: Your Facility has reduced non-hazardous waste generation for one (1) or more of your non-hazardous waste streams compared with your baseline.

Note: Reductions in waste quantity generated due to reductions in production volume should not be considered reductions in waste generation as time as this will not result in sustainable improvements.

If you answer Yes to this question, you will be asked to complete a table with the following questions to provide details on your non-hazardous waste reductions for each applicable waste stream:

- This is your reported baseline quantity.
- This is your reported unit of measure.
- This is your reported baseline year.
- **Note**: The above data will be auto-populated in the table based on your reported baseline data.
- Has your facility reduced waste generation for this stream compared with its baseline?
- What is your achievement for change (in %) in non-hazardous waste reduction from this stream compared to its baseline? (Enter negative for reduction %)
- Describe the strategies used to achieve this improvement.

Suggested Uploads:

- Documentation that supports a reduction in waste generation was achieved and that the reduction was related to specific actions taken by the facility to reduce waste (e.g., waste quantity data and baselines, evidence of process modifications, new equipment or work practices that resulted in waste reduction).

What is the intent of the question?
The intent of this question is for facilities to demonstrate that they have reduced the quantity of non-hazardous waste generated.

Technical Guidance:
Waste reductions can be absolute or normalized. However, it is recommended that you show normalized reductions (e.g., kg of waste per product was reduced by 50%). This is because normalized metrics data often provides a better indication of actual reductions whereas absolute improvements can be impacted by factors beyond the facility's control such as reductions related to business changes or reduced production.

When evaluating your waste reductions, be sure to do the following:

- Review the waste data to ensure the data and any automated calculations are accurate.
- Review the actions taken to make improvements and determine if they have resulted in measurable improvements by comparing the data with historical waste data to determine the improvement quantity. **Note:** Historical data accuracy should also be verified.
    - For example: The installation of 5 laser cutting machines produced a reduction of 0.02kg of fabric waste per unit made, which is an 8% reduction from the baseline waste data, OR
    - The installation of a CAD system that reduced the metal waste by 5% compared to the baseline data.

Reporting Improvements in the Higg FEM:

Do:

✓ Review the improvement data to ensure all aspects noted above are covered and that the information is accurate.
✓ Input the percent (%) change in the waste quantity from the baseline year. (e.g., -5 for a 5% reduction)
✓ Provide sufficient details in the "Describe the strategies used to achieve this improvement:" field (e.g., Normalized waste generation was reduced by switching to reusable packaging containers for raw materials).

Do Not:

X Report improvements that are not accurate (e.g., the data source is unknown or has not been verified)
X Report an improvement that is absolute and relates to a decrease in production or reduced facility operations. This is why data normalization is important.

X Report an improvement that is based on insufficient data. (e.g., an overall reduction was achieved but this was not related to measurable or defined actions taken to achieve the reduction). This is particularly important when the improvements are marginal (e.g., less than 1-2%) and possibly attributable to measurement/ tracking errors and/or operational variability.

How This Will Be Verified:

When verifying a facility's improvements, Verifiers **must** review:

- All supporting evidence (e.g., waste quantity data and baselines, etc.) to verify the reported improvement quantity is accurate and attributable to measurable actions taken to reduce waste.
- The implemented changes or actions taken to achieve the improvements.

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points:
Full Points will be awarded if the facility has achieved reductions from the baseline quantity **and** achieved year over year reductions for all waste streams.

Note: Points are automatically calculated in the Higg FEM and awarded for a reduction of any amount (i.e., scoring is not based on the amount of the reduction achieved).

Documentation Required:
- Documentation that demonstrates reductions were achieved for each applicable waste stream and result from specific actions taken by the facility to reduce waste. This may include:
    - Waste tracking reports and quantity records showing reductions of waste generated.
    - Documented evidence of facility actions to reduce waste (e.g., evidence of process modifications, new equipment or work practices that resulted in waste reduction).
    - Supporting calculations methodologies or assumptions used to determine the reduction.

Interview Questions to Ask:
- Staff responsible for waste management are able to describe how reductions were achieved including any calculations or assumptions made determining the reductions.

Inspection – Things to Physically Look For:
- Onsite observations that indicate the facility has implemented the noted actions to reduce waste (e.g., process modifications, new equipment or work practices).

Partial Points:

- Partial Points will be awarded if the facility has achieved reductions from the baseline quantity **or** achieved year over year reductions for one (1) or more waste streams.

25. Has your facility reduced hazardous waste generation in the reporting year, compared with your baseline?

Answer Yes if: Your Facility has reduced hazardous waste generation for one (1) or more of your non-hazardous waste streams compared with your baseline.

Note: Reductions in waste quantity generated due to reductions in production volume should not be considered reductions in waste generation as time as this will not result in sustainable improvements.

If you answer Yes to this question, you will be asked to complete a table with the following questions to provide details on your hazardous waste reductions for each applicable waste stream:

- This is your reported baseline quantity.
- This is your reported unit of measure.
- This is your reported baseline year.
- **Note**: The above data will be auto-populated in the table based on your reported baseline data.
- Has your facility reduced waste generation for this stream compared with its baseline?
- What is your achievement for change (in %) in hazardous waste reduction from this stream compared to its baseline? (Enter negative for reduction %)
- Describe the strategies used to achieve this improvement.

Suggested Uploads:

- Documentation that supports a reduction in waste generation was achieved and that the reduction was related to specific actions taken by the facility to reduce waste (e.g., waste quantity data and baselines, evidence of process modifications, new equipment or work practices that resulted in waste reduction).

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have reduced the quantity of hazardous waste generated.

Technical Guidance:

Waste reductions can be absolute or normalized. However, it is recommended that you show normalized reductions (e.g., kg of waste per product was reduced by 50%). This is because normalized metrics data often provides a better indication of actual reductions whereas absolute

improvements can be impacted by factors beyond the facility's control such as reductions related to business changes or reduced production.

When evaluating your waste reductions, be sure to do the following:

- Review the waste data to ensure the data and any automated calculations are accurate.
- Review the actions taken to make improvements and determine if they have resulted in measurable improvements by comparing the data with historical waste data to determine the improvement quantity. **Note:** Historical data accuracy should also be verified.
    - For example: The installation of automated printing machines reduced chemical waste by 15% per unit of production from the baseline waste data.

Reporting Improvements in the Higg FEM:

Do:

✓ Review the improvement data to ensure all aspects noted above are covered and that the information is accurate.
✓ Input the percent (%) change in the waste quantity from the baseline year. (e.g., -5 for a 5% reduction)
✓ Provide sufficient details in the "Describe the strategies used to achieve this improvement:" field (e.g., Normalized waste generation was reduced by switching to laser finishing for denim from potassium permanganate spraying).

Do Not:

X Report improvements that are not accurate (e.g., the data source is unknown or has not been verified)
X Report an improvement that is absolute and relates to a decrease in production or reduced facility operations. This is why data normalization is important.
X Report an improvement that is based on insufficient data. (e.g., an overall reduction was achieved but this was not related to measurable or defined actions taken to achieve the reduction). This is particularly important when the improvements are marginal (e.g., less than 1-2%) and possibly attributable to measurement/ tracking errors and/or operational variability.

How This Will Be Verified:

When verifying a facility's improvements, Verifiers **must** review:

- All supporting evidence (e.g., waste quantity data and baselines, etc.) to verify the reported improvement quantity is accurate and attributable to measurable actions taken to reduce waste.
- The implemented changes or actions taken to achieve the improvements.

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points:
Full Points will be awarded if the facility has achieved reductions from the baseline quantity **and** achieved year over year reductions for all waste streams.

Note: Points are automatically calculated in the Higg FEM and awarded for a reduction of any amount (i.e., scoring is not based on the amount of the reduction achieved).

Documentation Required:

- Documentation that demonstrates reductions were achieved for each applicable waste stream and result from specific actions taken by the facility to reduce waste. This may include:
    - Waste tracking reports and quantity records showing reductions of waste generated.
    - Documented evidence of facility actions to reduce waste (e.g., evidence of process modifications, new equipment or work practices that resulted in waste reduction).
    - Supporting calculations methodologies or assumptions used to determine the reduction.

Interview Questions to Ask:

- Staff responsible for waste management are able to describe how reductions were achieved including any calculations or assumptions made determining the reductions.

Inspection – Things to Physically Look For:

- Onsite observations that indicate the facility has implemented the noted actions to reduce waste (e.g., process modifications, new equipment or work practices).

Partial Points:

- Partial Points will be awarded if the facility has achieved reductions from the baseline quantity **or** achieved year over year reductions for one (1) or more waste streams.

26. Has your facility improved waste disposal methods for overall waste in the reporting year, compared with the baseline?

Answer Yes if: If your Facility has improved one (1) or more of the waste disposal methods used by your facility compared with your baseline.

Notes:

- Improvements are defined as:

- For Preferred Options - An increase in the amount/percentage compared to the baseline
- For Less Preferred Options - An increase in the amount/percentage compared to the baseline if the original waste type was disposed of previously with a least preferred option **or** a reduction in the amount/percentage compared to the baseline if the original waste type was disposed of previously as a less preferred option.
- For Least Preferred options - A reduction amount/percentage compared to the baseline

- Improvements in waste disposal methods due to reductions in production volume should not be considered reductions in waste generation as time as this will not result in sustainable improvements.

If you answer Yes to this question, you will be asked to complete a table with the following questions to provide details on your waste disposal methods improvement for each applicable disposal method:

- This is your reported baseline quantity.
- This is your reported unit of measure.
- This is your reported baseline year.
- **Note**: The above data will be auto-populated in the table based on your reported baseline data.
- Has your facility improved (increased or reduced) this waste disposal method compared with its baseline?
- What is your achievement for change (in %) in improving this waste disposal method compared to its baseline? (Enter negative for reduction %; Enter positive for increased %)
- Describe the strategies used to achieve this improvement.

Suggested Uploads:

- Documentation that supports how improvements were achieved (e.g., waste quantity data and baselines for waste disposal methods, agreement with third party who will accept and treat or utilize the waste, etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have improved the waste disposal method for wastes generated at the facility.

Technical Guidance:

Improvements in waste disposal methods can be demonstrated by diverting wastes to a preferred disposal/treatment method that results in less impacts to the environment. Examples of improvements in disposal methods can include:

- Increasing the quantity of waste sent to external recycling contractors and biological treatment (e.g., non-hazardous production waste recycling and food waste biological treatment) to divert waste from landfill or incineration without energy recovery.
- Switching to a disposal/treatment method that recovers usable aspects of the waste (e.g., using incineration with energy recovery as opposed to landfilling)

Waste Disposal Improvements in the Higg FEM:

The Higg FEM defines waste disposal improvements as the following based on the Preferred, Less Preferred, and Least Preferred methods listed in the Higg FEM:

- For Preferred Options – An increase in the amount/percentage compared to the baseline.
- For Less Preferred Options – An increase in the amount/percentage compared to the baseline if the original waste was disposed previously with a least preferred method **or** a reduction in the amount/percentage compared to the baseline if the original waste type was disposed of previously as a less preferred option.
- For Least Preferred options – A reduction in the amount/percentage compared to the baseline.

When evaluating your waste disposal improvements, be sure to do the following:

- Review the waste data to ensure the data and any automated calculations are accurate.
- Review the actions taken to make improvements and determine if they have resulted in measurable improvements by comparing the data with historical waste data to determine the improvement quantity. **Note:** Historical data accuracy should also be verified.
    - For example: By sourcing a new material recycling vendor using advanced technology, the facility was able to increase the amount of total waste recycled by 25%.

Reporting Improvements in the Higg FEM:

Do:

- ✓ Review the improvement data to ensure all aspects noted above are covered and that the information is accurate.
- ✓ Input the percent (%) change in the total waste quantity for the respective disposal method from the baseline year. (e.g., -5 for a 5% reduction or +5 for a 5% increase)
- ✓ Provide sufficient details in the "Describe the strategies used to achieve this improvement:" field (e.g., Both fabric and leather waste are now being sent to material recyclers instead of landfill).

Do Not:

X Report improvements that are not accurate (e.g., the data source is unknown or has not been verified)
X Report an improvement that is absolute and relates to a decrease in production or reduced facility operations. This is why data normalization is important.
X Report an improvement that is based on insufficient data. (e.g., an overall reduction was achieved but this was not related to measurable or defined actions taken to achieve the reduction). This is particularly important when the improvements are marginal (e.g., less than 1-2%) and possibly attributable to measurement/ tracking errors and/or operational variability.

How This Will Be Verified:

When verifying a facility's improvements, Verifiers **must** review:

- All supporting evidence (e.g., waste quantity data and baselines, etc.) to verify the reported improvement quantity is accurate and attributable to measurable improvements in waste disposal methods.
- The implemented changes or actions taken to achieve the improvements.

If any inconsistencies or errors are noted, the reported information must be corrected where possible and detailed comments should be included in the Verification Data field.

Full Points:
Full Points will be awarded if the facility has improved the amount/percentage of waste disposed of using a Preferred or Less Preferred Option.

Notes:
- Improvements are defined as:
    - For Preferred Options - An increase in the amount/percentage compared to the baseline
    - For Less Preferred Options - An increase in the amount/percentage compared to the baseline if the original waste type was disposed of previously with a least preferred option **or** a reduction in the amount/percentage compared to the baseline if the original waste type was disposed of previously as a less preferred option.
    - For Least Preferred options - A reduction amount/percentage compared to the baseline.
- No points will be awarded if there is a reported increase in any Least Preferred option.

Documentation Required:
- Documentation that supports the improvement for each waste disposal method and that they are based on a formal evaluation of improvement opportunities. This may include:
    - Waste quantity data and baselines tracking for waste disposal methods.,
    - Agreement with the third party who will accept and treat or utilize the waste using a more preferred method.

- Supporting calculations methodologies or assumptions used to determine the improvement.

Interview Questions to Ask:

- Staff responsible for waste management are able to describe how improvements were achieved including any calculations or assumptions made determining the improvements.

Inspection – Things to Physically Look For:

- The observed waste management practices on-site are appropriate in relation to the reported improvements (e.g., tracking of waste quantity, waste segregation, etc.)

Partial Points: N/A

27. Does your facility validate the final disposal and treatment of all hazardous wastes?

Answer Yes if: Your facility works with your waste contractors to validate the final disposal and how all hazardous wastes are treated. This means a formal evaluation or assessment has been conducted within the last three (3) years to validate the disposal and treatment of all hazardous wastes.

Answer Partial Yes if: Your Facility has established formal plans and procedures to work with your facility's waste contractors to validate the final disposal and how all hazardous wastes are treated. However:

- No formal evaluations or assessments have been conducted; or
- Validations are greater than 3-year-old or do not cover all hazardous wastes disposed of by the facility.

If you answer Yes to this question, you will be asked the following sub questions:

- Upload a supporting documentation.
- Describe how you work with your facility's waste contractors to ensure appropriate disposal during the waste treatment.

Suggested Uploads

- Documentation that demonstrates how the facility validates waste disposal and treatment with its waste contractors (e.g., documented procedures for validation reviews and assessments, completed validation assessment reports of waste contractors, etc.)

What is the intent of the question?

The intent is to ensure facilities are validating the final disposal and treatment of all hazardous waste.

Technical Guidance:

Hazardous waste poses serious risks to the environment when improperly treated and disposed of. Facilities should take steps to confirm that their waste contractors are properly transporting, storing, treating, and disposing of hazardous wastes from the facility.

Facilities should evaluate their waste contractor(s) during the contractor selection process and conduct regular assessments to ensure that contractors have obtained and are maintaining all required permits and legal authorizations, and that they are operating within legal compliance and with the terms of any contracts or agreements relating to waste disposal and treatment. Ongoing assessments should be conducted at least once every 3 years.

When evaluating waste management contractors, facilities should review and evaluate:

- Waste contractor qualifications (e.g., business license, environment permits, reports) of the contractor.
- Waste contractor due diligence and legal environment performance (e.g., historic violations)
- Overall environmental performance

After approving and working with contractors, facilities should conduct regular assessments of waste contractor facilities and work practices to review and evaluate if:

- The contractor continues to operate in compliance with all permits and legal obligations.
- The transportation of wastes is traceable and secure (e.g., proper waste manifesting and appropriate vehicles).
- The contractor utilizes good work practices for the handling and storage of wastes at its facilities including:
    - Proper segregation of waste.
    - Proper labelling of waste and transportation vessels.
    - Storage on impermeable surfaces.
    - Proper security and fire/flood protection.
    - No illegal dumping or burning.
    - Human health and safety practices, such as providing personal protective equipment, training, and machine safety.
- Where possible, contractors use optimized waste disposal methods (such as recycling hazardous waste or incinerate hazardous waste with energy recovery) that reduce impacts to the environment.

How This Will Be Verified:

Full Points:
Full Points will be awarded if the facility has validated the treatment and final disposal of all hazardous wastes within the last 3 years.

Documentation Required:

- Documentation that demonstrates how the facility validates waste disposal and treatment with its waste contractors. This should include:
    - Procedures to work with your facility's waste contractors to validate the final disposal and how all hazardous wastes are treated.
    - Records of validation reviews or assessments of contractors responsible for final disposal or treatment of all hazardous wastes.
        - **Notes**: Records must show that the validations occurred within the past 3 years.

Interview Questions to Ask:

- Staff responsible for waste management are able to describe how the facility screens waste contractors and conducts regular reviews of contractors to validate treatment and final disposal of all hazardous wastes.

Inspection - Things to Physically Look For:

- Evidence that shows the facility has validated their waste contractor's waste treatment facilities in the past 3 years.

Partial Points:

- Partial Points will be awarded if the facility has established formal plans and procedures to work with your facility's waste contractors to validate the final disposal and how all hazardous wastes are treated. However:
    - No formal evaluations or assessments have been conducted; or
    - Validations are greater than 3-year-old or do not cover all hazardous wastes disposed of by the facility.

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28. Does your facility validate the final disposal and treatment of all non-hazardous wastes?

Answer Yes if: Your facility works with your waste contractors to validate the final disposal and how all non-hazardous waste are treated. This means a formal evaluation or assessment has been conducted within the last three (3) years to validate the disposal and treatment of all hazardous wastes.

Answer Partial Yes if: Your Facility has established formal plans and procedures to work with your facility's waste contractors to validate the final disposal and how all non-hazardous waste are treated. However:

- No formal evaluations or assessments have been conducted; or
- Validations are greater than 3-year-old or do not cover all non-hazardous wastes disposed of by the facility.

If you answer Yes to this question, you will be asked the following sub questions:
- Upload a supporting documentation.
- Describe how you work with your facility's waste contractors to ensure appropriate disposal during the waste treatment.

Suggested Uploads
- Documentation that demonstrates how the facility validates waste disposal and treatment with its waste contractors (e.g., documented procedures for validation reviews and assessments, completed validation assessment reports of waste contractors, etc.)

What is the intent of the question?
The intent is to ensure facilities are validating the final disposal and treatment of all non-hazardous waste.

Technical Guidance:
Wastes that are not treated or disposed of properly can pose serious risks to the environment. Facilities should take steps to confirm that their waste contractors are properly transporting, storing, treating, and disposing of non-hazardous wastes from the facility.

Facilities should evaluate their waste contractor(s) during the contractor selection process and conduct regular assessments to ensure that contractors have obtained and are maintaining all required permits and legal authorizations, and that they are operating within legal compliance and with the terms of any contracts or agreements relating to waste disposal and treatment. Ongoing assessments should be conducted at least once every 3 years.

When evaluating waste management contractors, facilities should review and evaluate:

- Waste contractor qualifications (e.g., business license, environment permits, reports) of the contractor.
- Waste contractor due diligence and legal environment performance (e.g., historic violations)
- Overall environmental performance

After approving and working with contractors, facilities should conduct regular assessments of waste contractor facilities and work practices to review and evaluate:

- The contractor continues to operate in compliance with all permits and legal obligations.
- The transportation of wastes is traceable and secure (e.g., proper waste manifesting and appropriate vehicles).
- The contractor utilizes good work practices for the handling and storage of wastes at its facilities including:

- Proper segregation of waste.
- Proper labelling of waste and transportation vessels.
- Storage on impermeable surfaces.
- Proper security and fire/flood protection.
- No illegal dumping or burning.
- Human health and safety practices, such as providing personal protective equipment, training, and machine safety.

- Where possible, contractors use optimized waste disposal methods (such as recycling waste or incinerate waste with energy recovery) that reduce impacts to the environment.

How This Will Be Verified:

Full Points:
Full Points will be awarded if the facility has validated the treatment and final disposal of all non-hazardous wastes within the last 3 years.

Documentation Required:

- Documentation that demonstrates how the facility validates waste disposal and treatment with its waste contractors. This should include:
  - Procedures to work with your facility's waste contractors to validate the final disposal and how all non-hazardous wastes are treated.
  - Records of validation reviews or assessments of contractors responsible for final disposal or treatment of all non-hazardous wastes.
    - **Notes**: Records must show that the validations occurred within the past 3 years.

Interview Questions to Ask:

- Staff responsible for waste management are able to describe how the facility screens waste contractors and conducts regular reviews of contractors to validate treatment and final disposal of all non-hazardous wastes.

Inspection - Things to Physically Look For:

- Evidence that shows the facility has validated their waste contractor's waste treatment facilities in the past 3 years.

Partial Points:

- Partial Points will be awarded if the facility has established formal plans and procedures to work with your facility's waste contractors to validate the final disposal and how all non-hazardous wastes are treated. However:
  - No formal evaluations or assessments have been conducted; or
  - Validations are greater than 3-year-old or do not cover all non-hazardous wastes disposed of by the facility.

29. Has your facility disposed of waste through Preferred disposal methods?

Answer Yes if: Your facility uses one (1) or more of the Preferred disposal methods listed in the Higg FEM. These include Reuse, Recycle (including Upcycle), or Downcycle.

If you answer Yes to this question, you will be asked the following sub questions:

- Enter the total percentage of waste being disposed of through the Preferred disposal method.
    - This is calculated as follows: Total quantity of waste disposed of using Preferred Methods/Total waste quantity (of all wastes) x 100%
        - **Note:** Total quantities for the FEM reporting year must be used.
- Upload supporting documentation.
- Please describe how this is implemented.

Suggested Uploads:

- Documentation that demonstrates your facility's waste is disposed of using one of the preferred methods listed in the Higg FEM (e.g., waste disposal records, contracts/agreements with waste contractors, waste contractor evaluation/assessment reports, etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that waste is being disposed of using one of the preferred methods listed in the Higg FEM.

Technical Guidance:

Material recovery (i.e., reuse, recycle including upcycling, or downcycling) are preferred solutions for wastes as these methods create value from wastes and contribute to creating a circular economy that minimizes waste.

Facilities should strive to work with waste contractors, industry partners, local governments, and communities to identify preferred solutions for wastes that include reuse or recovery of waste materials that extends the materials lifespan as long as possible.

Resources:

- The Ellen MacArthur Foundation - https://ellenmacarthurfoundation.org/
- Zero Waste International Alliance - https://zwia.org/
- The Waste and Resources Action Programme (WRAP) https://wrap.org.uk/taking-action/textiles
- US EPASustainable Materials Management: Non-Hazardous Materials and Waste Management Hierarchy https://www.epa.gov/smm/sustainable-materials-management-non-hazardous-materials-and-waste-management-hierarchy
- Examples of online waste sourcing and material procurement platforms
    - https://cyrkl.com/en
    - https://recykal.com/

- https://www.wastetrade.com/

How This Will Be Verified:

Full Points:
Full Points will be awarded if the is using preferred disposal methods to dispose of 90% or more of its total waste.

Documentation Required:
- Documentation that demonstrates the facility's waste is disposed of using one of the preferred methods listed in the Higg FEM. This may include:
  - Waste disposal records including quantities and final disposal methods.
  - Contracts/agreements with waste contractors,
  - Waste contractor evaluation/assessment reports that confirm final disposal methods.

Interview Questions to Ask:
- Staff responsible for waste management are able to describe how the facility's waste is disposed of using preferred methods and how the total quantities are tracked.

Inspection – Things to Physically Look For:
- The observed waste management practices on-site are consistent with the facility's reported waste disposal methods.

Partial Points:
- Partial Points will be awarded if the is using preferred disposal methods to dispose of 25 to 89% of its total waste.

30. Do you or are you willing to work on circular economy systems?

Answer Yes if: Your facility is currently working on or is willing to work on circular economy initiatives.

If you answer Yes to this question, you will be asked the following sub question:
- Please describe how (Select all that apply)
  - Participate Independently - on your own.
  - Work with industry working groups.
  - Work with customers.
  - Work with other suppliers.
  - Other

Suggested Uploads:

- Documentation that demonstrates your facility is capturing and/or reintroducing waste materials that are being used as part of a circular economy system. (e.g., waste disposal or purchase records, contracts/agreements with receivers or suppliers of waste materials, etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate they are, or are willing to, participate in a circular economy system.

Technical Guidance:

A circular economy is a regenerative system in which resource input and waste is minimized by slowing, closing, and narrowing material loops; this can be achieved through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, recycling, and upcycling. This is in contrast to a linear economy which is a 'take, make, dispose' model of production.

In the Higg FEM, Circular systems is defined as a system that captures and reintroduces waste from and into the facility's own operations or production **or** captures and reintroduces waste into an external party's operations or production. Some examples include:

- Textile waste that is recycled into a new material and then used for a new production run.
- Recycling plastic bottles to make fabric.
- Recovering coal ash from the boiler room to make bricks.
- Aluminium recycling to produce cans.

The four key aspects of a closed-loop supply chain are:

- Source Materials: Use recycled or renewable materials that are responsibly sourced.
- Make Efficiently: Design and manufacture products to minimize the use of materials.
- Product Lifespan: Design products to be durable, so they can have long lives.
- Contribute: Replenish market supply with waste material or product that can be recycled, reclaimed, or renewed at least equal to the amount used to make the product.

Facilities should strive to conduct research and work with waste contractors, industry partners, local governments, and communities to identify creative solutions for wastes that include reuse or recovery of waste materials that extends the material's lifespan indefinitely or as long as possible.

Resources:

Several resources are provided below that include guidance or examples of initiative to create circular economy systems or zero waste solutions.

Note: The resources and examples provided below are for informational purposes only and do not constitute an endorsement by the SAC. Facilities should ensure that any circular economy

initiatives (e.g., the purchase or sale of wastes) is conducted in accordance with applicable regulations.

- Zero Waste International Alliance – Zero Waste Hierarchy of Highest and Best Use https://zwia.org/zwh/
- Close the Loop – A Guide Towards a Circular Fashion Industry https://www.close-the-loop.be/en
- The Ellen MacArthur Foundation - https://ellenmacarthurfoundation.org/
- Examples of online waste sourcing and material procurement platforms
    - https://cyrkl.com/en
    - https://recykal.com/
    - https://www.wastetrade.com/

How This Will Be Verified:

Note: This question is unscored.

Documentation Required:

- Documentation that demonstrates the facility is, is willing to, capturing and/or reintroducing waste materials as part of a circular economy system. This may include:
    - Waste material sale or purchase records
    - Contracts/agreements with receivers or suppliers of waste materials.
    - Production records that demonstrate waste materials were reintroduced to facility operations or manufacturing processes.
    - Company Sustainability Strategy or Environmental Policy that includes circular economy related commitments.

Interview Questions to Ask:

- Staff responsible for waste management or material procurement are able to describe how the facility operates in the circular economy or has an understanding of how the facility could participate.

Inspection – Things to Physically Look For:

- The observed waste management practices on-site are consistent with the facility's reported actions or intent for participating the circular economy (e.g., onsite capture and reintroduction of wastes)

Chemical Management

General Introduction

The use of chemicals in a facility's production processes and operations can pose significant risks to the environment and human health if not managed systematically and responsibly.

As governments and industry stakeholders continue to focus on responsible chemicals management, more stringent requirements and regulations may be imposed. New chemistries and technologies are also constantly being developed to support the reduction of hazardous chemicals in the supply chain. By proactively managing and striving to eliminate or reduce the use of hazardous chemicals, you can reduce impacts on the environment, exposure to regulatory risks or new requirements from business partners and contribute to a more sustainable future.

In general, the Higg FEM Chemicals Management section encourages you to:

- Establish an effective Chemicals Management System (CMS) with appropriate policies, procedures, and commitments that drive continuous improvements.

- Understand all chemicals used in the facility for production and operations through good chemical inventorying practices.
- Establish responsible chemical purchasing practices that focus on the reduction of hazardous chemical use.
- Ensure staff are appropriately trained and qualified to work with and/or manage chemicals in the workplace.
- Ensure the proper facilities and protections are in place for safe chemical storage, handling, and use.
- Establish procedures for chemical/product traceability, quality, and integrity.
- Establish procedures to promote responsible chemical use supplier and contractor facilities.
- Align with industry leading practices for chemicals management, the reduction of hazardous chemical use, and process innovation.

Additional details on the intent and criteria for each Higg FEM Chemicals Management question is provided in the guidance below along with useful technical guidance and resources to support your facility in managing chemicals responsibly.

Note: The Higg FEM Chemical Management section is the result of a collaboration between Sustainable Apparel Coalition, Outdoor Industry Association, and Zero Discharge of Hazardous Chemicals (ZDHC).

Chemical Use at your Facility

Chemicals are used for a wide variety of applications and processes. In the FEM, chemicals are categorized as follows:

- **Chemicals used in Production:** This refers to chemicals used in processes to make a product (e.g., chemicals used for dyeing or other wet processing, printing, laundry or washing, cementing or gluing, slashing during weaving, fibre extrusion, yarn spinning, leather tanning, electroplating, welding or other production process).

- **Chemicals used in Operations or Maintenance/Tooling/Equipment:** This refers to chemicals that are not used in production process and are used to operate the facility (e.g., chemicals used for fuels for boilers/generators, general facility/equipment maintenance, lubrication of facility equipment or tools, wastewater treatment, etc.)

ZDHC Partnership and Resources

One of our partner organizations, the Zero Discharge of Hazardous Chemicals (ZDHC) group, has developed a variety of excellent resources for managing chemicals that are referenced throughout the Higg FEM Guidance. For more information on the ZDHC, its initiatives, and

resources, we encourage you to visit the links throughout this guidance and/or visit their website here: https://www.roadmaptozero.com/?locale=en.

Applicability Questions

To determine which questions you will need to complete in the Chemicals section, you will need to complete the applicability questions listed below. You will be asked to select which processes you have on-site, whether you use commodity chemicals, and if your facility currently implements an MRSL. Your selections will direct you to complete the questions that are most applicable for your facility.

Based on your responses to the applicability questions, your facility will be classified in the Higg FEM as one (or a combination) of the facility types listed below:

- **Facility that uses Chemicals in Production.**
    - This refers to chemicals used in processes to make a product (e.g., chemicals used for dyeing or other wet processing, printing, laundry or washing, cementing or gluing, slashing during weaving, fibre extrusion, yarn spinning, leather tanning, electroplating, welding or other production process).
- **Facility that uses Chemicals in Operation only.**
    - This refers to chemicals that are not used directly in the production process but are used in equipment or processes utilized to operate basic energy conversion or wastewater management within the facility (e.g., Chemicals used in onsite wastewater treatment, Cooling Tower, Boilers (exclude small scale electricity boilers that are used for ironing/Mini Boilers))
- **Facility that uses Chemicals in Maintenance/Tooling/Equipment only.**
    - This refers to chemicals that are not used directly in the production process but are used for regular upkeep and maintenance of facility equipment. (e.g., chemicals used in general facility/equipment maintenance, lubrication of facility equipment or tools (Machine Oil), sourced in Industrial scale or in large quantities)
- **Facility that only uses Spot Cleaner in production.**
    - This refers to chemicals used to remove contaminated spots or nonpermanent stains from materials or final products (e.g., Garment Spot Cleaning, Fabric Stain Removal)
- **Facility that has minimal chemical use.**
    - This refers to facilities that use liquid and gaseous fuels (e.g., Diesel, LPG, for vehicles or cooking), over the counter chemicals for cleaning and factory maintenance/up-keep (e.g., detergent, kitchen supplies, paint, thinner)

1. Select all of the processes performed at your facility:

- Dyeing or other wet processing
- Printing

- Laundry or washing
- Cementing or gluing
- Fiber extrusion or yarn spinning (with chemical use)
- Slashing during weaving
- Leather tanning
- Lamination
- Extrusion, assembly, finishing of plastic parts
- Metal Finishing (with chemical use)
- Welding (with chemical use)
- Casting/Foundry (with chemical use)
- Degreasing with organic solvents
- Laser cutting (with chemical use)
- Metal plating (anodization, electroplating, electroless plating)
- Painting
- Powder Coating (with chemical use)
- Soldering (with chemical use)
- Printed Circuit Board (PCB) electronic automation (with chemical use)
- Other production processes that require chemicals
- Spot cleaners - Spot cleaners are chemicals used to remove contaminated spots from final products such as garments, bed covers, shoes etc.

2. Does your facility use commodity chemicals?

- Yes
- No

Note: The Higg FEM aligns with the definition of a commodity chemical that is published in the most recent ZDHC Performance InCheck Guidelines, which defined a commodity chemical as "single substances or chemical compounds whose chemical structure is well-known, and their use is to create conditions for a process (such as acid, alkaline, oxidizing, reducing, solubilizing conditions). They are produced in high volumes with low prices and do not have a brand name but are known by their common chemical names (for example, Acetic Acid). The chemical structure and purity of two commodity chemicals produced by different manufacturers can be the same and can be interchangeable. They are generally sold on technical specifications (such as purity) and are not designed for a unique/special property or effect nor require any scientific research in their development. Usually, commodity chemicals either get reacted in the process (for example Sodium Hydroxide or Sodium Hydrosulphite) or remain in the effluent after the process (for example Common Salt or Glauber's Salt used in reactive dyeing of cotton)"

3. Does your facility implement an MRSL?

- Yes - If yes is selected you will be asked to select from the following options:
    - Customer's MRSL

- ZDHC MRSL
- bluesign BSSL
- Other (If Other, please specify)

- No

Chemical Management - Level 1

1. Does your facility have a written Chemical Management System (CMS) policy?

For facilities that do not use Chemicals in Production:

Answer Yes if: Your facility has a documented Chemical Management System (CMS) policy that covers all of the following elements:

- Comply with all applicable laws and regulations.
- The safe use of chemicals, to ensure Health and Safety for workers and minimizing environmental impact.
- Capacity building and training of staff on CMS.

For facilities that use Chemicals in Production:

Answer Yes if: Your facility has a documented Chemical Management System (CMS) policy that covers all of the following elements:

- Comply with all applicable laws and regulations.
- The safe use of chemicals, to ensure Health and Safety for workers and minimizing environmental impact.
- Capacity building and training of staff on CMS.
- Incorporating traceability and transparency into your facility's operations.
- Incorporating sustainable chemical management practices in production processes
- Commitment to continuously improve CMS effectiveness.

If you select Yes, you will be asked the following sub question(s):

- Which of the following has been included in the policy (Select all that apply):
  - Ensuring the safe use of chemicals, to ensure Health and Safety for workers and minimizing environmental impact.
  - Capacity building and training of staff on CMS.

Suggested Uploads:

- A copy of the facility's Chemical Management System policy.

What is the intent of the question?

The intent of this question is for facilities to demonstrate that a formal policy is in place for managing chemicals safely and effectively.

Technical Guidance
A chemical management system policy is the foundation for a facility's chemical management system. A policy is important to make sure all stakeholders (internal and external) are aware of the goals of the facility with respect to chemicals management. A CMS policy should include a clear statement that outlines a facility's commitments to chemicals management. and provide details on the practices and procedures followed by the facility.

The specific content of a chemical management system policy may vary based on the nature of chemicals used at a facility. For example, a facility that only uses chemicals in facility operations (e.g., machine maintenance and lubrication) versus a facility with chemical intensive manufacturing processes. However, there are some key basics elements that should be included such as commitments to:

- Comply with all applicable laws and regulations.
- Reduce risks to workers and the environment.
- Training and capacity building for staff
- Communicate the policy and associated CMS procedures to all relevant parties (e.g., staff, external stakeholders, etc.)

For facilities that use chemicals in production additional policy elements should be included such as commitments to:

- Continuous improvement of the CMS effectiveness.
- Incorporate sustainable chemical management practices in its production processes.
- Incorporate traceability and transparency into its operations.

A CMS policy should also be regularly reviewed and updated as needed. To ensure it provides a framework for continuous improvement, allowing facilities to identify areas where they can improve their chemical management practices and reduce risks.

Resources:

The ZDHC CMS and Technical Industry Guide framework sets out the principles and practices that should be included in a CMS policy and CMS, which are designed to help companies establish a robust and effective CMS that meets the ZDHC framework requirements and reduces the environmental and health impacts associated with chemical use in the supply chain.

- The ZDHC Chemical Management System (CMS) framework and Chemicals Management System Technical Industry Guide can be downloaded here: https://www.roadmaptozero.com/process#Guidance

How This Will Be Verified:

Full Points:

Documentation Required:

- **For facilities that use do not use Chemicals in Production,** Documented Chemical Management System policy that clearly includes the following elements:
    - Comply with all applicable laws and regulations.
    - The safe use of chemicals, to ensure Health and Safety for workers and minimizing environmental impact.
    - Capacity building and training of staff on CMS.

- **For facilities that use Chemicals in Production,** Documented Chemical Management System policy that clearly includes the following elements:
    - Comply with all applicable laws and regulations.
    - The safe use of chemicals, to ensure Health and Safety for workers and minimizing environmental impact.
    - Capacity building and training of staff on CMSIncorporating traceability and transparency into your facility's operations.
    - Incorporating sustainable chemical management practices in production processes
    - Commitment to continuously improve CMS effectiveness.

- Other supporting documentation that shows the facility's practices and procedures align with the CMS policy. This may include:
    - Communication and/or training records on the facility's CMS policy
    - CMS procedures
    - Records of management review of CMS policy.

Interview Questions to Ask:

- Staff responsible for chemicals management at the facility, including top management, and employees are aware of the facility's CMS policy and can describe the facility's efforts to meet its stated objectives.

Inspection - Things to Physically Look For:

- Observations onsite are consistent with the facility's CMS policy (i.e., the policy is relevant to the facility operations and chemical use onsite).
- Posting of the CMS policy at the site or other forms of communication to staff.

Partial Points: N/A

2. Have you assigned the responsibility of implementing and maintaining the Chemical Management System (CMS) to a team/staff member?

Answer Yes if: Your facility has assigned the responsibility of implementing and maintaining the Chemical Management System (CMS) to a team or staff member and there are documented responsibilities for the implementing and maintaining the facility's CMS (e.g., job description).

Note: This responsibility may be assigned to a single person/role at the facility or spread across multiple staff members/roles.

If you select Yes, you will be asked the following sub question(s):

- Which competence(s) does your CMS team have: (Select all that apply)
    - Ability to read and interpret SDS.
    - Competency in RSL
    - Competency in MRSL
    - Knowledge of GHS of classification and labelling or equivalent as well as local and international regulations on chemical restrictions

Note: Competency means that the individual has received formal qualification, education, training, and/or has professional experience that allows the person to understand and manage the noted aspect in relation to the facility's CMS.

Suggested Uploads:

- List of staff responsible for implementing and maintaining the CMS and their responsibilities (e.g., documented job description).
- Documented CMS procedures that include responsibilities of staff related to CMS implementation.
- If applicable, documentation that demonstrates the competencies of staff assigned to implement the CMS (e.g., certification, training records, curriculum vitae (CV)).

What is the intent of the question?

The intent of this question is for facilities to demonstrate they have dedicated roles and responsibilities established and staff assigned for the implementation and maintenance of the facility's CMS.

Technical Guidance

Assigning a team/staff member and having defined roles and responsibilities for implementing and maintaining the facility's CMS creates a clear chain of accountability for chemicals management within the facility. This is the foundation to effective implementation of a facility's CMS.

Based on the size and scope of operations, a facility can decide on the number of staff required for CMS implementation. It is good practice to have a Chemical Responsible Person or a Core Team, composed of trained, capable, and experienced personnel to oversee the implementation and monitoring of a CMS.

Implementing and maintaining a CMS at a facility requires an in-depth understanding of chemicals management principles. One of the major barriers to effective implementation of a CMS is the lack of technical competencies in chemicals management. A team with appropriate competencies in chemicals management, helps facilities better understand the risks and impacts of chemicals in use, and helps to identify and implement appropriate measures to mitigate those risks and make improvements. Also, it helps ensure compliance with relevant regulations and other requirements, which are constantly evolving and becoming more complex.

Resources:

The ZDHC CMS and Technical Industry Guide framework sets out the principles and practices that should be included in a CMS which are designed to help companies establish a robust and effective CMS that meets the ZDHC framework requirements and reduces the environmental and health impacts associated with chemical use in the supply chain.

- The ZDHC Chemical Management System (CMS) framework and Chemicals Management System Technical Industry Guide can be downloaded here: https://www.roadmaptozero.com/process#Guidance

How This Will Be Verified:

Full Points:
Full points will be awarded to facilities that have assigned the responsibility of implementing and maintaining the CMS to a team or staff member **and** the team is comprised of individuals that are competent in the following chemicals management aspects:

- Ability to read and interpret SDS.
- RSL
- MRSL
- GHS of classification and labelling or equivalent as well as local and international regulations on chemical restrictions

Note: Team members do not need to be competent in all aspects noted above, however there must be at least one (1) team member who is competent in each of the aspects.

Documentation Required:

- Documentation that shows the facility has assigned the responsibility of implementing and maintaining the CMS to a team or staff member and there are documented responsibilities for the team member(s). This may include:
    - List of staff responsible for implementing and maintaining the CMS and their responsibilities (e.g., documented job description).
    - Documented CMS procedures that include responsibilities of staff related to CMS implementation.
    - If applicable, documentation that demonstrates the competencies of staff assigned to implement the CMS (e.g., certification, training records, curriculum vitae (CV)).

Interview Questions to Ask:

- Staff responsible for chemicals management are able to explain the roles and responsibilities of staff or team members related to the CMS.
- Relevant staff responsible for the implementation and maintenance of CMS are able to demonstrate their competency in SDS, RSL, MRSL, GHS for classifications and labelling or equivalent.

Inspection - Things to Physically Look For:

- Observations indicate that CMS are being managed by staff with appropriate technical competency and the facility's chemicals management practices are in line with the CMS.

Partial Points:

- Partial points will be awarded to facilities that have assigned the responsibility of implementing and maintaining the CMS to a team or staff member, but the team member(s) have at least one, but not all of the competencies listed below:
    - Ability to read and interpret SDS.
    - RSL
    - MRSL
    - GHS of classification and labelling or equivalent as well as local and international regulations on chemical restrictions

3. Does your facility have a chemical purchasing policy?

Answer Yes if: Your facility has established a formal documented chemical purchasing policy.

If you select Yes, you will be asked the following sub question(s):

- Which of the following criteria are being included into consideration in your chemical purchasing policy: (Select all that apply):

- Legal requirements
- Health and Safety requirements
- RSL and/or MRSL requirements

Note: RSL and MRSL requirements refers to both brand specific requirements and the requirements of other industry programs (e.g., ZDHC, bluesign, etc)

Suggested Uploads:

- A copy of the facility's chemical purchasing policy

What is the intent of the question?

The intent of this question is for facilities to demonstrate that a chemical purchasing policy is in place to ensure that chemicals are screened against established criteria before being purchased.

Technical Guidance

Establishing a formal chemical purchasing policy helps ensure chemicals are appropriately screened before being purchased. A chemical purchasing policy should clearly define the criteria for chemicals that can and cannot be purchased (e.g., specific legal or other requirements, health and safety considerations, etc.) The goal of the policy should be to reduce risk of hazardous or non-compliant chemicals entering the facility.

When developing a chemical purchasing policy, facilities should consider the following key elements of an effective chemical purchasing policy:

- Developing specific criteria (e.g., legal or other requirements) for selecting chemicals to purchase.
- Detailed procedures and responsibilities for the review and approval of chemicals before they are purchased.
- Procedures to communicate the policy and purchasing criteria to chemical suppliers (e.g., including terms and conditions in contracts and/or purchase agreements).
- Requirements for suppliers to provide sufficient chemical information for review, such as providing safety data sheets (SDS), labelling requirements, lot numbers, expiry dates, and other information on the environmental and health impact of their products.
- Procedures to ensure that staff are trained on the policy and understand the importance of selecting appropriate chemicals for use at the facility.

Resources:

The ZDHC CMS and Technical Industry Guide framework sets out the principles and practices that should be included in a CMS including chemicals purchasing which are designed to help companies establish a robust and effective CMS that meets the ZDHC framework requirements

and reduces the environmental and health impacts associated with chemical use in the supply chain.

- The ZDHC Chemical Management System (CMS) framework and Chemicals Management System Technical Industry Guide can be downloaded here: https://www.roadmaptozero.com/process#Guidance

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that shows the facility has an established chemical purchasing policy. This may include:
  - Chemical purchasing policy that outlines how chemicals are screened against established criteria before being purchased.
  - Chemical purchasing records that demonstrate chemicals are being purchased in line with the established chemical purchasing policy.
- Other supporting documentation that shows the facility's practices and procedures align with the chemical purchasing policy. This may include:
  - Communication and/or training records on the facility's purchasing policy.
  - Chemical procurement procedures.

Interview Questions to Ask:

- Staff responsible for chemical purchasing at the facility are aware of the facility's policy and can describe their process screening and purchasing chemicals in line with the established policy.

Inspection - Things to Physically Look For:

- Observations onsite indicate the chemicals are being purchased in line with the purchasing policy (e.g., all chemicals onsite are covered in the purchasing policy

Partial Points: N/A

4. Does your facility keep a Chemical Inventory List (CIL) and the suppliers of each chemical product?

Answer Yes if: Your facility has an up-to-date chemical inventory list (CIL) that includes **all** chemicals used at the facility.

Answer Partial Yes if: Your facility has an up-to-date chemical inventory list (CIL) that includes **some, but not all** chemicals at the facility.

Note: Up-to-date means that the information in the inventory includes all chemicals currently in use **and** accurately reflects chemical use at the facility (e.g., chemicals that are not currently onsite, but are commonly used within and by the facility).

If you select Yes, you will be asked the following sub question(s):

- Does your facility include the following types of chemicals in the inventory?
    - All chemicals used in manufacturing processes (including chemicals in production, reactants and additives.
    - All chemicals used in tooling/equipment (lubricants and grease).
    - All chemicals used to operate and maintain the facility, and wastewater treatment plant chemicals where applicable.
    - Spot cleaner(s).
- Please upload documentation, if available.

Note: To be able to answer Yes to the main question all responses to the sub question must be either Yes or Not Applicable. If any of the responses to the sub questions above are no, the response for the main question must be Partial Yes

If you select Partial Yes or No, you will be asked the following sub questions:

- For data not included in your facility's Chemical Inventory List, is there an action plan for obtaining this data?
    - Upload your action plan for obtaining this data.
    - If you don't have a document to upload, describe your plan.

Suggested Uploads:

- A copy of the facility's Chemical Inventory List
- If applicable, documentation action plan to obtain missing information in the inventory.

What is the intent of the question?

The intent of this question is to ensure that facilities have identified and created an inventory of all chemicals onsite.

Technical Guidance

Understanding which chemicals are used within a facility is a necessary first step in building a chemical management system. Identifying all chemicals used and their properties allows a facility to understand and manage regulatory and customer requirements, and ensure appropriate controls are in place to protect workers and the environment. A chemical inventory can also help facilities with purchasing decisions, increase transparency and traceability, and promote responsible chemical use.

Facilities should have a robust process for creating and updating their chemical inventory and have dedicated staff, in charge of maintaining the inventory.

While preparing an inventory, there are some important considerations that should be reviewed including:

- How to ensure that all chemicals are covered including production and non-production chemicals.
    - An inventory should contain all chemicals used and stored in the facility and may cover, but is not limited to, cleaners, adhesives, paints, inks, detergents, dyes, colourants, auxiliaries, coatings and finishing agents, and commodity chemicals, as well as those used for ETP, sanitary, laboratory and utility purposes.
- What information is needed in the inventory to manage the chemicals effectively and safely and how this information will be obtained (e.g., from chemical suppliers, SDS, other sources, etc). Key information that should be included, but is not limited to, the following:
    - Chemical name and type
    - Supplier/Vendor name and type
    - Manufacturer/Formulator name
    - Safety Data Sheet (SDS), Global Harmonization System (GHS) compliant or equivalent
    - Function
    - Hazard classification
    - Where it is used
    - Storage conditions and location
    - Quantities (quantity of chemicals used)
    - CAS number or numbers (when in a mixture)
    - Lot numbers (if applicable)
    - MRSL conformance
    - Purchase date
    - Expiration dates (if applicable)
- How the inventory will be updated (e.g., addition/removal of new/old chemicals, review frequency and responsible staff).

- How the inventory may be used to support monitoring of chemical consumption and purchasing to reduce risks of expiry or storage of excessive quantities of chemicals onsite.

Resources:
The resources below provide example templates and reference information that can support a facility in creating or updating their chemical inventory.

Note: The resources provided below are for reference only and facilities should ensure their chemical inventory complies with any applicable law or regulations.

- Examples of CIL templates can be downloaded from the ZDHC Resources page here: https://www.roadmaptozero.com/documents
- The ZDHC Chemical Management System (CMS) framework and Chemicals Management System Technical Industry Guide can be downloaded here: https://www.roadmaptozero.com/process#Guidance
- UNECE Globally Harmonized System of Classification and Labelling of Chemicals (GHS) https://unece.org/about-ghs

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities that have an up-to-date chemical inventory list (CIL) that includes **all** chemicals used at the facility.

Documentation Required:

- Documentation that shows the facility has a chemical inventory list (CIL) and this the list is up-to-to-date and accurate. This may include:
    - The chemical inventory list (CIL)
    - Purchase records of chemicals

Interview Questions to Ask:

- Staff responsible for the chemical inventory list are able to explain how the facility ensures that the list is maintained and updated.

Inspection - Things to Physically Look For:

- Observations onsite indicate that the inventory is up-to-date and accurate (e.g., chemicals observed to be in use at the facility are included on the inventory)

Partial Points:

- Partial points will be awarded for facilities that have an up-to-date chemical inventory list (CIL) that includes **some, but not all** chemicals at the facility.

5. Does your facility's Chemical Inventory List (CIL) include the following data? Select all that apply.

- Chemical name and type
- Supplier/Vendor name and type
- Manufacturer/Formulator name
- Safety Data Sheet (SDS), Global Harmonization System (GHS) compliant or equivalent
- Function
- Hazard classification
- Where it is used
- Storage conditions and location
- Quantities (quantity of chemicals used)
- CAS number or numbers (when in a mixture)
- Lot numbers (if applicable)
- MRSL conformance
- Purchase date
- Expiration dates (if applicable)

Notes:

- Exception for lot numbers: Facilities that do not use chemicals in production, (e.g., spot cleaning or ETP chemicals) that would not lead to RSL, MRSL, ZDHC Wastewater testing failures do not need to include the lot numbers for these chemicals and should check the box for lot number if these are the only types of chemicals used onsite.
- If a chemical does not conform to specific MRSL requirements, it does not mean the facility does not have a CIL or the required information if the MRSL conformance status is listed.

Suggested Uploads:

- A copy of the facility's Chemical Inventory List (CIL)
- Examples of supporting information for the data that is included in the CIL (e.g., SDS, chemical usage records, purchase records, MRSL conformance tests or declarations, etc.)

What is the intent of the question?

The intent of the question is for facilities to demonstrate that their chemical inventory contains the necessary information for each chemical.

Technical Guidance:

An effective chemical inventory should include all information needed to manage the chemicals effectively and safely. For the Higg FEM, the list of information included in this question is considered important to include in an inventory, however there may be additional information that is valuable to support a facility's management of chemicals. For example, it is also recommended as a good practice to indicate whether chemicals in your inventory are included in a positive list or negative list of any industry standard, if applicable.

The guidance below provides additional details on the type of information to include for the key items in the inventory:

- Chemical Product and Chemical Formulator name
    - This can be obtained from Section 1 of the SDS where the Chemical Product name and Chemical Formulator name are detailed. This should also be confirmed with the GHS-label on the chemical container.
- Supplier name
    - In case this is different from Chemical Formulator, such as a trader or distributor.
- Safety Data Sheet (SDS) Information
    - The date of issue of the SDS should be inputted, only if the SDS for the chemical product is available in the manufacturing facility. In case the SDS is not available or is found to be outdated, a follow-up should be made with the Chemical Formulator to obtain the latest SDS and then the date of issue should be input.
- Function
    - Indicates the use or application of the chemical.
- Hazard classification
    - Hazard Statements for the three Hazard Types - Physical, Health and Environmental- should be inputted, as listed in Section 2 of the SDS.
    - Storage, handling and discharge precautions: Refer to the P-Statements given in Section 2 and Section 7.2 of the SDS
- Where it is used
    - Input the locations/areas the chemical is used.
- Storage conditions and location
    - The location such as the main store, sub-store or a specific storage place can be described here to quickly understand the place of storage.
- Quantities (quantity of chemicals used)
    - For example, actual monthly/annual usage amount and unit
- CAS number or numbers
    - Input the CAS (Chemical Abstract Service) numbers of the hazardous substances as listed under Section 3 of the SDS.
    - Input the CAS number and % of the substance for mixtures.
- Lot numbers (if applicable)
    - The batch or lot number(s) of the chemical product purchased in the month can be inputted to establish traceability in case of Root Cause Analysis.
- MRSL conformance

- Input the conformance status with any applicable MRSL.

Resources:
The resources below provide example templates and reference information that can support a facility in creating or updating their chemical inventory.

Note: The resources provided below are for reference only and facilities should ensure their chemical inventory complies with any applicable law or regulations.

- Examples of CIL templates can be downloaded from the ZDHC Resources page here: https://www.roadmaptozero.com/documents
- The ZDHC Chemical Management System (CMS) framework and Chemicals Management System Technical Industry Guide can be downloaded here: https://www.roadmaptozero.com/process#Guidance
- UNECE Globally Harmonized System of Classification and Labelling of Chemicals (GHS) https://unece.org/about-ghs

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities that have an up-to-date chemical inventory list (CIL) that includes **all** of the data points listed in the FEM.

Documentation Required:

- Documentation that shows the facilities chemical inventory list (CIL) up-to-to-date and includes accurate information on chemicals in the list. This may include:
  - The chemical inventory list (CIL)
  - Safety Data Sheets (SDS) or Technical Data Sheets (TDS)
  - Chemical usage records
  - Purchase records of chemicals
  - MRSL conformance tests or declarations

Interview Questions to Ask:

- Staff responsible for the chemical inventory list are able to explain how the facility obtains information in the inventory and ensures that the list is maintained and updated.

Inspection - Things to Physically Look For:

- Observations onsite indicate that the inventory is up-to-date and the associated information in the inventory is accurate (e.g., chemicals observed to be in use at the facility are included on the inventory)

Partial Points:

- Partial points will be awarded for facilities that have an up-to-date chemical inventory list (CIL) that includes **some, but not all** data points listed in the FEM.
    - **Note**: Partial points are calculated automatically in the FEM based on the items that are included in the CIL.

6. Does your facility make Safety Data Sheets (SDS) available to employees for all chemicals used?

Answer Yes if: Your facility has up-to-date SDS information available to employees for **all** chemicals used **and** the SDS is at minimum, compliant with country specific regulations **and** the facility has an established process to ensure that SDS information is kept up-to-date.

Answer Partial Yes if: Your facility has up-to-date SDS information available to employees for some, but not all chemicals used **and** the available SDS are at minimum, compliant with country specific regulations.

Note: Up-to-date means that the SDS has been updated at the frequency defined by local law and/or if any of the following have occurred:

- An ingredient used in the formulation is changed due to which there is an impact on the hazard classification of the formulation.
- New toxicological/legislative information is applicable to any ingredient used in the formulation that may impact the overall hazard classification of the formulation.
- Any type of new restriction or authorisation has been imposed on a substance or mixture (e.g., under EU- REACH regulation or other legislation).

If you select Yes or Partial Yes, you will be asked the following sub question(s):

- Are Safety Data Sheets posted readily accessible where hazardous chemicals are stored/used?
- Are Safety Data Sheets available in languages workers understand (at least sections directly related to operational worker safety and storage requirements, such as first aid, hazard, and flammability information)?
- Please upload documentation, if available

Notes:

- Readily accessible means that SDS information is easily accessed in areas of use. For example, this could be achieved by posting of SDS and/or maintaining SDS information in a folder at a nearby work areas.
- It is not required to translate all SDS information into the language of workers in its entirety. It is acceptable to create translated simplified data sheets that contain translation of necessary information for workers related to their job function and chemical hazards/safety (e.g., appropriate handling, use, and storage of the chemical, personal protection, proper first aid/emergency response and disposal precautions).

Suggested Uploads:

- Photo images showing the SDS information available in applicable work areas and accessible to the employees.
- Copies of SDS
    - **Note:** Copies of all SDS do not need to be uploaded but should be available for review during verification.
- Procedures for ensuring SDS information is up-to-date.

What is the intent of the question?

The intent of this question is for facilities to ensure that up-to-date SDS information is available for all chemicals used in the facility.

Technical Guidance:

Safety Data Sheets (SDS) are a fundamental source of information on the hazards associated with a chemical. SDS provide crucial information on how to manage chemicals in a responsible manner including how chemicals should be stored, used, handled, and disposed of as well as information on health, safety, and environmental hazards.

An SDS (either as hard or soft copy) for every chemical used in a facility should be kept at a central location and also in areas where the chemical is stored and/or used so that it is readily accessible by staff. Staff should also be trained on how to read and understand SDS information.

The Globally Harmonized System of Classification and Labelling of Chemicals (GHS/CLP) is an internationally recognized system for the classification and labelling of chemicals. The GHS was developed to replace individual sets of classification and labelling standards used in different countries with a single, standardized set of criteria for the classification and labelling of chemicals and standardized requirements for the information required on SDS.

Country specific levels of GHS adoption may vary, however it is recommended that facilities request GHS compliant SDS form chemical suppliers when available, but at minimum facilities should follow applicable country specific regulations relating to SDS content.

It is also important that SDS information be provided in the language of all workers so that it is easily understood. It is not required to translate all SDS information into the language of workers in its entirety. It is acceptable to create translated simplified data sheets that contain translation of necessary information for workers related to their job function and chemical hazards/safety (e.g., appropriate handling, use, and storage of the chemical, personal protection, proper first aid/emergency response and disposal precautions) or as legally required.

The date of issue of SDS and its version number should be carefully monitored. An SDS needs to be updated by a chemical supplier when:

- Any ingredient(s) are changed that results in a change to the hazard classification of the chemical.
- New toxicological/legislative information is applicable to any ingredient(s) that may impact the hazard classification of the chemical.
- Any type of restriction or authorisation has been imposed on chemical or its ingredient(s) (e.g., under EU- REACH regulation or other legislation).

It is considered a good practice for facilities to monitor the validity of the SDS for each chemical product by checking regularly with the supplier for any potential updates. (**Note** that the FEM does not define a required frequency for this.)

In cases where certain SDS information is not available at the point of purchase (e.g., tooling or cleaning chemicals) Facility should strive to obtain as much information about the chemical as possible (e.g., by contacting manufacturers or suppliers provided on the product). Facilities should also ensure these products have appropriate labels which should provide details of ingredients and hazards. In cases where appropriate labels or SDS are not available, the original labels should be compliant to GHS/CLP or country specific regulations.

Resources:
The resources below provide helpful information on SDS management.

Note: The resources provided below are for reference only and facilities should ensure that their SDS management program complies with any applicable laws or regulations.

- UNECE Globally Harmonized System of Classification and Labelling of Chemicals (GHS) https://unece.org/about-ghs
- GHS implementation status by country - https://unece.org/transportdangerous-goods/regionalcountry-level?accordion=0#accordion_1
- Examples of CIL templates can be downloaded from the ZDHC Resources page here: https://www.roadmaptozero.com/documents
- The ZDHC Chemical Management System (CMS) framework and Chemicals Management System Technical Industry Guide can be downloaded here: https://www.roadmaptozero.com/process#Guidance

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities that have up-to-date SDS information available to employees for **all** chemicals used **and** the SDS is at minimum compliant with country specific regulations **and** the facility has an established process to ensure that SDS information is kept up-to-date.

Note: Up-to-date means that the SDS has been updated at the frequency defined by local law and/or if any of the following have occurred:

- An ingredient used in the formulation is changed due to which there is an impact on the hazard classification of the formulation.
- New toxicological/legislative information is applicable to any ingredient used in the formulation that may impact the overall hazard classification of the formulation.
- Any type of new restriction or authorisation has been imposed on a substance or mixture (e.g., under EU- REACH regulation or other legislation).

Documentation Required:

- Documentation that demonstrates the facility has up-to-date SDS information available in the workplace and that SDS information is available to workers. This may include:
    - Copies of up-to-date SDS that are at minimum compliant with legal requirements for SDS.
    - Copies SDS information translated into the language of workers.
    - SDS Training records for workers.
    - Procedures that demonstrate the facility has processes in place to ensure SDS information is kept up-to-date.

Interview Questions to Ask:

- Staff responsible for SDS management at the facility are able to explain the facility's procedures for Managing SDS information and how the facility ensures up-to-date SDS information for chemicals is obtained and communicated and made accessible to workers.

- Relevant employees understand the facility's SDS program and can explain how SDS information is accessed when needed.

Inspection - Things to Physically Look For:

- Observations that indicate up-to-date SDS information is available at the facility and made accessible to workers (e.g., SDS are available for chemicals observed onsite, SDS are stored (in hard or soft copy) in work areas)

Partial Points:

- Partial Points will be awarded to facilities that have up-to-date SDS information available to employees for some, but not all chemicals used **and** the available SDS are at minimum compliant with country specific regulations.

7. Does your facility train all employees who handle chemicals on chemical hazards, risk, proper handling, and what to do in case of emergency or spill?

Answer Yes if: Your facility has provided training to employees and the training meets **all** of the following criteria:

- Training has been delivered to **all** employees who handle chemicals.
- The Training covers all of the topics listed in the sub question below.
- The training is documented (with training records and/or material)
- Training is conducted at least annually **or** at a frequency that allows training all new employees according to the turnover rate.

Answer Partial Yes if: Your facility has provided training, but one (1) or more of the following criteria is **not** met:

- Training has been delivered to **all** employees who handle chemicals.
- The Training covers all of the topics listed in the sub question below.
- The training is documented (with training records and/or material)
- Training is conducted at least annually **or** at a frequency that allows training all new employees according to the turnover rate.

Note: If your facility has not provided training to any employees on chemicals, you should answer No to this question.

If you select Yes or Partial Yes, you will be asked the following sub question(s):

- Please select all topics included in your training:
    - Chemical hazards and identification
    - MSDS/SDS
    - Signage
    - Compatibility and risk
    - Proper storage and handling
    - PPEs
    - Procedure in case of emergency, accidents, or spill

- Access restriction to chemical storage areas
- Potential environmental impact of the chemicals in tanks
- The physical protection provided to employees in the area(s) where the factory uses, stores, and transports these containers.
- Individual duties associated with monitoring and maintaining this protection here.

- How many employees were trained?
- How frequently do you train your employees?
- Do you evaluate your employees after the training?
  - How do you evaluate the knowledge of your employees after the training?
- Please upload documentation.

Suggested Uploads:

- Documentation that demonstrates the facility has conducted training on chemicals for employees (e.g., Training plan/schedule, training records, training material used for training, post-training evaluation procedures and/or records)

What is the intent of the question?
The intent of this question is for facilities to demonstrate that procedures are in place to train employees who handle chemicals on chemicals hazards and safety, and that trainings have been conducted.

Technical Guidance:
It is important that all levels of employees are aware of chemical hazards, risks, safety precautions and emergency response for chemicals in use at the facility. Facilities should have formal documented training processes to ensure awareness and knowledge is shared with all employees who handle chemicals.

Effective training programs ensure that all levels of employees understand the potential hazards, risks, and controls associated with chemicals in the workplace. Various levels and types of training may be required to ensure training is appropriate for employees in different positions or with responsibilities and directly relates to the types of chemicals they may come into contact with during regular operations or emergency situations.

Having procedures to collect information to evaluate the effectiveness of training programs (e.g., trainee feedback questionnaires or test, observation, or reviews of trainer performance, etc) will help facilities ensure the effectiveness of training and knowledge retention.

Resources:

- The ZDHC Academy offers trainings to create awareness, learn and develop skills on sustainable chemical management - https://www.implementation-hub.org/academy

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities that have provided training to employees and the training meets **all** of the following criteria:

- Training has been delivered to **all** employees who handle chemicals.
- The training covers all of the topics listed in the sub question.
- The training is documented (with training records and/or material)
- Training is conducted at least annually **or** at a frequency that allows training all new employees according to the turnover rate.

Documentation Required:

- Documentation that shows the facility has provided chemicals related training employees. This may include:
    - Training plan that identifies training schedule(s), topics covered, and type of training for employees.
    - Training attendance records
    - Training material used for environmental training,
    - Training evaluation procedures and/or records

Interview Questions to Ask:

- Staff responsible for the facility's chemical training program can explain how training is provided and if applicable, how the effectiveness of training is evaluated.
- Employees who have received the training are aware of the content of the training.

Inspection - Things to Physically Look For

- Supporting evidence of the facility's environmental training program (e.g., awareness posters, informational postings related to the facility's chemical management/safety programs, if available)

Partial Points:

- Partial point will be awarded for facilities that have provided training, but one (1) or more of the following criteria is **not** met:
    - Training has been delivered to **all** employees who handle chemicals.
    - The Training covers all of the topics listed in the sub question below.
    - The training is documented (with training records and/or material)
    - Training is conducted at least annually **or** at a frequency that allows training all new employees according to the turnover rate.

8. Does your facility have a chemical spill and emergency response plan that is practiced periodically?

For facilities that use chemicals in production:

Answer Yes if: Your facility has a documented chemical spill and emergency response plan that meets the requirements listed in Section 4.3 of the ZDHC Chemical Management System (CMS) Framework **and** practice drills are conducted at least twice per year for all relevant staff.

Answer Partial Yes if: Your facility has a documented chemical spill and emergency response plan, but the plan does not meet the requirements listed in Section 4.3 of the ZDHC Chemical Management System (CMS) Framework **or** practice drills are not conducted at least twice per year for all relevant staff.

Note: For this question, **relevant staff** means any employee or manager that handles chemicals, works in areas where chemicals are used, and/or has defined responsibilities in the facility's chemical spill and emergency response plan/procedures.

For facilities that only use chemicals for operations or tooling/equipment:

Answer Yes if: Your facility has a documented chemical spill and emergency response plan that meets the requirements listed in Section 4.3 of the ZDHC Chemical Management System (CMS) Framework. Practice drills are not required.

Answer Partial Yes if: Your facility has a documented chemical spill and emergency response plan, but the plan does not meet the requirements listed in Section 4.3 of the ZDHC Chemical Management System (CMS) Framework. Practice drills are not required.

Note: The ZDHC Chemical Management System (CMS) Framework can be downloaded here: https://www.roadmaptozero.com/process#Guidance

If you select Yes or Partial Yes, you will be asked the following sub question(s):

- How many employees were trained on this topic?
- How frequently do you train your employees on this topic?
- Do you evaluate your employees after the training?
    - How do you evaluate the knowledge of your employees after the training?
- Does your facility keep records of all employee and environmental incidents related to chemical spills and emergency response?
- Please upload documentation, if available

Suggested Uploads:

- Documentation that demonstrates the facility has an emergency response plan in place and that practice drills are conducted, when required (e.g., copy of emergency response plan/procedures, records of practice drills, etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that emergency response procedures are in place and that employees are trained on how to respond in the event of a chemical emergency.

Technical Guidance:

The FEM aligns with the ZDHC criteria for emergency response plan content and procedures contained in Section 4.3 of the ZDHC Chemical Management System (CMS) Framework. These criteria are summarized below:

At minimum, facilities need to have:

- A procedure to identify and respond to potential chemical and natural incidents related but not limited to spills, fires, accidents, injuries to employees and damage to buildings and equipment.
- Detailed instructions on how to evacuate the building and contain contact names/ information for individuals in charge of the evacuation.
- Twice per year testing of procedures which shall include all employees, sub-contractors, EMS teams, and depending on the size and scope of the drill, and the outside community EMS team.
- Consultation of appropriate municipal officials since control may be exercised by the local government in major emergencies and additional resources may be available.
- Communication and training to ensure adequate performance in times of an emergency.
- Methods to update procedures where necessary after practice drills and actual emergencies. All drills and follow-up should be documented.

Resources:

- The ZDHC Chemical Management System (CMS) Framework can be downloaded here: https://www.roadmaptozero.com/process#Guidance

How This Will Be Verified:

Full Points:

For facilities that use chemicals in production:

Full Points will be awarded for facilities that have a documented chemical spill and emergency response plan that meets the requirements listed in Section 4.3 of the ZDHC Chemical

Management System (CMS) Framework **and** practice drills are conducted at least twice per year for all relevant staff.

For facilities that only use chemicals for operations or tooling/equipment:

Full Points will be awarded for facilities that have a documented chemical spill and emergency response plan that meets the requirements listed in Section 4.3 of the ZDHC Chemical Management System (CMS) Framework v1.0, May 2020. Practice drills are not required.

Documentation Required:

- Documentation that shows the facility has a documented emergency response plan in place and that practice drills are conducted, when required. This may include:
    - Emergency response plan/procedures,
    - Documentation of practice drills (e.g., drill practice/training records)

Interview Questions to Ask:

- Staff responsible for managing the facility's emergency response plan and procedures can explain the facility's procedures for responding to emergencies and how drills are practiced.
- Relevant staff understand the facility's emergency response procedures and have participated in drill, if applicable.

Inspection - Things to Physically Look For:

- Observations indicate that the facility has the necessary procedures and equipment in place to respond to chemical emergencies per their developed plan. (e.g., Availability of emergency response equipment e.g., spill kits, showers, eyewash stations, fire extinguishers, SDS, emergency exits clearly marked, unobstructed and unlocked, etc.)

Partial Points:

- **For facilities that use chemicals in production:**
    - Partial Points will be awarded for facilities that have a documented chemical spill and emergency response plan, but the plan does not meet the requirements listed in Section 4.3 of the ZDHC Chemical Management System (CMS) Framework **or** practice drills are not conducted at least twice per year for all relevant staff.

- **For facilities that only use chemicals for operations or tooling/equipment:**
    - Partial points will be awarded for facilities that have a documented chemical spill and emergency response plan, but the plan does not meet the requirements listed

in Section 4.3 of the ZDHC Chemical Management System (CMS) Framework. Practice drills are not required.

9. Does your facility have appropriate and operable protective and safety equipment, as recommended by the Global Harmonization System compliant (or equivalent) Safety Data Sheet, in all areas where chemicals are stored and used?

Answer Yes if: Your facility has appropriate and operable protective and safety equipment as recommended chemical safety data sheets (SDS) in **all** areas where chemicals are stored and used.

Answer Partial Yes if: Your facility has appropriate and operable protective and safety equipment as recommended chemical safety data sheets (SDS) in **some, but not all** areas where chemicals are stored and used.

Notes:

- This question applies to all production and non-production related chemicals.
- For this question the terms appropriate and operable are defined as follows:
    - **Appropriate** – refers to protective and safety equipment recommended for use on the SDS of each chemical or as required by a health and safety risk assessment conducted by a qualified safety professional.
    - **Operable** – refers to the protective and safety equipment being readily accessible to employees and maintained in good repair and/or working order (e.g., per the equipment manufacturer's specifications).

If you select Yes or Partial Yes, you will be asked the following sub question(s):

- Please upload documentation.

Suggested Uploads:

- Documentation that shows the facility has identified appropriate protective and safety equipment required and that the equipment is regularly replenished and/or maintained (e.g., health and safety risk assessment showing the required controls, inventory list of PPE and safety equipment with schedules of stock replenishment/replacement, equipment maintenance, etc.).

What is the intent of the question?

The intent of this question is to ensure facilities understand and provide appropriate protective and safety equipment to reduce worker exposure to health and safety risks of chemicals in the workplace.

Technical Guidance:

Ensuring appropriate personal protective equipment (PPE) (e.g., gloves, respirators, protective clothing, etc. and other safety equipment (e.g., spill kits, eye wash stations, emergency showers, fire extinguishers, etc) is available in areas where chemicals are stored and used is crucial to protecting workers from chemical exposure risks.

Information on the recommended safety and protective equipment may be found in the following sections of a GHS compliant SDS (note that SDS sections and content may vary by jurisdiction)

- Section 4: First-Aid Measures
- Section 5: Fire-Fighting Measures
- Section 8: Exposure Controls/Personal Protection

The selection of the most suitable PPE and safety equipment should be evaluated by an accredited health and safety professional to determine the most effective equipment and any limitations. This is particularly important for facilities that use a high number of chemicals where workers are potentially exposed to multiple chemicals and chemical mixtures.

For all PPE and safety equipment, appropriate replacement and maintenance schedules should be defined and be based on available information such as manufacturer recommendations, onsite conditions, the level and duration of potential exposures to chemicals.

It is also important for facilities to remember that PPE should only be used as a last resort if no other control methods are available or are sufficient. For tasks where PPE is needed, it should be selected based on a formal job hazard review that identifies the specific chemical or physical hazards and the most effective type of PPE.

Resources:

- U.S. OSHA – Personal Protective Equipment - https://www.osha.gov/sites/default/files/publications/osha3151.pdf
- Chemical Safety in the Workplace Guidance Notes on Personal Protective Equipment (PPE) for Use and Handling of Chemicals - http://www.labour.gov.hk/eng/public/os/C/equipment.pdf

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities that have appropriate and operable protective and safety equipment as recommended chemical safety data sheets (SDS) in **all** areas where chemicals are stored and used.

Documentation Required:

- Documentation that shows the facility has identified appropriate protective and safety equipment required and that the equipment is regularly replenished and/or maintained. This may include:
    - Documented health and safety risk assessment and/or SDS showing the required protective/safety equipment.
    - Inventory list of PPE with schedules for stock replenishment/replacement
    - Inspection and maintenance schedules for safety equipment (e.g., eyewash, emergency showers, etc)

Interview Questions to Ask:

- Staff responsible for health and safety at the facility can explain how the facility identifies the required type of PPE and safety equipment needed.
- Staff responsible for providing or maintaining protective and/or safety can explain the facility's procedures for ensuring equipment is available and in good working order.

Inspection - Things to Physically Look For:

- Observations onsite indicate that appropriate PPEs and safety equipment is available in relevant areas and are consistent with hazard classification on chemical SDS and safety equipment is accessible and functioning.

Partial Points:

- Partial points will be awarded for facilities that have appropriate and operable protective and safety equipment as recommended chemical safety data sheets (SDS) in some, but not all areas where chemicals are stored and used.

10. Does your facility have chemical hazard signage and safe handling equipment in the areas of the facility where chemicals are used?

Answer Yes if: Your facility has chemical hazard signage and safe handling equipment is available in **all** areas where chemicals are used.

Answer Partial Yes if: Your facility has chemical hazard signage and safe handling equipment **in some, but not all** areas where chemicals are used.

Note: This question applies to all production and non-production related chemicals.

If you select Yes or Partial Yes, you will be asked the following sub question(s):

- Please upload documentation.

Suggested Uploads:

- Documentation that demonstrates the facility has appropriate practices and procedures to ensure that chemical hazard signage and safe handling equipment are available in areas where chemicals are used (e.g., chemical labelling/signage procedures, examples of chemical signage, inspection schedule/procedures that cover chemical hazard signage and handling equipment, etc.)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that practices and procedures are in place to ensure chemical hazard signage and safe handling equipment is in place in all areas where chemicals are stored.

Technical Guidance:

It is important that the presence of chemical hazards in the workplace are clearly communicated and visible to employees. This helps employees understand where chemical hazards are present as well as the type of hazards that exist (e.g., flammable, toxic, corrosive, etc.). Facilities should post signage at all areas where chemicals are stored or used. Signage should depict the hazard classification(s) of chemicals as provided on the SDS (Section 2: Hazard(s) Identification) and/or other hazard identifiers required by local law.

Areas in the facility that may require chemical hazard signage include, but are not limited to:

- Receiving and delivery areas
- Chemical storage areas (centralized warehouse and temporary storage areas)
- Chemical process areas (e.g., manufacturing/production areas)
- Waste chemicals storage (including chemical residues and expired chemicals)
- Laboratories
- Maintenance areas

Safe handling and transfer equipment (e.g., trolleys, carts, pumps) should be available at relevant locations to ensure safe handling which can reduce the potential for spills, which can result in negative impacts to workers' health or the environment. These tools can also result in cost savings by reducing chemical loss.

Resources:

- The ZDHC Chemical Management System (CMS) framework and Chemicals Management System Technical Industry Guide can be downloaded here: https://www.roadmaptozero.com/process#Guidance
- U.S. Occupational Safety and Health Administration (OSHA) Hazcom website - https://www.osha.gov/hazcom

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities that have chemical hazard signage and safe handling equipment is available in **all** areas where chemicals are used.

Documentation Required:

- Documentation that demonstrates the facility has appropriate practices and procedures to ensure that chemical hazard signage and safe handling equipment are available in areas where chemicals are used. This may include:
    - Chemical labelling/signage procedures with requirements for chemical hazard signage
    - Inspection schedule/procedures that cover chemical hazard signage and handling equipment.
    - SDS that shows the hazard classes of chemicals onsite.

Interview Questions to Ask:

- Staff responsible for the facility's chemical management and/or safety programs can explain the facilities procedures to ensure appropriate hazard signage is available in areas where chemicals are stored and used.
- Relevant employees understand the facility's chemical hazard signage and how to use the provided safe handling equipment.

Inspection - Things to Physically Look For:

- Observations onsite indicate that chemical hazard signage is in place in all areas where chemicals are used, and the signage is consistent with the hazards indicated on SDS.
- Observations that indicate safe handling equipment is available and in being used.

Partial Points:

- Partial points will be awarded for facilities that have chemical hazard signage and safe handling equipment is available in **some, but not all** areas where chemicals are used.

11. Does your facility select and purchase chemicals based on their hazards and MRSL requirements?

Answer Yes if: Your facility has a documented process in place to select and purchase chemicals based on their hazards and MRSL requirements;
and all chemicals meet the requirements of MRSL and the facility's purchasing policy;
and MRSL conformance is confirmed annually (e.g., through certificates/declarations of MRSL conformance, certificates of analysis, etc).

Answer Partial Yes if: Your facility has a documented process in place to select and purchase chemicals based on their hazards and MRSL requirements but have purchased chemical(s) that do not have sufficient documentary evidence to prove compliance to MRSL, **and** your facility has a clear plan for obtaining the documents from chemical suppliers within 6 months or changing to a chemical supplier who can meet the requirements in order to increase the % of compliant chemicals meeting MRSL.

Non-production chemicals and spot cleaners:

For chemicals not used in the manufacturing process (e.g., lubricants, cleaning chemicals, etc.) or spot cleaners, it might not be feasible to obtain third party certificates/declarations of MRSL compliance or certificates of analysis. For these types of chemicals, this documentation is not required, but facilities must have an established process in place to review the chemical ingredients against the MRSL to check for conformance.

Notes:

- The ZDHC MRSL conformance levels (1, 2 and 3) from the ZDHC Gateway- Chemical Module should be used for the determination of the conformity with the ZDHC MRSL. For more information about the ZDHC MRSL conformance, refer to the ZDHC MRSL Conformance Guidance here: https://downloads.roadmaptozero.com/input/ZDHC-MRSL-Conformance-Guidance
- Tools to check your chemical inventory to the ZDHC MRSL are the InCheck Solutions https://www.roadmaptozero.com/process#Incheck-guidelines

If you select Yes or Partial Yes, you will be asked the following sub question(s):

- If yes, do all chemicals purchased and used in production meet the facility's chemical purchasing policy?

If you select No, you will be asked the following sub question(s):

- If no, do you have a process or plan for eliminating chemicals that do not meet the facility's chemical purchasing policy?

Suggested Uploads:

- Documentation that demonstrates the facility selects and purchases chemicals based on their hazards and MRSL requirements such as:

- MRSL(s) applicable to the facility (e.g., customer's MRSL, ZDHC MRSL, combined facility MRSL).
- Chemical purchasing policy and procedure(s).
- Positive lists used for chemical purchasing.
- Third party MRSL conformance certification/test reports/declarations and/or certificate of analysis of chemical composition.
- Chemical inventory showing MRSL compliance status of all chemicals.

What is the intent of the question?

The intent is to ensure facilities have an established process to evaluate chemical hazards and MRSL conformance during procurement and that only compliant chemicals are purchased for use at the facility.

Technical Guidance:

MRSL is a Manufacturing Restricted Substance List which can be defined as a list of chemicals that are banned from use in manufacturing. The goal of an MRSL is to ensure facilities are using the environmentally preferred chemicals that result in less harm to the environment and human health. Using an MRSL in chemicals procurement can also help ensure more consistent material compliance.

To ensure that chemicals are appropriately evaluated before purchase, facilities should:

- Establish their own chemical MRSL that covers all MRSL requirements from clients (e.g., brands) they work with or industry initiatives they are a part of or implement a strategy to use compliant chemicals from an active list that covers all MRSL (e.g., the bluesign system).
- Establish a process to communicate MRSL requirements to all chemical suppliers including the required evidence from suppliers to confirm compliance (e.g., positive lists, certificates/declarations of MRSL conformance, certificates of analysis, or other relevant documentation)
- Include MRSL compliance as a purchasing requirement for all chemicals.
    - This should include procedures to verify chemicals conform to MRSL requirements through documentation provided by chemical suppliers.
    - Where applicable, facilities should purchase chemicals that are certified to meet MRSL requirements such as bluesign approved chemistry, Ecopassport by OekoTex.
- Ensure all chemical procurement staff are aware of MRSL requirements and the facility's purchasing policy and procedure.
- For chemicals not used in the manufacturing process (e.g., lubricants, cleaning chemicals) ensure there is a process in place to, at minimum, review the list of ingredients and SDS if available against the facility's MRSL to confirm MRSL conformance.

It is critical that facilities discuss MRSL requirements with their chemical suppliers to determine which chemical products are MRSL compliant and the requirements for chemical suppliers to be able to demonstrate their products comply with the facility's MRSL requirements.

It is also important that facilities not only rely on simple declarations or assurances from suppliers alone, but ensure there is a validation processes in place to ensure compliance such as chemical composition test reports from ISO 17025 certified laboratories approved for conducting the required chemical testing or use of established positive lists that confirm compliance with applicable MRSL (e.g., ZDHC, bluesign, OEKO-TEX, etc.)

Guidance for Hardgoods facilities:

In the hardgoods sector MRSL (Manufacturing Restricted Substances List) requirements may not be available. However, there is a significant impact from the use of chemicals and therefore Restricted Lists should be used.

For hardgoods manufacturing, black, grey and white lists are often used. Black lists contain chemicals that are prohibited in manufacturing, grey lists contain chemicals that should be phased out from manufacturing and white lists contain chemicals that may be used. As a summary term we have chosen "Restricted Lists". Beyond the fact that different lists are used in the hardgoods sector, the question about selection and purchasing is also valid for hardgoods facilities.

It is expected that facilities may use either a sector-wide list, a brand-specific restricted list or create their own list.

All textile components in the hardgoods sector (for example, products such as rucksacks, tents, etc.) should apply the MRSL criteria as outlined in the Higg FEM.

All other components should be governed *at least* by a Restricted List regarding their use during manufacturing. The restrictions on the final product, as applied through an RSL, may especially be relevant for the metal processing and electronics industry, and yet again for other sectors are not relevant. With RSLs the management of residual chemicals on the final product is secured, however this may depend on the product and materials used.

Three examples of "Restricted Lists" are:

1. The RoHS directive of the EU, the European Union. The RoHS directive restricts residual chemicals on electronic products and is strongly linked to the EU WEEE directive mentioned in the waste section guidance. Electronic Products that may be relevant for the hardgoods section includes Consumer equipment, Lighting equipment (including light bulbs, Electronic and electrical tools, Toys, Leisure and Sports equipment, Monitoring and Control instruments). The chemicals that are restricted are:
    a. Lead (Pb)

   b. Mercury (Hg)
   c. Cadmium (Cd)
   d. Hexavalent chromium (Cr6+)
   e. Polybrominated biphenyls (PBB)
   f. Polybrominated diphenyl ether (PBDE)
   g. Bis(2-ethylhexyl) phthalate (DEHP)
   h. Butyl benzyl phthalate (BBP)
   i. Dibutyl phthalate (DBP)
   j. Diisobutyl phthalate (DIBP)
      i. Maximum Permitted Concentration: 0.1%[5]
      ii. Maximum for Cadmium: 0.01%[5]
2. The GADSL (Global Automotive Declarable Substance list).
3. The ABB List of Prohibited and Restricted Substances.

It is expected that facilities may use either a sector-wide list, a brand-specific restricted list or create their own list.

For the time being, it has been decided by the Hardgoods FEM working group, that the facilities that have not yet been exposed to the concept of MRSL or received an MRSL from one of their Brand/ Retail buyers, will not need to respond to the questions related to MRSL.

Please observe that this provision is an interim compromise in order to support hardgoods facilities that have not yet been exposed to the MRSL concept. However, we expect that these facilities as well strive for solutions related to MRSL.

Resources:

- ZDHC Gateway- Chemical Module https://www.my-aip.com/ZDHCGateway/Login.aspx
- ZDHC MRSL Conformance Guidance https://downloads.roadmaptozero.com/input/ZDHC-MRSL-Conformance-Guidance
- ZDHC InCheck Solutions https://www.roadmaptozero.com/process#Incheck-guidelines
- ZDHC ChemCheck https://www.zdhc-gateway.com/reports/chemcheck
- bluesign https://www.bluesign.com/en
- OEKO-TEX https://www.oeko-tex.com/en/

How This Will Be Verified:

Full Points:

Full points will be awarded for facilities that have a documented process in place to select and purchase chemicals based on their hazards and MRSL requirements **and all** chemicals meet the requirements of MRSL and the facility's purchasing policy **and** MRSL conformance is

confirmed annually (e.g., through certificates/declarations of MRSL conformance, certificates of analysis, etc).

Documentation Required:

- Documentation that demonstrates the facility selects and purchases chemicals based on their hazards and MRSL requirements. This may include:
    - MRSL(s) applicable to the facility (e.g., customer's MRSL, ZDHC MRSL, combined facility MRSL).
    - Chemical purchasing policy and procedure(s) that include, but are not limited to:
        - Process of communicating MRSL with the chemical suppliers,
        - Process to obtain suppliers' confirmation/declaration of MRSL compliance,
        - Collection of up-to-date positive lists from chemical suppliers.
        - Preference/requirements for purchasing chemicals on positive lists.
    - Positive lists used for chemical purchasing.
    - Annual third party MRSL conformance certification/test reports/declarations and/or certificate of analysis of chemical composition.
    - Chemical inventory showing MRSL compliance status of all chemicals.
- For chemicals not used in the manufacturing process documentation that the facility has a process in place to review chemical ingredients against the facility's MRSL. This may include:
    - SDS or TDS
    - Ingredient lists from consumer labels.

Interview Questions to Ask:

- Staff responsible for the facility's chemical management program can explain how the facility established its MRSL and MRSL requirements of the facility's chemical purchasing policy and procedure.
- Staff responsible for chemical procurement understand and can explain how chemicals are evaluated and approved for purchase in relation to the facility's MRSL and purchasing policy and procedure..

Inspection - Things to Physically Look For:

- Observations onsite indicate that all chemicals in use comply with the facility's MRSL and chemical purchasing policy and procedure (e.g., observed chemicals have been appropriately screened and there is documentary evidence to confirm MRSL conformance).

Partial Points:

- Partial points will be awarded for facilities that have a documented process in place to select and purchase chemicals based on their hazards and MRSL requirements, but have

purchased chemical(s) that do not have sufficient documentary evidence to prove compliance to MRSL **and** your facility has clear plan for obtaining the documents from chemical supplier within 6 months or changing to a chemical supplier who can meet the requirements in order to increase the % of compliant chemicals meeting MRSL.

12. Does your facility select and purchase chemicals based on their hazards and RSL requirements?

Answer Yes if: Your facility has a documented process in place to select and purchase chemicals based on their hazards and RSL requirements **and all** chemicals meet the requirements of RSL and the facility's purchasing policy **and** there is documentation to support this.

Answer Partial Yes if: Your facility has a documented process in place to select and purchase chemicals based on their hazards and RSL requirements but have purchased chemical(s) that do not have sufficient documentary evidence to prove compliance with the facility's purchasing policy **and** your facility has clear plan for obtaining the supporting this documentation.

If you select Yes or Partial Yes, you will be asked the following sub question(s):

- If yes, do all chemicals purchased and used in production meet the facility's chemical purchasing policy?

If you select No, you will be asked the following sub question(s):

- If no, do you have a process or plan for eliminating chemicals that do not meet the facility's chemical purchasing policy?

Suggested Uploads:

- Documentation that demonstrates the facility selects and purchases chemicals based on their hazards and RSL requirements such as:
    - RSL(s) applicable to the facility (e.g., customer's RSL, combined facility RSL).
    - Chemical purchasing policy and procedure(s).
    - Positive lists used for chemical purchasing.
    - Third party RSL conformance certification/test reports.
    - Chemical inventory showing compliance status of all chemicals with the facility's purchasing policy.

What is the intent of the question?

The intent is to ensure facilities have an established process to evaluate chemical hazards and RSL conformance risk during procurement and chemicals purchased are compliant with the facility's chemical purchasing policy.

Technical Guidance:

Restricted Substance List (RSL) is a list of chemicals that are regulated via limiting or restricting the allowable concentration of chemicals in final products due to their potential harmful impact on human health and the environment. RSLs are typically developed by industry associations, governments, or individual companies to ensure that products and materials used in manufacturing processes meet specific safety and environmental standards.

RSLs are one way to identify chemicals that are potentially hazardous which can be used to establish chemical purchasing practices to minimize the risk of hazardous chemicals entering a facility and products.

To ensure that chemicals are appropriately evaluated before purchase, facilities should:

- Establish their own chemical RSL that covers all RSL requirements from clients (e.g., brands) they work with or industry initiatives they are a part of
    - For facilities that have more than one customer RSL, a policy should be in place to use the most stringent RSL limits for each chemical and then establish their RSL to meet all customer requirements.
- Establish a process to communicate RSL requirements to all chemical suppliers including the evidence needed from suppliers to confirm compliance (e.g., positive lists, certificates/declarations of RSL conformance, certificates of analysis, or other relevant documentation)
- Include RSL compliance as a purchasing requirement for all chemicals.
    - This should include procedures to verify chemicals conform to RSL requirements through documentation provided by chemical suppliers.
- Ensure all chemical procurement staff are aware of RSL requirements and the facility's purchasing policy and procedure.
- For chemicals not used in the manufacturing process (e.g., lubricants, cleaning chemicals) ensure there is a process in place to, at minimum, review the list of ingredients and SDS if available against the facility's purchasing policy requirements.

Resources:

- bluesign system substance list which can be downloaded here: https://www.bluesign.com/en/downloads
- AFIRM RSL Toolkit https://afirm-group.com/toolkit/
- AFIRM Chemical Information Sheets https://afirm-group.com/english-information-sheets/

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities that have a documented process in place to select and purchase chemicals based on their hazards and RSL requirements **and all** chemicals meet the

requirements of RSL and the facility's purchasing policy **and** there is documentation to support this.

Documentation Required:

- Documentation that demonstrates the facility selects and purchases chemicals based on their hazards and RSL requirements. This may include:
    - RSL(s) applicable to the facility (e.g., customer's RSL, combined facility RSL).
    - Chemical purchasing policy and procedure(s) that include, but are not limited to:
        - Process of communicating RSL with the chemical suppliers,
        - Process to obtain suppliers' confirmation/declaration of RSL compliance,
        - Collection of up-to-date positive lists from chemical suppliers.
        - Preference/requirements for purchasing chemicals on positive lists.
    - Positive lists used for chemical purchasing.
    - Annual third party RSL conformance certification/test reports/declarations.
    - Chemical inventory showing RSL compliance status of all chemicals.

Interview Questions to Ask:

- Staff responsible for the facility's chemical management program can explain how the facility established its RSL and RSL requirements of the facility's chemical purchasing policy and procedure.
- Staff responsible for chemical procurement understand and can explain how chemicals are evaluated and approved for purchase in relation to the facility's RSL and purchasing policy and procedure.

Inspection - Things to Physically Look For:

- Observations onsite indicate that all chemicals in use comply with the facility's RSL ,chemical purchasing policy and procedure.(e.g., observed chemicals have been appropriately screened and there is documentary evidence to confirm RSL conformance).

Partial Points:

- Partial points will be awarded for facilities that have a documented process in place to select and purchase chemicals based on their hazards and RSL requirements but have purchased chemical(s) that do not have sufficient documentary evidence to prove compliance with the facility's purchasing policy and procedure **and** your facility has clear plan for obtaining the supporting this documentation.

13. Does your facility have an environmental and occupational health and safety program specific to chemicals management?

Answer Yes if: Your facility has a documented program and procedures specific to the environmental and occupational health and safety risks of chemical use at the facility **and** the program minimally includes the following:

- A designated person or team responsible for environmental and health and safety related to chemicals.
- A documented chemicals risk assessment that covers environmental and health and safety risks of chemicals used onsite.
- The program meets all legal health and safety requirements related to chemicals management.
- Documented procedures for chemical storage, handling, usage, disposal, and environmental controls for waste or discharge to the environment.

Answer Partial Yes if: Your facility has established practices specific to the environmental and occupational health and safety risks of chemical use at the facility, but the program does not include one (1) or more of the following:

- A designated person or team responsible for environmental and health and safety related to chemicals.
- A documented chemicals risk assessment that covers environmental and health and safety risks of chemicals used onsite.
- The program meets all legal health and safety requirements related to chemicals management.
- Documented procedures for chemical storage, handling, usage, disposal, and environmental controls for waste or discharge to the environment.

Note: The environmental and occupational health and safety procedures related to chemicals management may be included as part of the facility's overall environmental health and safety management program.

If you select Yes or Partial Yes, you will be asked the following sub question(s):

- Please upload documentation.

Suggested Uploads:

- Environmental and health and safety management team organization chart and/or job descriptions.
- Chemicals risk assessment.
- Environmental health and safety procedures related to chemical storage, handling, usage, and disposal.
- Permits governing health and safety requirements for chemical storage, use, and disposal if applicable.

What is the intent of the question?

The intent of this question is to ensure facilities have established procedures in place to manage and control environmental and health and safety risks associated with chemical use at the facility.

Technical Guidance:
An environmental and occupational health and safety (ESH) program aims to minimize environmental impacts, reduce workplace hazards, and protect the health and well-being of employees. The scope and complexity of a facility's EHS program will vary depending on the type of facility, types and quantities of chemicals used as well as other specific risks related to facility production and operations.

It is crucial that a facility's EHS program be developed and managed by qualified staff and be based on the formal evaluation of risks and hazards in the workplace with the goal of protecting workers and the environment.

In the FEM, facilities are expected to have EHS practices related to chemicals management that, at minimum, cover the following:

- Designated roles and responsibilities for environmental and health and safety related to chemicals.
- An assessment of risks associated with the storage, handling, use and disposal of chemicals used onsite including potential worker exposures to chemicals.
- Procedures to ensure compliance with all legal health and safety requirements related to chemicals management.
- Documented procedures for chemical storage, handling, usage, disposal, and environmental controls for waste or discharge to the environment.

Resources:

- ZDHC Chemical Management System Framework – Version 1.0 (May 2020) which can be downloaded here: https://www.roadmaptozero.com/process#Guidance
- International labour Organization Occupational Safety and Health Management Systems https://www.ilo.org/safework/areasofwork/occupational-safety-and-health-management-systems/lang--en/index.htm
- The National Institute for Occupational Safety and Health (NIOSH) Managing Chemical Safety in the Workplace https://www.cdc.gov/niosh/chemicals/default.html

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities that have a documented program and procedures specific to the environmental and occupational health and safety risks of chemical in use at the facility **and** the program minimally includes the following:

- A designated person or team responsible for environmental and health and safety related to chemicals.
- A documented chemicals risk assessment that covers environmental and health and safety risks of chemicals used onsite.
- The program meets all legal health and safety requirements related to chemicals management.
- Documented procedures for chemical storage, handling, usage, disposal, and environmental controls for waste or discharge to the environment.

Documentation Required:

- Documentation that demonstrates the facility has practices and/or procedures in place to manage environmental and health and safety risks of chemicals in use at the facility. This may include:
    - Environmental and health and safety management team organization chart and/or job descriptions.
    - Chemicals risk assessment.
    - Environmental health and safety procedures related to chemical storage, handling, usage, and disposal.
    - Required Permits governing health and safety requirements for chemical storage, use, and disposal.

Interview Questions to Ask:

- Staff responsible for EHS management and/or chemical safety management at the facility understand their roles and responsibilities and can explain how the facility manages risks related to the storage, handling, use, and disposal of chemicals.

Inspection - Things to Physically Look For:

- Observations onsite indicate the EHS program related to chemicals management is being implemented per the facility's established practices or procedures.

Partial Points:

- Partial points will be awarded for facilities that have established practices specific to the environmental and occupational health and safety risks of chemical in use at the facility, but the program does not include one (1) or more of the following:
    - A designated person or team responsible for environmental and health and safety related to chemicals.
    - A documented chemicals risk assessment that covers environmental and health and safety risks of chemicals used onsite.
    - The program meets all legal health and safety requirements related to chemicals management.

- Documented procedures for chemical storage, handling, usage, disposal, and environmental controls for waste or discharge to the environment

14. Does your facility have well marked, designated chemical storage areas?

Answer Yes if: Your facility has well marked, designated chemical storage areas for all chemicals stored onsite.

If you select Yes, you will be asked the following sub question(s) to indicate which storage practices are in place at the facility:

- The chemical storage area is ventilated, dry and protected from the weather and fire risk.
- The storage area is protected from unauthorized employees (i.e., locked).
- The chemical storage area is clearly marked.
- The chemical storage area has easy entry and exit in case of any emergencies.
- Storage containers are in good condition, appropriate for their contents, closed and clearly labelled with their contents.
- Floor in storage areas are solid and non-porous, there are no water drains that the liquid could spill into, and there is no evidence of spilled liquid.
- Secondary containment is available for liquid chemicals in tanks, drums, and temporary containers (where applicable) to ensure no unintended releases occur.
    - **Note**: The need for secondary containment must be based on a formal risk assessment that considers the risk and potential impact of spills and must also meet applicable legal requirements based on chemical volume and container size.
- Incompatible substances (such as strong acids and strong bases) are stored separately.
- Flammable substances are kept away from sources of heat or ignition, including the use of grounding and explosion-proof lighting.
- Temporary storage containers are closed and labelled with contents,hazard class, and lot number (if applicable)
- First Expiry, First Out (FEFO).
- Health and safety measures are in place (such as PPE, etc).

Suggested Uploads:

- Facility map showing the location of chemical storage areas.
- Floor layout plan of chemical storage areas, specifying categorization and storage location of different types of chemicals.
- Standard operating procedures for chemical storage and labelling.
- Example photos of chemical storage areas and controls
- Examples of storage in/out logs, FEFO records, specifying date of arrival at storage, lot number, and date of dispatch to production, etc.)
- Audits/inspections checklists or reports of chemical storage areas.

What is the intent of the question?

The intent of this question is for facilities to demonstrate that all storage areas are well-marked and have sufficient controls to prevent contamination and safety risks.

Technical Guidance:

Proper chemical storage with appropriate controls is important to reduce and prevent health & safety and environment risks. A well-planned storage area allows easy movement and protection of chemicals during handling and use. Storage conditions should be based on the recommended storage practices listed on safety data sheets (SDS) and/or storage practices recommended by chemical suppliers. Additionally, all legal requirements related to the storage of chemicals should be complied with.

Chemical storage areas and controls should be designed and appropriate for the specific types, quantities, and hazards of chemicals used on site. The list below provides recommended good practices for chemical storage that should be considered and implemented when appropriate:

- Separate chemical products based on their physical state and inherent properties. Solid and liquid chemicals should be stored separately.
- Ensure proper compatibility of chemicals as per information in the SDS (section 10).
- Provide proper ventilation, lighting and controlled temperature and humidity wherever required for storage of chemical products sensitive to these parameters.
- Make floors of storage area impermeable to liquids and non-slippery. They should be easy to clean and resistant to acids and organic solvents.
- Plan the layout to accommodate all chemical containers with enough space for movement and easy accessibility to the containers.
- Use color markings on the floor for designated walk areas and exit glow signs.
- If required, ensure emergency exits are available and kept clear of obstacles, and that the exit door opens outwards with a push-bar handle.
- Do a regular clean-out of expired chemical products, spill wastage and used containers.
- Mark a designated area with a red (or the local required color) border for non-conformant chemical products that are to be returned to the chemical supplier. Keep relevant documents in the vicinity.
- Keep the requisite amount of compatible fire- extinguishers in the stores and install smoke-detection alarms or sprinkler systems.
- Ensure secondary containment for containers. At a minimum, the capacity of secondary containment must meet applicable legal requirements based on chemical volume and container size and should be 110% of the original (primary) container(s).
- Gas cylinders should be stored in an upright position and in a separate location. The stored cylinders should be secured. LPG cylinders should be protected from direct sunlight and separated from flammable, combustible or oxidizing chemicals or other compressed gas cylinders.
- Chemical products stored outdoors should have a proper cover to protect them from sun and rain and high temperatures. The area should be fenced to prevent unauthorized

access. The flooring of such storage areas should be secured to prevent any leakages from contaminating the soil or water.

- Access to chemical stores should be given only to authorized staff and their names and photographs should be displayed near the main entrance door.
- Keep a spill control kit to contain spillages.
- Keep a box file of all the SDS of chemical products stored near the Stores main entrance door. The file should be indexed properly with the names of the Chemical Formulator and products. The SDS file should be accessible to all staff. SDS can also be put in plastic folders and displayed on a notice board near the stores.
- Install warning signage at key locations of stores to keep staff informed of risks.
- Prepare "Chemical Safety Cards" to convey important information on hazards and First-Aid/emergency response measures in a pictorial manner for a quick understanding by staff handling chemical products.

Resources:

- The ZDHC Chemical Management System (CMS) framework and Chemicals Management System Technical Industry Guide can be downloaded here: https://www.roadmaptozero.com/process#Guidance

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities that have well marked, designated chemical storage areas for all chemicals stored onsite **and** the storage areas have **all** of the controls listed in the sub question.

Documentation Required:

- Documentation that demonstrates the facility controls in place in chemical storage areas and these are appropriately maintained. This may include:
    - Facility map showing the location of chemical storage areas.
    - Floor layout plan of chemical storage areas, specifying categorization and storage location of different types of chemicals.
    - Standard operating procedures for chemical storage and labelling.
    - Examples of storage in/out logs, FEFO records, specifying date of arrival at storage, lot number, and date of dispatch to production, etc.)
    - Audits/inspections checklists or reports of chemical storage areas.

Interview Questions to Ask:

- Staff responsible for chemicals management understand the hazards and controls associated with chemical storage areas and can explain the facility's procedures to ensure controls are in place and properly maintained.

- Relevant staff (management and employees) understand the controls in place and their responsibilities for maintaining chemical storage areas.

Inspection - Things to Physically Look For:

- Observations onsite indicate that the listed controls are in place and being properly maintained (e.g., incompatible chemicals are stored separately or at safe distances, stored chemicals have appropriate labels, secondary containment is in place and of sufficient size, protections are in place for flammable chemicals, required PPE is present and being used, etc.)

Partial Points:

- Partial points will be awarded for facilities that have well marked, designated chemical storage areas for all chemicals stored onsite **and** the storage areas have **some, but not all** of the controls listed in the sub question.

15. Does your facility have well marked sub-storage areas?

Answer Yes if: Your facility has designated, well marked sub-storage areas for chemicals.

Answer Not Applicable if: Your facility does not have sub-storage areas.

Note: Sub-storage areas are defined as temporary or permanent areas used for storage and handling of chemicals during their use in production processes that are separate from the facility's main bulk chemical storage area(s). This includes temporary storage areas used for loading, QA inspections, etc.

If you select Yes, you will be asked the following sub question(s) to indicate which practices are in place in chemical sub-storage areas at the facility:

- The chemical storage area is ventilated, dry and protected from the weather.
- Temporary storage containers are closed and labelled with contents, lot, and hazard class.
- The chemical storage area is clearly marked.
- Floor in the storage area is solid and non-porous, there are no water drains that the liquid could spill into, and there is no evidence of spilled liquid.
- Secondary containment is available for liquid chemicals in tanks, drums, and temporary containers (where applicable) to ensure no unintended releases occur.
    - **Note**: The need for secondary containment must be based on a formal risk assessment that considers the risk and potential impact of spills and must also meet applicable legal requirements based on chemical volume and container size.
- Incompatible substances (such as strong acids and strong bases) are stored separately.

- Flammable substances are kept away from sources of heat or ignition, including the use of grounding and explosion-proof lighting.
- First Expiry, First Out (FEFO).
- Health and safety measures are in place (such as PPE, etc).

Suggested Uploads:

- Facility map showing the location of chemical sub-storage areas.
- Floor layout plan of chemical sub-storage areas, specifying categorization and storage location of different types of chemicals.
- Standard operating procedures for chemical storage and labelling (including sub-storage areas).
- Example photos of chemical sub-storage areas and controls
- Examples of storage in/out logs, FEFO records, specifying date of arrival at sub-storage, lot number, and date of dispatch to production, etc.)
- Audits/inspections checklists or reports of chemical sub-storage areas.

What is the intent of the question?

The intent of this question is for facilities to demonstrate that all sub-storage areas are well-marked and have sufficient controls to prevent contamination and safety risks.

Technical Guidance:

Proper chemical storage with appropriate controls is important to reduce and prevent health & safety and environment risks. This also applies to sub-storage areas which are defined as temporary or permanent areas used for storage and handling of chemicals during their use in production processes that are separate from the facility's main bulk chemical storage area(s). This includes temporary storage areas used for loading, QA inspections, etc.

Implementing effective chemical storage practices in sub-storage areas can contribute to minimizing the risk of environmental contamination and maintaining a safe work environment. Storage conditions should be based on the recommended storage practices listed on safety data sheets (SDS) and/or storage practices recommended by chemical suppliers. Additionally, all legal requirements related to the storage of chemicals should be complied with.

Chemical sub-storage areas and controls should be designed and appropriate for the specific types, quantities, and hazards of chemicals used on site. For a detailed list of recommended good practices for chemical storage that should be considered and implemented when appropriate, refer to the Technical Guidance section for the FEM question above on chemical storage.

Resources:

- The ZDHC Chemical Management System (CMS) framework and Chemicals Management System Technical Industry Guide can be downloaded here: https://www.roadmaptozero.com/process#Guidance

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities that have well marked chemical sub-storage areas for all sub-storage areas onsite **and** the sub-storage areas have **all** of the controls listed in the sub question.

Documentation Required:

- Documentation that demonstrates the facility controls in place in chemical sub-storage areas and these are appropriately maintained. This may include:
    - Facility map showing the location of chemical sub-storage areas.
    - Floor layout plan of chemical sub-storage areas, specifying categorization and storage location of different types of chemicals.
    - Standard operating procedures for chemical storage and labelling (including sub-storage).
    - Examples of storage in/out logs, FEFO records, specifying date of arrival at sub-storage, lot number, and date of dispatch to production, etc.)
    - Audits/inspections checklists or reports of chemical sub-storage areas.

Interview Questions to Ask:

- Staff responsible for chemicals management understand the hazards and controls associated with chemical sub-storage areas and can explain the facility's procedures to ensure controls are in place and properly maintained.
- Relevant staff (management and employees) understand the controls in place and their responsibilities for maintaining chemical sub-storage areas.

Inspection - Things to Physically Look For:

- Observations onsite indicate that the listed controls are in place and being properly maintained (e.g., incompatible chemicals are stored separately or at safe distances, stored chemicals have appropriate labels, secondary containment is in place and of sufficient size, protections are in place for flammable chemicals, required PPE is present and being used, etc.)

Partial Points:

- Partial points will be awarded for facilities that have well marked chemical sub-storage areas in all sub-storage areas onsite **and** the sub-storage areas have **some, but not all** of the controls listed in the sub question.

16. Does your facility train employees responsible for the chemical management system on Restricted Substance Lists (RSLs)?

Answer Yes if: Your facility has a designated person(s) responsible for RSL compliance who is knowledgeable on RSL, **and** documented training is provided to relevant employees with training records and/or material.

Answer Partial Yes if: Your facility has a designated person(s) responsible for RSL compliance and training is provided to relevant employees, but it is not documented with training records and/or material or responsible staff are not knowledgeable on RSL.

Note: RSL training must be provided by a knowledgeable and qualified person (internally or externally) who understands RSL requirements and procedures in place at the facility.

If you select Yes or Partial Yes, you will be asked the following sub question(s):

- Please describe the RSL trainings conducted in the reporting year.
- If yes, how many employees were trained?
- If yes, how frequently do you train your employees?
    - Do you evaluate your employees after the training?
    - How do you evaluate the knowledge of your employees after the training?
- Please upload documentation, if available

Suggested Uploads:

- Documentation that demonstrates the facility has conducted training on RSL for relevant employees (e.g., RSL training records, training material, post-training evaluation records)
- Documented job description for staff responsible for RSL management and compliance.

What is the intent of the question?

The intent of this question is to ensure that facilities have knowledgeable staff that are trained on RSL management and compliance.

Technical Guidance:
To effectively manage and implement RSL compliance programs, it is important to ensure that staff have the appropriate knowledge and training on RSL management and compliance. RSL management requires specific knowledge about applicable RSL requirements and procedures to ensure compliance.

Facilities should ensure that there are dedicated roles and responsibilities for staff who manage RSL compliance. This provides facilities with the needed resources to oversee RSL program implementation and ensure that relevant staff are trained on RSL requirements and procedures at the facility.

RSL training requirements can vary based on facility type and operations or products, however there are some key aspects that should be include in RSL training including, but not limited to:

- All applicable RSL requirements at the facility
- The facilities RSL management policy and procedures including procedures to investigate the root cause of RSL failures.
- Chemical procurement and screening with respect to RSL
- Areas of specific risks to RSL compliance at the facility.

Having procedures to collect information to evaluate the effectiveness of training programs (e.g., trainee feedback questionnaires or test, observation, or reviews of trainer performance, etc) will help facilities ensure the effectiveness of RSL trainings and knowledge retention.

Resources:

- AFIRM Group RSL Toolkit https://afirm-group.com/Toolkit-EN/
- AAFA Product Safety Guidance: Restricted Substances List (RSL) https://www.aafaglobal.org/AAFA/Solutions_Pages/Restricted_Substance_List

How This Will Be Verified:

Full Points:
Full points will be rewarded to facilities that have a designated person(s) responsible for RSL compliance who is knowledgeable on RSL, **and** documented training is provided to relevant employees with training records and/or material.

Documentation Required:

- Documentation that demonstrates the facility has a dedicated person(s) responsible for RSL compliance who is knowledgeable on RSL, and documented training is provided to relevant employees.
    - Documented job description and qualifications for staff responsible for RSL management and compliance
    - RSL training records and/or training material
    - Post-training evaluation records
    - RSL management policy and procedures

Interview Questions to Ask:

- Staff responsible for managing RSL at the facility can demonstrate appropriate knowledge of RSL.
- Staff responsible for the facility's RSL training program can explain how training is provided and if applicable, how the effectiveness of training is evaluated.
- Employees who have received the trainings are aware of the content of the training.

Inspection - Things to Physically Look For

- Observations onsite indicate that the facility's RSL program is being managed by trained and knowledgeable staff.

Partial Points:

- Partial points will be awarded to facilities that have a designated person(s) responsible for RSL compliance and training is provided to relevant employees, but it is not documented with training records and/or material **or** responsible staff are not knowledgeable on RSL.

17. Does your facility train employees responsible for the chemical management system on Manufacturing Restricted Substance Lists (MRSLs)?

Answer Yes if: Your facility has a designated person(s) responsible for MRSL compliance who is knowledgeable on MRSL, **and** documented training is provided to relevant employees with training records and/or material.

Answer Partial Yes if: Your facility designated a person(s) responsible for MRSL compliance and training is provided to relevant employees, but it is not documented with training records and/or material **or** responsible staff are not knowledgeable on MRSL.

Note: MRSL training must be provided by a knowledgeable and qualified person (internally or externally) who understands MRSL requirements and procedures in place at the facility.

If you select Yes or Partial Yes, you will be asked the following sub question(s):

- Please describe the MRSL trainings conducted in the reporting year.
- If yes, how many employees were trained?
- If yes, how frequently do you train your employees?
    - Do you evaluate your employees after the training?

    - How do you evaluate the knowledge of your employees after the training?
- Please upload documentation, if available

Suggested Uploads:

- Documentation that demonstrates the facility has conducted training on MRSL for relevant employees (e.g., MRSL training records, training material, post-training evaluation records)
- Documented job description for staff responsible for MRSL management and compliance.

What is the intent of the question?

The intent of this question is to ensure that facilities have knowledgeable staff that are trained on MRSL management and compliance.

Technical Guidance:
All facilities should ban non-compliant hazardous chemicals from use in the facility as required by laws and regulations and/or customers' requirements (e.g., the ZDHC Manufacturing Restricted Substance List (MRSL)).

To effectively manage and implement MRSL compliance programs, it is important to ensure that staff have the appropriate knowledge and training on MRSL management and compliance. MRSL management requires specific knowledge about applicable MRSL requirements and procedures to ensure compliance.

Facilities should ensure that there are dedicated roles and responsibilities for staff who manage MRSL compliance. This provides facilities with the needed resources to oversee MRSL program implementation and ensure that relevant staff are trained on MRSL requirements and procedures at the facility.

MRSL training requirements can vary based on facility type and operations or products for example facilities that use chemicals in production processes typically use a larger number of chemicals on-site and may require a more complex MRSL manage program that staff need be trained on as opposed to facilities that only use chemicals for facility operations or tooling. However, there are some key aspects that should be include in MRSL training including, but not limited to:

- All applicable MRSL requirements at the facility
- The facilities MRSL management policy and procedures including procedures to investigate the root cause of MRSL non-conformances that are identified.
- Chemical procurement and screening with respect to MRSL
- Areas of specific risks to MRSL compliance at the facility.

Having procedures to collect information to evaluate the effectiveness of training programs (e.g., trainee feedback questionnaires or test, observation, or reviews of trainer performance, etc) will help facilities ensure the effectiveness of MRSL trainings and knowledge retention.

Resources:

- ZDHC MRSL https://mrsl.roadmaptozero.com/
- ZDHC Academy https://academy.roadmaptozero.com/

How This Will Be Verified:

Full Points:
Full points will be rewarded to facilities that have a designated person(s) responsible for MRSL compliance who is knowledgeable on MRSL, **and** documented training is provided to relevant employees with training records and/or material.

Documentation Required:

- Documentation that demonstrates the facility has a dedicated person(s) responsible for MRSL compliance who is knowledgeable on MRSL, and documented training is provided to relevant employees.
    - Documented job description and qualifications for staff responsible for MRSL management and compliance
    - MRSL training records and/or training material
    - Post-training evaluation records
    - MRSL management policy and procedures

Interview Questions to Ask:

- Staff responsible for managing MRSL at the facility can demonstrate appropriate knowledge of MRSL.
- Staff responsible for the facility's MRSL training program can explain how training is provided and if applicable, how the effectiveness of training is evaluated.
- Employees who have received the trainings are aware of the content of the training.

Inspection - Things to Physically Look For

- Observations onsite indicate that the facility's MRSL program is being managed by trained and knowledgeable staff.

Partial Points:

- Partial points will be awarded to facilities that have a designated person(s) responsible for MRSL compliance and training is provided to relevant employees, but it is not documented with training records and/or material **or** responsible staff are not knowledgeable on MRSL.

18. Does your facility have an established process to investigate and resolve a potential RSL failure?

Answer Yes if: Your facility has a documented process for investigating and resolving RSL failures.

If you select Yes, you will be asked the following sub question(s):

- If yes, does this process cover steps such as a root cause analysis, steps for a corrective action plan and documentation procedure of such activities?
- If yes, does your facility have a Standard Operating Procedure (SOP) to resolve or prevent such a failure?
    - Please upload your SOP

Suggested Uploads:

- RSL management procedures that include the RSL failure investigation process.
- Examples of documentation from past RSL failure investigations (e.g., failure investigation/resolution form)

What is the intent of the question?

The intent of the question is for facilities to demonstrate that a process is in place to investigate and resolve any RSL failures.

Technical Guidance:

The goal of an RSL compliance program should focus on ensuring that chemicals and/or materials that are not RSL compliant or could result in RSL failures are not permitted to be used at the facility, however, if an RSL failure does occur, it is important to have a formal process to investigate and resolve RSL failures.

The cause of individual RSL failures can vary and having procedures to conduct a systematic investigation will help facilities identify the cause of the failure and address any gaps in their RSL management program. The investigation process should also include procedures for conducting a root cause analysis of the failure to prevent failures in the future.

When failures do occur, facilities should initiate an investigation and resolution process that includes, but is not limited to the key aspects listed below:

- Stop production of the noncompliant material/product and quarantine and potentially non-compliance materials/products.
- Ensure that any non-compliant material/products are not shipped from the facility.
- Evaluate the scope of the issue and the current materials/processes that produced the failure.
- Conduct a root cause investigation to identify the cause of the failure.
    - Engage with material/chemical suppliers as needed to help identify the root causes.
- Evaluate the need to update RSL management procedures to ensure the issue does not happen again.

Resources:

- AFIRM Group RSL Toolkit https://afirm-group.com/Toolkit-EN/ (**Note:** Appendix D contains examples of RSL failures and corrective actions)

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that shows the facility has documented procedures to investigate and resolve RSL failures. This may include:
    - RSL policy and/or management procedures that include RSL failure investigation process.
    - Records of historical RSL failure investigations (e.g., failure investigation/resolution form)

Interview Questions to Ask:

- Staff responsible for RSL management can explain the facility's RSL failure investigation and resolution procedures.

Inspection - Things to Physically Look For:

- Staff responsible for RSL failure investigation demonstrate sufficient knowledge of RSL and RSL failure investigation/resolution.

Partial Points: N/A

Chemical Management - Level 2

19. Does your facility engage contractor(s) or subcontractor(s) on MRSL / RSL?

Answer Yes if: Your facility has engaged contractor(s) or subcontractor(s) on MRSL/RSL, **and** this engagement includes:

- Formal process to communicate the facility's MRSL/RSL policy and requirements to contractors.
- Procedures to evaluate and improve MRSL/RSL management programs at contractor/subcontractor facilities. This may include any of the following:
    - Assessment or audit of MRSL/RSL management programs at the contractor/subcontractor.
    - Requirements to complete and share Higg FEM.
    - Requirements to purchase chemicals from positive lists.
    - Where applicable, documented support to help contactors/subcontractors improve MRSL/RSL management (e.g., training, improvement plans).

Answer Not Applicable if: Your facility does not use any contractors or subcontractors.

Note: Contractors/Subcontractors are defined as contracted business partners that support the manufacturing process of final products (e.g., screen printing, washing/dyeing, or other product embellishments).

If you select Yes, you will be asked the following sub question(s):

- Please describe how you engage your contractor or subcontractor in the process.
- Please upload documentation, if available

Suggested Uploads:

- Documentation that shows how the facility engages with contractors or subcontractors on MRSL/RSL (e.g., contracts/agreements that cover MRSL/RSL engagement and requirements, records of MRSL/RSL communication, assessments/audit reports and/or improvement plans from contractor/subcontractor engagement, records of Higg FEM completion and sharing, etc.)

What is the intent of the question?

The intent of the question is for facilities to demonstrate that they proactively engage contractors or subcontractors on MRSL/RSL.

Technical Guidance:
Manufacturing processes performed at contractor or subcontractor facilities can present risks related to a facility's MRSL/RSL compliance program as they have the potential to use banned or restricted substances if they are not aware or negligent with the requirements of the facility's MRSL/RSL policy and programs. Facilities should seek to proactively engage with any contractors or subcontractors to communicate and promote responsible MRSL/RSL management.

When engaging with contractors or subcontractors on MRSL/RSL management, facilities should communicate clear expectations and guidance to ensure compliance and adherence to MRSL/RSL requirements and good practices for MRSL/RSL management. This can be achieved through contractual agreements, ongoing communication to ensure all parties are aware of their roles and responsibilities in maintaining MRSL/RSL compliance.

Facilities should have procedures to outline the specific activities and responsibilities related to MRSL/RSL for contractor or subcontractor. This may include:

- Assessment or audit of contractor/subcontractors MRSL/RSL management programs.
- Requirements for contractor/subcontractors to complete and share Higg FEM.
- Requirements for contractor/subcontractors to purchase chemicals from positive lists.

Facilities can also engage contractor/subcontractors by providing any necessary support to help contractor/subcontractors improve their MRSL/RSL management such as training/capacity building and/or support on developing or implementing improvement plans.

Resources:

- ZDHC MRSL https://mrsl.roadmaptozero.com/
- ZDHC MRSL Conformance Guidancehttps://downloads.roadmaptozero.com/input/ZDHC-MRSL-Conformance-Guidance
- AFIRM Group RSL Toolkit https://afirm-group.com/Toolkit-EN/
- The ZDHC Chemical Management System (CMS) framework and Chemicals Management System Technical Industry Guide can be downloaded here: https://www.roadmaptozero.com/process#Guidance

How This Will Be Verified:

Full Points:
Full points will be awarded to facilities that have engaged with contractor(s) or subcontractor(s) on MRSL/RSL and this engagement includes:

- Formal process to communicate the facilities MRSL/RSL policy and requirements to contractors.
- Procedures to evaluate and improve MRSL/RSL management programs at contractor/subcontractor facilities. This may include any of the following:
    - Assessment or audit of MRSL/RSL management programs at the contractor/subcontractor.
    - Requirements to complete and share Higg FEM.
    - Requirements to purchase chemicals from positive lists.
    - Where applicable, documented support to help contractors/subcontractors improve MRSL/RSL management (e.g., training, improvement plans).

Documentation Required:

- Documentation that shows the facility has engaged with contractors or subcontractors on MRSL/RSL. This may include.
    - Contracts/agreements that cover MRSL/RSL engagement and requirements.
    - Records of MRSL/RSL communication.
    - Assessments/audit reports or improvement plans from contractor or subcontractor engagement.
    - Records of Higg FEM completion and sharing by contractors/subcontractors.
    - Records of training or capacity building with contractors/subcontractors.

Interview Questions to Ask:

- Staff responsible for the MRSL/RSL engagement activities can describe how the facility engages with contractors/subcontractors on MRSL/RSL.

Inspection - Things to Physically Look For:

- Where applicable, observations onsite are consistent with any reported contractor/subcontractor use and engagement.

Partial Points: N/A

20. Does your facility engage upstream supplier(s) on MRSL / RSL?

Answer Yes if: Your facility has engaged upstream suppliers on MRSL/RSL, **and** this engagement includes:

- Formal process to communicate the facility's MRSL/RSL policy and requirements to upstream suppliers.
- Procedures to evaluate and improve MRSL/RSL management programs at upstream supplier facilities. This may include any of the following:
    - Assessment or audit of MRSL/RSL management programs at the upstream supplier.
    - Requirements to complete and share Higg FEM.
    - Requirements to develop/provide positive lists (for chemical suppliers).
    - Requirements to source chemicals from positive lists (for material suppliers)
    - Where applicable, documented support to help upstream suppliers improve MRSL/RSL management (e.g., training, improvement plans).

Note: Upstream suppliers are defined as an entity that provides raw materials to manufacturers that ultimately process the materials. (e.g., Chemical suppliers. Fabric mills, zipper and button suppliers are common upstream suppliers for a cut-sew garment factory).

If you select Yes, you will be asked the following sub question(s):

- If yes, please describe which upstream supplier(s) you engage with.
- Please describe how you engage your upstream supplier in the process.
- Please upload documentation, if available.

Suggested Uploads:

- Documentation that shows how the facility engages with upstream suppliers on MRSL/RSL (e.g., contracts/agreements that cover MRSL/RSL engagement and requirements, records of MRSL/RSL communication, assessments/audit reports and/or improvement plans from upstream supplier engagement, records of Higg FEM completion and sharing, etc.)

What is the intent of the question?

The intent of the question is for facilities to demonstrate that they proactively engage upstream suppliers on MRSL/RSL.

Technical Guidance:

Materials provided by upstream suppliers can present risks related to a facility's MRSL/RSL compliance program as they have the potential to supply materials that contain banned or restricted substances if they are not aware or negligent with the requirements of the facility's MRSL/RSL policy and programs. Facilities should seek to proactively engage with any

contractors or subcontractors to communicate and promote responsible MRSL/RSL management.

When engaging with upstream suppliers on MRSL/RSL management, facilities should communicate clear expectations and guidance to ensure compliance and adherence to MRSL/RSL requirements and good practices for MRSL/RSL management. This can be achieved through contractual agreements, ongoing communication to ensure all parties are aware of their roles and responsibilities in maintaining MRSL/RSL compliance.

Facilities should have procedures to outline the specific activities and responsibilities related to MRSL/RSL for upstream suppliers. This may include:

- Assessment or audit of upstream supplier MRSL/RSL management programs.
- Requirements to complete and share Higg FEM.
- Requirements to develop/provide positive lists (for chemical suppliers).
- Requirements to source chemicals from positive lists (for material suppliers).

Facilities can also engage upstream suppliers by providing any necessary support to help them improve their MRSL/RSL management such as training/capacity building and/or support on developing or implementing improvement plans.

Resources:

- ZDHC MRSL https://mrsl.roadmaptozero.com/
- ZDHC MRSL Conformance Guidance https://downloads.roadmaptozero.com/input/ZDHC-MRSL-Conformance-Guidance
- AFIRM Group RSL Toolkit https://afirm-group.com/Toolkit-EN/
- The ZDHC Chemical Management System (CMS) framework and Chemicals Management System Technical Industry Guide can be downloaded here: https://www.roadmaptozero.com/process#Guidance

How This Will Be Verified:

Full Points:
Full points will be awarded to facilities that have engaged with upstream suppliers on MRSL/RSL **and** this engagement includes:

- Formal process to communicate the facility's MRSL/RSL policy and requirements to upstream suppliers.
- Procedures to evaluate and improve MRSL/RSL management programs at upstream supplier facilities. This may include any of the following:
    - Assessment or audit of MRSL/RSL management programs at the upstream supplier.

- Requirements to complete and share Higg FEM.
- Requirements to develop/provide positive lists (for chemical suppliers).
- Requirements to source chemicals from positive lists (for material suppliers)
- Where applicable, documented support to help upstream suppliers improve MRSL/RSL management (e.g., training, improvement plans).

Documentation Required:

- Documentation that shows the facility has engaged with upstream suppliers on MRSL/RSL. This may include.
  - Contracts/agreements that cover MRSL/RSL engagement and requirements.
  - Records of MRSL/RSL communication.
  - Assessments/audit reports or improvement plans from contractor or subcontractor engagement.
  - Positive lists from chemical suppliers.
  - Records of Higg FEM completion and sharing by contractors/subcontractors.
  - Records of training or capacity building with contractors/subcontractors.

Interview Questions to Ask:

- Staff responsible for the MRSL/RSL engagement activities can describe how the facility engages with upstream suppliers on MRSL/RSL.

Inspection - Things to Physically Look For:

- Where applicable, observations onsite are consistent with any reported upstream supplier use and engagement.

Partial Points: N/A

21. Does your facility have the following capabilities and authority in your Chemical Management System (CMS) team? Select all that apply.

- Knowledgeable of chemical products, production processes and applications
- You or your team have the requisite authority from the leadership to drive the CMS.
- Has access to In-House Testing (pH Testing, Color Fastness).

Suggested Uploads:

- Documentation that demonstrates the chemical management system (CMS) team has demonstrable knowledge of chemical products, production processes and applications (e.g., proof of tertiary education, certification/accreditation, training records/certificates).

- Management system documentation (e.g., policies and procedures) that demonstrates CMS team members have the necessary authorization to manage the CMS effectively.

What is the intent of the question?

The intent of the question is for facilities to confirm that staff responsible for chemicals management have the technical capabilities and knowledge related to chemicals used in the facility and have sufficient authorization from the facility management to allow them to effectively manage the facility's chemical management system (CMS).

Technical Guidance:

To manage a chemical management system effectively, responsible staff must have sufficient technical knowledge on chemicals and the facility's production processes that utilize chemicals. Ensuring staff have the right capabilities and knowledge ensures that decisions related to chemicals management are made by qualified individuals. Knowledge is typically demonstrated through one or more of the following:

- Tertiary education specific to chemicals (e.g., a degree in chemistry, chemical engineering or another related field).
- Professional accreditation/certification or work experience related to chemicals and/or chemicals management.
- Training from qualified training providers on topics specific to chemicals and/or chemicals management.

It is equally important the staff have the requisite authority from facility leadership to effectively implement and maintain the facility's CMS. This means that staff are provided with the necessary resources (e.g., financial resources and time) and authority to carry out and/or manage all aspects of the CMS. This is typically demonstrated through job descriptions and/or documented accountabilities in management system documentation (e.g., policies and procedures), however actual implementation of effective chemical management system processes and procedures is also a good measure of this.

Resources:

- The ZDHC Chemical Management System (CMS) framework and Chemicals Management System Technical Industry Guide can be downloaded here: https://www.roadmaptozero.com/process#Guidance

- The ZDHC Academy offers trainings to create awareness, learn and develop skills on sustainable chemical management - https://www.implementation-hub.org/academy

How This Will Be Verified:

Full Points:
Full points will be awarded if the facility's chemical management system team has **all** of the following:

- Knowledgeable of chemical products, production processes and applications
- Requisite authority from the leadership to drive the CMS.
- Access to In-House Testing (pH Testing, Color Fastness).

Documentation Required:

- Documentation that demonstrates the chemical management system (CMS) team has demonstrable knowledge of chemical products, production processes and applications. This may include:
    - Proof of tertiary education (e.g., copy of degree).
    - Copies of professional accreditation or certifications related to chemicals and/or chemicals management.
    - Records or certificate training on chemicals and/or chemicals management.
- Management system documentation that demonstrates CMS team members have the necessary authorization to manage the CMS (e.g., job descriptions, policies and procedures).
- Records of in-house testing.

Interview Questions to Ask:

- Staff responsible for the facility's CMS can demonstrate an understanding of chemicals, production processes and application throughout verification and can describe how they are authorized to effectively manage the CMS.
- Facility leadership can explain how they ensure and facilitate the required authority for the CMS team.

Inspection - Things to Physically Look For:

- Observations onsite indicate that CMS practices and procedures are being implemented by knowledgeable and qualified staff and that the CMS team has sufficient authority to effectively manage the CMS.
- In-house testing equipment is available onsite.

Partial Points:

- Partial points will be awarded if the facility's chemical management system team has **one (1) or more, but not all** of following:
    - Knowledgeable of chemical products, production processes and applications
    - Requisite authority from the leadership to drive the CMS.
    - Access to In-House Testing (pH Testing, Color Fastness).

22. Does your facility have an implementation plan to improve your chemicals management system?

Answer Yes if: Your facility has one of the following:

- A documented improvement plan to achieve a Yes response for all Higg FEM Level 1 Chemicals Management questions (**Note:** this applies to facilities that have one or more partial yes responses in level 1); **or**
- A documented plan to further improve your chemicals management system (CMS) if your facility has already achieved a Yes response for all Higg FEM Level 1 Chemicals Management questions.

If you select Yes, you will be asked the following sub question(s):

- Does your implementation plan include the following?
    - Goals based on your priorities and scope for the Chemical Management System
    - Continuously improve the effectiveness of the Chemical Management System
    - A hazardous chemicals use reduction plan.
- Please upload documentation.

Suggested Uploads:

- Documented improvement plan for achieving a Yes response for Level 1 Chemicals Management questions. This plan should include which Level 1 questions were not fully achieved, and defined actions to achieve a Yes response; **or**
- If all Level 1 responses are Yes, a documented improvement plan to further improve chemicals management.

What is the intent of the question?

The intention of this question is for facilities to demonstrate that they are proactively working to continually improve chemicals management regardless of how advanced their current CMS is, and the amount or type of chemicals used onsite.

Technical Guidance:

Like any other management system, the goal of a chemicals management system should be to drive continuous improvement. This can and should be done regardless of how advanced a facility's current CMS is, and the amount or type of chemicals used.

Note: For facilities that have not achieved a Yes response for all Level 1 questions in the FEM, these should be prioritized as the Level 1 questions focus on the foundational aspects of chemicals management.

The scope of improvements may depend on the extent (e.g., type and quantity) of chemicals used onsite and the status of the facility's current CMS. For example, the scope of improvements for a facility that uses few chemicals or chemicals only for tooling or operation may be limited compared to a facility with more complex chemical use, however in both cases, facilities should have a structured process to review their CMS and chemical management procedures to identify and prioritize improvements. This can include, but is not limited to:

- Review of the CMS policy, strategy, and chemicals management procedures at a specified frequency (e.g., annually) by the CMS Team or by external experts to identify areas for improvement.
    - For example, conducting regular internal or external audits to identify areas for improvement.
- Once areas for improvement have been identified, prioritize the improvements, and create improvement plans with defined timelines, actions, and responsibilities.
    - Areas of improvement may consist of action to increase the effectiveness of the chemicals management system and/or reduction of hazardous chemical use.
- Establish a process to monitor the improvement plan to ensure actions are implemented or updated as per the developed plan.

Resources:

- The ZDHC Chemical Management System (CMS) framework and Chemicals Management System Technical Industry Guide can be downloaded here: https://www.roadmaptozero.com/process#Guidance

- ZDHC Supplier to Zero Program https://www.implementation-hub.org/supplier-to-zero

- Implementation plan template: https://howtohigg.org/resources/resources-library/#templates

How This Will Be Verified:

Full Points:

Documentation Required:

- An implementation plan that includes details of the specific actions the facility plans to take to improve the chemicals management system. This may include:
    - If applicable, a list of Level 1 questions which were not fully achieved, and defined actions to achieve a Yes response for all Level 1 questions.
    - If all Level 1 responses are already Yes, a plan with defined actions to further improve chemicals management.

- Implementation timelines (i.e., the planned start and completion dates for actions listed in the plan).

Note: If the facility has completed all actions in the plan prior to reporting year and does not have an implementation for improving chemicals management in the reporting year and beyond, a No response should be selected (i.e., points are not awarded for historical plans that were implemented prior to the reporting year).

Interview Questions to Ask:

- Staff responsible for the implementation plan can explain the facility's plan to achieve a Yes response to all Level 1 questions or further improve their chemicals management systems, as applicable.

Inspection - Things to Physically Look For:

- The actions listed in the implementation plan directly relate to the observed chemical management practices and chemical use at the facility.

Partial Points: N/A

23. Does your facility have a traceability procedure in place which can track chemicals and raw materials used back from the product to the inventory?

Answer Yes if: Your facility has documented traceability procedures that allows you to trace **all** chemicals and raw materials used back from the final product to the chemical or material inventory.

Answer Partial Yes if: Your facility has documented traceability procedures that allows you to trace **some, but not all** chemicals and raw materials used back from the final product to the chemical or material inventory.

If you select Yes or Partial Yes, you will be asked the following sub question(s):

- Do you include the following practices in your traceability practice?
  - A clear overview of the source of your raw materials and chemical products and their suppliers.
  - Record lot/batch number on the purchase order of every chemical.
  - Record the lot/batch number of these chemicals on each colour/product batch.
  - Record the lot/batch number of these chemicals on each article type/order.

- Do you record the lot/batch number of your raw materials (fabric, yarn, garment etc.) on each article type/order?
- Please upload documentation.

Suggested Uploads:

- Chemical/material traceability procedures.
- Product batch cards including lot/batch number, dates, and production quantity.
- Recipe cards, formulation sheets, process instructions (where applicable), containing all traceability information (e.g., chemical/material name, lot/batch number, quantity, etc.)
- Chemical mixing/blending process records including relevant information (e.g., chemical name, lot/batch numbers and quantity used in mixtures).
- Chemical/material inventory and/or usage logs with chemical/material lot/batch numbers, quantity, and dates of usage, etc.

What is the intent of the question?

The intent of this question is for facilities to demonstrate that procedures are in place that allow for chemicals and materials used in a final product to be traced back to the chemical/material inventory.

Technical Guidance:

The purpose of traceability is to understand which chemicals and materials are used to make products. Traceability refers to the ability to select a final product and trace "backwards" to know the specific chemicals and raw materials that were used to produce that product (i.e., lots and batch numbers of chemicals/raw materials). This allows a facility to know all the components used to make each product. This also helps support investigations in case of any quality or material compliance issues or product recalls.

An effective traceability program will require facilities work with chemical and material suppliers, and any subcontractors to ensure that they provide traceable information on all chemicals/materials supplied to the facility (e.g., chemical name, ingredients, lot/batch number, production dates, etc.), and this information is recorded and tracked as part of the facility's traceability program.

A traceability program should also maintain a traceable linkage of information throughout the entire production process including, but not limited to:

- The product batch number.
- The production processes that a particular product underwent.
- The chemical recipe(s) in relation to each chemical process used to produce the material/product.
- Information on chemicals used in these recipes at the chemical mixing (e.g., name, lot number, and quantity)

- Linkage back to the chemical/material inventory and purchase records for information on the supplier and material composition and/or chemical ingredients.

Resources:

- The ZDHC Chemical Management System (CMS) framework and Chemicals Management System Technical Industry Guide can be downloaded here: https://www.roadmaptozero.com/process#Guidance

- ZDHC Supplier to Zero Program https://www.implementation-hub.org/supplier-to-zero

How This Will Be Verified:

Full Points:
Full points will be awarded to facilities that have documented traceability procedures that allow the facility to trace **all** chemicals and raw materials used back from the final product to the chemical or material inventory **and** the facility's traceability program includes **all** of the practices listed in the sub question.

Documentation Required:

- Documentation that shows the facility has documented traceability procedures that allows the facility to trace all chemicals and raw materials used back from the final product to the chemical or material inventory. This may include:
    - Chemical/material traceability procedures.
    - Product batch cards including lot/batch number, dates, and production quantity.
    - Recipe cards, formulation sheets, process instructions (where applicable), containing all traceability information (e.g., chemical/material name, lot/batch number, quantity, etc.)
    - Chemical mixing/blending process records including relevant information (e.g., chemical name, lot/batch numbers and quantity used in mixtures).
    - Chemical/material inventory and/or usage logs with chemical/material lot/batch numbers, quantity, and dates of usage, etc.
    - Historical production records that show chemicals/material traceability.

Interview Questions to Ask:

- Staff responsible for the facility's traceability program can describe the procedures in place to track relevant information on chemicals and raw materials.
- Relevant staff responsible for recording and/processing chemical or material information understand the facility's traceability program and procedures.

Inspection – Things to Physically Look For:

- Observations on site indicate that the facility's traceability program is being implemented appropriately (e.g., chemical/material information such as batch/lot numbers, production recipes are appropriately documented, etc.)

Partial Points:

- Partial point will be awarded to facilities that have documented traceability procedures that allows you to trace **some, but not all** chemicals and raw materials used back from the final product to the chemical or material inventory **and/or** the facility's traceability program includes some, but not all of the practices listed in the sub question.

24. Does your facility source already approved or preferred chemicals from a positive list?

Answer Yes if: 50% or more of the chemical formulations in your facility's chemical inventory are sourced from a positive list (e.g., a customer's positive list, ZDHC Gateway- Chemical Module(ZDHC MRSL Conformance Level 3), bluesign FINDER, etc.)

Answer Partial Yes if: If 49% or less of the chemical formulations in your facility's chemical inventory are sourced from a positive list (e.g., a customer's positive list, ZDHC Gateway (ZDHC MRSL Conformance Level 3), bluesign FINDER, etc.)

Note: The percentage is based on the number of chemicals, not the volume (e.g., 50 out of 100 chemicals equals 50%).

If you select Yes or Partial Yes, you will be asked the following sub question(s):

- Please upload documentation.

Suggested Uploads:

- Chemical purchasing policy.
- Chemical inventory that indicates which chemicals are sourced from a positive list (skip if previously uploaded).
- Copies of positive lists, or demonstrated access to positives list (e.g., bluesign FINDER).
- Purchasing contracts/records that indicate sourcing of chemicals from positive lists.

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they source chemicals from established positive lists to reduce impacts to human health and the environment.

Technical Guidance:

Positive lists are designed to provide facilities with a list of chemical products that have been screened and determined to be preferred options for use in manufacturing due to their reduced impacts on human health and the environment. Positive lists also consider the quality process in place at the facilities that manufacture these chemicals to ensure the composition of the chemical formulation is consistent over time and that the risk of unwanted impurities is limited.

Purchasing chemical formulations from reliable positive lists is an effective strategy to ensure that chemicals purchased do not contain hazardous substances. Driving demand for these substitutes, and green chemistry innovation as a whole, is an important driver for the overall improvement of the sustainability performance in the industry. Several brand-driven and third-party initiatives exist to identify positive chemistry such as the ZDHC Gateway- Chemical Module (ZDHC MRSL Conformance Level 3) or bluesign FINDER.

Note: Information on chemical composition available in Safety Data Sheets (SDS) only should not be used for the development of positive lists as the level of detail available in SDSs usually does not identify impurities or substances non intentionally added that can often be the source of the non-compliance with an RSL or an MRSL.

Resources:

- ZDHC Gateway- Chemical Module https://www.zdhc-gateway.com/

- ZDHC InCheck Solutions https://www.roadmaptozero.com/process#Incheck-guidelines
- bluesign FINDER https://finder.bluesign.com/index.html#

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities if 50% or more of the chemical formulations in their chemical inventory are sourced from a positive list (e.g., a customer's positive list, ZDHC Gateway- Chemical Module (ZDHC MRSL Conformance Level 3), bluesign FINDER, etc.)

Documentation Required:

- Documentation that demonstrates the facility sources and has purchased chemicals from positive lists. This may include:
    - Chemical purchasing policy.
    - Chemical inventory that indicates which chemicals are sourced from a positive list (skip if previously uploaded).

- Copies of positive lists, or demonstrated access to positives list (e.g., bluesign FINDER).
- Purchasing contracts/records that indicate sourcing of chemicals from positive lists.

Interview Questions to Ask:

- Staff responsible for chemicals management and/or purchasing can explain the facility's process to source chemicals from positive lists.

Inspection - Things to Physically Look For:

- Observations onsite indicate that the facility is sourcing chemicals from positive lists (e.g., chemicals in use at the facility are listed on the positives lists used by the facility for sourcing).

Partial Points:

- Partial points will be awarded for facilities if 49% or less of the chemical formulations in their chemical inventory are sourced from a positive list (e.g., a customer's positive list, ZDHC Gateway Chemical Modules (ZDHC MRSL Conformance Level 3), bluesign FINDER, etc.)

Chemical Management - Level 3

25. Have you adopted and implemented the ZDHC Roadmap to Zero (or the Supplier to Zero) programme on sustainable chemical management and its impact areas or other chemical management related industry programs?

Answer Yes if: Your facility has formally adopted and implemented the ZDHC Roadmap to Zero (or the Supplier to Zero) programme on sustainable chemical management and its impact areas or other chemical management related industry programs.

Note:

- Adoption is the decision to use the ZDHC MRSL or other guidelines for your business, as evident by changes in company's internal and external policies and its communication
- Implementation means steps are taken (beyond adoption) to put these decisions into action. Implementation could be, but is not limited to: training, change in purchasing

manufacturing practices to align with the programme, or adopting and monitoring metrics to track compliance with the policy.

If you select Yes, you will be asked the following sub question(s) to indicate which programs your facility has adopted and are implementing:

- ZDHC Manufacturing Restricted Substances List (MRSL) & InCheck Solutions
- ZDHC Wastewater Guidelines (for Leather & Textile) (WWG) & ClearStream report
- ZDHC Chemical Management System (CMS) Framework & Technical Industry Guide & Supplier to Zero Certificate
- ZDHC Man-Made Cellulosic Fibres (MMCF) Certificate (MMCF ONLY) / ZDHC MMCF Guidelines
- ZDHC Air Emissions Guideline
- ZDHC Waste Guidelines
- Other
    - If Other, please specify.

Suggested Uploads:

- Documentation that demonstrates the facility has adopted and is implementing the selected programs (e.g., company policies/procedures showing commitment to and alignment with program requirements, adoption/use of program MRSL or positive lists).

What is the intent of the question?

The intent of the question is for facilities to demonstrate that they have adopted AND implemented procedures to align with the ZDHC Roadmap to Zero (or Supplier to Zero) programme, or any similar initiatives, to improve sustainable chemical management and address related environmental and health impacts within their operations.

Technical Guidance:

The adoption of industry programs such as the ZDHC Roadmap to Zero (or the Supplier to Zero) programme provide a framework and resources for facilities to focus efforts on sustainable chemical management and reducing hazardous chemicals in the supply chain. This also facilitates further industry collaboration efforts to improve sustainability performance in the industry and reduce impacts to human health and the environment.

Adoption refers to the decision made by a facility to integrate the ZDHC Roadmap to Zero programme or other similar guidelines into its business operations, as demonstrated by incorporating the program guidelines and requirements into the facility's internal policies and practices, and any relevant external policies and communication (e.g., chemical purchasing policy, CMS/EMS procedures, training of staff, communication with stakeholders, etc.)

Implementation goes beyond adoption where facilities need to demonstrate that they are taking concrete actions to implement practices that align with the program guidance and requirements. Such actions can include, but are not limited to, modifications in chemical procurement practices, staff training and capacity building, and the establishment of systems to monitor and ensure compliance with the program requirements.

Resources:

The ZDHC Roadmap to Zero (or the Supplier to Zero) programme are initiatives aimed at promoting sustainable chemical management practices within the textile and footwear industry, with a focus on eliminating hazardous chemicals in production processes.

- ZDHC Roadmap to Zero https://www.roadmaptozero.com/?locale=en
- ZDHC Supplier to Zero https://www.implementation-hub.org/supplier-to-zero

How This Will Be Verified:

Full Points:
Full points will be awarded to facilities that have formally adopted and implemented one (1) or more of the programs listed in the sub question.

Documentation Required:

- Documentation that demonstrates the facility has adopted and is implementing the selected program(s). This may include:
    - Company policies/procedures showing commitment to the programme (e.g., chemical purchasing policy).
    - Demonstrated adoption/use of ZDHC MRSL or ZDHC Gateway- Chemical Module where applicable (e.g., chemical purchasing records, access to positive lists/databases)
    - Training records on policies/procedures related to program adoption.
    - Records of capacity building for staff on technical competencies needed to manage chemical programs in accordance with the adopted programs.

Interview Questions to Ask:

- Staff responsible for program adoption are knowledgeable on the programme requirements and can explain the facility's procedures for aligning with the program and how implementation/compliance with the program is monitored.

Inspection - Things to Physically Look For:

- Observations on site are consistent with the facility's policies and procedures in place to align with the adopted program(s).

Partial Points: N/A

26. Do you have a transparency policy or procedure in which you share information regarding chemical products, chemical waste, and wastewater with stakeholders (For example: with ZDHC, chemical formulators, brands/retailers, authorities, NGOs)?

Answer Yes if: Your facility has a documented transparency policy or procedure in place **and** you share information regarding chemical products, chemical waste, and/or wastewater with relevant stakeholders.

Suggested Uploads:

- Copy of the facility's transparency policy
- Examples of documented communications with stakeholders (email, report submittal, etc.)

What is the intent of the question?

The intent of the question is for facilities to demonstrate they have a transparency policy in place and are actively communicating information regarding chemical products, chemical waste, and/or wastewater with relevant stakeholders.

Technical Guidance:

Having a documented transparency policy or procedure demonstrates a facility's commitment to openness, collaboration, and accountability in addressing environmental and health impacts associated with chemical management in their operations.

A transparency policy should focus on sharing relevant information with specific groups of stakeholders such as customers, industry associations, local government, NGOs and supply chain partners. The transparency policy should include, but is not limited to:

- A list of stakeholders that the facility communicates with.
- The type of documents and information shared with each type of stakeholder.
- Frequency of sharing the documents and information
- Process of sharing

The list below provides some examples of the information that may be shared with relevant stakeholders as part of a transparency program.

- Chemical Formulators and Raw Material Suppliers:
    - MRSL/ Sustainable chemistry requirements
    - SDS requirements
    - Chemical Management Policy
    - Specification for chemical compliance and quality requirements

- Authorities/Local Government:
    - Wastewater test reports
    - Permit renewals
    - ETP design

- Brands/Retailers/Industry Groups:
    - Wastewater test report (e.g., ZDHC ClearStream)
    - Chemical Management Policy
    - Chemical/hazardous waste data
    - Permit renewals

- NGOs:
    - Corporate sustainability report
    - Proof of participation in industry program (e.g., ZDHC)

Resources:

- The ZDHC Chemicals Management System Technical Industry Guide can be downloaded here: https://www.roadmaptozero.com/process#Guidance

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that shows the facility has a documented transparency policy or procedure in place and they have shared information regarding chemical products, chemical waste, and/or wastewater with relevant stakeholders. This may include:
    - The facility's transparency policy/procedure.
    - A list of stakeholders the facility communicates with.
    - Examples of documented communications with stakeholders (email, report/information submittals, etc.)

Interview Questions to Ask:

- Staff responsible for the facility's transparency policy and communicating to stakeholders can explain the facility's transparency policy and how information is communicated to stakeholders.

Inspection - Things to Physically Look For:

- Observations indicate the information provided in the transparency policy and any stakeholder communications is accurate and relevant to the facility's operations.

Partial Points: N/A

27. Does your facility collaborate with brands and/or chemical suppliers to select chemicals for alternatives assessment?

Answer Yes If: Your facility has collaborated with brands and/or chemical suppliers to nominate and assess chemicals used in the manufacturing process for alternatives assessment **and** has established the following:

- A list of prioritized chemicals used in production processes and proposed alternatives that was developed through a transparent, science-based approach that evaluates chemicals and/or chemical products.
- A documented process for collaboration with brands or chemical suppliers regarding chemical alternatives, substances of concern.

Notes:

- This assessment must cover chemicals/substances that are not already restricted through regulation.
- If your facility does not actively participate in identifying and assessing chemicals/substances of concern and/or alternative chemicals, you should answer No to this question.

If you select Yes, you will be asked the following sub question(s):

- Please upload documentation.

Suggested Uploads:

- Prioritized list of substances of concern and alternatives for chemicals in use at the facility
- Records from collaborative meetings between facility, brand customers, and/or chemical suppliers regarding alternative chemicals (e.g., meeting minutes)

What is the intent of the question?

The intent of this question is for facilities to demonstrate that they have an established process in place to collaborate with brands and/or chemical suppliers to identify and assess chemical alternatives for chemicals used in the manufacturing process.

Technical Guidance:

It's critical that value chain partners work together to identify substances of concern and evaluate less hazardous alternatives.

An alternative assessment for chemicals is a process to minimise chemicals of concern while considering performance and economic viability through identifying, comparing and selecting safer alternatives. A primary goal of an alternatives assessment is to reduce risk to property, humans and the environment by identifying less hazardous materials.

A chemical alternatives assessment may be used to prioritise replacement of hazardous chemicals or chemical products. To avoid regrettable substitutions, a thorough assessment of the proposed alternative should follow a transparent, science-based, simple and reasonable system that evaluates chemicals and/or chemical products.

Collaboration to identify and develop alternatives can take various forms which may consist of formal processes to:

- Identify hazards associated with chemicals and/or substances of concern currently in use.
- Identify alternatives (e.g., public database/internet searches or collaborative meetings to identify alternative chemicals and suppliers)
- Compare alternatives including potential changes required to production processes (e.g., technical/hazard review, pilot testing, etc.)

Resources:

- The ZDHC Chemicals Management System Technical Industry Guide can be downloaded here: https://www.roadmaptozero.com/process#Guidance
- US OSHA Transitioning to Safer Chemicals: A Toolkit for Employers and Workers https://www.osha.gov/safer-chemicals/basics
- BizNGO Chemical Alternatives Assessment Protocol https://www.biznGO.org/alternatives-assessment/chemical-alternatives-assessment-protocol

How This Will Be Verified:

Full Points:

Documentation Required:

- Documentation that demonstrates the facility has collaborated with brands and/or chemical suppliers to nominate and assess chemicals used in the manufacturing process for alternatives assessment. This must include:
    - A list of prioritized chemicals used in production processes and proposed alternatives that was developed through a transparent, science-based approach that evaluates chemicals and/or chemical products.
    - A documented process for collaboration with brands or chemical suppliers regarding chemical alternatives, substances of concern.
- Records from collaborative meetings between facility, brand customers, and/or chemical suppliers regarding alternative chemicals (e.g., meeting minutes)

Interview Questions to Ask:

- Staff responsible for evaluating alternatives can describe the facility's process to collaborate with stakeholders to identify and assess chemicals or substances of concerns and alternatives.

Inspection - Things to Physically Look For:

- Observations on site are consistent with the facility's reported work to identify and assess alternatives (e.g., the facility's priority list of hazardous chemicals or substances of concern is consistent with chemicals used in production processes at the facility).

Partial Points: N/A

28. Does your facility contribute to a chemical analysis against human and environmental hazard criteria (e.g., persistent, bio-accumulative, and toxic) for selecting alternative processes?

Answer Yes if: Your facility has conducted or contributed to an assessment of chemicals used in manufacturing processes and alternatives against established human health and environmental hazard criteria **and** have documented prioritized actions to switch to alternative chemicals to reduce human health and environmental hazards.

Answer Partial Yes if: Your facility has conducted or contributed to an assessment of chemicals used in manufacturing processes and alternatives against established human health and environmental hazard criteria, but do not have documented prioritized actions to switch to alternative chemicals to reduce human health and environmental hazards.

If you select Yes or Partial Yes, you will be asked the following sub question(s):

- Please upload documentation.

Suggested Uploads:

- Hazardous chemicals risk assessment report such as a Screened Chemistry or Cradle2Cradle assessment report for chemicals in use and/or proposed alternatives.
- Evidence the facility has evaluated chemicals used in manufacturing and their alternatives against established human health and environmental hazard criteria.
- Prioritized list of chemical substitutions based on the hazard assessment.

What is the intent of the question?
The intent of the question is for facilities to demonstrate that they actively participate in the alternative assessment process by conducting or contributing to a chemical hazard assessment that evaluates human and environmental hazards.

Technical Guidance:
For this question in the FEM, the alternative assessment/selection process refers to an evaluation of human health and environmental hazards and risks of chemicals in use or proposed as alternatives to ensure all hazards/risks are fully evaluated to avoid chemical substitutions that could result in unintended risk or impacts. This should be done to prioritize action to reduce, substitute or ultimately phase out hazardous chemical use.

This level of evaluation requires specific technical expertise to ensure all risks (e.g., hazards and exposure potentials) are appropriately identified and evaluated using systematic approach. This should include consideration of all intrinsically hazardous properties and risks (e.g., persistent, bio-accumulative, and toxic (PBT); very persistent and very bio-accumulative (vPvB); carcinogenic, mutagenic, and toxic for reproduction (CMR); endocrine disruptors (ED), etc.)

Benefits of conducting a systematic hazard/risk assessment include:

- The approach can be used to assess and compare alternatives to an incumbent chemical substance. The goal is to identify alternative chemicals that are inherently less hazardous, thereby preventing substitutions that may increase risk to human health and the environment.
- The approach can be adapted and input into information technology tools, making it possible to screen a large number of chemicals in a relatively short period of time, and providing guidance for more comprehensive profiling of chemicals and materials.
- The approach can readily be adaptable to multiple industry sectors and provides a science-based approach to evaluating chemical hazards so that less hazardous alternatives may be identified.

Resources:

- Outdoor Industry Association (OIA) Guidance for Using Chemical Hazard Assessment for Alternative Chemical Assessment and Prioritization https://oia.outdoorindustry.org/OIAZDHCHazardAssessment
- The ZDHC Chemical Management System (CMS) framework and Chemicals Management System Technical Industry Guide can be downloaded here: https://www.roadmaptozero.com/process#Guidance

- TOXFMD Screened Chemistry https://www.screenedchemistry.com/

How This Will Be Verified:
Full Points:
Full points will be awarded for facilities that have conducted or contributed to an assessment of chemicals used in manufacturing processes and alternatives against established human health and environmental hazard criteria **and** have documented prioritized actions to switch to alternative chemicals to reduce human health and environmental hazards.

Documentation Required:

- Documentation that demonstrates the facility has conducted or contributed to an assessment of chemicals used in manufacturing processes and alternatives against established human health and environmental hazard criteria. This may include:
    - Hazardous chemicals risk assessment report such as a Screened Chemistry or Cradle2Cradle assessment report for chemicals in use and/or proposed alternatives.
    - Evidence the facility has evaluated chemicals used in manufacturing and their alternatives against established human health and environmental hazard criteria.
    - If applicable, a prioritized list of chemical substitutions/actions based on the hazard assessment.

Interview Questions to Ask:

- Staff involved in the chemical hazard assessment process can describe how the facility evaluates human health and environmental hazards and risks of chemicals in use or proposed as alternatives to ensure all hazards/risks are fully evaluated to avoid chemical substitutions that could result in unintended risk or impacts.

Inspection - Things to Physically Look For:

- Observations on site are consistent with the facility's reported work to identify and assess alternatives (e.g., the facility's hazard assessment is consistent with chemicals used in production processes at the facility).

Partial Points:

- Partial points will be awarded to facilities that have conducted or contributed to an assessment of chemicals used in manufacturing processes and alternatives against established human health and environmental hazard criteria, but do not have documented prioritized actions to switch to alternative chemicals to reduce human health and environmental hazards.

29. Does your facility contribute to an analysis of lifecycle impacts for selecting alternative processes?

Answer Yes if: Your facility has evaluated the environmental life cycle impacts (other than chemical hazards/risk) of chemicals used in manufacturing processes and alternatives **and** this includes impacts of replacing chemicals in your factory on **all** of the following aspects:

- Water usage
- Energy usage
- Waste generation/disposal
- Wastewater generation and quality
- Resource depletion
- Air emissions
- Human health hazards

Answer Partial Yes if: Your facility has evaluated the environmental life cycle impacts (other than chemical hazards/risk) of chemicals used in manufacturing processes and alternatives **and** this includes impacts of replacing chemicals in your factory on **some, but not all** of the following aspects:

- Water usage
- Energy usage
- Waste generation/disposal
- Wastewater generation and quality
- Resource depletion
- Air emissions
- Human health hazards

If you select Yes or Partial Yes, you will be asked the following sub question(s):

- Please upload documentation.

Suggested Uploads:

- Evidence the facility has evaluated chemicals used in manufacturing and their alternatives to determine life cycle impacts in addition to chemical hazard and risk.
    - Lifecycle studies or other third-party assessments.
    - bluesign Xpert assessment.
    - Documented metrics for water, energy, waste, etc.
    - MFCA (Material Flow Cost Accounting).

What is the intent of the question?

The intent of the question is for facilities to demonstrate that they have evaluated the environmental life cycle impacts (other than chemical hazards/risk) of chemicals used in manufacturing processes and alternatives.

Technical Guidance:

Facilities should strive to optimize chemical use and manufacturing processes to minimize all environmental impacts associated with production (e.g., energy and water consumption, waste generation, wastewater quality, etc). An example would be choosing a different dyestuff or recipe that results in reduced water or energy consumption during a dyeing process. The efficiency of a manufacturing process can be highly dependent on the optimization chemical use along with the manufacturing equipment/process. The optimization of these elements can generate significant benefits by reducing the amount of chemicals used, reducing resource consumption, and waste associated with the process and therefore reducing the life cycle impacts of the system.

A life cycle assessment (LCA) is a systematic approach to evaluate the environmental footprint of a product. This evaluation goes beyond just assessing chemical hazards and risk and is a more comprehensive approach to sustainability which looks at the life cycle impacts within and beyond the facility. LCAs should be conducted by qualified individuals in accordance with a recognized LCA framework such as ISO14040:2006.

Resources:

- American Center for Life Cycle Assessment https://lcacenter.org/
- Ecochain - Life Cycle Assessment (LCA) – Complete Beginner's Guide https://ecochain.com/knowledge/life-cycle-assessment-lca-guide/
- World Business Council for Sustainable Development - Life Cycle Metrics for Chemical Products http://wbcsdservers.org/wbcsdpublications/cd_files/datas/business-solutions/reaching-full-potential/pdf/Chemical%20Sector%20Life%20Cycle%20Metrics%20Guidance.pdf
- ISO 14040:2006 Life cycle assessment - Principles and framework https://www.iso.org/standard/37456.html
- ZDHC MMCF Guidelines https://www.roadmaptozero.com/process#materials

How This Will Be Verified:

Full Points:
Full points will be awarded for facilities that have evaluated the environmental life cycle impacts (other than chemical hazards/risk) of chemicals used in manufacturing processes and alternatives **and** this includes impacts of replacing chemicals in your factory on **all** of the following aspects:

- Water usage
- Energy usage

- Waste generation/disposal
- Wastewater generation and quality
- Resource depletion
- Air emissions
- Human health hazards

Documentation Required:

- Documentation that shows the facility has evaluated chemicals used in manufacturing and their alternatives to determine life cycle impacts in addition to chemical hazard and risk. This may include:
    - Lifecycle studies or other third-party assessments.
    - bluesign Xpert Assessment.
    - Documented metrics for water, energy, waste, etc.
    - MFCA (Material Flow Cost Accounting).

Interview Questions to Ask:

- Staff responsible for managing the assessment process can describe how the facility tracks and evaluates life cycle impacts of chemicals used in manufacturing processes and proposed alternatives.

Inspection - Things to Physically Look For:

- Observations on site are consistent with the facility's reported work to identify and assess the life cycle impacts of chemicals in use and alternatives (e.g., the facility's life cycle impact assessment is consistent with chemicals used in production processes at the facility).

Partial Points:

- Partial points will be awarded to facilities that evaluated the environmental life cycle impacts (other than chemical hazards/risk) of chemicals used in manufacturing processes and alternatives **and** this includes impacts of replacing chemicals in your factory on **some, but not all** of the following aspects:
    - Water usage
    - Energy usage
    - Waste generation/disposal
    - Wastewater generation and quality
    - Resource depletion
    - Air emissions
    - Human health hazards

30. Does your contractor(s)/subcontractor(s)/upstream supplier(s) source already approved or preferred chemicals from a positive list to replace chemicals not already included in RSL?

Answer Yes if: Your facility has a system in place that requires contractors/subcontractors and upstream suppliers to source chemicals from positive lists that go beyond restricted substances list (RSL) requirements **and** can demonstrate that this engagement has resulted in one (1) or more contractor/subcontractor or upstream suppliers replacing chemicals with approved or preferred chemicals from a positive list that is not already included in RSL requirements.

Answer Partial Yes if: Your facility has a documented policy/ agreement in place that requires contractors/subcontractors and upstream suppliers to source chemicals from positive lists that go beyond restricted substances list (RSL) requirements, however you are unsure or cannot demonstrate that this engagement has resulted in one (1) or more contractor/subcontractor or upstream suppliers replacing chemicals with approved or preferred chemicals from a positive list that is not already included in RSL requirements.

Notes:

- Contractors/Subcontractors are defined as contracted business partners that support the manufacturing process of final products (e.g., screen printing, washing/dyeing, or other product embellishments).
- Upstream suppliers are defined as an entity that provides raw materials to manufacturers that ultimately process the materials. (e.g., Chemical suppliers. Fabric mills, zipper and button suppliers are common upstream suppliers for a cut-sew garment factory).

If you select Yes or Partial Yes, you will be asked the following sub question(s):

- Does your facility have an implementation plan to reduce the use of hazardous chemicals beyond chemicals specified by regulations and/or Restricted Substance Lists with your contractor(s)/subcontractor(s)/upstream supplier(s)?
- Please upload documentation.

Suggested Upload:

- Documentation that shows engagement or plan to engage with contractors, subcontractors, and upstream suppliers to require chemicals to be sourced from positive lists.
    - List of contractors, subcontractors, and upstream suppliers.

- Communications/agreements with the contractors, subcontractors, and upstream suppliers requiring the practice of sourcing chemicals from positive lists (e.g., contractual, requirements, purchasing agreements, email correspondence).
- Higg FEM verification report from contractors, subcontractors, and upstream suppliers showing that they are sourcing chemicals from positive lists.
- Records of alternative chemical trials or piloting with contractors, subcontractors, and upstream suppliers.
- Positive lists and/or list of chemicals prioritized for substitution provided to contractors, subcontractors, and upstream suppliers.
- Implementation plan to reduce the use of hazardous chemicals beyond chemicals specified by regulations and/or RSL with your contractors, subcontractors, and upstream suppliers that requires the use of positive lists.

What is the intent of the question?

The intent of this question is for facilities to demonstrate that a process or plan is in place to engage with contractors, subcontractors, and upstream suppliers to require chemicals to be sourced from positive lists that go beyond RSL requirements.

Technical Guidance:

Facilities should proactively engage with their supply chain partners (i.e., contractors and upstream suppliers) to require the use of chemicals that are less hazardous and reduce impacts to human health and the environment. This can be done by requiring contractors and upstream suppliers to source chemicals from recognized positive lists (e.g., ZDHC Gateway- Chemical Module (ZDHC MRSL Conformance Level 3) or bluesign FINDER, etc.)

Facilities should work with contractors and upstream suppliers to understand the chemicals used at their facilities with the goal of identifying and prioritizing hazardous chemicals for substitution that are not already regulated by legislation or existing RSL with a focus on reducing risk as much as possible. For example, if a facility is currently following an industry or brand specific RSL, the facility can also proactively search to identify and require the phase out of hazardous chemicals not listed in the RSL by using available databases or other sources of information on safer alternative chemistry (e.g., ZDHC Gateway- Chemical Module, ECHA SVHC List, ChemSec SIN list).

It is also important to ensure that these expectations and requirements are clearly communicated with contractors and upstream suppliers. For example, facilities may include requirements to restrict chemicals and/or source from positive lists in the terms and conditions of contractual agreements.

Resources:

Note: Some resources provided below may include reference to legal requirements that may not apply to your facility. Facilities are expected to comply with applicable legal requirements related to chemicals management.

- ZDHC Gateway- Chemical Module https://www.zdhc-gateway.com/
- bluesign FINDER https://finder.bluesign.com/index.html#
- ChemSec SIN list https://sinlist.chemsec.org/
- European Chemical Agency (ECHA) SVHC (Substance of very high concern) (https://echa.europa.eu/candidate-list-table)
- Substitution Support Portal https://www.subsportplus.eu/subsportplus/EN/Home/Home_node.html
- Washington State Reporting List of Chemicals of High Concern to Children (CHCC) https://ecology.wa.gov/Regulations-Permits/Reporting-requirements/Childrens-Safe-Products-Act-Reporting/Chemicals-of-high-concern-to-children

How This Will Be Verified:

Full Points:
Full points will be awarded to facilities that have a system in place that requires contractors/subcontractors and upstream suppliers to source chemicals from positive lists that go beyond restricted substances list (RSL) requirements **and** can demonstrate that this engagement has resulted in one (1) or more contractor/subcontractor or upstream supplier replacing chemicals with approved or preferred chemicals from a positive list that is not already included in RSL requirements.

Documentation Required:

- Documentation that shows engagement or plan to engage with contractors, subcontractors, and upstream suppliers to require chemicals to be sourced from positive lists. This may include:
    - List of contractors, subcontractors, and upstream suppliers that the facility engages with.
    - Communications/agreements with the contractors, subcontractors, and upstream suppliers requiring the practice of sourcing chemicals from positive lists (e.g., contractual, requirements, purchasing agreements, email correspondence)
    - Higg FEM verification report from contractors, subcontractors, and upstream suppliers showing that they are sourcing chemicals from positive lists.
    - Records of alternative chemical trials or piloting with contractors, subcontractors, and upstream suppliers.
    - Positive lists and/or list of chemicals prioritized for substitution provided to contractors, subcontractors, and upstream suppliers.
    - Records of chemical substitution at contractors, subcontractors, and upstream suppliers, if applicable.

- Implementation plan to reduce the use of hazardous chemicals beyond chemicals specified by regulations and/or RSL with your contractors, subcontractors, and upstream suppliers that requires the use of positive lists.

Interview Questions to Ask:

- Staff responsible for engaging with contractors, subcontractors, and upstream suppliers can explain the facilities procedures or plan to require suppliers to source chemicals from positive lists.

Inspection - Things to Physically Look For:

- Where applicable, observations onsite indicate that the facility has, or is planning to engage with contractors, subcontractors, and upstream suppliers (e.g., observed supplier/contractor material or activities is consistent with the facility's reported list of suppliers/contractors and type of engagement.)

Partial Points:

- Partial points will be awarded to facilities that have a documented policy/agreement in place that will require contractors/subcontractors and upstream suppliers to source chemicals from positive lists that goes beyond RSL requirements.

31. Does your contractor(s)/subcontractor(s)/upstream supplier(s) source already approved or preferred chemicals from a positive list to replace chemicals not already included in MRSL?

Answer Yes if: Your facility has a system in place that requires contractors/subcontractors and upstream suppliers to source chemicals from positive lists that go beyond manufacturing restricted substances list (MRSL) requirements **and** can demonstrate that this engagement has resulted in one (1) or more contractor/subcontractor or upstream suppliers replacing chemicals with approved or preferred chemicals from a positive list that is not already included in MRSL requirements.

Answer Partial Yes if: Your facility has a documented policy/agreement in place that will require contractors/subcontractors and upstream suppliers to source chemicals from positive lists that go beyond MRSL requirements, however you are unsure or cannot demonstrate that this engagement has resulted in one (1) or more contractor/subcontractor or upstream suppliers replacing chemicals with approved or preferred chemicals from a positive list that is not already included in MRSL requirements.

Notes:

- Contractors/Subcontractors are defined as contracted business partners that support the manufacturing process of final products (e.g., screen printing, washing/dyeing, or other product embellishments).
- Upstream suppliers are defined as an entity that provides raw materials to manufacturers that ultimately process the materials. (e.g., Chemical suppliers. Fabric mills, zipper and button suppliers are common upstream suppliers for a cut-sew garment factory).

If you select Yes or Partial Yes, you will be asked the following sub question(s):

- Does your facility have an implementation plan to reduce the use of hazardous chemicals beyond chemicals specified by regulations and/or Manufacturing Restricted Substance Lists with your contractor(s)/subcontractor(s)/upstream supplier(s)?
- Please upload documentation.

Suggested Upload:

- Documentation that shows engagement or plan to engage with contractors, subcontractors, and upstream suppliers to require chemicals to be sourced from positive lists.
    - List of contractors, subcontractors, and upstream suppliers.
    - Communications/agreements with the contractors, subcontractors, and upstream suppliers requiring the practice of sourcing chemicals from positive lists (e.g., contractual, requirements, purchasing agreements, email correspondence).
    - Higg verification report from contractors, subcontractors, and upstream suppliers showing that they are sourcing chemicals from positive lists.
    - Records of alternative chemical trials or piloting with contractors, subcontractors, and upstream suppliers.
    - Positive lists and/or list of chemicals prioritized for substitution provided to contractors, subcontractors, and upstream suppliers.
    - Implementation plan to reduce the use of hazardous chemicals beyond chemicals specified by regulations and/or MRSL with your contractors, subcontractors, and upstream suppliers that requires the use of positive lists.

What is the intent of the question?

The intent of this question is for facilities to demonstrate that a process or plan is in place to engage with contractors, subcontractors, and upstream suppliers to require chemicals to be sourced from positive lists that go beyond MRSL requirements.

Technical Guidance:

Facilities should proactively engage with their supply chain partners (i.e., contractors and upstream suppliers) to require the use of chemicals that are less hazardous and reduce impacts to human health and the environment. This can be done by requiring contractors and upstream

suppliers to source chemicals from recognized positive lists (e.g., ZDHC Gateway- Chemical Module(ZDHC MRSL Conformance Level 3) or bluesign FINDER, etc.)

Facilities should work with contractors and upstream suppliers to understand the chemicals used at their facilities with the goal of identifying and prioritizing hazardous chemicals for substitution that are not already regulated by legislation or existing MRSL with a focus on reducing risk as much as possible. For example, if a facility is currently following an industry or brand specific MRSL, the facility can also proactively search to identify and require the phase out of other hazardous chemicals not listed in the MRSL by using available databases or other sources of information on safer alternative chemistry (e.g., ZDHC Gateway- Chemical Module, ZDHC MRSL Candidate List, ECHA SVHC List, ChemSec SIN list).

It is also important to ensure that these expectations and requirements are clearly communicated with contractors and upstream suppliers. For example, facilities may include requirements to restrict chemicals and/or source from positive lists in the terms and conditions of contractual agreements.

Resources:

Note: Some resources provided below may include reference to legal requirements that may not apply to your facility. Facilities are expected to comply with applicable legal requirements related to chemicals management.

- ZDHC Gateway- Chemical Module https://www.zdhc-gateway.com/
- ZDHC MRSL (refer to MRSL Candidate List) https://mrsl.roadmaptozero.com/
- bluesign FINDER https://finder.bluesign.com/index.html#
- ChemSec SIN list https://sinlist.chemsec.org/
- European Chemical Agency (ECHA) SVHC (Substance of very high concern) (https://echa.europa.eu/candidate-list-table)
- Substitution Support Portal https://www.subsportplus.eu/subsportplus/EN/Home/Home_node.html
- Washington State Reporting List of Chemicals of High Concern to Children (CHCC) https://ecology.wa.gov/Regulations-Permits/Reporting-requirements/Childrens-Safe-Products-Act-Reporting/Chemicals-of-high-concern-to-children

How This Will Be Verified:

Full Points:
Full points will be awarded to facilities that have a system in place that requires contractors/subcontractors and upstream suppliers to source chemicals from positive lists that go beyond MRSL requirements **and** can demonstrate that this engagement has resulted in one (1) or more contractor/subcontractor or upstream supplier replacing chemicals with approved or preferred chemicals from a positive list that is not already included in MRSL requirements.

Documentation Required:

- Documentation that shows engagement or plan to engage with contractors, subcontractors, and upstream suppliers to require chemicals to be sourced from positive lists. This may include:
    - List of contractors, subcontractors, and upstream suppliers that the facility engages with.
    - Communications/agreements with the contractors, subcontractors, and upstream suppliers requiring the practice of sourcing chemicals from positive lists (e.g., contractual, requirements, purchasing agreements, email correspondence)
    - Higg verification report from contractors, subcontractors, and upstream suppliers showing that they are sourcing chemicals from positive lists.
    - Records of alternative chemical trials or piloting with contractors, subcontractors, and upstream suppliers.
    - Positive lists and/or list of chemicals prioritized for substitution provided to contractors, subcontractors, and upstream suppliers.
    - Records of chemical substitution at contractors, subcontractors, and upstream suppliers, if applicable.
    - Implementation plan to reduce the use of hazardous chemicals beyond chemicals specified by regulations and/or MRSL with your contractors, subcontractors, and upstream suppliers that requires the use of positive lists.

Interview Questions to Ask:

- Staff responsible for engaging with contractors, subcontractors, and upstream suppliers can explain the facilities procedures or plan to require suppliers to source chemicals from positive lists.

Inspection - Things to Physically Look For:

- Where applicable, observations onsite indicate that the facility has, or is planning to engage with contractors, subcontractors, and upstream suppliers (e.g., observed supplier/contractor material or activities is consistent with the facilities reported list of suppliers/contractors and type of engagement.)

Partial Points:

- Partial points will be awarded to facilities that have a documented policy/agreement in place that will require contractors/subcontractors and upstream suppliers to source chemicals from positive lists that go beyond MRSL requirements.

Higg Facility Environmental Module (FEM) – Glossary

Note: This glossary does not reflect the most recent changes that will be available in the next How to Higg Guide update. You may still refer to the definition of many of these terms now as the majority of them are still valid.

Terms	Description of terms	Source	Reference
Absolute reductions	Reduction in actual utility consumption (e.g. kWh of electricity used, or cubic meter of water used for the whole facility within a calendar year) or pollution generated (e.g. kg of hazardous waste for the whole facility within a calendar year) regardless of facility size, production volumes, production hours, raw material usage or other business metrics.	Higg Index	
Air emission inventory	An inventory of emissions to air is a detailed list of the emissions and their sources, it should include the following information for each emission source: ● the pollutants known or likely to be present; ● the quantity emitted (if known or estimated); ● the location of, for example, the stack, vent etc.; ● any control devices (e.g. abatement equipment) installed; ● frequency of monitoring; and ● whether the particular emission is legally regulated.	Higg Index	
Air pollution control	Air pollution control refer to steps taken to maintain a standard of purity of air for good public health; for protection of plant and animal life, and property; for visibility; and for safe ground and air transportation.	OECD	https://stats.oecd.org/glossary/detail.asp?ID=87

All waste stream	All waste stream means all the wastes produced on-site including wastes generated from manufacturing the product, office use, waste produced by workers at the canteen, dormitory, and waste produced by contractor coming on-site to perform a service.	Higg	
Alternative assessment	It is a process for identifying alternatives (chemical or non-chemical) to a chemical of concern, screening out equally or more hazardous alternatives, and selecting an alternative that is technically and economically viable and does not have the potential for causing significant environmental or human health impacts.	OIA - Chemicals Management Framework Glossary	
Barriers	Any coatings and/or laminations used on textiles or footwear products. Barriers may be bicomponent (two or more materials), microporous (material with pore diameters of less than 2nm) or monolithic (single covering without seams or joints).	Higg Index	
Baseline	Baseline is the initial metric for the utility use to be improved from. The initial metric is the beginning measure taken to establish a stable starting point to evaluate improvement against. It must reference a specific timeframe from which the baseline was calculated, typically annual consumption. Identifying any unique variables makes the metric more accurate.	Higg Index	

Biological oxygen demand (BOD)	Biological Oxygen Demand (or Biochemical Oxygen Demand) (BOD) is an indicator of the level of organic matter in the water and, hence, the rate at which oxygen in the water is used up as the organic matter is consumed by organisms in the water. Generally, the lower the BOD, the better the water/ wastewater quality.	Higg Index & GSCP	
Biomass	Biomass is biological material from living or recently living organism. Sustainable biomass sources are: • Energy crops that do not compete with food crops for land; high yield crops grown specifically for energy applications. • Agricultural residues: residues from agriculture harvesting or processing, such as wheat straw or rice husk. • Sustainably-harvested wood and forest residues. • Waste wood	Higg Index	
Brackish surface water/seawater	Brackish water is water in which the concentration of salts is relatively high (over 10,000 mg/l). Seawater has a typical concentration of salts above 35,000 mg/l.	CDP Water Reporting Guidance	https://b8f65cb373b1b7b15feb-c70d8ead6ced550b4d987d7c03fcdd1d.ssl.cf3.rackcdn.com/cms/guidance_docs/pdfs/000/000/225/original/CDP-Water-Reporting-Guidance.pdf?1478544069
CAS number	CAS Registry Numbers (often referred to as CAS RN® or CAS Numbers) are universally used to provide a unique, unmistakable identifier for chemical substances. A CAS Registry Number itself has no inherent chemical significance but provides an unambiguous way to identify a chemical substance or molecular structure when there are many possible systematic, generic, proprietary or trivial names.	CAS	http://www.cas.org/about-cas/faqs

Chemical oxygen demand (COD)	Chemical Oxygen Demand (COD) is an indicator of the level of organic matter and chemicals in the water and, hence, the rate at which oxygen in the water is used up as the organic matter and chemicals are consumed. Generally, the lower the COD the better the water/ wastewater quality.	GSCP	
Circular economy	A circular economy is an alternative to a traditional linear economy (make, use, dispose) in which we keep resources in use for as long as possible, extract the maximum value from them whilst in use, then recover and regenerate products and materials at the end of each service life.	WRAP	http://www.wrap.org.uk/about-us/about/wrap-and-circular-economy
Climate change	Climate change refers to any long-term change in Earth's climate, or in the climate of a region or city. This includes warming, cooling and changes besides temperature.	NASA	https://www.nasa.gov/audience/forstudents/5-8/features/nasa-knows/what-is-climate-change-58.html
Domestic water	Water consumed for non-industrial purposes within the facility, such as drinking water, flush water.	Higg Index	
Emergency Response Plan (ERP)	An Emergency Response Plan is a plan of action for the efficient deployment and coordination of services, agencies and personnel to provide the earliest possible response to an emergency.	WREM	http://www.wrem.ca/en/emergencyplans/
Energy (indirect)	Energy (indirect) can be purchased from public and private utilities in the form of electricity, steam, or heat.	Higg Index	

Energy carrier	Substance or phenomenon that can be used to produce mechanical work or heat or to operate chemical or physical processes.	ISO	https://www.iso.org/obp/ui/#iso:std:iso:13600:ed-1:v1:en
Environmental Management System	A management system is a set of interrelated elements used to establish policy and objectives and to achieve those objectives. An environmental management system must consist of: a. Environmental Policy b. Planning: environmental risk assessment, setting objectives and targets c. Implementation and operation: operational procedures; adequate training; documentation and its control d. Checking: monitoring and measurement, audit and inspections e. Management Review	GSCP, Higg Index based on ISO14001:2004	
Environmental policy	The policy describes the site's activities, products, and services including a commitment to continual improvement and prevention of pollution, as well as a commitment to comply with legal and other requirements that relate to the significant environmental aspects identified for the site. The policy should set out the framework for setting and reviewing environmental objectives and targets.	Higg Index	

Final disposal	Final disposal means the final step to transform or destroy your waste. If your contractor is only collecting your waste and selling it to another company, the final disposal will be the last company that handle your waste by recycling or incinerating or treating (physical or chemical treatment) or landfilling your waste. This can be controlled in the factory by checking the waste collection area and confirming that sorting is well-managed.	Higg Index	
Foams	A solid “open cell” or “closed cell” foam material commonly used in packaging and footwear. Includes EVA, PE, and PU foam.		
Fossil fuels	Fossil fuels are coal, oil and natural gas. They are derived from the remains of ancient plant and animal life.	OECD	https://stats.oecd.org/glossary/detail.asp?ID=1062
Fresh surface water	Surface water is naturally occurring water on the Earth's surface in ice sheets, ice caps, glaciers, icebergs, bogs, ponds, lakes, rivers and streams. (Fresh water underground is called groundwater and oceans are not freshwater). Fresh water sources are generally characterized by having low concentrations of dissolved salts (below 1,000 mg/l) and other total dissolved solids.	CDP Water Reporting Guidance	https://b8f65cb373b1b7b15feb-c70d8ead6ced550b4d987d7c03fcdd1d.ssl.cf3.rackcdn.com/cms/guidance_docs/pdfs/000/000/225/original/CDP-Water-Reporting-Guidance.pdf?1478544069
Freshwater	The most common freshwater use is potable municipal or city water (drinking water). Other sources can be from ground water wells, surface waters (lakes, rivers, and streams), rain water, and even condensate when collected from steam which is supplied to the business from an external source.	Higg Index	

Freshwater Footprint	Freshwater Footprint is defined as the total volume of all freshwater used to produce goods and services within a defined time period. This includes freshwater use in canteens, dormitories, landscape irrigation, vehicle washing, etc. – all freshwater use. The number represents the environmental impact as it pertains to freshwater use. A sustainable business should strive to minimize freshwater footprint. Many ways can be used to reduce freshwater use, including: fixing leaks, manufacturing process efficiency improvements, technology upgrades, reuse, and recycling	Higg Index	
Fugitive	Fugitive emissions are defined as those emissions which could not reasonably pass through a stack, chimney, vent, or other functionally-equivalent opening	US EPA	https://www.epa.gov/sites/production/files/2015-07/documents/fug-def.pdf
Global Harmonization System (GHS)	GHS stands for the Globally Harmonized System of Classification and Labelling of Chemicals. GHS defines and classifies the hazards of chemical products and communicates health and safety information on labels and safety data sheets). The goal is that the same set of rules for classifying hazards, and the same format and content for labels and safety data sheets (SDS) will be adopted and used around the world. An international team of hazard communication experts developed GHS.	CCOHS	http://www.ccohs.ca/oshanswers/chemicals/ghs.html

Greenhouse gases emissions (GHG)	Gases that trap heat in the atmosphere are called greenhouse gases. The primary human activity affecting the amount and rate of climate change is greenhouse gas emissions from the burning of fossil fuels. The most common GHG, regulated under the Kyoto Protocol and are usually accounted in GHG inventories, are carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), sulfur hexafluoride (SF6), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and Nitrogen trifluoride (NF3). A site's GHG emissions, sometimes called 'carbon footprint,' refer to the amount of GHG emitted to the atmosphere as a result of the site's activities, whether from energy use, refrigerant use and wastewater treatment or other. The scope of measuring and tracking of a site's GHG emissions is defined by different international accounting standards like the ISO14064, GHG Protocol – A Corporate and Accounting Standard (Revised Edition), etc. Local GHG accounting requirements and standards may be available.	Adapted from US EPA and GHG Protocol	

Groundwater	Water in soil beneath the soil surface, usually under conditions where the pressure in the water is greater than the atmospheric pressure, and the soil voids are substantially filled with the water. Non-renewable groundwater is generally located at deeper depths and cannot be replenished easily or is replenished over very long periods of time. They are sometimes referred to as "fossil" groundwater sources.	CDP Water Reporting Guidance	https://b8f65cb373b1b7b15feb-c70d8ead6ced550b4d987d7c03fcdd1d.ssl.cf3.rackcdn.com/cms/guidance_docs/pdfs/000/000/225/original/CDP-Water-Reporting-Guidance.pdf?1478544069
Hazardous waste	Hazardous waste is waste that could cause harm to public health and/or the environment because of its chemical, physical, or biological characteristics (e.g., it is flammable, explosive, toxic, radioactive, or infectious). The U.S. Environmental Protection Agency defines hazardous waste as "waste that is dangerous or potentially harmful to our health or the environment. Hazardous wastes can be liquids, solids, or gases, or sludge.	US EPA	
Higg FEM Trainer	An Individual qualified to provide Higg Index FEM Training.	Higg FEM Training Program	https://howtohigg.org/higg-fem-training-program/
Incinerated with energy recovery	Materials that are collected and intentionally allocated to incineration, gasification, anaerobic digestion, or other technology that recovers the inherent useful energy of the material. Methods that prevent environmental impacts and maximize resource utilization are required.	Higg Index	
Insulation Materials	Substance used to reduce or prevent the transmission of heat, sound or electricity. Insulation materials can be natural (e.g. duck/goose down, or wool) or synthetic (e.g. polyester insulation).		

Incineration	Materials that are collected and managed through an incineration process that meets international standards.	Higg Index	
Landfill	Materials that are collected and managed through a landfilling process that meets international standards.	Higg Index	
Leachate	Leachate is the liquid (e.g.: rain) that drains or 'leaches' (e.g. water contained in food waste) from waste when water percolates through any waste. It varies widely in composition regarding the age of the waste and the type of waste. It usually contains both dissolved and suspended material.	Higg Index	
Manufacturing Restricted Substance Lists (MRSLs)	The ZDHC MRSL is a list of chemical substances subject to a usage ban (see Usage Ban, page 2). The MRSL applies to chemicals used in facilities that process materials and trim parts for use in apparel and footwear. Chemicals in the ZDHC MRSL include solvents, cleaners, adhesives, paints, inks, detergents, dyes, colorants, auxiliaries, coatings and finishing agents used during raw material production, wet-processing, maintenance, wastewater treatment, sanitation and pest control.	ZDHC	http://www.roadmaptozero.com/fileadmin/pdf/MRSL_v1_1.pdf

Material waste	These wastes may include scrap generated during the production or leftover / unused. Some example of material waste in Apparel, Textiles, and Footwear industry (not exhaustive) are: • Leather (synthetic or natural) • Glass • Fabric (Cotton or Nylon or blended) • Polyurethane Foams (laminated or unlaminated) • Lining materials • Rubber • EVA • Lining materials • Mixed material waste.	Higg Index	
Municipal water	Water provided by a municipality or other public provider.	CDP Water Reporting Guidance	https://b8f65cb373b1b7b15feb-c70d8ead6ced550b4d987d7c03fcdd1d.ssl.cf3.rackcdn.com/cms/guidance_docs/pdfs/000/000/225/original/CDP-Water-Reporting-Guidance.pdf?1478544069
Non-Hazardous wastes	Discarded materials from the consumption of goods and services and the manufacture of goods (e.g. cloth, leather, plastic, and paper or packaging waste. Non-hazardous waste usually includes non-hazardous production waste and domestic waste. Non-hazardous waste, such as food waste or plastic waste can still pose contamination and fire risks if not properly managed.	Higg Index	

Normalized data	Normalized data includes a comparison of totals or usage data against a predefined variable (or set of variables), e.g. kWh of electricity used per employee on-site, kg of hazardous waste per unit of production etc. An organization can decide whether absolute or normalized data are going to be the most appropriate and representative data to collate/report. Within each of the performance areas discussed in this document there are examples of variables against which data can be normalized	GSCP	
Normalized reductions	Reduction in actual utility consumption (e.g. average kWh of electricity used, or cubic meter of water used per employee on-site within a calendar year)/pollution generated (e.g. average kg of hazardous waste per unit of production within a calendar year) that has been normalized to a business metric (e.g. units or mass of production, unit revenue, unit gross sales, unit turnover, full-time employee equivalent, square foot) when compared to normalized utility/pollution generated in a base year. To calculate a normalized value, measure utility/pollution generated in a given time period and divide by the chosen business metric. For example, a normalized waste generation can be calculated as follows: 10,000 kg waste ÷ 5,000 garments = 2kg waste/garment.		

Off-site wastewater treatment	Off-site wastewater treatment is a third-party enterprise or organization who provides wastewater treatment service for more than two pollutant discharging entities by collecting their wastewater, and the wastewater discharged directly to environment should meet with the relevant limits. The off-site treatment can be public wastewater treatment facility, regional wastewater treatment facility (i.e. industrial park, industry area etc.)	Higg Index	
On-site wastewater treatment	On-site wastewater treatment is the wastewater treatment plant used and managed by the factory only. After treated by the on-site treatment, the wastewater can meet with relevant limits and be directly discharged into the environment, or into an Off-site 3rd party treatment plant (known as partial onsite treatment).	Higg Index	
Open burning	Open burning is outdoor burning of wastes such as lumber, scrapped cars, textiles, sawdust and so forth.	OECD	https://stats.oecd.org/glossary/detail.asp?ID=1907
Permit	Permit is defined as all documents required to comply and submit to government, including but not limited to governmental permits, authorizations, licenses, registrations, certificates, annual government reports and registration of specific chemicals use.	Higg Index	

Personal protective equipment	Personal protective equipment, commonly referred to as "PPE", is equipment worn to minimize exposure to hazards that cause serious workplace injuries and illnesses. These injuries and illnesses may result from contact with chemical, radiological, physical, electrical, mechanical, or other workplace hazards. Personal protective equipment may include items such as gloves, safety glasses and shoes, ear plugs or muffs, hard hats, respirators, or coveralls, vests and full body suits.	US Department of labor	https://www.osha.gov/SLTC/personalprotectiveequipment/
Preventative maintenance	Preventative maintenance (or preventive maintenance) is maintenance that is regularly performed on a piece of equipment to lessen the likelihood of it failing. Preventative maintenance is performed while the equipment is still working, so that it does not break down unexpectedly.	Fiix	https://www.fiixsoftware.com/maintenance-strategies/preventative-maintenance/
Process water	Water consumed for industrial purposes, such as laundry, finishing or feed-in water for boiler.	Higg Index	
Produced/process water	Water which, during extraction or processing, comes into direct contact with or results from the production or use of any raw material (e.g. crude oil or a by-product from sugar cane crushing), intermediate product, finished product, by-product, or waste product. Note this also includes reused / recycled water.	CDP Water Reporting Guidance	https://b8f65cb373b1b7b15feb-c70d8ead6ced550b4d987d7c03fcdd1d.ssl.cf3.rackcdn.com/cms/guidance_docs/pdfs/000/000/225/original/CDP-Water-Reporting-Guidance.pdf?1478544069

Rainwater	If a company is managing rainwater, either to harvest and use, or to prevent flooding for example, they should try to estimate and disclose it as withdrawal from the hydrological system. This helps companies better understand their water dependency and risks.	CDP Water Reporting Guidance	https://b8f65cb373b1b7b15feb-c70d8ead6ced550b4d987d7c03fcdd1d.ssl.cf3.rackcdn.com/cms/guidance_docs/pdfs/000/000/225/original/CDP-Water-Reporting-Guidance.pdf?1478544069
Recycle	Requires the waste to be re-processed so as to obtain a product, material or substance whether for the original or other purposes. It does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operation. For example: ● Plastic recycling is the process of recovering scrap or waste plastic and reprocessing the material into useful products, sometimes completely different in form from their original state. For instance, this could mean melting down soft drink bottles and then casting them as plastic chairs and tables. ● Plastic used for playground surfaces or traffic cones ● Padding/stuffing used for furniture, mattresses, blankets, toys	Higg Index	

Recycled Water	Recycled Process Water: treated effluent used again in main process Reused Water: treated effluent used in other areas except recycled water such as toilets or landscaping Recycled water is the reuse of wastewater that has been treated to remove solids and certain impurities to meet water quality standards associated with the designated application.	CDP Water Reporting Guidance	https://b8f65cb373b1b7b15feb-c70d8ead6ced550b4d987d7c03fcdd1d.ssl.cf3.rackcdn.com/cms/guidance_docs/pdfs/000/000/225/original/CDP-Water-Reporting-Guidance.pdf?1478544069
Renewable energy	This relates to energy generated by a renewable source (i.e. source which is not depleted or used up as it is naturally replenished. Renewable sources can either be managed so that they last forever, or so that their supply is not significantly impacted. Unlike fossil fuels, most renewable energy sources do not release carbon dioxide and other air pollutants as by-products into the atmosphere. As the amount of fossil fuel resources on Earth decreases, it is becoming increasingly important to find and utilize renewable energy sources. Examples include: solar, biofuels, wind, hydroelectric, geothermal, tidal and wave.	GSCP	
Restricted Substance Lists (RSLs)	A list, compiled by a business, trade group or other organization, of chemicals (aka chemical substances) to be actively managed and informed on. An RSL may contain chemicals for controlled use, targeted for elimination/substitution, and those that may be totally banned or may be regulated. (e.g., American Apparel and Footwear Association (AAFA) RSL)	OIA - Chemicals Management Framework Glossary	

Reuse	Means checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other preprocessing whether for the original or other purposes. For example: ● Chemical supplier can reuse the chemical container for filling them up with the same chemical ● Fabric leftover can be reused in another factory ● Rechargeable batteries can be reused many times	Higg Index	
Rubber material	A tough, flexible, highly resilient, waterproof material. Natural rubber is produced using an organic compound (isoprene) usually harvested in the form of latex from rubber trees. A synthetic rubber is any artificial elastomer (polymer with elastic properties).		
Safety Data Sheets (SDS)	SDS (also called material safety data sheet (MSDS) or production safety data sheet (PSDS)) is an important component of product stewardship and occupational safety and health. It is intended to provide workers and emergency personnel with procedures for handling or working with a substance in a safe manner and should include information such as physical data (melting point, boiling point, flash point, etc.), toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, and spill-handling procedures.	Higg Index	
Scope 1 emissions	Direct GHG emissions occur from sources that are owned or controlled by the company, for example, emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc.; emissions from chemical production in owned or controlled process equipment.	GHG protocol	http://www.ghgprotocol.org/corporate-standard

Scope 2 emissions	Scope 2 accounts for GHG emissions from the generation of purchased electricity2 consumed by the company. Purchased electricity is defined as electricity that is purchased or otherwise brought into the organizational boundary of the company. Scope 2 emissions physically occur at the facility where electricity is generated.	GHG protocol	http://www.ghgprotocol.org/corporate-standard
Stakeholders	Stakeholders are defined broadly as those groups or individuals: (a) that can reasonably be expected to be significantly affected by the organization's activities, products, and/or services; or (b) whose actions can reasonably be expected to affect the ability of the organization to successfully implement its strategies and achieve its objectives.	GRI G3 2001	
Standard Allowed Minute (SAM) or Standard Minute Value (SMV)	**Standard Minute Value,** or **SMV,** is the time value arrived at for a task based on the average rate of output which qualified workers will naturally achieve without over exertion provided that they know and adhere to the specified method and provided that they are motivated to apply themselves to their work. (ILO) *Note that SMV is often used interchangeably with **Standard Allowed Minute, or SAM**.*	International Labour Organization	Introduction to Work Study, 4th ed.
Synthetic leather materials	A synthetic (man-made and typically petroleum-based) material used as a substitute for leather.		

Target	A formal target here refers to a quantified performance requirement of the site's annual utility use of a particular utility source. A formal target must: 1) include a definite start date (i.e., "baseline") of target, the measurement unit, and the baseline consumption (i.e. m3/year at 2010 baseline) 2) include an end date of the target, meaning the intended completion of the required reductions; and 3) include an exact reduction quantity, expressed as a number (e.g. reduce by 1 million m3) or a percentage (e.g. reduce by 5%). 4) be relevant to reducing the site's utility use (e.g. focuses on the most significant utility uses at the site)	Higg Index	
Total suspended solids (TSS)	A measure of the suspended solids in wastewater, effluent, or water bodies, determined by tests for "total suspended non-filterable solids".	OECD	https://stats.oecd.org/glossary/detail.asp?ID=7219
Units	Units refer to common consistent units. Examples: If dyeing or using wet processes proper units would be volume/mass. For finished goods, proper units are volume/piece.	Higg Index	
Upcycling	Upcycling is the process of transforming by-products, waste materials, useless and/or unwanted products into new materials or products of better quality or for better environmental value	Higg Index	
Verifier – Chemical Specialist	An individual qualified to verify Higg Index FEM scores for all facilities. Must be used to verify facilities where Level 1, 2 and Level 3 chemical management sections apply.	SAC Verification Program	
Verification Code of Conduct	The norms and behaviors expected of an SAC approved verifier during a verification.	SAC Verification Program	

Verifier Criteria	The set of criteria for which individuals and the companies they work for are vetted against to determine provisional acceptance or denial as an SAC approved verifier.	SAC Verification Program	
Verifier - Generalist	An individual qualified to verify Higg Index FEM scores for all facilities that are applicable to only Level 1 chemical management section questions. Except when facilities are classified as not using chemicals in production.	SAC Verification Program	
Verification – Offsite	When an SAC approved verifier conducts a verification remotely by, web conference, photo and/or file submitted via e-mails or other means which do not require the verifier to enter onto the manufacturer premises.	SAC Verification Program	
Verification - Onsite	When an SAC approved verifier conducts a verification by entering onto the manufacturer premises and completes the verification in person.	SAC Verification Program	
Verification Person Day	The number of verifiers and number of days it takes to complete the verification process. For example, 2 man days can be 2 verifiers completing a verification on one day or 1 verifier completing a verification in two days. Both of these scenarios would each equal a total of 2 man days.	SAC Verification Program	
Verification Performance Improvement Plan (PIP)	The verification result outcome which is a template manufacturers use to help track their continuous improvement.	SAC Verification Program	
Verification Program	Establishes the guidelines and protocol for approving verifiers and conducting module verifications.	SAC Verification Program	

Verification Program Manager (VPM)	An external party to help with scale and expertise to manage the day to day operations of the program. SAC and members will be involved in overseeing the overall health of the program, providing strategic guidance, and building enhancements.	SAC Verification Program	
Verifier Protocol	The step-by-step guide and set of requirements for verifiers conducting either off-site or on-site verification.	SAC Verification Program	https://howtohigg.org/higg-fem-verification-program/?sq=Verification%20Protocol
Verifier Training	Required training for Verifiers to become eligible to conduct Verification.	SAC Verification Program	
Waste inventory	A waste inventory records information of all waste stream generated on-site, it could include information on: ● nature of the waste (hazardous/non-hazardous); ● its source (e.g. process, area); ● the physical form of the waste (solid, liquid etc.); ● formal classification code (if applicable); ● specific handling/ storage arrangements; ● the quantity of waste disposed of/treated; ● the disposal/treatment method (biological, chemical, physical), ● including any on-site treatment; ● details of waste contractors used; and ● disposal/treatment route (recycled, landfill, incineration)	Higg Index & GSCP	

Waste Manifest	EPA's hazardous waste manifest system is designed to track hazardous waste from the time it leaves the generator facility where it was produced, until it reaches the off-site waste management facility that will store, treat or dispose of the hazardous waste.	USEPA	https://www.epa.gov/hwgenerators/hazardous-waste-manifest-system
Waste minimization	The policy and process to have the waste minimization means to reduce the production of waste at society and individual level. The wider part of the aim, which is remarked as waste reduction, is often understood as waste hierarchy.	Waste Management Resources	http://www.wrfound.org.uk/articles/waste-minimization.html
Wastewater	Ceres Aqua gauge defines wastewater as "Water that is of no further immediate value to the purpose for which it was used or in the pursuit of which it was produced because of its quality, quantity or time of occurrence." Cooling water is not considered to be wastewater. Wastewater is also defined as water of a quality that no longer serves a useful purpose for the business and is normally discharged under a permit from the property.	CDP Water Reporting Guidance	https://b8f65cb373b1b7b15feb-c70d8ead6ced550b4d987d7c03fcdd1d.ssl.cf3.rackcdn.com/cms/guidance_docs/pdfs/000/000/225/original/CDP-Water-Reporting-Guidance.pdf?1478544069

Wastewater quality	Wastewater quality may be measured using many factors, such as suspended solids, reduced biological oxygen demand (BOD) or chemical oxygen demand (COD), metals content, oil/grease content, temperature, pH, etc. Wastewater quality can be improved through reducing strength/concentration of contamination at the source of generation and should be considered top priority, before targeting to reduce wastewater volume. Wastewater treatment volume and quality are tightly linked. It is important to not focus solely on one without understanding how it affects the others. For instance, if you decrease your wastewater discharge volume, you may inadvertently create wastewater quality that is untreatable (on-site or off-site) and have a net-negative impact. Wastewater generation should be compared between fixed periods so that unusual patterns in generation can be identified.		

Wastewater quality target	A formal target here refers to a quantified performance requirement of the site's wastewater discharge quality. A formal target must: 1) include a definite start date (i.e., "baseline") of target and the performance level (at least COD, BOD, TSS, temperature, and pH) at baseline date; 2) include an end date of the target, meaning the intended completion of the required reductions/ improvements; and 3) include an exact reduction quantity or extent, expressed in an absolute number or a percentage. 4) be relevant to improving the site's wastewater discharge quality. Formal targets in this instance may be absolute or normalized. Absolute = total volume of wastewater discharged regardless of variables (facility size, process volumes, production hours, raw material usage, etc.) Normalized = volume of wastewater discharged relative to some relevant variable (e.g., volume of wastewater discharged per unit of production)	Higg Index & GSCP	
Water Balance	A basic water balance is an equation used to describe flow of water into and out of the facility. The total metered influents would equal to the total of all effluents and water losses.	Higg Index	
Water recycling	Water recycling is a reliable water supply which significantly lowers a facility's water footprint. Advances in wastewater treatment technology and recycling ability enable business growth while minimizing environmental impact. As freshwater supplies around the world experience increased stress due to demand, recycling will play a greater role in overall water supply strategies.	Higg Index	

Zero Liquid Discharge	Zero-liquid discharge (ZLD) is a treatment process that design for no water leaves a facility in liquid form. At a facility with on-site ZLD treatment system, almost all wastewater is treated and recovered such that the only water discharged from the facility exists by evaporation or as moisture in the sludge from treatment plant operations. A facility is not considered to have a ZLD treatment system if there is a liquid discharge.	ZDHC Wastewater Guideline	https://www.roadmaptozero.com/output

Appendix A – Facility Foundations

The section will be available in the next update of the How to Higg Guide.