

**Deutsche Gesellschaft für Internationale  
Zusammenarbeit (GIZ) GmbH**

**Self-learning Training Material on Higg Facility  
Environmental Module (FEM) 2020 for Textile  
Factories**

## Imprint

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# Contents

BACKGROUND.....	9
OBJECTIVES.....	10
DISCLAIMER.....	11
INTRODUCTION.....	12
Modules.....	12
Levels.....	12
Time Frame.....	13
HOW TO USE THE GUIDELINES.....	15
Structure of the document.....	15
Structure of sections.....	15
Structure of questions.....	15
0. SITE INFORMATION AND PERMITS.....	17
0.1. Site Information.....	17
0.2. Permits.....	25
1. Environmental Management System (EMS).....	30
1.1. Level-1.....	30
1.2. Level-2.....	38
1.3. Level-3.....	40
2. Energy & GHG.....	47
2.1. Level-1.....	47
2.2. Level-2.....	51
2.3. Level-3.....	61
3. Water Use.....	64
3.1. Applicability.....	64
3.2. Level-1.....	65
3.3. Level-2.....	67
3.4. Level-3.....	74
4. Wastewater.....	76
4.1. Applicability.....	76
4.2. Level-1.....	79
4.3. Level-2.....	90
4.4. Level-3.....	93
5. Air Emissions.....	95
5.1. Applicability.....	95
5.2. Level-1.....	97

5.3.	Level-2.....	107
5.4.	Level-3.....	109
6.	Waste .....	111
6.1.	Level-1.....	111
6.2.	Level-2.....	121
6.3.	Level-3.....	131
7.	Chemical Management.....	135
7.1.	Applicability .....	135
7.2.	Level-1.....	136
7.3.	Level-2.....	165
7.4.	Level-3.....	168
	Index .....	179
	References.....	182

## List of Figures

Figure 1: Higg FEM 2020 Timelines .....	14
Figure 2: Process of calculating number of workers.....	23
Figure 3: Scoring scheme of EMS section .....	30
Figure 4: Typical management review as per ISO14001 .....	39
Figure 5: Scoring for Energy section .....	47
Figure 6: Explanation of GHG emission Scopes.....	50
Figure 7: Example analysis of major thermal energy uses .....	53
Figure 8: Example Sankey Diagram (fictitious values of flows in GWh per year).....	54
Figure 9: Process of setting Science Based Targets.....	63
Figure 10: Scoring scheme in Water section .....	64
Figure 11: Applicability in Water Section.....	65
Figure 12: Scoring scheme in Wastewater section .....	77
Figure 13: Applicability in Wastewater Section for ZLD .....	77
Figure 14: Applicability in Wastewater Section for Wastewater Treatment (Industrial / domestic).....	78
Figure 15: Categorization of wastewater into Industrial and Domestic.....	78
Figure 16: Scoring scheme in Air Emissions section.....	96
Figure 17: Draft Air Standard for Boilers and Generators (Unit of measure: mg/Nm <sup>3</sup> ): .....	109
Figure 18: Scoring for waste section .....	111
Figure 19: Scoring scheme in Chemicals Management section .....	136
Figure 20: Example of a Process Flow Chart .....	139
Figure 21: ZDHC InCheck Report Sample .....	140
Figure 22: Hierarchy of Risk Control (GIZ REMC Toolkit) .....	149
Figure 23: Chemical Compatibility Storage Chart (TRGS 510) .....	155
Figure 24: Assigning storage areas as per storage classes (HSE-HSG 71).....	156
Figure 25: ZDHC InCheck Report Sample .....	162
Figure 26: Sample process of tracing chemicals from manufacturing process back to chemical inventory .....	164
Figure 27: Typical traceability process required in CM Question 20 .....	174

## List of Abbreviations

APEO	Alkylphenol Ethoxylates
BMZ	German Federal Ministry for Economic Cooperation and Development
BSR	Business for Social Responsibility
CAS	Chemical Abstracts Service
CETP	Common Effluent Treatment Plant
CFC	Chlorofluorocarbon
CHCC	Chemicals of High Concern to Children
CIL	Chemicals Inventory List
CLP	Regulation on Classification, Labelling and Packaging
CMR	Carcinogenic, Mutagenic, and Toxic for reproduction
CMS	Chemical Management System
ED	Endocrine Disruptors
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EMS	Environmental Management System
EnB	Energy Baseline
ETP	Effluent Treatment Plant
FABRIC	Fostering and Advancing Sustainable Business and Responsible Industrial Practices in the Clothing Industry in Asia
FEM	Facility Environmental Module
GHG	Green House Gases
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GJ	Giga Joules
GWG	Global Warming Gases
GWP	Global Warming Potential

HAP	Hazardous Air Pollutants
HCFC	Hydrochlorofluorocarbons
IPE	Institute of Public & Environmental Affairs, China
KPI	Key Performance Indicator
LCA	Life Cycle Assessment
MJ	Mega Joules
MRSL	Manufacturing Restricted Substances List
MSDS	Materials Safety Data Sheet
MW	Mega Watts
NOx	Nitrogen Oxides
ODS	Ozone Depleting Substances
PBT	Persistent, Bio-accumulative, and Toxic
PFC	Perfluorinated Compound
PLCA	Product Life Cycle Assessment
PM	Particulate Matter
PPE	Personal Protective Equipment
PTE	Potential to Emit
QA	Quality Assurance
R&D	Research and Development
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
REMC	Resource Efficient Management of Chemicals
RO	Reverse Osmosis
RSL	Restricted Substances List
SAM	Standard Allowed Minutes
SBTi	Science-Based Targets Initiative
SDS	Safety Data Sheet

SOP	Standard Operating Procedure
SOx	Sulphur Oxides
SVHC	Substances of Very High Concern
TAP	Toxic Air Pollutants
TDS	Technical Data Sheet
TNA	Training Needs Analysis
TOC	Total Organic Compounds
VOC	Volatile Organic Compound
vPvB	very Persistent and very Bio-accumulative
WRI	Water Resource Institute
WWF	Worldwide Fund for Nature
ZDHC	Zero Discharge of Hazardous Chemicals
ZLD	Zero Liquid Discharge



## BACKGROUND

Higg FEM is a tool focused on environmental footprint associated with production processes carried out in a textile facility. It measures and quantifies the sustainability impacts of a facility. It also helps the facilities to uncover inefficient areas through scoring mechanism. The Higg FEM helps manufacturers identify and prioritize opportunities for performance improvements. Measuring environmental performance is the key for environmental sustainability. If things are not properly measured effective decision making for improvement cannot be made. Higg FEM presents a validated tool widely used for measuring the environmental performance.

The Self-learning/Training Material on Higg Facility Environmental Module (FEM) 2020 for Textile Factories would answer common questions of users and clarify common misconceptions which result in flawed self-assessment and weak preparation for the verification process. Such a guideline may assist the user to make realistic self-assessments using Higg FEM 2020 at Factory level and factories can pursue verification process.

This is aligned with the objectives of the GIZ and its regional project Fostering and Advancing Sustainable Business and Responsible Industrial Practices in the Clothing Industry in Asia (FABRIC). GIZ is an enterprise owned by the Government of the Federal Republic of Germany and provides services worldwide in the field of international cooperation for sustainable development and international education. GIZ is mainly commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ). GIZ's regional project FABRIC is being implemented in Bangladesh, Cambodia, China, Myanmar, Pakistan and Vietnam by German Development Cooperation (GIZ). FABRIC is addressing sustainability in the textile and garment industry in its social, economic and environmental dimensions, supporting knowledge exchange and sharing of good practices in the textile and garment industry in Asia. Through its project activities, FABRIC supports the textile and garment industry in Asia to reduce GHG emissions, thereby contributing to the global climate agenda.

This training material prepared for the factory level application of Higg FEM may complement the existing How to Higg Guide. The guideline may be disseminated via a quick walkthrough training on Higg FEM focused for persons making environmental assessments at factory level. The training package will increase the capacity of realistic measurement of environmental performance at factory level and provides guidelines for reducing the environmental footprint. This results in reduced environmental footprint of the supply chain.

GIZ FABRIC has commissioned a consortium of consulting companies; adelphi consult of Germany taking the lead, and one consulting company from each of the three partner countries (Espire Consult in Pakistan, RCB in Bangladesh and TUV Rheinland in Vietnam); support GIZ for implementation of the environment component of the project; and to develop this document.

## OBJECTIVES

The objective of developing this document is to facilitate users in conducting self-assessment using Higg FEM in a productive manner by;

- 1- Clarifying common misconceptions and confusions in facilities
- 2- Highlighting what kind of systems should be in place for facilities to conform to FEM requirements
- 3- Guiding facilities in fulfilling the FEM requirements in a sustainable manner
- 4- Training key employees or users on FEM requirements and structure of FEM questions; may also be used as a self-learning material

## DISCLAIMER

This document does not substitute the How to Higg Guide; but only acts as supplementary information for Higg FEM users as explained in the background section.

The content of this document is largely based on guidelines provided in How to Higg Guide and Higg FEM Scoring System Guidance. Other references consulted are marked with hyperlinks in relevant areas as well as compiled at the end of this document. GIZ Resource Efficient Management of Chemicals (REMC) Toolkit and ZDHC Chemical Management System Guidelines were major references for chemicals management section.

In addition, the authors used their experience in supporting textile companies on environmental management and other related topics and common challenges faced by facilities in conforming to Higg FEM requirements.

Qualified Higg verifiers and experienced personnel in textile facilities were also consulted for quality review of the document and their feedback was incorporated.

As this document summarises the requirements of questions and guides how to fulfil the requirements, the users are encouraged to consult How to Higg Guide for detailed technical guidance.

## INTRODUCTION

Higg FEM is a tool developed by the Sustainable Apparel Coalition (SAC) to not only gauge and track the environmental performance of a textile and apparel manufacturing facility but also encourage the facilities to improve the performance. Due to its methodical approach Higg FEM is being effectively used or referred by other initiatives like ZDHC, Science based targets (SBTs), Carbon Disclosure Project (CDP), emission factors for GHG inventories etc. to assess the environmental performance.

### History:

In 2009, Wal-Mart and Patagonia came together with a radical mission collect peers and competitors from across the apparel, footwear and textile sector and together, developed a universal approach to measure sustainability performance.

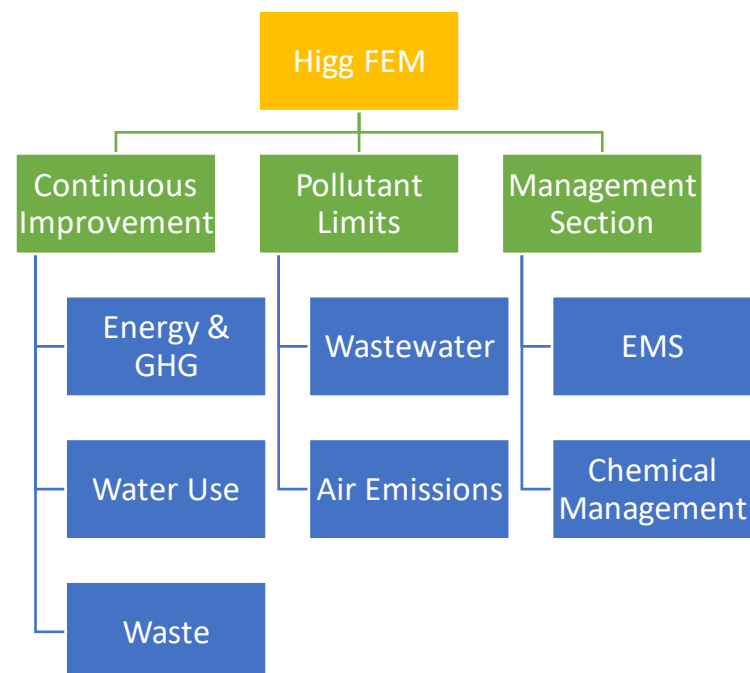
“Higg” came from the search for the Higgs Boson Particle. The index reflected “search for the particle of sustainability”.

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## Modules

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Higg FEM targets 03 areas consisting of 07 modules. Every module covers the distinct significant environmental aspects like energy, water, chemicals and wastewater etc.



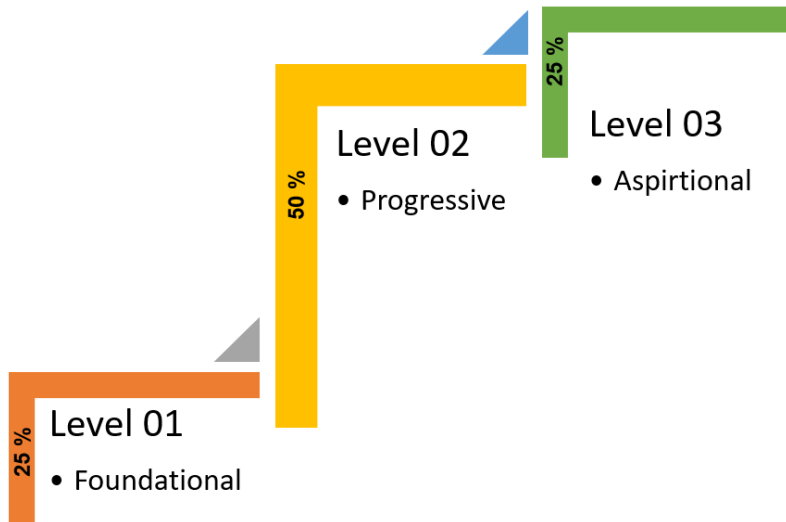
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## Levels

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Each module is further categorised in 03 levels and questions are asked at every level. Every module starts with Level 01 addressing the basic needs and prerequisites of the environmental aspects. In Level 01 qualifying questions are asked at the start to determine the level and extent of the production processes. Later on in level 01 the basic understanding of environmental aspect in the facility is

assessed and possibility of data and performance tracking is analysed through questions. Based on the information fed to Level 01, Level 02 questions are posted which judges the ability of the facility in making baseline assessments, goal setting and achieving targets. Level 02 carries the maximum weight in the Higg scoring methodology. Level 03 is the highest level where a facility can share the information of their best practices which may inspire others to follow. This level emphasizes on the innovative solutions and achievements implemented successfully in a facility.



*There are three levels (1, 2 and 3) in all seven sections. Level 1 must be achieved to unlock access to levels 2 & 3*

## Time Frame

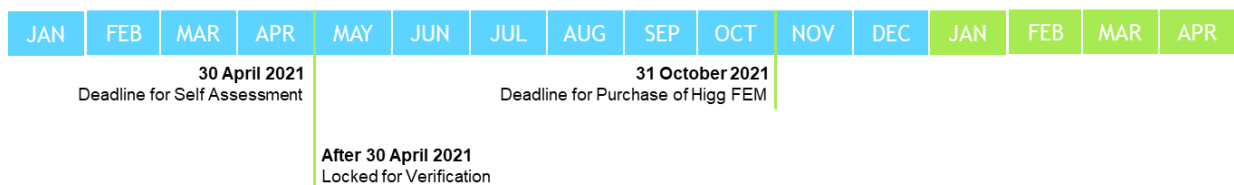
**Reporting Period:** Annual

**Annual Cycle:** Calendar Year

**Self Assessment for Calendar Year:** Initial months of new calendar year. Each year Higg announced the deadlines for self-assessment posting and verification. For 2020 assessment the deadline was 30 April 2021.

**Verification:** After the Deadline of self assessment when modules are locked for benchmarking and verification

### Higg FEM 2020 Timeline



**Figure 1: Higg FEM 2020 Timelines**

## HOW TO USE THE GUIDELINES

### Structure of the document

This document provides guidelines for compliance to Higg FEM requirements and is organized in following sections;

- 0- Site Information and Permits
- 1- Environmental Management System (EMS)
- 2- Energy and GHG
- 3- Water Use
- 4- Wastewater
- 5- Air Emissions
- 6- Waste
- 7- Chemicals Management

### Structure of sections

Each section starts with applicability and scoring, providing overview on;

- What are the applicability conditions of this section
- How does scoring scheme change according to the applicability conditions
- Questions in the applicability section and how to answer these questions
- What evidence does a facility need to keep verifying correct selection against applicability questions

### Structure of questions

Each question is structured in a table as described below;

Question Number- Question Statement	
How to answer this question	This cell provides the structure of question, sub-questions and answering options.
Scoring	This cell explains the scoring scheme of the question and guides how the scoring affects with selection of answers or evidences provided.
Input Connection	This cell identifies if there are any other questions or documents which provide input support to this question
Output Connection	This cell identifies if there are any other questions or documents for which this provides input support.
Keywords	This cell lists keywords for easy identification of subject of the question.  For Chemicals Management section, this cell identifies the Key Performance Indicators applicable to the question.

<p>How to Systematically Fulfil Requirements</p>	<p>This cell provides guidance for the question by;</p> <ul style="list-style-type: none"> <li>1- highlighting what kind of systems should be in place for facilities to conform to FEM requirements</li> <li>2- guiding facilities in fulfilling the FEM requirements in a sustainable manner</li> </ul> <p>As How to Higg Guide already provides detailed technical guidance, the attempt is to guide facilities in establishing such a system that makes the compliance easy. Users may need to refer to How to Higg Guide for detailed technical guidance in some areas.</p>
<p>Evidence Required</p>	<p>This cell enlists the evidences required and interview questions verifier may ask during the verification process. These documents will also be required to be uploaded at portal.</p>
<p>Additional Notes</p>	<p>This section provides following information;</p> <ul style="list-style-type: none"> <li>• clarifying common misconceptions and confusions in facilities</li> <li>• provide additional guidance e.g., how to do calculations for answering the questions</li> <li>• Any additional improvement opportunities this question may drive in the facility</li> </ul>



## 0. SITE INFORMATION AND PERMITS

This section collects basic information about the facility. Responses to the site information questions are used to categorize the factory for comparative analytics. This section is not scored, however, if a facility does not have a valid operating license / permit / no objection certificate from competent authority, the factory scores ZERO for whole Facility Environmental Module (FEM) regardless of compliance status to any of the sections. The facility must complete this section before moving forward to other sections of FEM. The information provided in this module serves as filters in the results dashboards. So, it is very much required that data submitted should be realistic and accurate. Otherwise, the questions to address later, may not relate to actual conditions of the factory so will result scoring which is not representative for the factory.

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*In case the operating licence of facility is expired or even in the process of updating the licence in under progress the accurate answer is NO which will result overall score of ZERO.*

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For Chinese supplier the Records in IPE database and Environmental Impact Assessment (EIA) also needs to be submitted under "Other Environmental Permits".



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### 0.1. Site Information

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Various selections are required to be made in the beginning including;

**1- Country:**

Select the country where the subject facility is located.

<b>2- Industry Sector</b>	
How to answer this question	<p>Select applicable industry sector from following list. This is a multi-selection list hence all applicable sectors must be selected;</p> <ul style="list-style-type: none"> <li>• Apparel</li> <li>• Footwear</li> <li>• Home Textiles (includes bed linens, tablecloths, towels, cloth napkins, and similar products)</li> <li>• Accessories (includes handbags, jewellery, belts, and similar products)</li> <li>• Home Furnishings</li> <li>• Hard Goods (includes bikes, tents, backpacks, luggage, electronics, coolers, climbing gear, watercrafts, and other equipment made of metal, plastic or wood)</li> <li>• Others (all other products)</li> </ul>
Input Connection	Independent
Output Connection	Used for categorization of the facility.
Keyword	Applicable Industry Sector,
How to Systematically Fulfill Requirements	<p>To be able to select right options and go through verification process smoothly, it is important that facility keeps an up-to-date record of;</p> <ul style="list-style-type: none"> <li>• List of machinery</li> <li>• Process flow charts</li> <li>• Production record showing the products produced at site</li> <li>• Sales record showing products sold from the facility</li> </ul>
Evidence Required	No specific evidence required here; however, a verifier may have a look at production records of reporting year or visit the facility to verify the selection.

<b>1- Facility Type</b>	
How to answer this question	<p>Select applicable facility type from following list. This is a multi-selection list hence all applicable facility types must be selected;</p> <ul style="list-style-type: none"> <li>• Sewing or Final Product Assembly</li> <li>• Printing or Dyeing - facilities that are involved in the printing and dyeing of materials, including wet processing, and laundering</li> <li>• Materials manufacturer (including wet process) - (textile, rubber, foam, insulation, pliable materials) – facilities that manufacture and assemble materials (e.g., textiles, leathers, plastics, insulation, foams, etc.)</li> <li>• Trim Manufacturer - facilities that manufacture product trims (e.g., zippers, buttons, labels, etc.)</li> <li>• Chemical Manufacturer</li> <li>• Packaging Manufacturer</li> <li>• Other (all other types)</li> </ul>

Input Connection	Independent		
Output Connection	<p>Used for categorization of the facility.</p> <p>It will be required to select the processes conducted at the facility based on the facility type selected. This is also a multi-selection list and all applicable processes being conducted at site must be selected.</p> <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top; width: 50%;"> <p><b>Sewing or Final Product Assembly</b></p> <ul style="list-style-type: none"> <li>• Casting</li> <li>• Cutting</li> <li>• Embossing</li> <li>• Priming</li> <li>• Heat Press / Heating and Cooling</li> <li>• Lasting</li> <li>• Molding</li> <li>• No sew</li> <li>• Packaging</li> <li>• Gluing</li> <li>• Seam Taping</li> <li>• Sewing</li> <li>• Sundries Application</li> <li>• Washing</li> <li>• Welding</li> <li>• Printing</li> <li>• Embroidery</li> </ul> <p><b>Printing or Dyeing</b></p> <ul style="list-style-type: none"> <li>• Dyeing</li> <li>• Sublimation</li> <li>• Wet printing</li> <li>• Screen Printing</li> <li>• Rotary Printing</li> <li>• Wet processing/laundry</li> </ul> <p><b>Chemical</b></p> <ul style="list-style-type: none"> <li>• Raw Material Storage / Warehousing</li> <li>• Chemical Synthesis</li> <li>• Standardization / Chemical Finishing</li> <li>• Blending / Formulating</li> <li>• Packaging</li> <li>• Waste Treatment / Management</li> <li>• Final Product Warehousing/Storage</li> <li>• Shipping</li> </ul> <p><b>Others</b></p> <ul style="list-style-type: none"> <li>• No further selection is required if “Other” is selected as Facility Type</li> </ul> </td> <td style="vertical-align: top; width: 50%;"> <p><b>Material Supplier Incl. Wet Process</b></p> <ul style="list-style-type: none"> <li>• Casting</li> <li>• Coating</li> <li>• Dyeing</li> <li>• Extrusion</li> <li>• Finishing</li> <li>• Insulation: animal (down) processing</li> <li>• Insulation: non-woven processing</li> <li>• Knitting</li> <li>• Lamination</li> <li>• Mixing (EVA/Rubber/primer/glue)</li> <li>• Bonding</li> <li>• Spinning</li> <li>• Tanning (beam house or re-tannage)</li> <li>• Vulcanization</li> <li>• Washing</li> <li>• Weaving</li> </ul> <p><b>Trim</b></p> <ul style="list-style-type: none"> <li>• Casting</li> <li>• Dyeing</li> <li>• Gluing</li> <li>• Heat Press / Heating and Cooling</li> <li>• Lamination/Coating</li> <li>• Molding</li> <li>• Non-woven</li> </ul> <p><b>Packaging</b></p> <ul style="list-style-type: none"> <li>• Converting raw materials (incoming paperboard or plastic resin)</li> <li>• Die cutting (e.g., cartons)</li> <li>• Assembly (e.g., corrugated board)</li> <li>• Molding (plastic)</li> <li>• Printing</li> <li>• Assembly</li> <li>• Gluing</li> <li>• Finishing</li> <li>• Die cutting</li> <li>• Packing</li> <li>• Shipping</li> </ul> </td> </tr> </table>	<p><b>Sewing or Final Product Assembly</b></p> <ul style="list-style-type: none"> <li>• Casting</li> <li>• Cutting</li> <li>• Embossing</li> <li>• Priming</li> <li>• Heat Press / Heating and Cooling</li> <li>• Lasting</li> <li>• Molding</li> <li>• No sew</li> <li>• Packaging</li> <li>• Gluing</li> <li>• Seam Taping</li> <li>• Sewing</li> <li>• Sundries Application</li> <li>• Washing</li> <li>• Welding</li> <li>• Printing</li> <li>• Embroidery</li> </ul> <p><b>Printing or Dyeing</b></p> <ul style="list-style-type: none"> <li>• Dyeing</li> <li>• Sublimation</li> <li>• Wet printing</li> <li>• Screen Printing</li> <li>• Rotary Printing</li> <li>• Wet processing/laundry</li> </ul> <p><b>Chemical</b></p> <ul style="list-style-type: none"> <li>• Raw Material Storage / Warehousing</li> <li>• Chemical Synthesis</li> <li>• Standardization / Chemical Finishing</li> <li>• Blending / Formulating</li> <li>• Packaging</li> <li>• Waste Treatment / Management</li> <li>• Final Product Warehousing/Storage</li> <li>• Shipping</li> </ul> <p><b>Others</b></p> <ul style="list-style-type: none"> <li>• No further selection is required if “Other” is selected as Facility Type</li> </ul>	<p><b>Material Supplier Incl. 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<p><b>Sewing or Final Product Assembly</b></p> <ul style="list-style-type: none"> <li>• Casting</li> <li>• Cutting</li> <li>• Embossing</li> <li>• Priming</li> <li>• Heat Press / Heating and Cooling</li> <li>• Lasting</li> <li>• Molding</li> <li>• No sew</li> <li>• Packaging</li> <li>• Gluing</li> <li>• Seam Taping</li> <li>• Sewing</li> <li>• Sundries Application</li> <li>• Washing</li> <li>• Welding</li> <li>• Printing</li> <li>• Embroidery</li> </ul> <p><b>Printing or Dyeing</b></p> <ul style="list-style-type: none"> <li>• Dyeing</li> <li>• Sublimation</li> <li>• Wet printing</li> <li>• Screen Printing</li> <li>• Rotary Printing</li> <li>• Wet processing/laundry</li> </ul> <p><b>Chemical</b></p> <ul style="list-style-type: none"> <li>• Raw Material Storage / Warehousing</li> <li>• Chemical Synthesis</li> <li>• Standardization / Chemical Finishing</li> <li>• Blending / Formulating</li> <li>• Packaging</li> <li>• Waste Treatment / Management</li> <li>• Final Product Warehousing/Storage</li> <li>• Shipping</li> </ul> <p><b>Others</b></p> <ul style="list-style-type: none"> <li>• No further selection is required if “Other” is selected as Facility Type</li> </ul>	<p><b>Material Supplier Incl. Wet Process</b></p> <ul style="list-style-type: none"> <li>• Casting</li> <li>• Coating</li> <li>• Dyeing</li> <li>• Extrusion</li> <li>• Finishing</li> <li>• Insulation: animal (down) processing</li> <li>• Insulation: non-woven processing</li> <li>• Knitting</li> <li>• Lamination</li> <li>• Mixing (EVA/Rubber/primer/glue)</li> <li>• Bonding</li> <li>• Spinning</li> <li>• Tanning (beam house or re-tannage)</li> <li>• Vulcanization</li> <li>• Washing</li> <li>• Weaving</li> </ul> <p><b>Trim</b></p> <ul style="list-style-type: none"> <li>• Casting</li> <li>• Dyeing</li> <li>• Gluing</li> <li>• Heat Press / Heating and Cooling</li> <li>• Lamination/Coating</li> <li>• Molding</li> <li>• Non-woven</li> </ul> <p><b>Packaging</b></p> <ul style="list-style-type: none"> <li>• Converting raw materials (incoming paperboard or plastic resin)</li> <li>• Die cutting (e.g., cartons)</li> <li>• Assembly (e.g., corrugated board)</li> <li>• Molding (plastic)</li> <li>• Printing</li> <li>• Assembly</li> <li>• Gluing</li> <li>• Finishing</li> <li>• Die cutting</li> <li>• Packing</li> <li>• Shipping</li> </ul>		
Key Words	Cut to Pack, Dyeing and Printing, Material Supplier, Wet Processing		
How to Systematically Fulfill Requirements	<p>A facility may be categorized in multiple types according to the products being produced. Examples of multiple selection are;</p> <ul style="list-style-type: none"> <li>• Example-1: If a facility is Cut-Sew, and produces trim parts on site (e.g., zippers, buttons, labels), the facility shall select both, “Sewing or Final Product Assembly” and “Trim Manufacturer” facility types.</li> <li>• Example-2: If a facility is Cut-Sew, and does screen printing or wet</li> </ul>		

	<p>processing on site, the facility shall select both “Sewing or Final Product Assembly” and “Printing or Dyeing” facility types.</p> <p>Process selection is required only for selected facility types.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility keeps an up-to-date record of;</p> <ul style="list-style-type: none"> <li>• List of machinery</li> <li>• Process flow charts</li> <li>• Production record showing the processes that were executed at site</li> </ul>
<p>Evidence Required</p>	<p>No specific evidence required here; however, a verifier may have a look at production records of reporting year or visit the facility to verify the selection. It should be made sure that no process is missed out in making selection.</p>

<h2 style="text-align: center;">2- Materials</h2>	
<p>How to answer this question</p>	<p>Select material types that the facility (i) produces, or (ii) works with/processes, from following list. This is a multi-selection list hence all applicable materials must be selected;</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p><b>Barriers</b></p> <ul style="list-style-type: none"> <li>• BiComponent Coating</li> <li>• BiComponent Laminate</li> <li>• Microporus Coating</li> <li>• Microporus Laminate</li> <li>• Monolithic Coating</li> <li>• Monolithic Laminate</li> </ul> <p><b>Foams</b></p> <ul style="list-style-type: none"> <li>• Ethylene-vinyl acetate (EVA) foam</li> <li>• Polyethylene (PE) foam</li> <li>• Polyurethane (PU) foam</li> </ul> <p><b>Metals</b></p> <ul style="list-style-type: none"> <li>• Aluminum</li> <li>• Brass</li> <li>• Chromium</li> <li>• Copper</li> <li>• Gold</li> <li>• Iron</li> <li>• Lead</li> <li>• Nickel</li> <li>• Platinum</li> <li>• Silver</li> <li>• Steel</li> <li>• Tin</li> <li>• Titanium</li> <li>• Zinc</li> </ul> </div> <div style="width: 48%;"> <p><b>Insulation Materials</b></p> <ul style="list-style-type: none"> <li>• Duck Down insulation</li> <li>• Goose Down Insulation</li> <li>• Polyester insulation</li> <li>• Sheep Wool insulation</li> </ul> <p><b>Leather</b></p> <ul style="list-style-type: none"> <li>• Cow leather</li> <li>• Goat leather</li> <li>• Kangaroo leather</li> <li>• Pig leather</li> </ul> <p><b>Plastics</b></p> <ul style="list-style-type: none"> <li>• Acrylonitrile butadiene styrene (ABS) plastic</li> <li>• Epoxy plastic</li> <li>• Nylon/Polyamide (PA) plastic</li> <li>• Poly (methyl methacrylate) (PMMA) (Acrylic) plastic</li> <li>• Polycarbonate (PC) plastic</li> <li>• Polyester plastic</li> <li>• Polyethylene (PE) plastic</li> <li>• Polylactic Acid (PLA) plastic</li> <li>• Polypropylene (PP) plastic</li> <li>• Polystyrene (PS) plastic</li> <li>• Polytetrafluoroethylene (PTFE) plastic</li> <li>• Polyurethane (PU) plastic</li> <li>• Polyvinyl Acetate (PVA) plastic</li> <li>• Silicone plastic</li> <li>• Thermoplastic Polyurethane (TPU) plastic</li> <li>• Thermoset PU plastic</li> </ul> </div> </div>

	<p><b>Rubbers</b></p> <ul style="list-style-type: none"> <li>• Butyl rubber</li> <li>• Chloroprene rubber (Neoprene)</li> <li>• Elastomeric polyurethane (PU) rubber</li> <li>• Foamed rubber</li> <li>• Isoprene Rubber (IR)</li> <li>• Natural Rubber (NR)</li> <li>• Nitrile Rubber (NBR)</li> <li>• Polybutadiene rubber (BR)</li> <li>• Silicone rubber</li> <li>• Styrene-butadiene rubber (SBR)</li> <li>• Thermoplastic elastomer (TPE)</li> </ul> <p><b>Synthetic Leathers</b></p> <ul style="list-style-type: none"> <li>• Polyurethane (PU) synthetic leather</li> </ul> <p><b>Wood-Based</b></p> <ul style="list-style-type: none"> <li>• Cork</li> <li>• Wood</li> </ul>	<p><b>Textiles</b></p> <ul style="list-style-type: none"> <li>• Acetate, Triacetate fabric</li> <li>• Acrylic fabric</li> <li>• Alpaca</li> <li>• Aramid fabric</li> <li>• Bast fiber fabric</li> <li>• Carbon fiber fabric</li> <li>• Elastane/Spandex fabric</li> <li>• Glass fiber fabric</li> <li>• Lyocell fabric</li> <li>• Cashmere</li> <li>• Cotton fabric</li> <li>• Modal fabric</li> <li>• Nylon fabric</li> <li>• Polyester fabric</li> <li>• Polylactic Acid (PLA) fabric</li> <li>• Polypropylene (PP) fabric</li> <li>• Silk fabric</li> <li>• Viscose/Rayon fabric</li> <li>• Wool fabric</li> </ul>
Input Connection	Independent	
Output Connection	Used for categorization of the facility.	
Key Words	Materials Handled, Material Processed	
How to Systematically Fulfill Requirements	<p>To be able to select right options and go through verification process smoothly, it is important that facility keeps up-to-date inventory of;</p> <ul style="list-style-type: none"> <li>• materials procured and stored in raw material store</li> <li>• production records showing which materials were used in the production processes, and</li> <li>• materials produced, stored at warehouse, and sold</li> </ul>	
Evidence Required	No specific evidence required here; however, a verifier may have a look at procurement and production records of reporting year or visit the facility to verify the selection.	
Additional Notes	<p>All materials either produced or used during the reporting year <b>must be selected</b>. If a material is not selected but is found stored in the facility or is found on a product in storage, the facility would need to prove that the material was not used or produced during the reporting year.</p> <p>Material used in the main product need to be selected; for example, for denim jeans, materials like button/zipper or packaging do not need to be selected.</p>	

<b>3- How many days did your facility operate in this reporting year?</b>	
How to answer this question	This is a simple text-box section where the facility must enter the number of operating days in the reporting year.
Input Connection	Independent

Output Connection	The reporting year needs to be consistent for all the questions answered later in subsequent modules.
Key Words	Annual Reporting, Annual Operational Days,
How to Systematically Fulfill Requirements	<p>Operating days are considered days when production and/or production related activities (e.g., product/raw material loading/shipment) were conducted at the facility.</p> <ul style="list-style-type: none"> <li>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.</li> <li>Where the number of hours in operation OR the number of workers is greater than 50%, then count the day as 1 day.</li> </ul> <p>To be able to answer correctly and go through verification process smoothly, it is important that facility keeps an up-to-date record of;</p> <ul style="list-style-type: none"> <li>Daily production at each operation</li> <li>Daily number of hours the work was performed in production or production related activities</li> <li>Daily attendance record of workers in each production or production related activities including workhours spent by each worker</li> </ul>
Evidence Required	No specific evidence required here; however, a verifier may have a look at procurement and production records of reporting year or visit the facility to verify the selection.
Additional Notes	<p>Day is counted even if production is not carried out and only production related activity like material loading is conducted.</p> <p>Accurate calculation of number of days might not be possible for facilities having complex set-ups; however, the user must enter best estimate of number of days and should be able to generate records as mentioned above if needed for verification purposes.</p>

<b>4- Total number of employees</b>	
How to answer this question	This is a simple text-box section where the facility must separately enter number (not range) of full time and temporary employees at the facility during the reporting year.
Input Connection	Number of operating days would be relevant for pay period of daily wagger temporary employees.
Key Words	Pay Period, Payroll, Accounting, Salary, Workers
How to Systematically Fulfill Requirements	The process of calculating number of workers is described in following schematic diagram.

	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="display: flex; justify-content: space-between; width: 100%;"> <div style="border: 1px solid black; background-color: #f4a460; padding: 5px; width: 45%;"> <p><b>Define a "pay period"</b></p> <ul style="list-style-type: none"> <li>• i.e. after how many days are employees in each category paid?</li> <li>• pay period may be defined separately for different categories of employees</li> <li>• e.g. some workers may be paid monthly hence the pay period is 1 month, for daily wagers pay period would be 1 day</li> </ul> </div> <div style="border: 1px solid black; background-color: #808080; padding: 5px; width: 45%;"> <p><b>Count number of pay periods</b></p> <ul style="list-style-type: none"> <li>• number of pay periods might be different for different category of employees</li> <li>• e.g. daily wagers may have 365 pay periods while office staff may have only 12</li> </ul> </div> </div> <div style="margin: 10px 0;">→</div> <div style="display: flex; justify-content: space-between; width: 100%;"> <div style="border: 1px solid black; background-color: #ffcc00; padding: 5px; width: 45%;"> <p><b>Count number of workers in each pay period</b></p> <ul style="list-style-type: none"> <li>• Number of workers of each category paid in each pay period</li> </ul> </div> <div style="border: 1px solid black; background-color: #4a90e2; padding: 5px; width: 45%;"> <p><b>Take average workers for each pay period</b></p> <ul style="list-style-type: none"> <li>• Cumulate number of workers in all pay periods separately for each category</li> <li>• Divide by number of pay periods to get an annual average number of workers of each category</li> </ul> </div> </div> </div> <p><b>Figure 2: Process of calculating number of workers</b></p> <p>To be able to answer correctly and go through verification process smoothly, it is important that facility keeps an up-to-date record of;</p> <ul style="list-style-type: none"> <li>• Daily attendance of all permanent and temporary employees</li> <li>• List of workers in each category</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Payroll/accounting records that show number of each worker category (full-time and temporary) in each pay period.</li> <li>• Payroll/accounting records that show the number of pay periods in the reporting year.</li> </ul>
Additional Notes	<p>Situation may arise where a facility has multiple sub-categories of permanent and temporary employees and subsequent multiple pay periods. For examples, facility may have permanent workers with pay period of 14 days and may also have office staff having pay period of 1 month. Facility must keep record of all sub-categories, calculate number of employees in each sub-category and then add them to calculate number of employees in categories of Permanent and Temporary employees.</p>

<b>5- What was your facility's annual volume?</b>	
How to answer this question	<ul style="list-style-type: none"> <li>• Report the total amount of product shipped/sold in the last calendar year (January to December). <ul style="list-style-type: none"> <li>○ Total amount of product shipped/sold should not include the total amount of rejects in the last calendar year as these are to be reported in Waste Module.</li> </ul> </li> <li>• Select one of the following applicable units; <ul style="list-style-type: none"> <li>○ Square yard</li> <li>○ Meter</li> <li>○ Kilogram</li> <li>○ Unit (piece or pair)</li> <li>○ Cubic meters (m<sup>3</sup>)</li> <li>○ Standard Allowed Minutes (SAM)</li> </ul> </li> </ul>
Input Connection	Material, Annual operating days

Output Connection	Annual production unit will be used for all normalized baselines, targets, and reductions in the Higg Energy, Water, and Waste sections. So, units used for production should be consistent in all modules wherever production is referred directly or indirectly.
Key Words	Annual Volume
How to Systematically Fulfill Requirements	<p>Please select the unit that are used most to track production for the facility. For example, if annual production is reported in kilograms, facility will be asked to share baselines for energy used per kilogram in the Energy section and baselines for water used per kilogram in the Water section.</p> <p>When reporting production volume in SAM, the user must report the TOTAL SUM of SAM for the reporting year and <b>not the</b> INDIVIDUAL SAM for each product type that is manufactured in the facility. Method of calculating SAM and further references is provided in <a href="#">How to Higg Guide</a>.</p> <p>To be able to answer correctly and go through verification process smoothly, the facility must;</p> <ul style="list-style-type: none"> <li>Establish a process to track the volumes; the records must be available in human readable formats e.g., summarizing records in terms of daily, monthly and yearly volumes for each product as well as cumulative volume. Any relevant supporting evidence must be readily available for review during Verification</li> <li>Keep record of calculation of Total SAM for all products produced in the reporting year. For this purpose, having a standard procedure of calculating SAM and a record of Individual SAM of each product may be very helpful.</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>Production, sales, product shipment records that show the quantity of products shipped/sold in the reporting year</li> </ul>
Additional Notes	Verifier may ask for additional evidence to track the volumes. In such case facility may be asked to demonstrate the process of recording production volume of each product from each of the processes, summarizing into cumulative volume for each product and cumulating total volumes.

<b>6- Does your facility have onsite water treatment (i.e., Pre-treatment and/or Wastewater treatment)?</b>			
How to answer this question	<p>User is expected to select either (i) Yes, (ii) No, or (iii) Not Applicable against this question.</p> <p>No further action is needed if options (ii) and (iii) are selected.</p> <p>On selection of “Yes”, the tool requires further selection of type of treatments. This is a multi-select section and the facility must select all treatment types carried out at the facility for Pre-treatment of water and/or wastewater treatment.</p> <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top;"> <p><b>Pre-Treatment</b></p> <ul style="list-style-type: none"> <li>Screening/Seaving</li> <li>Equalization tank/Homogenization tank</li> <li>Grit chambers (only Spanish version)</li> </ul> </td> <td style="vertical-align: top;"> <p><b>Primary Treatment</b></p> <ul style="list-style-type: none"> <li>Coagulation -flocculation</li> <li>Primary clarifier</li> <li>Dissolved air flotation</li> </ul> </td> </tr> </table>	<p><b>Pre-Treatment</b></p> <ul style="list-style-type: none"> <li>Screening/Seaving</li> <li>Equalization tank/Homogenization tank</li> <li>Grit chambers (only Spanish version)</li> </ul>	<p><b>Primary Treatment</b></p> <ul style="list-style-type: none"> <li>Coagulation -flocculation</li> <li>Primary clarifier</li> <li>Dissolved air flotation</li> </ul>
<p><b>Pre-Treatment</b></p> <ul style="list-style-type: none"> <li>Screening/Seaving</li> <li>Equalization tank/Homogenization tank</li> <li>Grit chambers (only Spanish version)</li> </ul>	<p><b>Primary Treatment</b></p> <ul style="list-style-type: none"> <li>Coagulation -flocculation</li> <li>Primary clarifier</li> <li>Dissolved air flotation</li> </ul>		



	<ul style="list-style-type: none"> <li>pH Neutralization</li> </ul> <p><b>Biological Treatment</b></p> <ul style="list-style-type: none"> <li>Activated sludge</li> <li>Sequential batch reactor (SBR)</li> <li>Trickling filters</li> <li>Rotating biological contactors</li> <li>Submerged aerated filters</li> <li>Aerated biofilters</li> <li>Fluidized Bed</li> <li>Anaerobic digestion</li> <li>UASB Reactor</li> <li>Membrane bioreactors</li> <li>Aerated ponds</li> </ul> <p><b>Sludge Treatments</b></p> <ul style="list-style-type: none"> <li>Sludge thickening</li> <li>Sludge dehydration technologies</li> </ul>	<ul style="list-style-type: none"> <li>Lamellar settling</li> </ul> <p><b>Secondary Treatment</b></p> <ul style="list-style-type: none"> <li>Sand filtration</li> <li>Adsorption with activated carbon</li> <li>Fenton reactions</li> <li>Ozonization</li> <li>Membrane filtration and reverse osmosis</li> <li>Ion exchange</li> </ul> <p><b>Advanced</b></p> <ul style="list-style-type: none"> <li>Advanced Oxidation Processes (AOPs)</li> <li>Electrocoagulation-Electroflocculation</li> <li>Evaporation</li> </ul>
Input Connection	Independent	
Output Connection	Connection to multiple questions in Wastewater section.	
Key Words	Onsite Water Treatment, Wastewater Treatment	
How to Systematically Fulfill Requirements	<p>Selections must be made for Raw Water Treatment or Pre-treatment as well as Wastewater Treatment.</p> <p>Even if a water treatment process is carried out for pre-treatment as well as wastewater treatment, the selection can only be made once.</p> <p>To be able to answer correctly and go through verification process smoothly, it is important that the facility maintains following;</p> <ul style="list-style-type: none"> <li>Layout of the facility (including locations for water/wastewater treatment facilities)</li> <li>Water and wastewater piping/drain layouts</li> </ul>	
Evidence Required	<ul style="list-style-type: none"> <li>Facility's water treatment flow chart and/or hydraulic diagrams</li> <li>Permits, if required</li> </ul>	

## 0.2. Permits

This section is not scored. The facility must complete this section before moving forward to other sections of FEM.

1- Does your factory site have a valid operating license, if required by law?	
How to answer this question	<p>User is expected to select either (i) Yes, (ii) No, or (iii) Unknown against this question.</p> <p>On selection of "Yes", the tool requires to upload a copy of operating license, NOCs, Environmental Permits and any other permits like for wastewater discharges etc. as per local governing laws.</p>

	<p>No further action is needed if options (ii) and (iii) are selected. On selecting these responses, the facility scores ZERO for whole Facility Environmental Module regardless of compliance status to any of the sections.</p> <p>The facility shall select “Yes” if operating license is not required.</p>
Input Connection	Independent (Basic prerequisite asking for the legal position of facility)
Output Connection	Whole FEM is scored as ZERO if operating license is not available or the facility does not know about requirement of an operating license. However, the user will be able to move to next sections.
Key Words	Permits, Environmental Permits, Valid Licence,
How to Systematically Fulfil Requirements	<p>If the operating license has expired, the facility must select “No”, as only a Valid and Current operating license qualifies for selecting “Yes”.</p> <ul style="list-style-type: none"> <li>• <b>Valid</b> means, the operating license must be entitled to the facility site being assessed/ verified. Verifiers may physically check if Name on Business/Operating License matches the business name found on the facility premises</li> <li>• <b>Current</b> means the operating license has not expired</li> <li>• <b>Operating license</b> means, business licenses like Certificate of Incorporation, Labour Registration Certificate, Membership of Chamber of Commerce, National Tax number etc.</li> </ul> <p>To be able to answer correctly and go through verification process smoothly, it is important that the facility maintains following;</p> <ul style="list-style-type: none"> <li>• Inventory of all required operating licenses along with readily accessible references of relevant laws or legal/regulatory requirements</li> <li>• Procedure for maintaining and updating the business licenses including; <ul style="list-style-type: none"> <li>○ Responsibilities for keeping the licenses up to date</li> <li>○ Procedure and responsibility in case if main responsible person is out of office</li> <li>○ Procedure for keeping track of regulatory changes which affect requirements for operating licenses.</li> </ul> </li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Copy of update-to-date business license, if applicable</li> <li>• Any other relevant licenses</li> <li>• Verifiers may physically check if Name on Business/Operating License matches the business name found on the facility premises</li> </ul>

<b>2- Did your facility receive any government-issued environmental violation records for this reporting year?</b>	
How to answer this question	<p>User is expected to select either (i) Yes, (ii) No, or (iii) Unknown against this question.</p> <p>On selection of “Yes”, the user must answer following sub-questions;</p> <p>a. If yes, please describe the violation and your site's action plan to improve:</p> <ul style="list-style-type: none"> <li>• In response to this, the facility must describe the violation in detail along with the measures planned and being taken to improve.</li> </ul>

	<p>b. Does your facility currently have any records in the Institute of Public &amp; Environmental Affairs (IPE) database?</p> <ul style="list-style-type: none"> <li>• Response to this question is only required by facilities located in China.</li> </ul> <p>c. If yes, has your facility supplied enterprise feedback to the database and/or taken steps to remove the record(s) from the database?</p> <ul style="list-style-type: none"> <li>• Links to IPE database and guidance to removing records are provided in the How to Higg Guide.</li> </ul> <p>No further action is needed if options (ii) and (iii) are selected.</p>
Input Connection	Reporting Year,
Output Connection	Validity of Environmental Permits and licences
Key Words	Environmental Violations, Records,
How to Systematically Fulfil Requirements	<p>The question is not scored; however, it is important for the facility to display ability of tracking and addressing the violations in timely and sustainable manner.</p> <p>Main intent of this question is to assess if the facility has a process of managing and maintaining local permits and compliance and addressing the environmental complaints and grievances. For example, discharge of untreated wastewater to water bodies is an environmental offence as per regulatory mechanism and similarly emissions from boilers, engines, oil heaters having parameters more than prescribed limits of environmental quality standards is also an environmental violation. In some cases, community can also file a complaint to environmental authorities if environmental conditions are deteriorated with the operation of facility.</p> <p>To be able to answer correctly and also go through verification process smoothly, it is important that the facility maintains following (as verifier may physically look for these as well);</p> <ul style="list-style-type: none"> <li>• Procedure to manage local permits and their compliance and assigned responsibilities</li> <li>• Record of violation notices received or IPE Violation records including; <ul style="list-style-type: none"> <li>○ Identifying issuing authorities, date of issuance and reason for the government-issued violation record</li> <li>○ Action plan to address the listed issues along with responsibilities and timelines. Having a preventive action plan helps avoiding violations in future</li> <li>○ Progress track of action plan implementation and current status of violations</li> <li>○ Evidence of corrective actions (e.g., new equipment installed and operating, test results showing compliance, etc.)</li> <li>○ Steps taken to remove the facility from the IPE list (if applicable). Record of communication with IPE for record removal must also be maintained</li> </ul> </li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Copies of violation notices</li> <li>• IPE database records (if facility is based in China)</li> </ul>

<b>3- Please complete the following questions to provide details on your facility's environmental permits requirements and compliance status</b>	
How to answer this question	In this question, the user is expected to fill a table listing required environmental permits and registrations, issuing authorities, effective and expiry dates, and compliance status.
Input Connection	Independent
Output Connection	EMS Question 4
Keywords	Status, Environmental Compliance, Permit Requirements
How to Systematically Fulfil Requirements	<p>Main intent of this question is to assess if the facility has a process of managing local permits and environmental compliance through meeting requirements. For example, timely renewal of licences etc.</p> <p>To be able to answer correctly and go through verification process smoothly, it is important that the facility maintains following;</p> <ul style="list-style-type: none"> <li>• Inventory of all applicable and attained environmental permits and registrations along with <ul style="list-style-type: none"> <li>○ Names of regulatory authorities that issue the permits</li> <li>○ Readily accessible references of relevant laws or legal/regulatory requirements (Regulatory Registry)</li> <li>○ Effective and expiry date of permits</li> <li>○ Status of compliance to the permits</li> </ul> </li> <li>• Procedure for maintaining and updating the permits including; <ul style="list-style-type: none"> <li>○ Responsibilities for keeping the permits up to date</li> <li>○ Procedure and responsibility in case if main responsible person is out of office</li> <li>○ Procedure for keeping track of regulatory changes which affect requirements for permits</li> <li>○ Procedure and responsibilities for ensuring compliance to permits (e.g., an internal audit mechanism)</li> <li>○ Maintenance of environmental permit requirement and compliance status is recommended as part of facility environmental management processes</li> </ul> </li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• 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.</li> </ul>
Additional Notes	<p>Following are examples of some cases which should also be included in the inventory of permits, although there are not necessarily permits in essence;</p> <ul style="list-style-type: none"> <li>• Facility may need registration to carry out certain operations or store certain substances e.g., <math>KMnO_4</math> for which registration at Police office is required in some countries.</li> <li>• Facilities located in or near residential areas may require additional No Objection Certificates (NOC) for wastewater discharge.</li> </ul> <p>Facility shall enlist permits required only for the facility itself and not for its</p>

	<p>contractors if the contractors' operations are not carried out at facility site.</p> <p>Facilities upload the waste contractor agreement or NOC which is common mistake. Licenses/permits for hazardous waste contractors are requested in the Waste section.</p> <p>It is very important to review local regulations and practices, For example, in Pakistan (Punjab and Sindh provinces), Environment permit obtained against section 12 of IEE/EIA complies with the requirement of water discharge, wastewater, chemical, solid waste and air emission. A permit for water discharge is issue by the irrigation department but it is enforced in few cities. For water usage/ extraction there is no formal permit required in major cities; the water bills by water authority is considered a substitute of water extraction permit. Similarly for chemical usage and storage, permit is required under section 14 of PEPA/ SEPA act; however, it is not currently being issued by the department. Now a days facilities also obtain the Sulphuric Acid permit from antinarcotics department which can be upload in chemical permit section</p>
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# 1. Environmental Management System (EMS)

This section assesses if the Environmental Management System (EMS) is appropriately set-up at the facility as only a facility can only maximize environmental performance by setting a long-term strategy that will inform decision-making on environmental management.

This section has 12 questions distributed in 3 levels and all questions are scored as per following scheme. There is no general Applicability for this section, however, scoring changes based on applicability of Question 10.

1. If question 10 is applicable, the scoring breakdown is as follows:

Level	Question Number	Score per Question	Level Weight	Total
Level 1	#1 (emsmgmt), #2 (emsstrategy), #3 (emsopsimpact), #4 (emspemitstatus), #5 (emsregulationsystem), #6 (emaequipmaintain)	4.17	25%	100%
Level 2	#7 (emsstrategyreview), #8 (emsmgmtcompetence)	25	50%	
Level 3	#9 (emsstrategyawareness), #10 (emshiggindexsubcontract), #11 (emshiggindexlocal), #12 (emshiggindexupstream)	6.25	25%	

2. If question 10 is NOT applicable, the scoring breakdown is as follows:

Level	Question Number	Score per Question	Level Weight	Total
Level 1	#1 (emsmgmt), #2 (emsstrategy), #3 (emsopsimpact), #4 (emspemitstatus), #5 (emsregulationsystem), #6 (emaequipmaintain)	4.17	25%	100%
Level 2	#7 (emsstrategyreview), #8 (emsmgmtcompetence)	25	50%	
Level 3	#9 (emsstrategyawareness), #10 (emshiggindexsubcontract), #11 (emshiggindexlocal), #12 (emshiggindexupstream)	8.33	25%	

Figure 3: Scoring scheme of EMS section

## 1.1. Level-1

<b>1- Are one or more employees at your facility responsible for coordinating your facility's environmental management activities?</b>	
How to answer this question	User is expected to select either (i) Yes, (ii) No, or (iii) Unknown against this question.  On selection of "Yes", the tool requires to fill a table enlisting participating employees, their roles and responsibilities in EMS, time spent per year and the environmental topics they are related to. Answer Yes if any full-time, half-time, part-time, seasonal or contract employees work on environmental management in the facility.  No further action is needed if options (ii) or (iii) are selected.
Input Connection	Independent
Output Connection	Names of the employees may be used in the responsibility section of action plan

Keywords	EMS, Environmental Management Representative (EMR), Environmental Management Team
How to Systematically Fulfil Requirements	<p>To be able to select right options and go through verification process smoothly, it is important that facility keeps an up-to-date record of;</p> <ul style="list-style-type: none"> <li>• Job description of employees working on environmental management clearly mentioning their roles and responsibilities on environmental management</li> <li>• Up-to-date curriculum vitae, resume, or profiles of Environmental Management Team members that demonstrate their educational and professional background to prove that the Team is appropriately staffed and capable for the facility operations and size</li> <li>• Facility must be able to display that there are enough environmental personnel part of the team to handle the breadth and depth of environmental impacts created by the facility. For example, for a small cut-pack facility, an EMS team of 1-2 persons might suffice; however, for a large facility having multiple processes might need multiple members, each taking care of distinct subjects i.e., Energy, Water, Wastewater, Chemical Management, EMS, Air Emissions, Waste</li> <li>• Record of work/tasks executed by employees e.g., minutes and attendance of meeting on environmental management</li> <li>• Action plans on environmental management for key environmental impacts (e.g., energy, water, waste, improving equipment or process efficiency) along with monitoring of implementation and assessment of impact; and demonstrating reductions in environmental impact. It is advised to keep the record of implemented projects during the reporting year.</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Environmental Management Team organization chart and job descriptions records</li> <li>• Supporting documentation: <ul style="list-style-type: none"> <li>○ Employee Name(s)</li> <li>○ Job Title(s)</li> <li>○ Time Spent on each area (General environmental management, Energy, Water, Wastewater, Air, Waste, etc.)</li> <li>○ Performance and project plans for various environmental initiatives</li> </ul> </li> </ul>
Additional Notes	<p>It is not mandatory to have only full-time employees working on environmental management. Half-time, part-time, seasonal or contract employees also qualify for being in the team.</p> <p>It is also not mandatory to assign an employee (permanent or temporary) solely for environmental management work. Employees having other responsibilities may also be assigned this as additional task, provided that the company is able to proof that such employees spent designated time on environmental management.</p>

<b>2- Does your facility have a company environmental management strategy that guides long-term decision-making on environmental management?</b>	
How to answer this question	<p>User is expected to select either (i) Yes, (ii) No, or (iii) Unknown against this question.</p> <p>On selection of “Yes”, the tool requires user to select all topics covered by the</p>

	<p>strategy, i.e., Energy, Water, Wastewater, Air Emissions, Waste, Chemicals Management.</p> <p>No further action is needed if options (ii) and (iii) are selected.</p>
Input Connection	The strategy should be based on an environmental impact assessment as required in EMS Question-3.
Output Connection	The strategy shall transform into environmental targets and action plans in all selected topics.
Keywords	Environmental Management Strategy, Long-term decision-making, KPIs, Targets, Action Plans
How Systematically Fulfil Requirements	<p>to</p> <p>It is advised to follow an internationally recognized EMS standard, for example ISO 14001 while developing the environmental management strategy and related processes and procedures.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility can demonstrate that the long-term strategy is in place and working. For this purpose, it is advised to keep up-to-date record of;</p> <ul style="list-style-type: none"> <li>• Compliance with environmental regulations – this feeds-in from the Questions 2 and 3 in Permits section.</li> <li>• Regular and frequent tracking of all environmental impacts – for this, the facility should develop KPIs for key environmental impacts, establish baselines and reduction targets, record the KPI values, and monitor the trends using visual means like graphs and charts</li> <li>• Action plans on environmental management for key environmental impacts (e.g., energy, water, waste, improving equipment or process efficiency) along with monitoring of implementation and assessment of impact; and demonstrating reductions in environmental impact. It is advised to keep the record of implemented projects during the reporting year.</li> <li>• The use of renewable energy; and any community service projects including tree planting, water filtration, etc. – these show that the facility is willing to go beyond compliance in reducing environmental impacts</li> <li>• Communicating strategy to all employees – to ensure environmental objectives are carried out, the strategy should include plans for achievement that detail: what will be done, what resources will be required, who will be responsible, when it will be completed, and how results will be evaluated. These should be well communicated to all employees in the organization.</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• The company's environmental strategy is signed off by factory management and there is a long-term strategy that extends 3+ years into the future</li> <li>• The company environmental strategy should provide a direction and a plan of actions designed to achieve goals within a defined timeline. The strategy document should be well written and endorsed by the company management or authorized committee to guide planning, decision making and activities that impact on the environmental improvement and target achievement. Including items such as consumption reduction, emission reduction, cost saving target, or changing staff practice to reduce water consumption, waste reduction and resource conservation, etc.</li> </ul>



<b>3- Has your facility identified the significant environmental impacts associated with current operations within the factory premises?</b>	
How to answer this question	<p>User is expected to select either (i) Yes, (ii) No, or (iii) Unknown against this question.</p> <p>On selection of “Yes”, the tool requires user to upload the relevant documentation.</p> <p>No further action is needed if options (ii) or (iii) are selected.</p>
Input Connection	<ul style="list-style-type: none"> <li>• Facility Type and Processes mentioned in Site Information section</li> <li>• Inventory of environmental permits</li> <li>• Environmental topics selected in EMS Question 2</li> </ul>
Output Connection	<ul style="list-style-type: none"> <li>• Used to develop environmental management strategy as required in EMS Question 2</li> <li>• Energy &amp; GHG, Air, Wastewater, Waste sections</li> </ul>
Keywords	Significant Environmental Impact, Environmental Impact Assessment
How to Systematically Fulfil Requirements	<p>Assessment of environmental impacts should be conducted covering all key environmental aspects of the facility and their impacts on the environment.</p> <p>While evaluating the environmental impacts, the facility must follow the rules set by laws / regulations of local government. In case of absence of any such laws / regulations, the facility must follow an internationally established framework (e.g., ISO14001)</p> <p>To be able to select right options and go through verification process smoothly, it is advised to ensure following;</p> <ul style="list-style-type: none"> <li>• The environmental impact assessment is an iterative process that will continuously evaluate any new risks associated with the location and/or operations of the facility. The facility should develop a procedure of conducting the assessment, also including the conditions or frequency for repeating the assessment.</li> <li>• Inventory of legal requirements should be up-to-date and identifies the requirements for impact assessment</li> <li>• All environmental aspects associated within the factory's control or influence should be included in the report</li> <li>• All environmental impacts covered by local regulation must be included as well</li> <li>• The assessment must include an analysis of the significance/importance of the different environmental impacts. The process for evaluating the significance of environmental impacts must be done periodically in order that the document be reproducible for comparing results</li> <li>• The assessment should lead to creation of necessary risk mitigation and elimination strategies to minimize harm to the environment.</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Environmental impact analysis, aspect evaluation and/or latest local government environmental assessment report</li> </ul>

Additional Notes	<p>Environmental permit application and permit requiring controls based on the impacts described in the application together are also an acceptable means of demonstrating conformance with this requirement. A summary of environmental impacts and their significance derived from the permit application and the permit shall be acceptable. If permit is not renewed at a frequency stipulated by regulation, then the impacts should be assessed every three years against any changes in the operation as a general good practice.</p> <p>While selecting environmental aspects; the factory may choose to ignore the aspects out of control or scope of the facility, e.g., a common effluent treatment plant (CETP) is usually controlled by the industrial estate or local government, hence quality of wastewater discharged from the CETP is not the responsibility of the facility. However, if as per agreement with CETP or local regulations, the facility is required to pre-treat wastewater before discharging to CETP, the quality requirements set forth by such agreement or regulation must be considered in the assessment of impacts.</p> <p>In some countries, an Environmental Impact Assessment (EIA) is necessary before building any industrial facility; however, repetition of this assessment is not required in some countries. Such an assessment might not be valid if significant time has passed since the EIA and/or if significant changes to facility have been made ever since (e.g., inclusion of new machines)</p>
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<b>4- Does your facility have a program or system in place to review and monitor environmental permit status and renewal (where appropriate) and ensure compliance?</b>	
How to answer this question	<p>User is expected to select either (i) Yes, (ii) No, or (iii) Unknown against this question.</p> <p>On selection of “Yes”, the tool requires user to upload the relevant documentation.</p> <p>No further action is needed if options (ii) or (iii) are selected.</p>
Input Connection	Question 3 of Permits Section
Keywords	Permits
How to Systematically Fulfill Requirements	<p>The intent of this question is to ensure the facility can act and manage a process (or standard operating procedure) maintaining compliance with environmental permits.</p> <p>To be able to answer correctly and go through verification process smoothly, it is important that the facility maintains following;</p> <ul style="list-style-type: none"> <li>• Inventory of all applicable and attained environmental permits and registrations needed for the facility to operate, along with;             <ul style="list-style-type: none"> <li>○ Names of regulatory authorities that issue the permits</li> <li>○ Permit requirements by local authorities and readily accessible references of relevant laws or legal/regulatory requirements (Regulatory Registry)</li> <li>○ Effective and expiry date of permits</li> <li>○ Status of compliance to the permits</li> </ul> </li> <li>• Procedure for maintaining and updating the permits including;             <ul style="list-style-type: none"> <li>○ Responsibilities for renewing and keeping the permits up to date (including timeframe)</li> <li>○ Procedure and responsibility in case if main responsible person is out</li> </ul> </li> </ul>

	<p>of office</p> <ul style="list-style-type: none"> <li>○ Procedure for keeping track of regulatory changes which affect requirements for permits</li> <li>○ Procedure and responsibilities for ensuring compliance to permits (e.g., an internal audit mechanism)</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Local environmental permit requirement for the facility's corresponding country or locality</li> <li>• List of required permits needed for facility to operate</li> <li>• Permits listed in the Permits section on Site Info</li> <li>• Documentation of the program or system in place to review and monitor environmental permit status and renewal and ensure you are meeting the legal requirement. Elements include: <ul style="list-style-type: none"> <li>○ Internal review mechanism</li> <li>○ Responsible staff/party</li> <li>○ Environmental permits renewal process</li> <li>○ Timeframe to renew the permits to ensure compliance</li> <li>○ Action plan if the environmental permits expire</li> </ul> </li> </ul>
Additional Notes	<p>At a minimum it is advised to create a regularly updated document that tracks your environmental permit review and update approach on a set schedule. The content of the tracking document can include environmental impact areas, permit name, permit status, permit number, valid period, requirements, key responsible person for ensuring compliance, etc. However, having a proper procedure helps in sustaining the results.</p> <p>The template proposed by How to Higg Guide can be downloaded from <a href="https://howtohigg.org/fem-landing/fem-templates/">https://howtohigg.org/fem-landing/fem-templates/</a>.</p>

<p><b>5- 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?</b></p>	
How to answer this question	<p>User is expected to select either (i) Yes, (ii) No, or (iii) Unknown against this question.</p> <p>No further action is needed if options (ii) or (iii) are selected.</p> <p>On selection of "Yes", the tool requires user to;</p> <p><b>Select all topics covered by the system</b> (i.e., Energy, Water, Wastewater, Air Emissions, Waste, and Chemicals Management)</p> <p>Further, the user must answer;</p> <p><b>"Are the finding used to set an improvement plan that is regularly reviewed?"</b> with either (i) Yes, (ii) No, or (iii) Unknown</p>
Input Connection	Environmental topics selected in EMS Question 2
Output Connection	List of required permits may be derived from this regulatory registry
Keywords	Regulatory Registry
How to	The intent of this question is to evaluate if facility management has a process (or

<p>Systematically Fulfil Requirements</p>	<p>standard operating procedure) that ensures the facility is acting from laws, regulations, standards, codes and other legislative and regulatory requirements for significant environmental impacts outside of legal permits. (This is not inclusive of legal permits. See EMS Question #4).</p> <p>To be able to answer correctly and go through verification process smoothly, it is advised that the facility maintains following;</p> <ul style="list-style-type: none"> <li>• Regulatory registry listing all applicable laws, regulations, standards, codes and other legislative and regulatory requirements for the facility’s significant environmental impacts</li> <li>• Monitoring and verification of industry standards (facility must follow the most stringent of regulatory or industry requirements)</li> <li>• Procedure or process to identify, monitor, verify and maintain environmental compliance as part of formal EMS, including scope of requirements, responsibilities, review and tracking mechanism and frequency, and approval processes</li> <li>• Responsibilities for maintaining and executing the procedure must be allocated to qualified personnel having good understanding of environmental regulations</li> <li>• Records of periodic review/verification and updates to all laws, regulations, standards, codes, and other legislative and regulatory requirements for facility’s significant environmental impacts</li> <li>• Record of non-compliances and action plans to correct and prevent the non-compliances along with progress monitoring of implementation and its results</li> <li>• In general, the facility must be able to demonstrate that the system is in place and being used effectively</li> </ul>
<p>Evidence Required</p>	<ul style="list-style-type: none"> <li>• Documentation of the facility's system to identify, monitor, and periodically verify all laws, regulations, standards, codes, and other legislative and regulatory requirements for the facility's significant environmental impacts. Facility should follow the most stringent of national level, provincial level, or industrial requirements</li> </ul>
<p>Additional Notes</p>	<ul style="list-style-type: none"> <li>• Scope of this question does not include legal permits as that have already been answered in EMS Question 4. The intent of the question is to enable facility to track and review the applicable legal requirements.</li> <li>• In many cases, facilities may have a valid permit, but they are not complying with all local environmental requirements or don't have a program to identify which laws are applicable to the factory. Examples: 1) facility has valid permit but they don't know which regulations they should check against for legally restricted chemicals; 2) Water recycling/ energy efficient machineries are required by the local government but there is no specified timeline for facility to complete or no specified legal consequence on the environmental permit if they don't change the machines.</li> <li>• Manufacturing organization may monitor and verify regulations at the parent company level or at the facility level. The response will identify the management practices that maintain business continuity. However, if the regulations for the parent company and facility vary (for example due to being in different regions or countries), the requirements applicable to the facility must be preferred.</li> <li>• The facility must follow the most stringent requirements. For example, in many cases the wastewater quality limits set by buyers or international</li> </ul>

	organizations (like ZDHC) might be more stringent than those set by local regulations; in which case former must be followed.
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<b>6- Does your facility have a process and schedule to maintain all equipment?</b>	
How to answer this question	User is expected to select either (i) Yes, (ii) No, or (iii) Unknown against this question.
Input Connection	Independent
Output Connection	Independent
Keywords	Maintenance
How to Systematically Fulfill Requirements	<p>The intent is for the facility to have appropriate maintenance procedures for managing emissions to air, energy efficiency, water efficiency etc. Maintenance can help the facility ensure compliance, reduce waste due to inefficient machinery or leakage, and identify savings opportunities.</p> <p>To be able to answer correctly and also go through verification process smoothly, it is advised that the facility ensures following;</p> <ul style="list-style-type: none"> <li>• At least one facility engineer or technician is responsible for managing equipment maintenance. It is important to ensure that the assigned maintenance team have enough qualified personal to manage all equipment in the facility</li> <li>• Equipment maintenance procedure is established including;                             <ul style="list-style-type: none"> <li>○ list of equipment and machinery</li> <li>○ maintenance scope and schedule for all equipment</li> <li>○ process to regularly maintain all production and operational equipment. Having proper predictive and preventive maintenance plans is highly advised to ensure that the facility operations are maintained in a sustainable manner</li> </ul> </li> <li>• The maintenance procedure is regularly updated as per frequency or conditions defined in the procedure (e.g., in case of significant change in performance of equipment)</li> <li>• All equipment for production and operation is maintained regularly to ensure compliance and reduce environmental impact; and record of all maintenance activities is maintained</li> <li>• Action plan is developed which provides information on performance status of equipment, identified problems, planned actions, responsibilities and timelines, and status of implementation</li> <li>• Maintenance personnel are aware of impact of their work on efficiency and performance of equipment and are trained to ensure that maintenance activities facilitate improvement in environmental performance</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Equipment maintenance schedule</li> <li>• Equipment maintenance log</li> <li>• Equipment maintenance procedures including;</li> </ul>

	<ul style="list-style-type: none"> <li>○ A list of all equipment used for production and measurement; Date Checked; Performance Status; Problems Identified; Action required; Action Complete Date; Name of personnel and Signature; Due date for next check</li> </ul>
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## 1.2. Level-2

<b>7- Does your facility review the environmental management strategy with your facility's managers each calendar year?</b>	
How to answer this question	User is expected to select either (i) Yes, (ii) No, or (iii) Unknown against this question.
Input Connection	EMS Question 2 and Question 5
Output Connection	Independent
Keywords	Environmental Management Strategy, Management Review
How to Systematically Fulfil Requirements	<p>The intent of this question is to drive management to communicate environmental management strategy and/or opportunities to present environmental progress to facility management team each year.</p> <p>To be able to answer correctly and go through verification process smoothly, it is advised that the facility ensures following;</p> <ul style="list-style-type: none"> <li>• Management review of environmental management systems is regularly conducted with a focus on driving improvements</li> <li>• Schedule for management review meetings is defined (e.g., quarterly, annually) and at least one full management review is conducted annually</li> <li>• The management review covers the entire scope of the EMS, although not all elements of the EMS need to be reviewed at once. The review process can take place over a period.                             <ul style="list-style-type: none"> <li>○ For larger organizations, the process may be divided into multiple steps where detailed reviews are conducted at middle management level while the top management conducts a holistic review. Strategic decisions of such a top-management review must translate into operational action plans of each middle-management review team.</li> </ul> </li> <li>• Agenda, minutes, and attendance records of all management reviews are maintained</li> <li>• Implementation of action plans derived from the management review is monitored and status is communicated to all relevant actors</li> <li>• Decisions of management review are communicated to employees via trainings, awareness sessions, meetings or other appropriate means; and record of such activities is maintained.</li> </ul> <p>Following schematic diagram presents a typical management review as per ISO14001</p>

	<p><b>Inputs</b></p> <ul style="list-style-type: none"> <li>• Results audits and legal and other compliance</li> <li>• Communication from external parties</li> <li>• Environmental performance</li> <li>• Progress of objective and targets</li> <li>• Progress of corrective actions</li> <li>• Follow-up actions from previous management review</li> <li>• Changing circumstances</li> <li>• Recommendations for improvement</li> </ul> <p><b>Process</b></p> <ul style="list-style-type: none"> <li>• At least one full annual review</li> <li>• Focus on driving improvements</li> <li>• Inclusive and collaborative process of decision making (not an adhoc activity)</li> </ul> <p><b>Outputs</b></p> <ul style="list-style-type: none"> <li>• Decision and actions related to possible changes to environmental strategy, policy, objectives, targets and other elements of the EMS consistent with the commitment to continual improvement</li> </ul> <p><b>Figure 4: Typical management review as per ISO14001</b></p>
Evidence Required	<ul style="list-style-type: none"> <li>• Site EMS management review meeting plan</li> <li>• Site EMS management review meeting agenda</li> <li>• Meeting memo, action plan &amp; timeline</li> <li>• Meeting attendance record</li> </ul>

<p><b>8- Do employees at your facility responsible for environmental management have the technical competence required to do their job?</b></p>	
How to answer this question	<p>User is expected to select either (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown against this question.</p> <ul style="list-style-type: none"> <li>• Answer Yes if facility can explain how, you ensure environmental employees: a) have technical competence, b) are provided with trainings or certifications as needed, and c) are evaluated for competence on an annual basis.</li> <li>• Answer Partial Yes if facility can demonstrate employee competence but do not yet have a process for annual performance review</li> </ul>
Input Connection	EMS Question 1
Output Connection	Independent
Keywords	Job Description, Performance Review, Training, Competence
How to Systematically Fulfil	<p>The intention is to demonstrate value in technical training for staff and/or hire staff with technical backgrounds to manage the facility's environmental impacts.</p> <p>To be able to answer correctly and go through verification process smoothly, it is</p>

Requirements	<p>advised that the facility ensures following;</p> <ul style="list-style-type: none"> <li>• A procedure or process is established that ensures             <ul style="list-style-type: none"> <li>○ the staff have strong technical expertise in relevant impact areas</li> <li>○ training needs are evaluated for staff responsible for environmental management and appropriate training, certification, and development opportunities are provided</li> <li>○ annual review of employee's job performance is conducted to ensure they are meeting the technical competence needed to do their job</li> <li>○ development plans are in place for staff to ensure they have the appropriate level of technical knowledge and resources to successfully manage their areas of responsibility                 <ul style="list-style-type: none"> <li>▪ It is recommended to prepare a facility wide training plan covering all environmental subjects</li> </ul> </li> </ul> </li> <li>• Up-to-date curriculum vitae, resume or profiles of all relevant staffs are kept that demonstrate their educational and professional background</li> <li>• Record is kept for certifications or trainings provided to the individuals listed who are responsible for environmental related issues</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• For “YES”             <ul style="list-style-type: none"> <li>○ List of individuals that are responsible for environmental related issues</li> <li>○ Environmental management team organization chart</li> <li>○ Roles &amp; responsibilities, and their background &amp; qualification in corresponding area</li> <li>○ Certificates proving their professional qualifications</li> <li>○ Training records showing the person in charge has received training from time to time to update his/her knowledge in environmental management field</li> </ul> </li> <li>• For “Partial Yes”             <ul style="list-style-type: none"> <li>○ List of individuals that are responsible for environmental related issues</li> <li>○ Job descriptions for the list of individuals that are responsible for environmental related issues</li> <li>○ Development plans for staff to ensure they have the appropriate level of technical knowledge and resources to successfully manage their areas of responsibility</li> </ul> </li> </ul>
Additional Notes	<p>External trainings provided to staffs for getting certified on international environment related standards also qualify for this question.</p> <p>Facility may hire external consultants or technical experts to fulfil gaps in internal team.</p>

### 1.3. Level-3

<b>9- Does your facility promote awareness of the environmental strategy to employees?</b>	
How to answer this question	User is expected to select either (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown against this question.



	<ul style="list-style-type: none"> <li>• Answer Yes, if facility can demonstrate how your environmental strategies have been communicated to workers.</li> <li>• Answer Partial Yes, facility is in the process of developing a communication plan</li> </ul>
Input Connection	EMS Question 2
Output Connection	Independent
Keywords	Communication, Training, Awareness
How to Systematically Fulfil Requirements	<p>The intent is for facility management to communicate environmental strategy and action plan to the facility’s workers through trainings, newsletters, posters, or other mechanisms.</p> <p>To be able to answer correctly and go through verification process smoothly, it is advised that the facility ensures following;</p> <ul style="list-style-type: none"> <li>• An internal communication plan is developed which identifies different ways of communicating the facility’s environmental strategy. This should include schedule and frequency of communication along with content to be communicated. This may also be part of the overall competence development plan of the organization.</li> <li>• Records and evidence of promoting awareness on environmental strategy among workers are maintained (these may include posters in a visible place, training materials provided to workers, formal meeting minutes and sign in sheets, evaluation reports, etc.)</li> <li>• Effectiveness of awareness activities is assessed, and communication plan is revised accordingly (if needed)</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• For “YES” <ul style="list-style-type: none"> <li>○ Plans for promoting awareness of the environmental strategy to workers that includes the schedule and frequency of communications as well as the content to be delivered, attendance records, and employee evaluations on the success of the program.</li> <li>○ Communications tactics may include slogan, posters, newsletters, games &amp; competitions, awards, team/division ambassadors, training, best practice sharing, broadcast announcement, etc.</li> </ul> </li> <li>• For “Partial Yes” <ul style="list-style-type: none"> <li>○ A plan for promoting awareness of the environmental strategy to workers exists (but could not be implemented in reporting year) and implementation will begin this year</li> </ul> </li> </ul>
Additional Notes	<p>At times companies tend to post whole environmental strategy document in various areas of the facility; however, a more effective way would be to first identify information needs of various categories of employees and communicate accordingly. This ensures that employees receive necessary information needed to perform their tasks. For example, the employees performing administrative support functions might not need to be known technical details of planned environmental actions but should generally be aware about the direction set by company and the environmental topics being addressed.</p>

<b>10- Does your facility monitor, evaluate, and/or engage with your subcontractors on their environmental performance using the Higg Index?</b>	
How to answer this question	<p>User is expected to select either (i) Yes, (ii) Partial Yes, (iii) No, (iv) Unknown, or (v) Not Applicable against this question.</p> <ul style="list-style-type: none"> <li>• Answer Yes if facility engaged any subcontractors in environmental assessment using the Higg Index.</li> <li>• Answer Partial Yes facility you have a plan to engage subcontractors using the Higg Index</li> <li>• Answer “Not Applicable” if facility does not have subcontractors</li> </ul>
Input Connection	Independent
Output Connection	Independent
Keywords	Subcontractors
How to Systematically Fulfil Requirements	<p>The scope of subcontractors for this question only includes subcontractors used for production.</p> <p>The intent is to leverage the Higg FEM and communicate why environmental performance matters to facility’s business with subcontractors, and work with them to evaluate their own performance, monitor impacts, and improve. It’s important to start with Level 1 practices to ensure facility have own environmental strategy and action plan, before extending efforts to subcontractors.</p> <p>To be able to answer correctly and go through verification process smoothly, it is advised that the facility ensures following;</p> <ul style="list-style-type: none"> <li>• A subcontractor evaluation system is established, and monitoring plan is developed</li> <li>• An annual training plan is developed, and EMS training is provided to subcontractors to ensure they understand the facility’s requirements and any targets they must achieve</li> <li>• Subcontractors are provided training on using Higg FEM</li> <li>• Proper training records are maintained including attendance list, training material / content, feedback and evaluation of trainings etc.</li> <li>• Record of relevant documentation about subcontractor engagement is maintained (e.g., agreements, communication documents with subcontractors, Higg Index results for suppliers)</li> <li>• Evaluation of environmental footprint of sub-contractors is conducted</li> <li>• Sub-contractors’ Higg results are used to drive environmental improvements up the value chain and action plans of sub-contracts are regularly monitored</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• For “YES” <ul style="list-style-type: none"> <li>○ List of all subcontractors that your facility conducts business with along with ones that have posted Higg FEM modules</li> <li>○ Obtain a list from the accounting department and cross reference all subcontractors are listed</li> <li>○ Proof of Higg Index engagement: e.g., show Higg.org connections and shared modules or other documentation of subcontractor module</li> </ul> </li> </ul>

	<p>results such as an emailed export of results.</p> <ul style="list-style-type: none"> <li>○ The facility should demonstrate a subcontractor evaluation system and monitoring plan which should include items such as:             <ul style="list-style-type: none"> <li>▪ an EMS training for subcontractors to ensure they understand your facility's requirements and any targets they must achieve</li> <li>▪ an annual training plans</li> <li>▪ training materials</li> <li>▪ training records, such as an attendance list</li> </ul> </li> <li>● For “Partial Yes”             <ul style="list-style-type: none"> <li>○ List of all subcontractor's facility conducts business with and which ones they engage with or plan to engage with using Higg</li> <li>○ Evidence of Engagement with subcontractors or a plan to engage with them (but no or limited Higg completion or sharing has occurred: e.g., emailed invitations to register, emailed invitation to participate with description of Higg)</li> </ul> </li> <li>● For “Not Applicable”             <ul style="list-style-type: none"> <li>○ Proof that subcontracts are not used for production activities.                 <ul style="list-style-type: none"> <li>▪ For this the facility may need to provide proof that all production processes were conducted in-house e.g., production records of all processes for reporting year</li> </ul> </li> </ul> </li> </ul>
Additional Notes	<p>The scope of subcontractors for this question only includes subcontractors used for production.</p> <p>A subcontractor is usually an entity hired by a manufacturer to complete specific tasks which are also considered special tasks or manufacturing process steps. Manufacturers hire subcontractors because they do not have the expertise or resources in-house, and they need the services from subcontractors to complete a portion of the manufacturing process or certain pieces of work to produce finished goods. For example, cut and sew garment manufacturers may need to hire subcontractors for processes, such as, garment dyeing, embroidery and screen-printing tasks.</p> <p>Subcontractors may or may not have direct ownership connection to the manufacturer. Finished goods facilities that <b>perform the complete manufacturing process</b>, even when they are not privately owned by the manufacturer or the manufacturer's mother company; should not be considered or termed as a subcontractor in the Higg FEM context.</p>

11- Does your facility engage in environmental improvement in your local context?	
How to answer this question	<p>User is expected to select either (i) Yes, or (ii) No against this question.</p> <p>On selecting Yes, the user is required to select from following list the ways in which the facility engages in environmental improvement:</p> <ul style="list-style-type: none"> <li>● We support (financially or otherwise) conservation or improvement projects for environmental issues (e.g., preserving wetlands).</li> <li>● We work with other similar businesses to share best practice for environmental management.</li> <li>● We engage in dialogue with local communities to understand their views on how we as a company should manage our environmental impacts.</li> <li>● We work within a group of other local stakeholders including government and</li> </ul>

	<p>communities, to understand and address local environmental issues together. We engage directly with local or national governance bodies on environmental regulation or management issues.</p> <ul style="list-style-type: none"> <li>• We work together in a group with other local stakeholders, to engage with local or national governance bodies on environmental regulation or management issues.</li> <li>• Other</li> </ul> <p>In all these ways of engaging, the user must select the topics facility engages in (i.e., energy, water, wastewater, air emissions, waste, chemicals management)</p>
Input Connection	Environmental Impact Assessment
Output Connection	Independent
Keywords	Community
How to Systematically Fulfil Requirements	<p>The intent is to build engagement with people, businesses, and organizations in the community around your facility on environmental practices and improvement.</p> <p>To be able to answer correctly and go through verification process smoothly, it is advised that the facility ensures following;</p> <ul style="list-style-type: none"> <li>• Local actors relevant to facility’s environmental performance are identified and impacts of facility operations on local actors are assessed and documented</li> <li>• Procedure is established to engage in environmental improvement in local context</li> <li>• Record of all activities of engaging with local community is maintained e.g., event photographs / videos, charitable contributions, newspaper articles etc.</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Evidence of environmental improvement in their local context (e.g., community, river basin, etc.) such as donations to local charities; participation in local environmental initiatives; community service outcomes; newspaper articles, pamphlets, or photo evidence of local community involvement; outcomes of environmental policy work; etc.</li> <li>• List of local stakeholders and dates of engagement</li> </ul>
Additional Notes	<p>Some ways to engage in environmental improvement in local context are included in description of the question. Generally, this question can be addressed if the facility is part of any initiative on environmental improvement which is not directly related to the operations of the facility, for example, being part of a Community of Practice, or supporting any environmental working groups, non-governmental organizations, societies, or providing support to government in their environmental initiatives. The intent must be to go beyond own facility borders and contribute towards climate improvement in a broader spectrum.</p>

<b>12- Does your facility monitor, evaluate, and/or engage with your upstream suppliers using the Higg Index?</b>	
How to answer this question	User is expected to select either (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown against this question.

	<ul style="list-style-type: none"> <li>• Answer Yes if facility engaged any upstream suppliers in environmental assessment using the Higg Index. On selecting Yes, the user is required to select from following list the type of supplier's facility engages with for Higg index;             <ul style="list-style-type: none"> <li>○ Chemical suppliers</li> <li>○ Raw material suppliers</li> <li>○ Other suppliers</li> </ul> </li> <li>• Answer Partial Yes if facility have a plan to engage upstream suppliers using the Higg Index</li> </ul>
Input Connection	Independent
Output Connection	Independent
Keywords	Suppliers
How to Systematically Fulfil Requirements	<p>The intent is to communicate why environmental performance matters to upstream suppliers, and work with them to evaluate their performance, monitor impacts, and improve using the Higg Index. It's important to start with Level 1 practices to ensure facility have own environmental strategy and action plan, before extending efforts to suppliers.</p> <p>To be able to answer correctly and go through verification process smoothly, it is advised that the facility ensures following;</p> <ul style="list-style-type: none"> <li>• Suppliers' environmental performance is evaluated / tracked systematically and a schedule to regularly monitor performance is developed; documentation review and factory site visits are conducted, and records are maintained (the Higg FEM can be used as a tool to monitor upstream suppliers)</li> <li>• An annual training plan is developed, and EMS training is provided to suppliers also including training on using Higg FEM</li> <li>• Suppliers' Higg results are used to drive environmental improvements up the value chain and action plans of suppliers are regularly monitored</li> <li>• Proper training records are maintained including attendance list, training material / content, feedback and evaluation of trainings etc.</li> <li>• Record of relevant documentation about supplier engagement is maintained (e.g., contract, agreements, Higg registration invitations and other communication documents with suppliers, Higg Index results for suppliers etc.)</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• For "Yes"             <ul style="list-style-type: none"> <li>○ List of ALL upstream supplier's facility conducts business with</li> <li>○ Proof of Higg Index engagement: e.g., emailed registration invitations, communications/requests for completion, Higg.org Module share, documentation of their Module results.</li> <li>○ Communications with upstream suppliers and their feedback on the use of the Higg Index</li> </ul> </li> <li>• For "Partial Yes"             <ul style="list-style-type: none"> <li>○ List of ALL upstream supplier's facility conducts business with</li> <li>○ Proof of Higg Index engagement: e.g., emailed registration invitations, communications/requests for completion, Higg.org Module share, documentation of their Module results.</li> </ul> </li> </ul>

	<ul style="list-style-type: none"><li>○ Communications with upstream suppliers and their feedback on the use of the Higg Index</li></ul>
Additional Notes	<p>Upstream suppliers are usually an entity providing raw materials to manufacturers that ultimately process the materials. For example, fabric mills, zipper and buttons manufactories are common upstream suppliers for a cut-sew garment factory.</p> <p>Based on revised guidelines facilities should only track the main raw material suppliers like fabrics, yarn etc.</p>

## 2. Energy & GHG

The purpose of this section is not only to assess the compliance, but to drive the reduction in energy use and GHG emissions. This section supports facilities in assessing their energy and GHG emission baselines, set reduction targets, and develop action plans to implement best practices that will improve the current usage of energy as compared with baseline.

This section has 08 questions distributed in 3 levels; level-3 (questions 7 and 8) is unscored because it asks for calculation of Scope-3 emissions which are advanced calculations but do not drive sustainability directly. Scoring scheme is provided in the following chart.

Level	Question Number	Score/Question	Level Weight	Total
Level 1	#1 (ensourcestrack)	50	50%	100%
Level 2	#2 (enbaselinesource), #3 (enhighestuse) #4 (entargetssource), #5 (enimproveplan) #6 (enimprovesource)	10	50%	
Level 3	#7 (enscope3ghg)	0	0%	

Figure 5: Scoring for Energy section

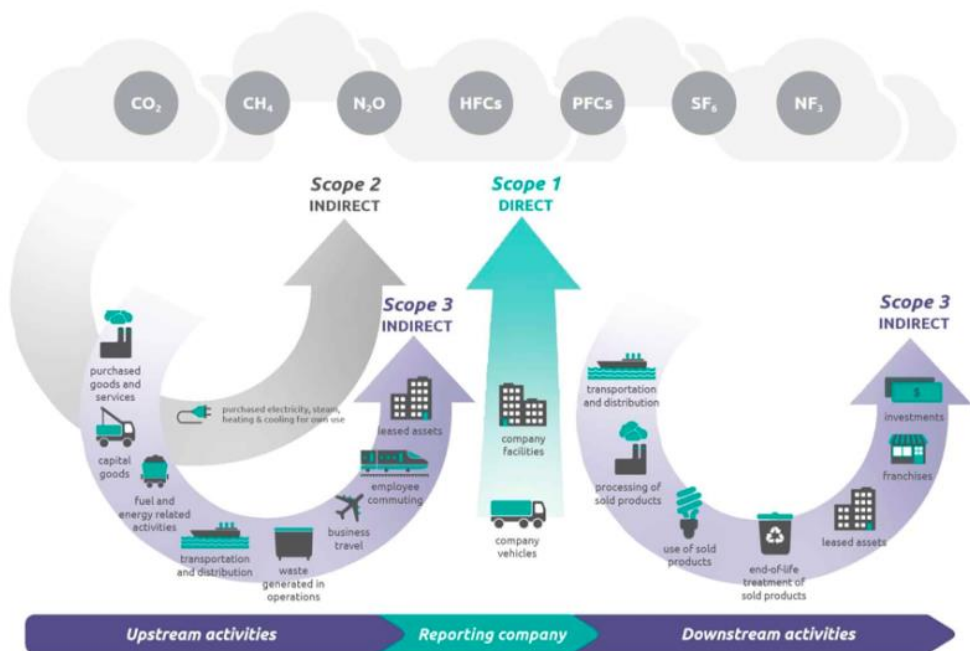
### 2.1. Level-1

1- Select all sources of energy for your facility?									
How to answer this question	<p>a) User is expected to select all energy sources that facility uses from following list;</p> <ul style="list-style-type: none"> <li>• Coal- commercial mix</li> <li>• Biomass- general</li> <li>• Biomass- wood</li> <li>• Natural Gas</li> <li>• Diesel</li> <li>• Fuel oil- blended average</li> <li>• LPG- Liquid petroleum gas</li> <li>• Petrol</li> <li>• Propane</li> <li>• Biodiesel</li> <li>• Solar photovoltaic</li> <li>• Wind</li> <li>• Geothermal</li> <li>• Hydro</li> <li>• Electricity</li> <li>• Micro-hydro</li> <li>• Solar Thermal</li> <li>• Steam (purchased)</li> <li>• Chilled water</li> <li>• Purchased Renewables</li> </ul> <p>b) Once the selection is done, the user must answer “Does your facility track any of its energy uses?”</p> <p>The user may select (i) Yes, (ii) No, or (iii) Unknown.</p> <p>No further action is needed if options (ii) or (iii) are selected.</p> <p>On selection of “Yes”, the tool requires to fill a table asking following questions;</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #4a7ebb; color: white;">Questions</th> <th style="background-color: #4a7ebb; color: white;">Responses</th> </tr> </thead> <tbody> <tr> <td>Energy Source</td> <td>filled automatically according to above selection</td> </tr> <tr> <td>Does your facility track its energy use from this source?</td> <td>Yes/No/Unknown</td> </tr> <tr> <td>What quantity of energy was used by this source during this reporting year?</td> <td>Text input</td> </tr> </tbody> </table>	Questions	Responses	Energy Source	filled automatically according to above selection	Does your facility track its energy use from this source?	Yes/No/Unknown	What quantity of energy was used by this source during this reporting year?	Text input
Questions	Responses								
Energy Source	filled automatically according to above selection								
Does your facility track its energy use from this source?	Yes/No/Unknown								
What quantity of energy was used by this source during this reporting year?	Text input								

	Unit of Measure	dropdown list
	Which method was used to track this energy source?	Meters/invoices/estimates
	What was the frequency of measurement?	dropdown list
	Provide any additional comments	Text input (e.g., explaining how facility tracks this source of energy)
Scoring	<ul style="list-style-type: none"> <li>• Full points if facility is completely tracking all sources of energy that the facility uses.</li> <li>• Partial points if facility is completely tracking at least one of the energy sources but is not yet tracking all the energy sources.</li> </ul>	
Input Connection	Independent	
Output Connection	Higg FEM converts energy use data into common units (MJ), % of total use, and CO <sub>2</sub> equivalent. This is further used to calculate KPIs e.g., MJ/unit-production.	
Keywords	Energy Sources, Energy Tracking	
How to Systematically Fulfill Requirements	<p>Facility must include all energy used within the site’s physical boundary and operations under the business control (owned, operated or directly leased). Please exclude any outsourced services or areas such as a contracted canteen or rental shop.</p> <p>Facilities may consult ISO 50001 (Energy Management System) and ISO 50006 (EnMS – Measuring energy performance using energy baseline and energy performance indicators) for developing a proper energy tracking /monitoring system. Brief technical guidance is also provided in How to Higg Guide.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Energy review (Level 1 – energy inputs): mapping out business and operational processes to identify sources of energy use; identifying the purpose of each energy source e.g., if the fuel is used for stationery combustion or mobile combustion</li> <li>• Establish an energy monitoring and measurement procedure and plan (Level-1: only at Energy Input level for scope of this question) <ul style="list-style-type: none"> <li>○ Identify all energy sources used by the facility and develop a procedure for monitoring various energy sources (i.e., Meters, invoices, or estimates). This could be documented in tabular form showing all types of energy sources and their measuring /estimating method</li> <li>○ If estimation techniques are used, the calculation methodology should be clearly defined and be supported by verifiable data</li> <li>○ Use consistent units for an energy source; if conversions are used, document standard methodology for conversions using reliable sources</li> <li>○ Utility bills or purchase invoices can be used for purchased energy (electricity, steam, chilled water, fuels etc.)</li> <li>○ Meters or estimates may be used for internal distribution of energy sources; for example, a fuel may be used for multiple purposes like power generation, process heating (e.g., boilers) etc. It is advised to record all such uses as separate energy sources for better energy</li> </ul> </li> </ul>	



	<p>accounting</p> <ul style="list-style-type: none"> <li>○ Similarly, separately record fuels used for stationery combustion (boilers, oil heaters, engines etc.) and mobile combustion (carriage vehicles, employee transport, private cars, forklifts etc.) – tracking only those which are in control of facility; there is no need to track fuel consumed by contractors for this question, however, if contractor is using fuel procured by the facility, then it must also be tracked.</li> <li>○ Sub-meters are needed to track renewable energy use from in-house renewable energy generation</li> </ul> <ul style="list-style-type: none"> <li>● Keep records of energy tracking data as per monitoring and measurement plan; this data should be up-to-date and readily accessible to relevant personnel in the facility. Further, the data should be available in human readable formats so that same could be presented to verifier as evidence.</li> <li>● Energy Management System             <ul style="list-style-type: none"> <li>○ Develop a legal registry (also required in EMS section) tracking the permits, laws and regulations concerning energy use, transport and GHG emissions etc. and tracking compliance to the requirements. This may also include reporting energy data to authorities where required/ applicable (As per country specific legal requirements)</li> <li>○ Record all activities to ensure that applicable laws and regulations are maintained including action plans, provision of resources etc.</li> <li>○ Ensure all monitoring and measuring devices are calibrated and calibration record is maintained</li> <li>○ Communicate to management and key employees about energy source tracking ensuring;                 <ul style="list-style-type: none"> <li>▪ Management is aware of legal and other requirements in terms of energy and GHG and actions taken for the compliance</li> <li>▪ Key Employees are aware of the facility's energy data tracking program and how data quality is maintained</li> <li>▪ Key Employees are aware of energy use and greenhouse gas emissions permit/license requirements, where applicable</li> <li>▪ Employees have access to, and understand, energy use, transport and greenhouse gas emissions procedures, where appropriate</li> </ul> </li> </ul> </li> </ul>
<p>Evidence Required</p>	<ul style="list-style-type: none"> <li>● Frequency and method of measurement for all sources of energy</li> <li>● Electricity, fuel, steam and other energy consumption records (e.g., monthly bills and annual consumption records; metering records compiled in a spreadsheet (e.g., Excel) is ok if the metering records are available for review as well) whose totals match the reported answers to all questions answered.</li> <li>● Meter calibration records where applicable (e.g., as per manufacturer's specifications)</li> <li>● Estimation methodology documented where applicable</li> <li>● All energy 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.</li> <li>● For Partial points; same requirements as for "Full Points" above for at least one energy source at the facility. This must be tracked in full. This means</li> </ul>

	<p>that at least one (but not all) energy sources listed in the Question 1 table have complete answers in all columns and there is evidence to support all the answers.</p>
<p>Additional Notes</p>	<p>This question requires energy data for both Scope-1 and Scope-2 emissions. Therefore, it requires separately identifying energy inputs for (i) stationary and mobile combustion (scope-1), and (ii) purchased energy (scope-2).</p> <p>If a facility is purchasing chilled water from any sources, then this would be counted in Scope-2 emissions. However, if water chilling is done in-house, there is no need to report chilled water in the tool as it is not being purchased; and the energy used for water chilling would already be accounted in relevant energy source.</p> <p>Similarly, the facility should report steam separately only if it is purchased; otherwise, the energy source to generate steam at site should be reported.</p> <p>Following diagram from <a href="#">British Retail Consortium</a> explains what is included in the GHG scopes;</p>  <p><b>Figure 6: Explanation of GHG emission Scopes</b></p> <p>In general, any emissions that result from direct use (for use in company operations) of primary energy sources; from combustion sources which are directly in control of the facility e.g. Fuel combustion, Company vehicles, Fugitive emissions, are included in Scope-1 emissions.</p> <p>Any emissions associated with purchased energy i.e. electricity, heat, steam, and chilled water are included in Scope-2 emissions.</p> <p>Scope 3 includes all other indirect emissions that occur in a company's value chain, e.g.;</p> <ul style="list-style-type: none"> <li>• Purchased goods and services</li> <li>• Business travel</li> <li>• Employee commuting</li> <li>• Waste disposal</li> </ul>

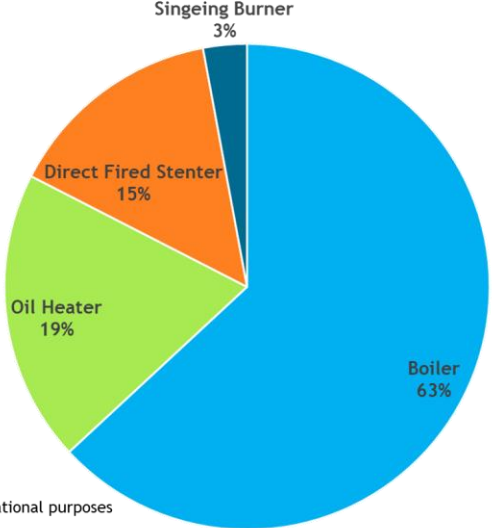
	<ul style="list-style-type: none"> <li>• Use of sold products</li> <li>• Transportation and distribution (up- and downstream)</li> <li>• Investments</li> <li>• Leased assets and franchises</li> </ul> <p><b>Important note:</b> The facilities need not to worry about GHG emission factors for Scope-1 and Scope-2 emissions related to energy as these emissions are calculated automatically by Higg FEM based on the selected energy inputs and their annual quantities. However, if a facility sequesters the emissions by taking certain measures, the sequestered emissions need to be calculated and the method needs to be explained in detail in relevant section.</p>
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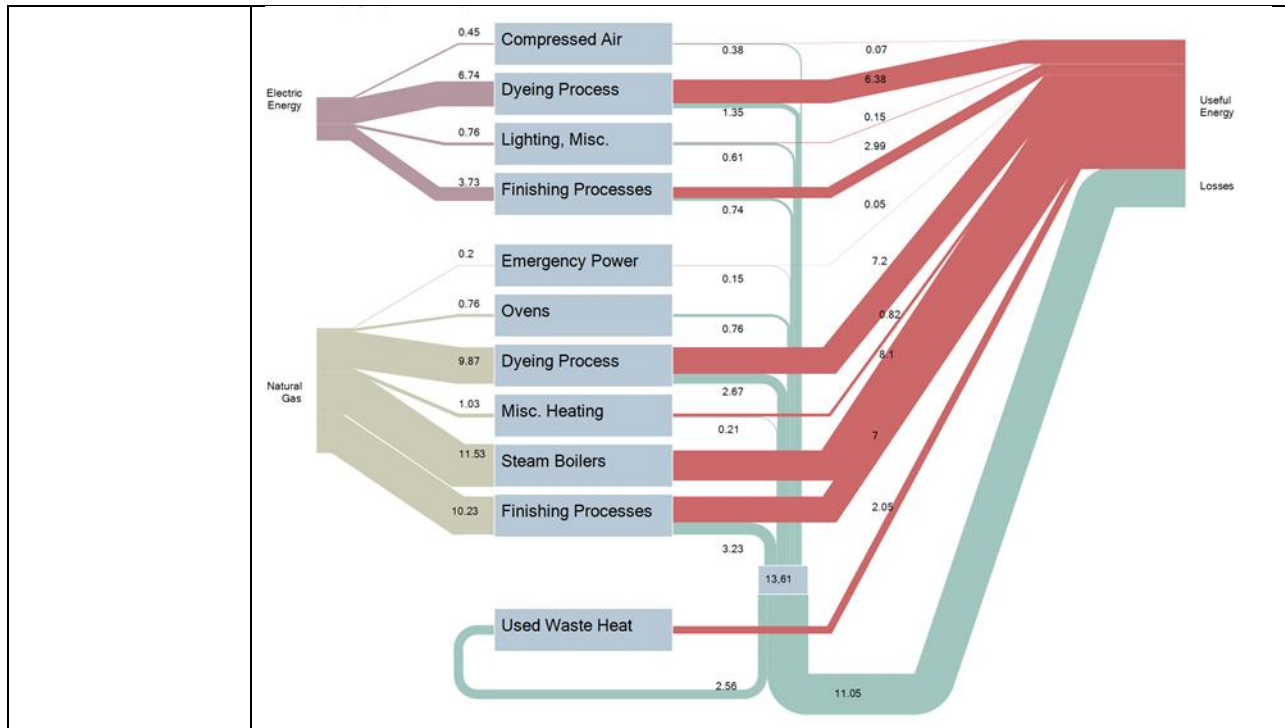
## 2.2. Level-2

2- Has your facility set baselines for energy use?																			
How to answer this question	<p>The user may select (i) Yes, or (ii) No while answering this question.</p> <p>On selection of “Yes”, the tool requires to fill a table asking following questions;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Energy Source</td> <td>Filled automatically according to selection in question 1</td> </tr> <tr> <td>Have you set a baseline for this source?</td> <td>Yes/No</td> </tr> <tr> <td>Is the baseline absolute or normalized?</td> <td>Normalized/Absolute</td> </tr> <tr> <td>What is the baseline quantity?</td> <td>Text input</td> </tr> <tr> <td>Unit of Measure</td> <td>dropdown list</td> </tr> <tr> <td>Enter the baseline year</td> <td>dropdown list</td> </tr> <tr> <td>How was your baseline calculated?</td> <td>Text input: describe the methodology e.g., total electricity used divided by total production output</td> </tr> <tr> <td>Was the baseline verified?</td> <td>Yes/No</td> </tr> </tbody> </table>	Questions	Responses	Energy Source	Filled automatically according to selection in question 1	Have you set a baseline for this source?	Yes/No	Is the baseline absolute or normalized?	Normalized/Absolute	What is the baseline quantity?	Text input	Unit of Measure	dropdown list	Enter the baseline year	dropdown list	How was your baseline calculated?	Text input: describe the methodology e.g., total electricity used divided by total production output	Was the baseline verified?	Yes/No
Questions	Responses																		
Energy Source	Filled automatically according to selection in question 1																		
Have you set a baseline for this source?	Yes/No																		
Is the baseline absolute or normalized?	Normalized/Absolute																		
What is the baseline quantity?	Text input																		
Unit of Measure	dropdown list																		
Enter the baseline year	dropdown list																		
How was your baseline calculated?	Text input: describe the methodology e.g., total electricity used divided by total production output																		
Was the baseline verified?	Yes/No																		
Input Connection	Energy Question 1																		
Output Connection	Used for setting reduction targets, and as a baseline for monitoring reductions																		
Keywords	Energy Baseline																		
How to Systematically Fulfill Requirements	<p>As per ISO 50001:2018, Energy baseline (EnB) is quantitative reference(s) providing a basis for comparison of energy performance. An energy baseline is based on data from a specified period and/or conditions, as defined by the organization.</p> <p>For Higg FEM, a baseline should generally comprise of a full calendar year’s data.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Establish a procedure of developing, monitoring, verifying and updating the</li> </ul>																		

	<p>energy baselines, including data records, conditions for revising baselines, measuring methods etc.</p> <ul style="list-style-type: none"> <li>• Establish EnB(s) using the information from the energy review (see Energy Question 1), considering a suitable period</li> <li>• Baselines can be Absolute (e.g., 120,000 GJ/year) or Normalized (e.g., 6.5 GJ/Tonne-production). If the data indicates that relevant variables significantly affect energy performance (e.g., environmental temperature, humidity, raw material type), the facility should carry out normalization of the EnB(s). Depending on the nature of the activities, normalization can be a simple adjustment, or a more complex procedure.</li> <li>• EnB(s) should be revised, (i) as per predefined method, or (ii) if there have been major changes in the energy sources or facility's energy use patterns             <ul style="list-style-type: none"> <li>○ If the baseline is used to evaluate performance against a target, the baseline should remain unchanged. The baseline may be revised once the target is achieved, and the baseline is no more relevant.</li> </ul> </li> <li>• The facility should retain information of EnB(s), relevant variable data and modifications to EnB(s) as documented information</li> <li>• Maintain record of verification of energy baselines e.g., previous Higg FEM Verifications, Internal / external energy assessment by qualified personnel etc.</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Description/Methodology showing how the baseline was calculated</li> <li>• Documentation that shows the baseline matches consumption records for the year the baseline was set.</li> <li>• Ability to demonstrate how baseline data was validated</li> </ul>
Additional Notes	<p>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. The record of verification must be maintained.</p> <p>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).</p> <p>It is advisable to keep the baseline unit same as Question 1, e.g., Electricity kWh per meter fabric or per garment in case of normalization</p>

<b>3- Does your facility know what facility processes or operations use the most energy?</b>	
How to answer this question	<p>The user may select (i) Yes, or (ii) No while answering this question.</p> <p>On selection of “Yes”, the tool requires user to respond to following</p> <ul style="list-style-type: none"> <li>• Upload (or describe) the methodology for identifying the highest energy use factors.</li> <li>• What are the highest energy use factors at your facility?             <ul style="list-style-type: none"> <li>○ These can be any factors in production such as machines, processes, or sections</li> </ul> </li> </ul>
Input Connection	Energy sources selected in Question 1
Output	Independent

Connection	
Keywords	Significant Energy Uses, Highest Energy Use Factors
<p>How to Systematically Fulfill Requirements</p>	<p>The intent is to have the facility complete an entire-facility analysis to evaluate the amount and sources of energy in all places where the energy is used (i.e., processes, lighting, HVAC, boiler, etc.). The intent of question is to have the facility demonstrate they strategically prioritize operations or processes with the highest energy consumption for energy efficiency programs or with plans to replace the energy source with renewable energy.</p> <p>To be able to select right options and also go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>Energy review (Level-2 – energy users): mapping out business and operational processes (machinery, utilities etc.) to identify and quantify energy consumption and identifying significant energy uses (SEUs) or Highest Energy Use Factors based on a pre-defined criterion or methodology (e.g. Pareto analysis to identify major energy uses that consume 80% of all energy input). Energy sub-meters are the best means to demonstrate which operation or processes use the highest energy usage.</li> </ul> <p><b>Thermal Energy Supply in Textile Wet Processing</b></p>  <p>The figures are only for informational purposes</p> <p><b>Figure 7: Example analysis of major thermal energy uses</b></p> <ul style="list-style-type: none"> <li>Developing an energy flow chart or an energy Sankey diagram is a very good way of mapping both energy sources as well as energy uses in one chart. Highest energy use factors can also be easily highlighted in the same chart and may be used for both Questions 1 and 3.</li> </ul>



**Figure 8: Example Sankey Diagram (fictitious values of flows in GWh per year)**

- Establish an energy monitoring and measurement procedure and plan (Level-2 – at energy use level for scope of this question)
  - Identify which energy sources are used by various energy uses and develop a procedure for monitoring energy consumption (i.e. Meters, invoices, or estimates). This could be documented in tabular form showing all types of energy sources, their distribution among energy uses, and their measuring /estimating method.
  - Develop a list of energy users with their energy ratings
  - It is also important here to define the level and detail of monitoring and measurement. The facility may start with department level monitoring and monitoring for major energy consumers. Later facility may opt for a more complex monitoring system
  - Energy use may be measured as well as estimated depending upon energy monitoring and measurement plan
  - Facility may also use services of certified profession energy engineer to conduct an energy review/assessment
  - Enlist monitoring equipment used and their methodology of data gathering (e.g., data loggers)

Evidence Required

- Provide at least one complete and up-to-date document such as:
  - Records of onsite energy influences (e.g., list of machines and energy ratings/consumption)
  - Ranking of processes, services, or operations that consume the most energy (with energy consumption values).
  - Recent energy audits conducted by a qualified energy auditor (internal or external)
  - Consumption records accurately analysed, and operations or processes categorized from highest consumption to lowest
  - Capitalization plans to replace old equipment for new energy-efficient equipment

4- Has your facility set targets for improving energy use? If yes, select all sources of energy for which your facility has set an energy reduction target?															
How to answer this question	<p>The user may select (i) Yes, or (ii) No while answering this question.</p> <p>On selection of “Yes”, the tool requires user to fill a table with following questions;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Energy Targets</td> <td>Filled automatically according to selection in question 1</td> </tr> <tr> <td>Have you set a target for this source?</td> <td>Yes/No/Unknown</td> </tr> <tr> <td>What is your target for change in energy use from this source?</td> <td>Enter a negative percentage for a reduction target, and a positive percentage for an increase target. For example, electricity reduction -5 and renewable energy 5 %</td> </tr> <tr> <td>Enter target year</td> <td>dropdown list</td> </tr> <tr> <td>Is this a Normalized or Absolute target?</td> <td>Normalized/Absolute (Please ensure Questions 2, 4 &amp; 6 have consistent information; for example, if baseline set in Question 2 is normalized, the reduction target should also be a normalized value.)</td> </tr> <tr> <td>Describe the measures planned to achieve this target</td> <td>Text input, e.g., improving engine efficiency, creating awareness, controlling and reducing line losses etc.</td> </tr> </tbody> </table>	Questions	Responses	Energy Targets	Filled automatically according to selection in question 1	Have you set a target for this source?	Yes/No/Unknown	What is your target for change in energy use from this source?	Enter a negative percentage for a reduction target, and a positive percentage for an increase target. For example, electricity reduction -5 and renewable energy 5 %	Enter target year	dropdown list	Is this a Normalized or Absolute target?	Normalized/Absolute (Please ensure Questions 2, 4 & 6 have consistent information; for example, if baseline set in Question 2 is normalized, the reduction target should also be a normalized value.)	Describe the measures planned to achieve this target	Text input, e.g., improving engine efficiency, creating awareness, controlling and reducing line losses etc.
Questions	Responses														
Energy Targets	Filled automatically according to selection in question 1														
Have you set a target for this source?	Yes/No/Unknown														
What is your target for change in energy use from this source?	Enter a negative percentage for a reduction target, and a positive percentage for an increase target. For example, electricity reduction -5 and renewable energy 5 %														
Enter target year	dropdown list														
Is this a Normalized or Absolute target?	Normalized/Absolute (Please ensure Questions 2, 4 & 6 have consistent information; for example, if baseline set in Question 2 is normalized, the reduction target should also be a normalized value.)														
Describe the measures planned to achieve this target	Text input, e.g., improving engine efficiency, creating awareness, controlling and reducing line losses etc.														
Scoring	<ul style="list-style-type: none"> <li>• Full Points if facility sets targets for energy sources that make up 80% or more of your total energy use value.</li> <li>• Partial Points if facility sets targets for energy sources that make up 50-79% of total energy use value. This is to reward for aiming to improve the most significant sources of energy use which will maximize environmental impact.</li> <li>• Note: Full or Partial points are automatically calculated based on which reported sources have an improvement target</li> </ul>														
Input Connection	Energy sources selected in Question 1 and baselines set in Question 2 (normalized or absolute)														
Output Connection	Environmental action plan														
Keywords	Energy Target, Action Plan														
How to Systematically Fulfil Requirements	<p>The intent is to enable facilities in improving the energy performance in a systemic way.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Energy Review (Level-3 – improvement actions): determine and prioritize opportunities for improving energy performance</li> <li>• Establish and maintain action plans that include specific actions to improve energy performance, required resources, responsibilities, timelines and methodology of evaluating results.</li> <li>• It is advised to make a common environmental action plan for all Higg FEM sections for consistency and ease of monitoring.</li> </ul>														

	<ul style="list-style-type: none"> <li>• Establish targets for all energy sources (at least 80% to score full points) against the energy baselines, based on the formal evaluation of opportunities and action plans. Targets may be Absolute or Normalized depending on what selection was made while setting energy baselines in Question 2.</li> <li>• 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.</li> <li>• Ensure the target is relevant to reducing the site's energy use (e.g., focuses on the most significant energy use areas at the site)</li> <li>• Energy Management System             <ul style="list-style-type: none"> <li>○ Provide training to energy team and other key personnel on methodology of determining, monitoring and reviewing targets (e.g., based on calculated reductions from evaluations of improvement opportunities)</li> <li>○ Conduct (and keep record of) management review meetings to drive continuous improvement and review on-site energy reduction targets (at least on an annual basis).</li> <li>○ Management should actively promote or endorse proactive energy conservation e.g., by providing resources, establishing an energy policy, conducting awareness sessions with employees etc.</li> <li>○ Ensure energy consumption and greenhouse gas emissions data is made available to relevant internal and/or external stakeholders in order to drive accountability for achieving targets</li> </ul> </li> </ul>
<p>Evidence Required</p>	<ul style="list-style-type: none"> <li>• Consolidated targets for different energy sources</li> <li>• Supporting documentation that demonstrates targets are based on a formal evaluation of reductions/improvement opportunities (e.g., calculations, energy use/GHG data and baselines, new/proposed equipment specifications, etc.)</li> <li>• Supporting methodology and calculations to show how the target(s) was calculated</li> <li>• List of measures/actions to be taken to achieve the target</li> <li>• Target communicated to the relevant employees and linked to the major energy usage of the facility identified in Question 1.             <ul style="list-style-type: none"> <li>○ Communication methods may include Meeting, bulletin board posting, newsletter release, any other form of written communication to employees which are involved with the tasks as they relate to energy usage in the facility.</li> </ul> </li> <li>• <b>Partial Points:</b> Same requirements as for "Yes" answer but for sources (or one source) totalling 79% or less of energy use (this data is found in the % contribution calculation in Question 1)</li> </ul>



<b>(NEW)- Has your facility set targets for reducing your facility overall GHG emissions??</b>																	
How to answer this question	<p>The user may select (i) Yes, or (ii) No while answering this question.</p> <p>On selection of “Yes”, the tool requires user to fill a table with following questions;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>GHG Targets</td> <td>Filled automatically according to selection in question 1</td> </tr> <tr> <td>Enter baseline year</td> <td>Dropdown list</td> </tr> <tr> <td>What is your target for reducing your facility overall GHG emissions?</td> <td>Enter a negative percentage for a reduction target.</td> </tr> <tr> <td>Unit of Measure</td> <td>Dropdown list</td> </tr> <tr> <td>Enter the target year</td> <td>Dropdown list</td> </tr> <tr> <td>Is this a normalized or absolute target?</td> <td>Absolute/Normalized</td> </tr> <tr> <td>Describe the measures planned to achieve this target</td> <td>Text input</td> </tr> </tbody> </table>	Questions	Responses	GHG Targets	Filled automatically according to selection in question 1	Enter baseline year	Dropdown list	What is your target for reducing your facility overall GHG emissions?	Enter a negative percentage for a reduction target.	Unit of Measure	Dropdown list	Enter the target year	Dropdown list	Is this a normalized or absolute target?	Absolute/Normalized	Describe the measures planned to achieve this target	Text input
Questions	Responses																
GHG Targets	Filled automatically according to selection in question 1																
Enter baseline year	Dropdown list																
What is your target for reducing your facility overall GHG emissions?	Enter a negative percentage for a reduction target.																
Unit of Measure	Dropdown list																
Enter the target year	Dropdown list																
Is this a normalized or absolute target?	Absolute/Normalized																
Describe the measures planned to achieve this target	Text input																
Scoring	This question is <b>not scored</b> in 2020 Higg FEM reporting year. Score may be applied in future reporting year.																
Input Connection	Energy sources and baselines																
Output Connection	Environmental action plan																
Keywords	GHG, Emissions, Action Plan																
How to Systematically Fulfill Requirements	<p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Establish targets for GHG emission reduction based on formal evaluation of improvement opportunities, actions and energy reduction targets (as set in Level-3 energy review in Question 4)</li> <li>• Targets may be Absolute or Normalized.</li> <li>• 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.</li> <li>• Ensure the target is relevant to reducing the site’s overall GHG emissions (e.g., focuses on the highest GHG emissions areas at the site)</li> <li>• Energy Management System                             <ul style="list-style-type: none"> <li>○ Provide training to energy team and other key personnel on methodology of determining, monitoring and reviewing GHG targets (e.g., based on calculated reductions from evaluations of improvement opportunities)</li> <li>○ Conduct (and keep record of) management review meetings to drive continuous improvement and review on-site GHG emission reduction targets (at least on an annual basis).</li> <li>○ Management should actively promote or endorse proactive GHG reduction e.g., by providing resources, establishing an energy policy, conducting awareness sessions with employees etc.</li> <li>○ Ensure energy consumption and greenhouse gas emissions data is</li> </ul> </li> </ul>																

	made available to relevant internal and/or external stakeholders in order to drive accountability for achieving targets
Evidence Required	<ul style="list-style-type: none"> <li>Consolidated targets for different activities that would reduce GHG emissions</li> <li>Supporting documentation that demonstrate targets are based on a formal evaluation of reductions/improvement opportunities (e.g., calculations, energy use/GHG data and baselines, new/proposed equipment specifications, etc.)</li> <li>Supporting methodology and calculations to show how the target(s) was calculated</li> <li>List of measures/actions to be taken to achieve the target</li> </ul>
Additional Notes	Requirements of this question and question 4 are similar except that Question 4 requires setting Energy reduction targets while this question requires setting GHG emission reduction targets. It is advised to have a common management system to address both questions.

<b>5- Does your facility have an implementation plan to improve energy use and/or GHG Emissions?</b>	
How to answer this question	<p>The user may select (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown while answering this question.</p> <p>On selection of “Yes” or “Partial Yes”, the tool requires user to upload the implementation plan.</p> <ul style="list-style-type: none"> <li>Answer Yes if an implementation plan is in place that demonstrates facility is taking action to achieve the targeted reductions</li> <li>Answer Partial Yes if a plan is in place but facility has not started on all action items</li> </ul>
Input Connection	Targets and Actions identified in Question 4 and NEW Question
Output Connection	Environmental Action Plan, Energy Tracking Reports
Keywords	Action Plan, Monitoring
How to Systematically Fulfil Requirements	<p>The intent is for your facility to create an action plan for reducing energy use and/or GHG emissions prioritizing by the highest energy consuming processes identified in Question 3.</p> <p>Improvements may be made by reducing energy use or improving GHG emissions by replacing existing energy sources with renewable sources.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>Energy Review (Level-3 – improvement actions): determine and prioritize opportunities for improving energy performance (also required for Question 4 and NEW Question on GHG targets)</li> <li>Evaluate improvement options based on a set criterion (e.g., payback, return on investment, legal compliance, customer requirements etc.) and select the most suited options</li> </ul>

	<ul style="list-style-type: none"> <li>Establish and maintain action plans that include specific actions to improve energy performance and/or reduce GHG emissions (e.g., changing fuel), required resources, responsibilities, timelines and methodology of evaluating results. <ul style="list-style-type: none"> <li>It is advised to make a common environmental action plan for all Higg FEM sections for consistency and ease of monitoring.</li> </ul> </li> <li>Conduct a management review of action plan setting process and take necessary decisions to enable timely implementation and desired results</li> <li>Ensure that key employees are aware of their responsibilities and participate in the improvement process. It is advised to keep record of awareness activities (e.g., attendance sheets) and team meetings (minutes of meeting).</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>Energy reduction plan listing specific projects, target reductions, dates, and progress that covers 80% or more of total energy use and/or</li> <li>Energy audit or assessment done by a qualified energy auditor (internal or external) identifying energy reduction opportunities and implementation dates. A qualified energy auditor should be trained / experienced with the ISO 50002:2014 standard related to Energy auditing.</li> <li><b>Partial Yes:</b> Same requirements as for "Yes" answer but for sources (or one source) totalling 50-79% of total energy use</li> </ul>
Additional Notes	<p>This question combines the requirements of Question 4 and NEW Question. If a facility prepares well for both questions and compiles the results in form of action plan, the requirements of this question are automatically fulfilled.</p> <p>Template for action plan may be downloaded from <a href="https://howtohigg.org/wp-content/uploads/2021/01/Implementation-Plan-Template-2.xlsx">https://howtohigg.org/wp-content/uploads/2021/01/Implementation-Plan-Template-2.xlsx</a>.</p>

6- Has your facility improved energy consumption compared with its baseline in the last calendar year? If yes, select all sources of energy that have been improved.															
How to answer this question	<p>The user may select (i) Yes, or (ii) No while answering this question.</p> <p>On selection of "Yes" or "Partial Yes", the tool requires user to fill a table with following questions;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Energy Improvements</td> <td>Filled automatically according to selection in question 1</td> </tr> <tr> <td>Has your facility improved energy consumption for this source compared with its baseline?</td> <td>Yes/No Please select No as your answer option for that source if you have no reductions in the last calendar year or are unable to state what your reductions are for a source</td> </tr> <tr> <td>Select a baseline year</td> <td>Dropdown list (Should be same as in Question 2)</td> </tr> <tr> <td>Quantity</td> <td>Indicate your facility's change in energy use from each source separately. -ve number for reduction and +ve for increase.</td> </tr> <tr> <td>Unit of Measure</td> <td>Dropdown list (Should be same as in Question 2)</td> </tr> <tr> <td>Percent Change</td> <td>-ve number for reduction and +ve for increase.</td> </tr> </tbody> </table>	Questions	Responses	Energy Improvements	Filled automatically according to selection in question 1	Has your facility improved energy consumption for this source compared with its baseline?	Yes/No Please select No as your answer option for that source if you have no reductions in the last calendar year or are unable to state what your reductions are for a source	Select a baseline year	Dropdown list (Should be same as in Question 2)	Quantity	Indicate your facility's change in energy use from each source separately. -ve number for reduction and +ve for increase.	Unit of Measure	Dropdown list (Should be same as in Question 2)	Percent Change	-ve number for reduction and +ve for increase.
Questions	Responses														
Energy Improvements	Filled automatically according to selection in question 1														
Has your facility improved energy consumption for this source compared with its baseline?	Yes/No Please select No as your answer option for that source if you have no reductions in the last calendar year or are unable to state what your reductions are for a source														
Select a baseline year	Dropdown list (Should be same as in Question 2)														
Quantity	Indicate your facility's change in energy use from each source separately. -ve number for reduction and +ve for increase.														
Unit of Measure	Dropdown list (Should be same as in Question 2)														
Percent Change	-ve number for reduction and +ve for increase.														

	Is this normalized or absolute?	Absolute/Normalized (Should be same as in Question 2)
	Describe the strategies used to achieve this improvement	Text input: describe what measures were taken and how the savings were achieved
Scoring	<ul style="list-style-type: none"> <li>• Full points if facility made reductions in the last calendar year for energy sources that make up 80% or more of its total energy use</li> <li>• Partial points if Facility made reductions in the last calendar year for energy sources that make up 50-79% of its total energy use. This is to reward the facility for reducing its greatest sources of energy use which will maximize environmental impact</li> <li>• This is question does NOT provide scoring based on the actual % or quantity of improvement because a facility may be working on the last 5-10% of energy efficiency which is hard to make up.</li> </ul>	
Input Connection	Energy and GHG Baselines, Targets, and Action Plans	
Output Connection	Independent	
Keywords	Monitoring, Tracking	
How to Systematically Fulfill Requirements	<p>Taking action to reduce impacts on site is the primary important goal for this assessment.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Establish procedure of monitoring the progress of implementation and keep record of monitoring activities and results</li> <li>• Conduct a management review of implementation and take necessary decisions to enable timely implementation and desired results</li> <li>• Review the energy source data and aggregated total to ensure the data and any automated calculations are accurate.</li> <li>• 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.</li> <li>• Evaluate results of completed actions, verify energy performance improvement and record the results in form of energy tracking /monitoring reports</li> <li>• Ensure that whole process is inclusive in nature and key employees can explain and demonstrate how the improvement was achieved</li> <li>• Keep record of any awards, certifications, or certificates for energy efficiency or renewable energy achievements (e.g., green building certifications, Energy Star certification, etc.).</li> </ul>	
Evidence Required	<ul style="list-style-type: none"> <li>• Energy tracking reports, comparison charts and consumption records showing reductions for energy sources (against the baseline year) that make up more than 80% of your total energy use</li> <li>• Evidence of new equipment purchases or efficiency improvements that demonstrate that energy reductions weren't made solely from a decline in production, or number of employees, or change in processes.</li> <li>• Partial Points: Same requirements as for "yes" above but for energy sources (or one source) that make up less than 79% of your total energy use.</li> </ul>	

## 2.3. Level-3

7- Were your facility's annual Scope 3 greenhouse gas (GHG) emissions calculated during this reporting year?	
How to answer this question	<p>The user may select (i) Yes, or (ii) No while answering this question.</p> <p>On selection of "Yes" the user is asked following;</p> <ul style="list-style-type: none"> <li>• Report your facility's annual Scope 3 GHG emissions in CO<sub>2</sub>e here</li> <li>• Describe your Scope 3 calculation here</li> </ul>
Scoring	<p>Calculating Scope 3 emissions for your facility or business is an advanced practice that can be noted in this question. However, this question is unscored because Higg only gives Level 3 points for taking action that improves environmental impact directly. Calculating Scope 3 emissions can provide useful insights and/or support reporting, but it does not guarantee any environmental improvement has occurred.</p>
Input Connection	Independent
Output Connection	Independent
Keywords	GHG, Scope-3 emissions
How to Systematically Fulfil Requirements	<p>Detailed technical guidance is provided by GHG Protocol in <a href="#">Scope 3 Calculation Guide</a>. Brief guidance is also provided in How to Higg Guide.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Establish a methodology and calculate and report Scope 3 GHG emissions in accordance with the Corporate Value Chain (Scope 3) Standard. This includes: <ul style="list-style-type: none"> <li>○ Calculating GHG emissions from all Scope 3 emissions sources (as defined by Chapter 5 &amp; 6 of the Standard)</li> <li>○ 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</li> </ul> </li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Records of sources for calculating Scope 3 GHG emissions in the last calendar year</li> <li>• Supporting evidence to demonstrate GHG emissions from all relevant Scope 3 emissions sources have been calculated (as defined by Chapter 5 of the Standard) o 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)</li> </ul>
Additional Notes	<p>Basic reporting of only a select number of scope 3 sources without following the reporting requirements outlined in Chapter 11 of the Corporate Value Chain (Scope 3) Standard does not meet the expectations for a Yes Answer (e.g., informal</p>

	tracking/reporting of emissions from 1 or 2 sources of Scope 3 emissions)
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<b>8- Has your facility set a Science-Based Target according to the SBTi?</b>	
How to answer this question	<p>The user may select (i) Yes, or (ii) No while answering this question.</p> <p>If selected No, the user is required to answer (Yes/No) following question;</p> <ul style="list-style-type: none"> <li>• Is your facility preparing to set a Science-Based Target according to the SBTi                             <ul style="list-style-type: none"> <li>○ Select Yes to this question if the company has committed to the SBTi (i.e. submitted commitment letter and paid fee) but has not yet established or submitted a target for approval, or if the target is under review</li> </ul> </li> </ul>
Scoring	This question is not scored in 2020 Higg FEM reporting year. Score may be applied in future reporting year.
Input Connection	Independent
Output Connection	Independent
Keywords	SBTi, Science Based Targets
How to Systematically Fulfil Requirements	<p>The intent of this question is for companies to demonstrate that they have established science-based greenhouse gas (GHG) targets that align with the <a href="#">Science Based Targets Initiative (SBTi)</a>. Also see the detailed <a href="#">GUIDE</a> for technical guidance</p> <p>GHG 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 global warming.</p> <p>Following figure explains the process of setting <a href="#">Science Based Targets</a>;</p>

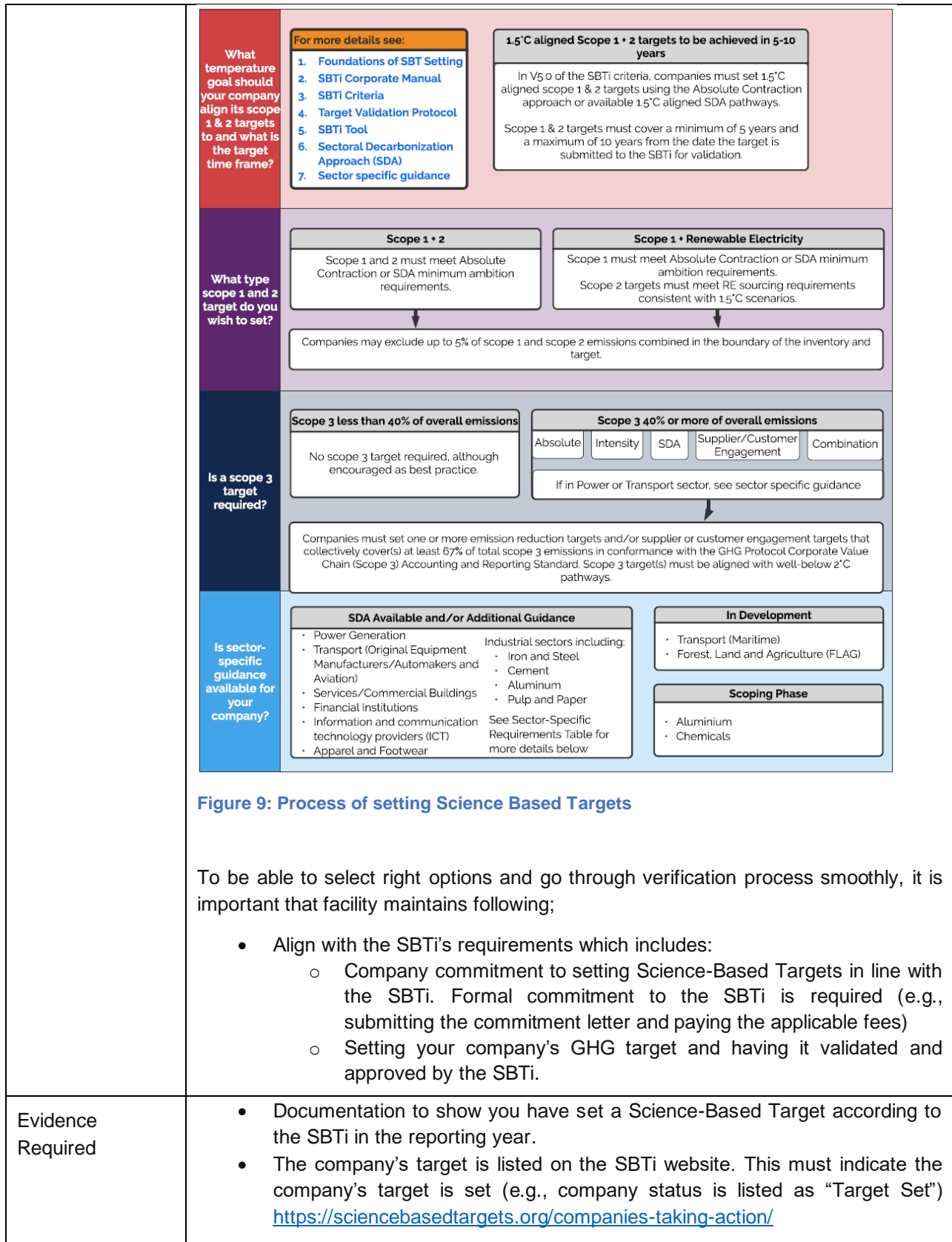


Figure 9: Process of setting Science Based Targets

To be able to select right options and go through verification process smoothly, it is important that facility maintains following;

- Align with the SBTi's requirements which includes:
  - Company commitment to setting Science-Based Targets in line with the SBTi. Formal commitment to the SBTi is required (e.g., submitting the commitment letter and paying the applicable fees)
  - Setting your company's GHG target and having it validated and approved by the SBTi.

Evidence Required

- Documentation to show you have set a Science-Based Target according to the SBTi in the reporting year.
- The company's target is listed on the SBTi website. This must indicate the company's target is set (e.g., company status is listed as "Target Set") <https://sciencebasedtargets.org/companies-taking-action/>

## 3. Water Use

The purpose of this section is not only to assess the compliance, but to drive the reduction in water use. This section supports facilities in assessing their water baselines, setting reduction targets, and developing action plans to implement best practices which will improve the current usage of water as compared with baseline.

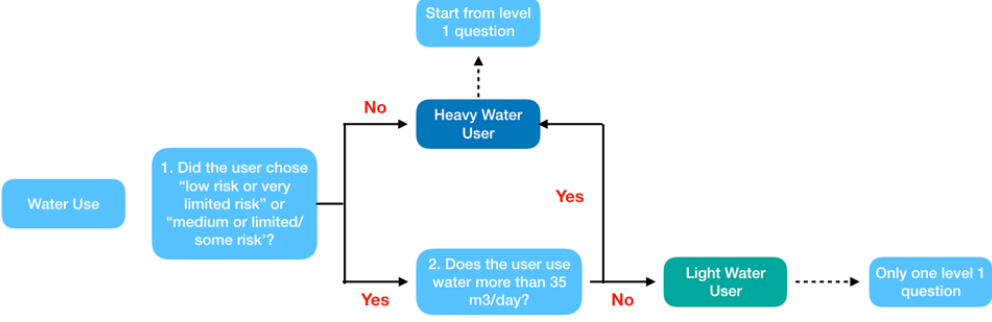
### 3.1. Applicability

The water section begins with an applicability section based on which it is decided which questions are applicable to the facility.

Following are the questions in Applicability section;

Applicability																																					
How to answer this question	<p>The user is asked following questions in this section;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>How many days did your facility operate during this reporting year?</td> <td>Enter numeric value (Should be consistent with site info)</td> </tr> <tr> <td>Select the tool used to assess your facility's water risk</td> <td>WRI Aqueduct Tool/ WWF Water Risk Filter</td> </tr> <tr> <td>Is your facility location rated as high/very high for overall water risk using this tool?</td> <td>Yes/No</td> </tr> </tbody> </table> <p>If facility selects Yes to last question, it is rated as Heavy Water User.</p> <p>If rated Light Water User, the tool shall reassess based on annual water quantity entered in Question 1 of Level 1.</p>			Questions	Responses	How many days did your facility operate during this reporting year?	Enter numeric value (Should be consistent with site info)	Select the tool used to assess your facility's water risk	WRI Aqueduct Tool/ WWF Water Risk Filter	Is your facility location rated as high/very high for overall water risk using this tool?	Yes/No																										
Questions	Responses																																				
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Select the tool used to assess your facility's water risk	WRI Aqueduct Tool/ WWF Water Risk Filter																																				
Is your facility location rated as high/very high for overall water risk using this tool?	Yes/No																																				
Scoring	<p>This section is not scored but affects scoring as explained earlier. The scoring changes according to applicability as presented below;</p> <table border="1"> <thead> <tr> <th rowspan="2">Level</th> <th rowspan="2">Question Number</th> <th colspan="2">Applicability Pathway with Points</th> </tr> <tr> <th>Heavy Water User</th> <th>Light Water User</th> </tr> </thead> <tbody> <tr> <td>Level 1</td> <td>#1 (watsources)</td> <td>25</td> <td>100</td> </tr> <tr> <td rowspan="4">Level 2</td> <td>#2 (watbaselinesource)</td> <td>10</td> <td></td> </tr> <tr> <td>#3 (wathighestuse)</td> <td>10</td> <td></td> </tr> <tr> <td>#4 (wattargetssource)</td> <td>10</td> <td></td> </tr> <tr> <td>#5 (watimproveplan)</td> <td>10</td> <td></td> </tr> <tr> <td rowspan="2">Level 3</td> <td>#6 (watimprovesource)</td> <td>10</td> <td></td> </tr> <tr> <td>#7 (watbalanceanalysis)</td> <td>25</td> <td></td> </tr> <tr> <td colspan="2">Total</td> <td>100</td> <td>100</td> </tr> </tbody> </table> <p><b>Figure 10: Scoring scheme in Water section</b></p>			Level	Question Number	Applicability Pathway with Points		Heavy Water User	Light Water User	Level 1	#1 (watsources)	25	100	Level 2	#2 (watbaselinesource)	10		#3 (wathighestuse)	10		#4 (wattargetssource)	10		#5 (watimproveplan)	10		Level 3	#6 (watimprovesource)	10		#7 (watbalanceanalysis)	25		Total		100	100
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Total		100	100																																		
Input Connection	Independent.																																				
Output Connection	Affects scoring as explained earlier																																				



Keywords	Water risk, Water consumption
How to Systematically Fulfill Requirements	<p>This section asks user to evaluate facility’s water risk using either the <a href="#">WRI Aqueduct Tool</a> or the <a href="#">WWF Water Risk Filter</a>. Facilities with high water use and those located in areas of high/very high-water risk (termed as Heavy Water User) will be asked to complete the full Water section to ensure appropriate water management. Facilities with low water use (less than 35 m<sup>3</sup>/day) that are in areas of low water risk will only need to answer Level 1 questions. This is explained in following schematic diagram as well;</p>  <pre> graph TD     Start[Water Use] --&gt; Q1{1. Did the user chose "low risk or very limited risk" or "medium or limited/ some risk"?}     Q1 -- No --&gt; HWU[Heavy Water User]     Q1 -- Yes --&gt; Q2{2. Does the user use water more than 35 m3/day?}     HWU --&gt; L1Q1[Start from level 1 question]     Q2 -- No --&gt; LWU[Light Water User]     Q2 -- Yes --&gt; HWU     LWU -.-&gt; L1Q2[Only one level 1 question]     </pre> <p><b>Figure 11: Applicability in Water Section</b></p>
Evidence Required	<ul style="list-style-type: none"> <li>No evidence needed to upload; however, the results of assessment conducted using either the WRI Aqueduct Tool or the WWF Water Risk Filter must be documented for verification purpose.</li> </ul>

### 3.2. Level-1

1- Select all water sources used by your facility.									
How to answer this question	<p>The user is required to select all applicable water sources out of following list. Possible responses against all options are Yes, No, Unknown;</p> <ul style="list-style-type: none"> <li>Surface fresh water</li> <li>Rainwater</li> <li>Ground water</li> <li>Produced/Process water</li> <li>Municipal Water</li> <li>Water from another organization</li> <li>Brackish surface water / sea water</li> <li>Water General or Unknown Origin</li> </ul> <p>Please note that if you are unable to identify the sources of water used, please select “Water – general or unknown origin” as your answer for this question</p> <p>After selection, the user is asked following question;</p> <p><b>Does your facility track its water use from this source? (Yes/No/Unknown)</b></p> <p>On selecting Yes, the user is required to fill a table with following questions;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Water source</td> <td>Filled automatically based on above selection</td> </tr> <tr> <td>Does your facility track use from this source?</td> <td>Yes/No/Unknown</td> </tr> <tr> <td>What quantity of water from this source was used during the reporting year?</td> <td>Numeric value</td> </tr> </tbody> </table>	Questions	Responses	Water source	Filled automatically based on above selection	Does your facility track use from this source?	Yes/No/Unknown	What quantity of water from this source was used during the reporting year?	Numeric value
Questions	Responses								
Water source	Filled automatically based on above selection								
Does your facility track use from this source?	Yes/No/Unknown								
What quantity of water from this source was used during the reporting year?	Numeric value								

	Unit of Measure	Dropdown list (It is advisable to track the water in m <sup>3</sup> , since in Wastewater Question 1 requires the wastewater discharge in m <sup>3</sup> . This will help facility to create a good water balance.)
	Which method was used to track water use from this source?	Meters/Invoices/Estimates
	What was the frequency of measurement?	Dropdown list
The tool totals the quantity of water from all sources to check applicability as explained earlier.		
Scoring	<ul style="list-style-type: none"> <li>• Full Points if facility is completely tracking the quantity of water that facility withdraws from all sources</li> <li>• Partial Points if facility is completely tracking at least one of the sources but is not yet tracking all your sources.</li> </ul>	
Input Connection	Independent.	
Output Connection	Affects scoring as explained earlier. Used to calculate baseline values.	
Keywords	Tracking Water Sources	
How to Systematically Fulfill Requirements	<p>Facility must include all water sources within the site's physical boundary and operations under the business control (owned, operated or directly leased). Please exclude any outsourced services or areas such as a contracted canteen or rental shop.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Mapping out business and operational processes to identify sources of water use and areas/processes that use water</li> <li>• Establish a water monitoring and measurement procedure and plan (only at Water Input level for scope of this question) <ul style="list-style-type: none"> <li>○ Identify all water sources used by the facility and develop a procedure for monitoring various water sources (i.e., Meters, invoices, or estimates). This could be documented in tabular form showing all types of water sources and their measuring /estimating method</li> <li>○ If estimation techniques are used, the calculation methodology should be clearly defined and be supported by verifiable data</li> <li>○ Use consistent units for a water source; if conversions are used, document standard methodology for conversions using reliable sources</li> <li>○ Utility bills or purchase invoices can be used for purchased water (municipal water, water from other organization etc.)</li> <li>○ Install sub-meters to track the amount of water used at site</li> <li>○ Sub-meters are also recommended to track recovered/reused water e.g., recycled wastewater</li> <li>○ Water may be used in multiple ways; for example, a facility might be pre-treating water as well as use water in some areas without treating. It is advised to install sub-meters on such streams as well.</li> </ul> </li> </ul>	

	<ul style="list-style-type: none"> <li>Keep records of water tracking data as per monitoring and measurement plan; this data should be up-to-date and readily accessible to relevant personnel in the facility. Further, the data should be available in human readable formats so that same could be presented to verifier as evidence.</li> <li>Provide training and awareness to key employees on the facility's water data tracking program and how data quality is maintained.</li> <li>Ensure all monitoring and measuring devices are calibrated and calibration record is maintained</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>Water consumption records (e.g., monthly bills and annual consumption records; metering records compiled in a spreadsheet (e.g., Excel) is ok if the metering records are available for review as well) whose totals match the reported data to all questions answered.</li> <li>Meter calibration records where applicable (e.g., as per manufacturer's specifications).</li> <li>Estimate methodology documented where applicable</li> <li>All water sources at the facility are tracked in full. This means that all water sources listed in the Level 1 table have complete answers in all columns that are accurate.</li> <li><b>Partial Points:</b> Same requirements as for "full points" above for at least one water source at the facility. This must be tracked in full. This means that at least one (but not all) water sources listed in the Level 1 table have complete answers in all columns and there is evidence to support all the answers</li> </ul>
Additional Notes	<p>The user may enter different units for different water sources. Higg FEM automatically converts water use data into common units (litre) and % of total use.</p> <p>If facility is reusing/recycling and wastewater stream and using in the main production process; it must be tracked and reported.</p>

### 3.3. Level-2

<p><b>2- Has your facility set baselines for water use? If yes, select all water sources for which your facility has set a baseline?</b></p>															
How to answer this question	<p>The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question.</p> <p>On selection of "Yes", the tool requires to fill a table asking following questions;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Water Source</td> <td>Filled automatically according to selection in question 1</td> </tr> <tr> <td>Have you set a baseline for this source?</td> <td>Yes/No</td> </tr> <tr> <td>Is the baseline absolute or normalized?</td> <td>Normalized/Absolute</td> </tr> <tr> <td>What is the baseline quantity?</td> <td>Text input</td> </tr> <tr> <td>Unit</td> <td>dropdown list</td> </tr> <tr> <td>Enter the baseline year</td> <td>dropdown list</td> </tr> </tbody> </table>	Questions	Responses	Water Source	Filled automatically according to selection in question 1	Have you set a baseline for this source?	Yes/No	Is the baseline absolute or normalized?	Normalized/Absolute	What is the baseline quantity?	Text input	Unit	dropdown list	Enter the baseline year	dropdown list
Questions	Responses														
Water Source	Filled automatically according to selection in question 1														
Have you set a baseline for this source?	Yes/No														
Is the baseline absolute or normalized?	Normalized/Absolute														
What is the baseline quantity?	Text input														
Unit	dropdown list														
Enter the baseline year	dropdown list														

	How was your baseline calculated?	Text input: describe the methodology e.g., total ground water used divided by total production output
	Was the baseline verified?	Yes/No
Input Connection	Water Question 1	
Output Connection	Used for setting reduction targets, and comparing reductions against baseline	
Keywords	Water Baseline	
How to Systematically Fulfil Requirements	<p>Water baseline is quantitative reference(s) providing a basis for comparison of water use over time. A water baseline is based on data from a specified period and/or conditions, as defined by the organization.</p> <p>For Higg FEM, a baseline should generally comprise of a full calendar year's data.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Establish a procedure of developing, monitoring, verifying and updating the water baselines, including data records, conditions for revising baselines, measuring methods etc.</li> <li>• Confirm the water use data is stable, and sufficient to be used to determine a baseline and establish baselines using the information from the water use data (see Water Question 1), considering a suitable period</li> <li>• Baselines can be Absolute (e.g., 120,000 m<sup>3</sup>/year) or Normalized (e.g., 6.5 m<sup>3</sup>/Tonne-production). If the data indicates that relevant variables significantly affect water use (e.g., environmental temperature, humidity, raw material type), the facility must carry out normalization of the baselines. Depending on the nature of the activities, normalization can be a simple adjustment, or a more complex procedure.</li> <li>• Baselines should be revised, (i) as per predefined method, or (ii) if there have been major changes in the water sources or facility's water use patterns <ul style="list-style-type: none"> <li>○ If the baseline is used to evaluate performance against a target, the baseline should remain unchanged. The baseline may be revised once the target is achieved, and the baseline is no more relevant.</li> </ul> </li> <li>• The facility should retain information of baselines, relevant variable data and modifications to baselines as documented information</li> <li>• Maintain record of verification of water baselines e.g., previous Higg FEM Verifications, Internal / external water assessment by qualified personnel etc.</li> </ul>	
Evidence Required	<ul style="list-style-type: none"> <li>• Description/Methodology showing how the baseline was calculated</li> <li>• Documentation that shows the baseline matches consumption records for the year the baseline was set.</li> <li>• Ability to demonstrate how baseline data was validated</li> </ul>	
Additional Notes	<p>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. The record of verification must be maintained.</p> <p>For water consumption that is not related to production, other normalizing metrics</p>	

	<p>should be used where appropriate (e.g., Water consumption in the canteen can be normalized per meal served or per worker)</p> <p>It is advisable to keep the baseline unit same as Question 1, e.g., ground water m<sup>3</sup> per meter fabric or per piece garment in case of normalization.</p>
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<b>3- Does your facility know what facility processes or operations use the most water?</b>	
How to answer this question	<p>The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question.</p> <p>On selection of “Yes”, the tool requires user to respond to following</p> <ul style="list-style-type: none"> <li>• Upload (or describe) the methodology for identifying the highest water use factors.</li> <li>• What is the highest water use factors at your facility?                             <ul style="list-style-type: none"> <li>○ These can be any factors in production such as machines, processes, or sections</li> </ul> </li> </ul>
Input Connection	Water sources selected in Question 1
Output Connection	Independent
Keywords	Significant Water Uses, Highest Water Use Factors
How to Systematically Fulfill Requirements	<p>The intent is to assess freshwater usage and impacts for the site and to identify which processes, machines or operations use the most water. It is important to understand what influences water withdrawal the most in the facility. This allows to strategically be targeting those factors to reduce water withdrawal.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Mapping out business and operational processes (machinery, utilities etc.) to identify and quantify water consumption and identifying significant water uses or Highest Water Use Factors based on a pre-defined criterion or methodology (e.g. Pareto analysis to identify major water uses that consume 80% of all water input). Water sub-meters are the best means to demonstrate which operation or processes use the highest water usage.</li> <li>• Developing a water flow chart or water Sankey diagram (example shown in Energy Question 4) or water piping layout are very good ways of mapping both water sources as well as water uses in one chart. Highest water use factors can also be easily highlighted in the same chart. This chart must point out incoming water, water loss and outgoing water.</li> <li>• Establish a water monitoring and measurement procedure and plan (at water use level for scope of this question)                             <ul style="list-style-type: none"> <li>○ Identify which water sources are used by various water uses and develop a procedure for monitoring water consumption (i.e., Meters, invoices, or estimates). This could be documented in tabular form showing all types of water sources, their distribution among water uses, and their measuring /estimating method. The list of monitoring devices should also be marked in the water flow/Sankey/piping diagram</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>○ Develop a list of water users with their water ratings/consumption</li> <li>○ It is also important here to define the level and detail of monitoring and measurement. The facility may start with department level monitoring and monitoring for major water consumers. Later facility may opt for a more complex monitoring system</li> <li>○ Water use may be measured as well as estimated depending upon energy monitoring and measurement plan</li> <li>○ Facility may also use services of certified profession energy engineer to conduct an energy review/assessment</li> <li>○ Enlist all monitoring devices along with methodology of data gathering (e.g., data logging)</li> <li>● Conducting a detailed water assessment (by internal or external qualified resources) is highly recommended</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>● Ranking of processes or services, or operations that consume the most water (with water consumption values).</li> <li>● Facility can demonstrate they have evaluated and are aware of incoming water, water loss and outgoing water in facility through one or both of the following):             <ul style="list-style-type: none"> <li>○ Documented water assessment (conducted internally or by a third party) of the site identifying the aspects that contribute the most to the water withdrawal</li> <li>○ Facility flowchart including where measurements are made for water use and wastewater effluents</li> </ul> </li> </ul>

<b>4- Has your facility set targets for reducing water use from any sources? If yes, select all sources of water for which your facility has set a reduction target?</b>															
How to answer this question	<p>The user may select (i) Yes, (ii) No or (iii) Unknown while answering this question. On selection of “Yes”, the tool requires user to fill a table with following questions;</p> <table border="1"> <thead> <tr> <th style="background-color: #4F81BD; color: white;">Questions</th> <th style="background-color: #4F81BD; color: white;">Responses</th> </tr> </thead> <tbody> <tr> <td>Water Source</td> <td>Filled automatically according to selection in question 1</td> </tr> <tr> <td>Has your facility set a target for reducing water use from this source?</td> <td>Yes/No/Unknown</td> </tr> <tr> <td>What is your target for change in water use from this source?</td> <td>Enter a negative percentage for a reduction target, and a positive percentage for an increase target</td> </tr> <tr> <td>Enter target year</td> <td>dropdown list (Please make sure Questions 2, 4 &amp; 6 have consistent information for instance if baseline set in Question 2 in normalized, reduction target should also be a normalized value)</td> </tr> <tr> <td>Is this a Normalized or Absolute target?</td> <td>Normalized/Absolute</td> </tr> <tr> <td>Describe the measures planned to achieve this target</td> <td>Text input</td> </tr> </tbody> </table>	Questions	Responses	Water Source	Filled automatically according to selection in question 1	Has your facility set a target for reducing water use from this source?	Yes/No/Unknown	What is your target for change in water use from this source?	Enter a negative percentage for a reduction target, and a positive percentage for an increase target	Enter target year	dropdown list (Please make sure Questions 2, 4 & 6 have consistent information for instance if baseline set in Question 2 in normalized, reduction target should also be a normalized value)	Is this a Normalized or Absolute target?	Normalized/Absolute	Describe the measures planned to achieve this target	Text input
Questions	Responses														
Water Source	Filled automatically according to selection in question 1														
Has your facility set a target for reducing water use from this source?	Yes/No/Unknown														
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Is this a Normalized or Absolute target?	Normalized/Absolute														
Describe the measures planned to achieve this target	Text input														
Scoring	<ul style="list-style-type: none"> <li>● Full Points if facility set targets for water sources that make up 80% or more of total water use.</li> <li>● Partial Points if facility set targets for water sources that make up 50-79% of total water use. This is to reward for aiming to reduce greatest sources of</li> </ul>														

	<p>water withdrawal which will maximize environmental impact.</p> <ul style="list-style-type: none"> <li>• Please Note: Full or Partial points are automatically calculated based on which sources facility reports having an improvement target for.</li> <li>• Note that the targeted or actual water reduction amounts (i.e., quantity in m<sup>3</sup>) are not used in determining the points awarded.</li> </ul>
Input Connection	Water sources selected in Question 1, and baselines set in Question 2
Output Connection	Environmental action plan
Keywords	Water Target
How to Systematically Fulfill Requirements	<p>The intent is to enable facilities in reducing water use in a systemic way.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Determine and prioritize opportunities for reducing water use</li> <li>• Establish and maintain action plans that include specific actions to achieve water targets, required resources, responsibilities, timelines and methodology of evaluating results.</li> <li>• It is advised to make a common environmental action plan for all Higg FEM sections for consistency and ease of monitoring.</li> <li>• Establish targets for all water sources (at least 80% to score full points) against the water baselines, based on the formal evaluation of opportunities and action plans. Targets may be Absolute or Normalized depending on what selection was made while setting water baselines in Question 2.</li> <li>• 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.</li> <li>• Ensure the target is relevant to reducing the site's water use (e.g., focuses on the most significant water use areas at the site)</li> <li>• Provide training to key personnel on methodology of determining, monitoring and reviewing targets (e.g., based on calculated reductions from evaluations of improvement opportunities)</li> <li>• Conduct (and keep record of) management review meetings to drive continuous improvement and review on-site water reduction targets (at least on an annual basis).</li> <li>• Management should actively promote or endorse proactive water conservation e.g., by providing resources, establishing a water policy, conducting awareness sessions with employees etc.</li> <li>• Ensure water data is made available to relevant internal and/or external stakeholders to drive accountability for achieving targets</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Supporting documentation that demonstrate targets are based on a formal evaluation of reductions/improvement opportunities (e.g., calculations, water use data and baselines, new/proposed equipment specifications, etc.)</li> <li>• Supporting methodology and calculations to show how the target(s) was calculated</li> <li>• List of measure/actions to be taken to achieve the target</li> <li>• Target communicated to the relevant employees and linked to the major water usage of the facility identified in Question 3. <ul style="list-style-type: none"> <li>○ Communication methods may include Meeting, bulletin board</li> </ul> </li> </ul>

	<p>posting, newsletter release, any other form of written communication to employees which are involved with the tasks as they relate to energy usage in the facility.</p> <ul style="list-style-type: none"> <li>• Note: If targets are newly established, the review structure and responsibility delegation must already be in place.</li> <li>• <b>Partial Points:</b> Same requirements as for "Yes" answer but for sources (or one source) totalling 50-79% of water use (this data is found in the % contribution calculation in Question 1).</li> </ul>
Additional Notes	If only one source of water makes up for more than 80% of water intake, the facility needs to set target only for this one water source to attain full points.

5- Does your facility have an implementation plan to improve water use?	
How to answer this question	<p>The user may select (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown while answering this question.</p> <p>On selection of "Yes" or "Partial Yes", the tool requires user to upload the implementation plan.</p> <ul style="list-style-type: none"> <li>• Answer Yes if an implementation plan is in place that demonstrates facility is taking action to achieve the targeted reductions</li> <li>• Answer Partial Yes if a plan is in place but facility has not started on all action items</li> </ul>
Input Connection	Targets and Actions identified in Question 4
Output Connection	Environmental Action Plan, Water Tracking Reports
Keywords	Action Plan
How to Systematically Fulfil Requirements	<p>The intent is for your facility to create an action plan for reducing water use prioritizing by the highest water consuming processes identified in Question 3.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Determine and prioritize opportunities for reducing water use (also required for Question 4)</li> <li>• Evaluate improvement options based on a set criterion (e.g., payback, return on investment, legal compliance, customer requirements etc.) and select the most suited options</li> <li>• Establish and maintain action plans that include specific actions to reduce water use, required resources, responsibilities, timelines and methodology of evaluating results. <ul style="list-style-type: none"> <li>○ It is advised to make a common environmental action plan for all Higg FEM sections for consistency and ease of monitoring.</li> </ul> </li> <li>• Conduct a management review of action plan setting process and take necessary decisions to enable timely implementation and desired results</li> <li>• Ensure that key employees are aware of their responsibilities and participate in the improvement process. It is advised to keep record of awareness</li> </ul>



	activities (e.g., attendance sheets) and team meetings (minutes of meeting).
Evidence Required	<ul style="list-style-type: none"> <li>Water reduction plan listing specific projects, target reductions, dates, and progress that covers 80% or more of total water use and/or</li> <li>Water audit or assessment done by external party identifying water reduction opportunities and implementation dates</li> <li><b>Partial Yes:</b> Same requirements as for "Yes" answer but for sources (or one source) totalling 50-79% of total water use</li> </ul>

6- Has your facility reduced water withdrawal for any sources, compared with your baseline? Select all water sources that have been reduced.																	
How to answer this question	<p>The user may select (i) Yes, (ii) No or (iii) Unknown while answering this question.</p> <p>On selection of "Yes" or "Partial Yes", the tool requires user to fill a table with following questions;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Water Sources</td> <td>Filled automatically according to selection in question 1</td> </tr> <tr> <td>Has your facility reduced water withdrawal for this source compared with its baseline?</td> <td>Yes/No Please select No as your answer option for that source if you have no reductions in the last calendar year or are unable to state what your reductions are for a source</td> </tr> <tr> <td>Select a baseline year</td> <td>Dropdown list (Should be same as in Question 2)</td> </tr> <tr> <td>Indicate the quantity change in water use from this source in the last calendar year</td> <td>Numeric input</td> </tr> <tr> <td>Unit</td> <td>Dropdown list (Should be same as in Question 2)</td> </tr> <tr> <td>Percent Change</td> <td>-ve number for reduction and +ve for increase.</td> </tr> <tr> <td>Describe the strategies used to achieve this improvement</td> <td>Text input: describe what measures were taken and how the savings were achieved</td> </tr> </tbody> </table>	Questions	Responses	Water Sources	Filled automatically according to selection in question 1	Has your facility reduced water withdrawal for this source compared with its baseline?	Yes/No Please select No as your answer option for that source if you have no reductions in the last calendar year or are unable to state what your reductions are for a source	Select a baseline year	Dropdown list (Should be same as in Question 2)	Indicate the quantity change in water use from this source in the last calendar year	Numeric input	Unit	Dropdown list (Should be same as in Question 2)	Percent Change	-ve number for reduction and +ve for increase.	Describe the strategies used to achieve this improvement	Text input: describe what measures were taken and how the savings were achieved
Questions	Responses																
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Percent Change	-ve number for reduction and +ve for increase.																
Describe the strategies used to achieve this improvement	Text input: describe what measures were taken and how the savings were achieved																
Scoring	<ul style="list-style-type: none"> <li>Full Points if facility made reductions in the last calendar year for water sources that make up 80% or more of total water withdrawals.</li> <li>Partial Points if facility made reductions in the last calendar year for water sources that make up 50-79% of total water withdrawals. This is to reward facility for reducing greatest sources of water withdrawal which will maximize environmental impact.</li> <li>This is NOT scoring the actual % of improvement because a facility may be working on the last 5-10% of water efficiency which is hard to make up.</li> </ul>																
Input Connection	Water Baselines, Targets, and Action Plans																
Output Connection	Independent																
Keywords	Monitoring, Tracking																
How to Systematically Fulfil	Taking action to reduce impacts on site is the primary important goal for this assessment.																

Requirements	<p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Establish procedure of monitoring the progress of implementation and keep record of monitoring activities and results</li> <li>• Conduct a management review of implementation and take necessary decisions to enable timely implementation and desired results</li> <li>• Review the water source data and aggregated total to ensure the data and any automated calculations are accurate.</li> <li>• 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.</li> <li>• Evaluate results of completed actions, verify water withdrawal reductions and record the results in form of water tracking /monitoring reports</li> <li>• Ensure that whole process is inclusive in nature and key employees can explain and demonstrate how the improvement was achieved</li> <li>• Maintain record of any awards, certificates or certifications received for water efficiency achievements</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Water tracking reports and consumption records showing reductions from water sources that make up more than 80% of your total water use</li> <li>• Evidence of new equipment purchases or efficiency improvements that demonstrate that water reductions weren't made solely from a decline in production, or number of workers, or change of process.</li> <li>• <b>Partial Points:</b> Same requirements as for "yes" above but for water sources (or one source) that make up 50- 79% of total water use</li> </ul>
Additional Notes	<p>If you have entered a baseline for each of your sources, your reductions will be auto calculated within the tool. If you have not entered a baseline, you have the option to manually enter your reductions.</p>

### 3.4. Level-3

<p><b>7- Has your facility implemented a water balance or another analysis to evaluate the traceability of water intake vs. usage (i.e., which processes) and output (i.e., to wastewater treatment plant)?</b></p>	
How to answer this question	<p>The user may select (i) Yes, (ii) Partial Yes, (iii) No or (iv) Unknown while answering this question.</p> <ul style="list-style-type: none"> <li>• Answer Yes if the facility has fully implemented a water balance to fully understand the traceability of water intake vs. usage and outputs in the facility.</li> <li>• Answer Partial Yes if you have completed a partial water balance but have an action plan to complete all requirements.</li> </ul> <p>On selection of “Yes” or “Partial Yes”, the tool requires user to explain;</p> <ul style="list-style-type: none"> <li>• How was the water balance analysis conducted?</li> </ul>
Input Connection	Water Use data in Question 1

Output Connection	Wastewater Question 1
Keywords	Water Balance
How to Systematically Fulfil Requirements	<p>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.</p> <p>The creation of a full-facility water balance allows facilities to identify unaccounted-for water and provide insight into areas with efficiency improvement opportunities. A water balance, along with historical water use and cost of water, will help build a facility understand the overall water use and cost savings opportunities to the facility.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Identify and analyse how water is used in the entire facility; analysis must be carried out in the facility to evaluate/understand the traceability of water intake vs. Usage (i.e., which processes) and output (i.e., to ETP).</li> <li>• To be able to conduct a comprehensive water balance, the facility should install meters and sub-meters on all water intake, use and wastewater streams including process water, utility water and domestic use water (e.g., offices, dormitory, gardening etc.)</li> <li>• Tracking and measuring leakages is also very important for which a proper methodology should be developed and implemented.</li> <li>• Conduct a complete water balance including; <ul style="list-style-type: none"> <li>○ The incoming water in the facility: amount and water sources</li> <li>○ The quantity of water used during the production process</li> <li>○ The quantity of water recycled/reused in the facility</li> <li>○ The quality of wastewater generated</li> <li>○ The volume of water discharged after the own treatment</li> <li>○ The frequency which the water balance is updated</li> </ul> </li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• The facility has fully implemented a water balance or is able to demonstrate transparently another type of method for conducting analysis to fully understand the traceability of water intake vs. usage and outputs in the facility.</li> </ul>
Additional Notes	A common mistake is that facilities do not calculate the evaporation and leakage and do not define the frequency of updating the water balance

## 4. Wastewater

This section refers to water leaving a site that is not intended for reuse within your facility. Wastewater can be a significant cause of environmental pollution if not handled, stored, transferred, treated, and/or disposed of appropriately.

This section has 09 questions spread across three levels. Responses to questions are required depending upon applicability which is explained in following sub-section.

### 4.1. Applicability

The wastewater section begins with an applicability section based on which it is decided which questions are applicable to the facility.

All levels will be displayed, regardless of your achievement of the prior level. This is the only section where this is the case.

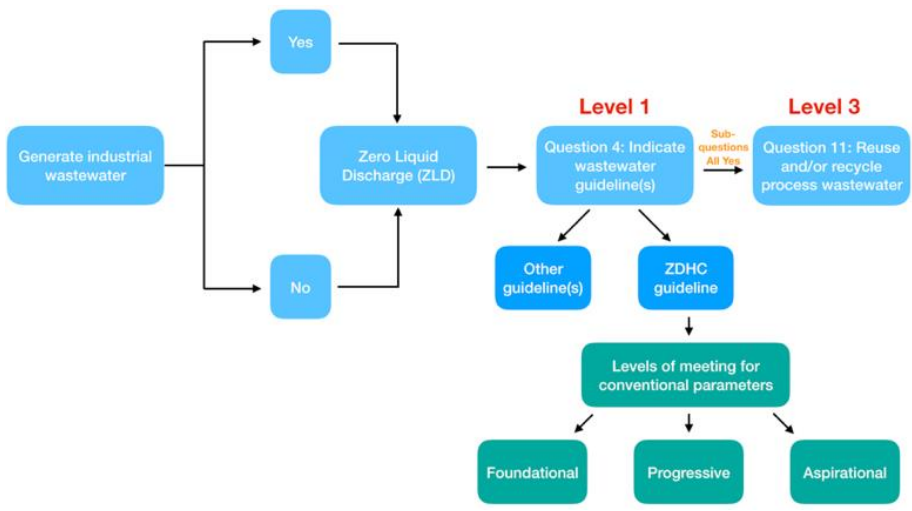
Following are the questions in Applicability section;

Applicability															
How to answer this question	<p>The user is asked following questions in this section. Only applicable questions appear as per applicability arrangement explained later.</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Does your facility generate industrial wastewater?</td> <td>Yes/No</td> </tr> <tr> <td>Does your facility have Zero Liquid Discharge?</td> <td>Yes/No</td> </tr> <tr> <td>Do you treat industrial and domestic wastewater together?</td> <td>Yes/No</td> </tr> <tr> <td>Where is your domestic wastewater treated?</td> <td> <ul style="list-style-type: none"> <li>• Treated onsite and discharged to the environment after treatment</li> <li>• Treated Offsite Only</li> <li>• Treated Onsite and offsite</li> <li>• Sent to a septic system</li> <li>• Not Treated</li> </ul> </td> </tr> <tr> <td>Where is your industrial wastewater treated?</td> <td> <ul style="list-style-type: none"> <li>• Treated Onsite Only</li> <li>• Treated Offsite Only</li> <li>• Treated Onsite and offsite</li> <li>• Not Treated</li> </ul> </td> </tr> <tr> <td>Where is your combined wastewater treated?</td> <td> <ul style="list-style-type: none"> <li>• Treated Onsite Only</li> <li>• Treated Offsite Only</li> <li>• Treated Onsite and offsite</li> <li>• Not Treated</li> </ul> </td> </tr> </tbody> </table>	Questions	Responses	Does your facility generate industrial wastewater?	Yes/No	Does your facility have Zero Liquid Discharge?	Yes/No	Do you treat industrial and domestic wastewater together?	Yes/No	Where is your domestic wastewater treated?	<ul style="list-style-type: none"> <li>• Treated onsite and discharged to the environment after treatment</li> <li>• Treated Offsite Only</li> <li>• Treated Onsite and offsite</li> <li>• Sent to a septic system</li> <li>• Not Treated</li> </ul>	Where is your industrial wastewater treated?	<ul style="list-style-type: none"> <li>• Treated Onsite Only</li> <li>• Treated Offsite Only</li> <li>• Treated Onsite and offsite</li> <li>• Not Treated</li> </ul>	Where is your combined wastewater treated?	<ul style="list-style-type: none"> <li>• Treated Onsite Only</li> <li>• Treated Offsite Only</li> <li>• Treated Onsite and offsite</li> <li>• Not Treated</li> </ul>
Questions	Responses														
Does your facility generate industrial wastewater?	Yes/No														
Does your facility have Zero Liquid Discharge?	Yes/No														
Do you treat industrial and domestic wastewater together?	Yes/No														
Where is your domestic wastewater treated?	<ul style="list-style-type: none"> <li>• Treated onsite and discharged to the environment after treatment</li> <li>• Treated Offsite Only</li> <li>• Treated Onsite and offsite</li> <li>• Sent to a septic system</li> <li>• Not Treated</li> </ul>														
Where is your industrial wastewater treated?	<ul style="list-style-type: none"> <li>• Treated Onsite Only</li> <li>• Treated Offsite Only</li> <li>• Treated Onsite and offsite</li> <li>• Not Treated</li> </ul>														
Where is your combined wastewater treated?	<ul style="list-style-type: none"> <li>• Treated Onsite Only</li> <li>• Treated Offsite Only</li> <li>• Treated Onsite and offsite</li> <li>• Not Treated</li> </ul>														
Scoring	<p>This section is not scored but affects scoring. The scoring changes according to scheme presented below. The wastewater section has the most applicability combinations. Anywhere there is no score listed (blank) means that question was not applicable to that facility;</p>														

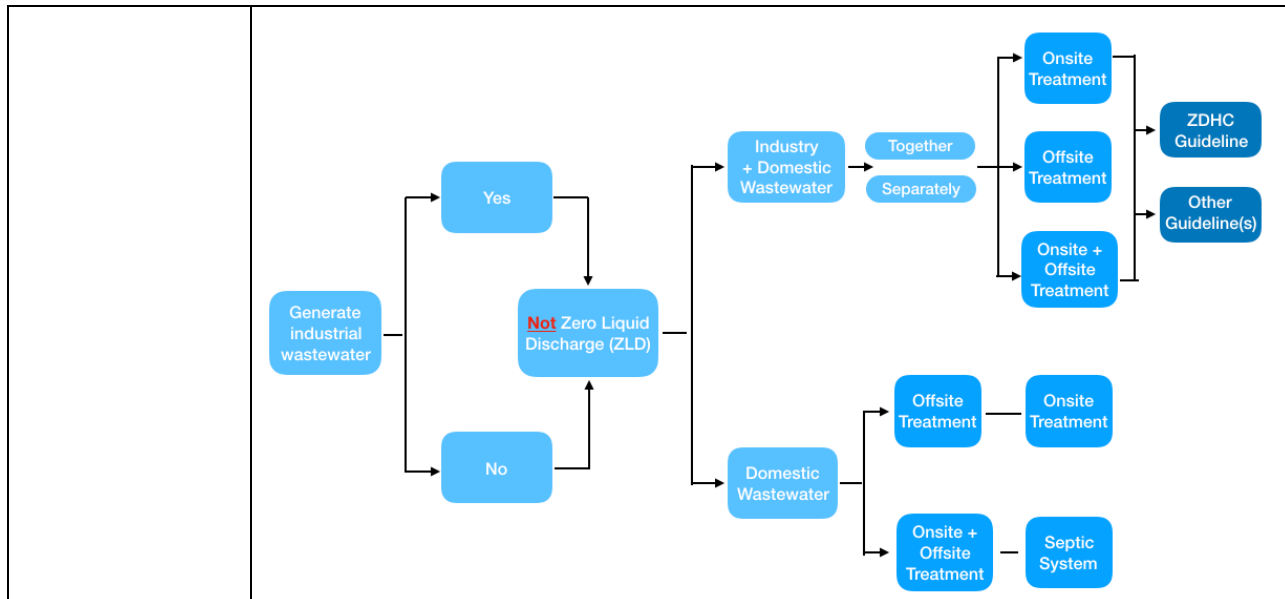
Level	Question	Industrial Onsite	Industrial Offsite	Industrial Onsite & Offsite	Domestic Onsite	Domestic Offsite	Domestic Onsite & Offsite	Septic	ZLD
1	#1 (wwtrack)	8.33	8.33	6.25	50	25	16.66		
1	#2 (wwoffsitetreatplant)		8.33	6.25		25	16.66		
1	#3 (wwemergplan)	8.33	8.33	6.25					
1	#4 (wwsludgedisposal)	8.33		6.25					
1	#5 (wwnsludgedisposal)				50		16.66		
1	#6 (wwsepticwater)							100	
2	#7 (wwstandard)	50	25	25			50		50
2	#8 (wwqualitytest)		25	25		50			
3	#9 (wwrecycle)	25	25	25					50

**Figure 12: Scoring scheme in Wastewater section**

You may download the [Higg FEM Scoring System Guidance](#) for more details on scoring and applicability.

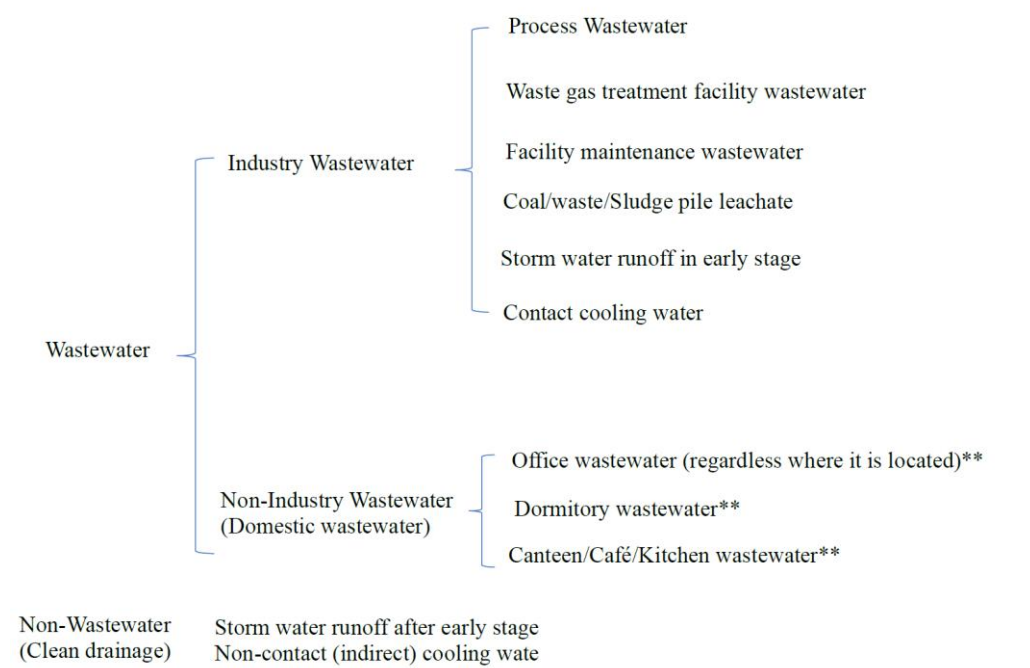
Input Connection	Independent.
Output Connection	Affects scoring as explained earlier
Keywords	Wastewater type, Wastewater Treatment, ZLD
How to Systematically Fulfill Requirements	<p>The applicability in Wastewater section is mainly organized around three selections;</p> <ul style="list-style-type: none"> <li>• Zero Discharge Liquid Treatment</li> <li>• Industrial and Domestic Wastewater Treatment</li> <li>• Domestic Wastewater Treatment Only</li> </ul> <p>Further applicability requirements apply in each of the options as explained in following figures. Please note that these figures present only a holistic view. You may download the <a href="#">Higg FEM Scoring System Guidance</a> for more details on scoring and applicability.</p> 

**Figure 13: Applicability in Wastewater Section for ZLD**



**Figure 14: Applicability in Wastewater Section for Wastewater Treatment (Industrial / domestic)**

Following diagram provides guidance on categorizing wastewater into industrial or Domestic Wastewater;



**Figure 15: Categorization of wastewater into Industrial and Domestic**

Evidence Required	No evidence needed to be uploaded. However, the facility must be able to demonstrate the validity of selection to the verifier during physical visit. For this purpose, it is suggested to keep the Water and wastewater flow diagram, piping layout, and wastewater treatment records.
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## 4.2. Level-1

1- Does your facility track its wastewater volume? (Industrial/Domestic/Combined)																									
How to answer this question	<p>The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question.</p> <p>On selecting Yes, the user is required to fill a table with following questions;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Wastewater Tracking</td> <td>Filled automatically based on above selection</td> </tr> <tr> <td>Does your facility track its wastewater volume from this source?</td> <td>Yes/No/Unknown</td> </tr> <tr> <td>What was the total quantity of wastewater discharged from your facility during this reporting year? (in m<sup>3</sup>)</td> <td>Numeric value in m<sup>3</sup> (This is why using m<sup>3</sup> unit in Water section)</td> </tr> <tr> <td>Which method was used to track wastewater volume?</td> <td>Meters/Invoices/Estimates</td> </tr> <tr> <td>What was the frequency of measurement?</td> <td>Dropdown list</td> </tr> <tr> <td>How many wastewaters discharge points do you have?</td> <td>Numeric entry</td> </tr> <tr> <td>Have you labelled all wastewater discharge points?</td> <td>Yes/No</td> </tr> <tr> <td>Do you monitor all identified wastewater discharge points?</td> <td>Yes/No</td> </tr> <tr> <td>What was the final discharge point for your facility's wastewater?</td> <td> <ul style="list-style-type: none"> <li>• Offsite wastewater treatment plant</li> <li>• Septic/Lagoon</li> <li>• Environment: Land</li> <li>• Environment: Water</li> <li>• Recycled/Reused in the facility</li> </ul> </td> </tr> <tr> <td>Provide any additional comments</td> <td>Text input</td> </tr> <tr> <td>Please upload the document</td> <td>Upload field</td> </tr> </tbody> </table> <p>Wastewater tracking should include water that is either discharged out from the facility, reclaimed/recycled or reused at your site</p>	Questions	Responses	Wastewater Tracking	Filled automatically based on above selection	Does your facility track its wastewater volume from this source?	Yes/No/Unknown	What was the total quantity of wastewater discharged from your facility during this reporting year? (in m <sup>3</sup> )	Numeric value in m <sup>3</sup> (This is why using m <sup>3</sup> unit in Water section)	Which method was used to track wastewater volume?	Meters/Invoices/Estimates	What was the frequency of measurement?	Dropdown list	How many wastewaters discharge points do you have?	Numeric entry	Have you labelled all wastewater discharge points?	Yes/No	Do you monitor all identified wastewater discharge points?	Yes/No	What was the final discharge point for your facility's wastewater?	<ul style="list-style-type: none"> <li>• Offsite wastewater treatment plant</li> <li>• Septic/Lagoon</li> <li>• Environment: Land</li> <li>• Environment: Water</li> <li>• Recycled/Reused in the facility</li> </ul>	Provide any additional comments	Text input	Please upload the document	Upload field
Questions	Responses																								
Wastewater Tracking	Filled automatically based on above selection																								
Does your facility track its wastewater volume from this source?	Yes/No/Unknown																								
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Which method was used to track wastewater volume?	Meters/Invoices/Estimates																								
What was the frequency of measurement?	Dropdown list																								
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Have you labelled all wastewater discharge points?	Yes/No																								
Do you monitor all identified wastewater discharge points?	Yes/No																								
What was the final discharge point for your facility's wastewater?	<ul style="list-style-type: none"> <li>• Offsite wastewater treatment plant</li> <li>• Septic/Lagoon</li> <li>• Environment: Land</li> <li>• Environment: Water</li> <li>• Recycled/Reused in the facility</li> </ul>																								
Provide any additional comments	Text input																								
Please upload the document	Upload field																								
Scoring	Full points for tracking all sources, half points for tracking some sources, and no points for not tracking any sources.																								
Input Connection	Selections in Applicability section																								
Output Connection	Used to calculate baseline values																								
Keywords	Tracking Wastewater Volume																								
How to Systematically Fulfil Requirements	<p>The intent of this question is to ensure that the site knows how much wastewater is being produced and where it is discharged to.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Mapping out business and operational processes to identify where wastewater is generated or discharged</li> <li>• Establish a wastewater monitoring and measurement procedure and plan</li> </ul>																								

	<p>(may also be part of water monitoring and measurement plan)</p> <ul style="list-style-type: none"> <li>○ Identify all wastewater discharges in the facility and develop a procedure for monitoring various wastewater streams (i.e., Meters, invoices, or estimates). This could be documented in tabular form showing all wastewater streams and their measuring /estimating method</li> <li>○ Install on-site meters or use metered invoices from off-site treatment facilities.</li> <li>○ If estimation techniques are used, the calculation methodology should be clearly defined and be supported by verifiable data</li> <li>○ Install sub-meters to track the amount of water used at site</li> <li>○ Sub-meters are also recommended to track wastewater reclaimed/recycled or reused at your site</li> <li>○ Establish a procedure to track and remove wastewater leakages/spills</li> <li>○ Track water used and wastewater discharge in other non-production activities like boiler blowdown, membrane cleaning, equipment cooling etc.</li> </ul> <ul style="list-style-type: none"> <li>● Keep records of wastewater tracking data as per monitoring and measurement plan; this data should be up-to-date and readily accessible to relevant personnel in the facility. Further, the data should be available in human readable formats so that same could be presented to verifier as evidence.</li> <li>● Provide training and awareness to key employees on the facility's wastewater data tracking program and how data quality is maintained.</li> <li>● Ensure all monitoring and measuring devices are calibrated and calibration record is maintained</li> </ul>
<p>Evidence Required</p>	<ul style="list-style-type: none"> <li>● Wastewater discharge records (e.g., monthly bills and annual discharge records; metering records compiled in a spreadsheet (e.g., Excel) is ok as long as the metering records are available for review as well) whose totals match the reported data to all questions answered.</li> <li>● Meter calibration records where applicable (e.g., as per manufacturer's specifications).</li> <li>● Estimation methodology documented where applicable</li> <li>● 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</li> </ul>
<p>Additional Notes</p>	<ul style="list-style-type: none"> <li>● 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.</li> <li>● 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); provided that the reports are current and valid.</li> <li>● In case of no documentation, the facility may estimate industrial wastewater volume based on different production processes and equipment specific consumption (e.g., process recipe, design data of machine) and accumulate</li> </ul>



	<p>estimated discharge from all processes and equipment to estimate total discharge. It would be important to estimate evaporation losses.</p> <ul style="list-style-type: none"> <li>• Similar techniques can be used for domestic wastewater estimation.</li> </ul> <p><b>Additional Opportunities</b></p> <p>If a facility can track all water uses and their subsequent wastewater discharges, the facility may be able to tap into following potentials;</p> <ul style="list-style-type: none"> <li>• Reusing/redirecting wastewater streams which are fit to be used as input water for other processes without any treatment or only after basic filtration. e.g., wastewater from mercerizing washings can be used as input to scouring process,</li> <li>• Reusing/Redirecting wastewater streams to other non-production uses where water quality is not very important, e.g., rejected water from Reverse Osmoses Plants, membrane cleaning water or boiler blowdown may be redirected to gardening, floor cleaning, washing vehicles, or showering in boiler wet scrubbers</li> <li>• Separately treating high and low pollution load wastewater to reduce wastewater treatment cost</li> </ul> <p>Recovering chemicals from wastewater e.g., Salt, Caustic, or Size recovery to reduce chemical cost as well as reduce pollution load on wastewater treatment plant</p>
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<b>(NEW)- Does your facility have a mechanism to prevent wastewater from mixing with stormwater in the storm drain systems?</b>	
How to answer this question	The user may select (i) Yes, or (ii) No while answering this question.
Scoring	This question is not scored in 2020 Higg FEM reporting year. Score may be applied in future reporting year.
Input Connection	Independent
Output Connection	Independent
Keywords	Stormwater
How to Systematically Fulfill Requirements	<p>It is considered good to separate stormwater from wastewater for many reasons including greater control of 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.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Separately collect, treat and discharge Stormwater (e.g., rainwater) and wastewater, to reduce the impact of stormwater on wastewater treatment plant and ensure treatment efficacy.</li> <li>• Review permit or other regulatory information around combined sewers and/or separation of stormwater and any stormwater treatment prior to discharge regulations and update Permits Inventory if needed</li> </ul>

	<ul style="list-style-type: none"> <li>• Develop a wastewater flow chart Sankey diagram or piping layout to demonstrate the separation between various wastewater streams. This may already be part of the water flow/piping diagrams of facility structural drawings</li> <li>• Code and label all the stormwater and wastewater collection points and drainage systems, and assign designated responsible department or person for regular management</li> <li>• Provide training to all responsible persons on the different uses of each collection system.</li> <li>• Regularly check (e.g., daily, monthly, etc.) on all stormwater and wastewater collection points and drainage systems to ensure there is no mixing or damage to the systems. Keep record of all inspection and correction activities.</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Stormwater and wastewater drainage map(s) that shows the two collection and drainage systems are separate</li> <li>• Documented policies or procedures, and regular monitoring records if available</li> </ul>

2- Do you have the name and contact information of the offsite wastewater treatment plant?															
How to answer this question	<p>The user may select (i) Yes, or (ii) No while answering this question.</p> <p>On answering “Yes”, the user is required to answer following questions;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Name</td> <td>Text input</td> </tr> <tr> <td>Address</td> <td>Yes/No/Unknown</td> </tr> <tr> <td>Ownership</td> <td>Government/Private owned</td> </tr> <tr> <td>Do you have a copy of the contract with the wastewater treatment plant?</td> <td>Yes/No</td> </tr> <tr> <td>Please upload documentation if available</td> <td>Upload field</td> </tr> <tr> <td>If you cannot upload the documents, please describe here</td> <td>Text input</td> </tr> </tbody> </table>	Questions	Responses	Name	Text input	Address	Yes/No/Unknown	Ownership	Government/Private owned	Do you have a copy of the contract with the wastewater treatment plant?	Yes/No	Please upload documentation if available	Upload field	If you cannot upload the documents, please describe here	Text input
Questions	Responses														
Name	Text input														
Address	Yes/No/Unknown														
Ownership	Government/Private owned														
Do you have a copy of the contract with the wastewater treatment plant?	Yes/No														
Please upload documentation if available	Upload field														
If you cannot upload the documents, please describe here	Text input														
Scoring	<p>Full Points if information of off-site wastewater treatment plant is available and contract is uploaded.</p> <p>Please note that a contract will be required during verification for all factories in China.</p>														
Input Connection	Independent														
Output Connection	Permits Inventory														
Keywords	Offsite Wastewater Treatment														
How to Systematically	This information is important because environmental contamination from improper treatment must be addressed regardless of where the problem originates. This														

<p>Fulfil Requirements</p>	<p>information can help your factory, the community, and local businesses prevent or clean-up accidental environmental contamination in the case of a failure.</p> <p>The intent of this question is for the facility to have a relationship and be able to communicate with the wastewater treatment plant. This also enables troubleshooting and supports continuous improvement.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Ensure that contract/agreement and other relevant documentation with off-site wastewater treatment plant is available and accessible to key personnel; and establish a procedure to renew the contract with the 3rd party off site treatment plant</li> <li>• Ensure facility has a permit to show that facility is allowed to discharge into the off-site wastewater treatment plant</li> <li>• Maintain documentation with (at least) basic details of the off-site wastewater treatment plant like layout, treatment type (primary, secondary, tertiary), etc.</li> <li>• Document any other pre-conductions for discharging wastewater to off-site wastewater treatment plant e.g., requirements for prior on-site treatment, any wastewater quality limits set by off-site wastewater treatment plant etc. and establish procedure to ensure compliance/conformance</li> </ul>
<p>Evidence Required</p>	<ul style="list-style-type: none"> <li>• Signed contract with the off-site wastewater treatment plant</li> <li>• A permit for your facility to show that you are allowed to discharge into the off-site wastewater treatment plant</li> </ul>

<p><b>3- Does your facility have a back-up plan if there is an emergency related to wastewater?</b></p>																					
<p>How to answer this question</p>	<p>The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question.</p> <p>On answering “Yes”, the user is required to answer following questions;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Does your facility have a process to contact appropriate government authorities or agencies as legally required in case of accidental discharge?</td> <td>Yes/No</td> </tr> <tr> <td>a. Upload documentation / explain the process</td> <td>One upload field; one text input field</td> </tr> <tr> <td>Does you facility provide training to all relevant employees regarding the backup plan?</td> <td>Yes/No</td> </tr> <tr> <td>a. How many employees were trained?</td> <td>Numeric input</td> </tr> <tr> <td>b. How frequently do you train your employees?</td> <td>Dropdown list</td> </tr> <tr> <td>c. Upload documentation</td> <td>Upload field</td> </tr> <tr> <td>Select all strategies included in your facility's back-up plan for wastewater</td> <td></td> </tr> <tr> <td>a. Emergency Production Shutdown</td> <td>Yes/No/Unknown</td> </tr> <tr> <td>b. Holding Tank</td> <td>Yes/No/Unknown</td> </tr> </tbody> </table>	Questions	Responses	Does your facility have a process to contact appropriate government authorities or agencies as legally required in case of accidental discharge?	Yes/No	a. Upload documentation / explain the process	One upload field; one text input field	Does you facility provide training to all relevant employees regarding the backup plan?	Yes/No	a. How many employees were trained?	Numeric input	b. How frequently do you train your employees?	Dropdown list	c. Upload documentation	Upload field	Select all strategies included in your facility's back-up plan for wastewater		a. Emergency Production Shutdown	Yes/No/Unknown	b. Holding Tank	Yes/No/Unknown
Questions	Responses																				
Does your facility have a process to contact appropriate government authorities or agencies as legally required in case of accidental discharge?	Yes/No																				
a. Upload documentation / explain the process	One upload field; one text input field																				
Does you facility provide training to all relevant employees regarding the backup plan?	Yes/No																				
a. How many employees were trained?	Numeric input																				
b. How frequently do you train your employees?	Dropdown list																				
c. Upload documentation	Upload field																				
Select all strategies included in your facility's back-up plan for wastewater																					
a. Emergency Production Shutdown	Yes/No/Unknown																				
b. Holding Tank	Yes/No/Unknown																				

	<p>c. What is the size of your facility's holding tank?</p> <p>d. Secondary Treatment (biological and advanced chemical treatment—excluding coagulation, flocculation, neutralization, clarification/sedimentation process)</p> <p>e. Discharge to Offsite Water Treatment Plant</p> <p>f. Other Backup Process</p> <p>g. If Others, please describe here</p> <p>What is your facility's wastewater treatment handling peak / max average capacity?</p>	<p>Numeric/text input</p> <p>Yes/No/Unknown</p> <p>Yes/No/Unknown</p> <p>Yes/No/Unknown</p> <p>Text input</p> <p>Numeric/text input</p>
Scoring	<p>It is critical that your facility have a backup plan in the event of a wastewater treatment failure to prevent untreated effluent from being discharged to the local environment. If you do not have a backup process that can handle your average daily capacity, you cannot score points or complete Level 1.</p>	
Input Connection	<p>Independent</p>	
Output Connection	<p>Permits Inventory</p>	
Keywords	<p>Emergency Back-up Plan</p>	
How to Systematically Fulfill Requirements	<p>This question promotes a contingency plan in the event the treatment process fails to prevent untreated effluent from being discharged.</p> <p>The intent of this question is for the facility to have a relationship and be able to communicate with the wastewater treatment plant. This also enables troubleshooting and supports continuous improvement.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Develop a contingency plan in response to emergencies relating wastewater and wastewater treatment</li> <li>• The back-up option must be comparable to the wastewater quantities and designed to hold the wastewater during emergencies. (Holding tanks should not be considered as an exclusive backup measure)</li> <li>• Establish a procedure to record the emergency incidences, how the back-up responded, and corrective/preventive actions taken</li> </ul>	
Evidence Required	<ul style="list-style-type: none"> <li>• Documented backup process that is sufficient to treat the average daily amount of wastewater discharged by the facility site. This should outline either the emergency production shutdown procedures or/and the type of treatment, availability of treatment, procedures for putting back up treatment into operation, responsible person or people for delivering these operations, etc.</li> <li>• Any schematics describing the backup treatment options and capacity</li> </ul>	

Additional Notes	<ul style="list-style-type: none"> <li>• Minimum one day holding tank storage is required if there is no on-site treatment and only off-site treatment is carried out</li> <li>• In cases if the facility is doing pre-treatment in-house to meet the contractual requirements with the CETP on the quality of the wastewater discharged, then they should have a collection tank followed by homogenization or neutralization etc. In those cases, the facility should have a larger collection tank with capacity to hold more than the volume of the wastewater generated currently, and it should additionally hold at least 1 day's production volume in additional to the existing volume or residence time.</li> <li>• If production shutdown is opted as a back-up plan, it should be backed up by some kind of documented emergency response process rather than stating simply that facility will stop production</li> </ul>
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<b>(NEW). Can you confirm that there is no leaking or bypassing of wastewater?</b>	
How to answer this question	The user may select (i) Yes, or (ii) No while answering this question.
Scoring	This question is not scored in 2020 Higg FEM reporting year. Score may be applied in future reporting year.
Input Connection	Independent
Output Connection	Process Flow Diagram, Water Flow Diagram, Wastewater Flow Diagram
Keywords	Leakage, Bypass
How to Systematically Fulfill Requirements	<p>The intent is to assess a facility's knowledge of their process flow diagram in terms of the piping and other conveyance systems used for distributing water and directing wastewater flows to the correct treatment or discharge locations.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Establish a system to track, quantify and eliminate any leakages in the wastewater streams and keep record of monitoring and correction activities</li> <li>• Ensure that there are no by-passes in the wastewater streams; and if any by-passes are built as emergency back-up plan, a process should be in place to authorize by-passing only in event of an emergency. Such by-passes must only be connected to the back-up system mentioned as response to Question 3. Proper drawings of such by-passes must be available and verifiable at site.</li> <li>• Provide training to all employees working with wastewater</li> <li>• In addition, requirements of Question1, New Question for Stormwater, and Question 3 also apply to this question</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Review documentation to record what inspections are done, where they are done, and the frequency to monitor for leaks and bypasses</li> <li>• Compare operation and monitoring records of wastewater treatment plant. e.g., Influent/Effluent records, online monitory system records and other</li> </ul>

	system records to check if the difference between amount of wastewater generated and discharged is acceptable
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<b>4- Is hazardous sludge (chemical / industrial) disposed of properly?</b>											
How to answer this question	<p>The user may select (i) Yes, (ii) No, (iii) Unknown, or (iv) My Sludge Is Not Hazardous, while answering this question.</p> <p>On selection of “Yes”, the user is required to answer following;</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #4F81BD; color: white;"> <th style="width: 60%;">Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Does your facility provide training to all relevant employees regarding the disposal method of hazardous sludge?</td> <td>Yes/No</td> </tr> <tr> <td>How many employees were trained?</td> <td>Numeric input</td> </tr> <tr> <td>How frequently do you train your employees?</td> <td>Dropdown list</td> </tr> <tr> <td>                     How is your hazardous sludge disposed of?                     <ul style="list-style-type: none"> <li>Hazardous Waste Treatment</li> <li>Incinerated controlled conditions</li> <li>Landfilled</li> <li>Open burning</li> <li>Fuel Blended</li> <li>Composted</li> <li>Fertilizer (applied to land)</li> </ul> </td> <td>Select <u>Yes/ No/ Not Applicable</u> against all options</td> </tr> </tbody> </table>	Questions	Responses	Does your facility provide training to all relevant employees regarding the disposal method of hazardous sludge?	Yes/No	How many employees were trained?	Numeric input	How frequently do you train your employees?	Dropdown list	How is your hazardous sludge disposed of? <ul style="list-style-type: none"> <li>Hazardous Waste Treatment</li> <li>Incinerated controlled conditions</li> <li>Landfilled</li> <li>Open burning</li> <li>Fuel Blended</li> <li>Composted</li> <li>Fertilizer (applied to land)</li> </ul>	Select <u>Yes/ No/ Not Applicable</u> against all options
Questions	Responses										
Does your facility provide training to all relevant employees regarding the disposal method of hazardous sludge?	Yes/No										
How many employees were trained?	Numeric input										
How frequently do you train your employees?	Dropdown list										
How is your hazardous sludge disposed of? <ul style="list-style-type: none"> <li>Hazardous Waste Treatment</li> <li>Incinerated controlled conditions</li> <li>Landfilled</li> <li>Open burning</li> <li>Fuel Blended</li> <li>Composted</li> <li>Fertilizer (applied to land)</li> </ul>	Select <u>Yes/ No/ Not Applicable</u> against all options										
Input Connection	Independent										
Output Connection	Hazardous Waste Tracking Question 2 in Waste section										
Keywords	Hazardous Sludge										
How to Systematically Fulfil Requirements	<p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>Maintain an inventory of sludge generated including quantities and types (hazardous / non-hazardous)</li> <li>Establish a procedure to regularly assess the characteristics of sludge by laboratory tests, separately mentioning hazardous and non-hazardous components of sludge</li> <li>Maintain records of wastewater treatments, sludge disposal, and wastewater and sludge quality analysis</li> <li>Develop and document methodology of handling and disposing each type of sludge and attain required permits;                             <ul style="list-style-type: none"> <li>Hazardous sludge must be disposed of through a licensed hazardous waste contractor or through incineration under properly controlled conditions.</li> <li>If decomposed at site, the facility should have the license by relevant authority (e.g., local pollution board) to decompose it in premises.</li> <li>Chemicals should be handled and disposed in accordance with MSDS section 13.</li> </ul> </li> </ul>										

	<ul style="list-style-type: none"> <li>○ In cases where the local government has classified the sludge under non-hazardous waste then the test report of sludge analysis may not be necessary. However, landfilling and open burning activity in-house may not be appropriate unless it is clearly identified through sludge analysis that the sludge is non-hazardous in nature.</li> <li>○ If disposal is done via landfilling, open burning, compost, fuel blended, or as fertilizer applied to land, the sludge must be analysed and documented as non-hazardous and suitable for the disposal method</li> <li>● For off-site disposal, maintain record of invoices or delivery records confirming that the types of disposals selected here reflect what's being used in practice</li> <li>● Train relevant employees on methods of handling and disposing each type of sludge</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>● An inventory of the amounts and types (non-hazardous and hazardous) of sludge generated</li> <li>● Lab analyses showing the non-hazardous and hazardous (if applicable) components for the various types of sludge</li> <li>● Documentation showing methods for disposing each type of sludge</li> <li>● For off-site disposal, invoices or delivery records confirming that the types of disposals selected here reflect what's being used in practice</li> <li>● If disposal is done via landfilling, open burning, compost, fuel blended, or as fertilizer applied to land, the sludge must be analysed and documented as non-hazardous and suitable for the disposal method</li> <li>● Permits, if applicable for a particular disposal method</li> </ul>

<b>5- Is non-hazardous sludge disposed of properly? (Domestic wastewater only)</b>											
How to answer this question	<p>The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question.</p> <p>On selection of “Yes”, the user is required to answer following;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Does your facility provide training to all relevant employees regarding the disposal method of non-hazardous sludge?</td> <td>Yes/No</td> </tr> <tr> <td>How many employees were trained?</td> <td>Numeric input</td> </tr> <tr> <td>How frequently do you train your employees?</td> <td>Dropdown list</td> </tr> <tr> <td>                     How is your non-hazardous sludge disposed of?                     <ul style="list-style-type: none"> <li>● Hazardous Waste Treatment</li> <li>● Incinerated controlled conditions</li> <li>● Landfilled</li> <li>● Open burning</li> <li>● Fuel Blended</li> <li>● Composted</li> <li>● Fertilizer (applied to land)</li> </ul> </td> <td>                     Select using checkboxes.                      Multiple options can be selected.                 </td> </tr> </tbody> </table>	Questions	Responses	Does your facility provide training to all relevant employees regarding the disposal method of non-hazardous sludge?	Yes/No	How many employees were trained?	Numeric input	How frequently do you train your employees?	Dropdown list	How is your non-hazardous sludge disposed of? <ul style="list-style-type: none"> <li>● Hazardous Waste Treatment</li> <li>● Incinerated controlled conditions</li> <li>● Landfilled</li> <li>● Open burning</li> <li>● Fuel Blended</li> <li>● Composted</li> <li>● Fertilizer (applied to land)</li> </ul>	Select using checkboxes. Multiple options can be selected.
Questions	Responses										
Does your facility provide training to all relevant employees regarding the disposal method of non-hazardous sludge?	Yes/No										
How many employees were trained?	Numeric input										
How frequently do you train your employees?	Dropdown list										
How is your non-hazardous sludge disposed of? <ul style="list-style-type: none"> <li>● Hazardous Waste Treatment</li> <li>● Incinerated controlled conditions</li> <li>● Landfilled</li> <li>● Open burning</li> <li>● Fuel Blended</li> <li>● Composted</li> <li>● Fertilizer (applied to land)</li> </ul>	Select using checkboxes. Multiple options can be selected.										
Input Connection	Independent										
Output	Independent										

Connection	
Keywords	Non-hazardous Sludge
How to Systematically Fulfil Requirements	<p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Maintain an inventory of sludge generated including quantities and types (hazardous / non-hazardous)</li> <li>• Establish a procedure to regularly assess the characteristics of sludge by laboratory tests, separately mentioning hazardous and non-hazardous components of sludge</li> <li>• Maintain records of wastewater treatments, sludge disposal, and wastewater and sludge quality analysis</li> <li>• Develop and document methodology of handling and disposing each type of sludge and attain required permits;             <ul style="list-style-type: none"> <li>○ Hazardous sludge must be disposed of through a licensed hazardous waste contractor or through incineration under properly controlled conditions.</li> <li>○ If decomposed at site, the facility should have the license by relevant authority (e.g., local pollution board) to decompose it in premises.</li> <li>○ Chemicals should be handled and disposed in accordance with MSDS section 13.</li> <li>○ In cases where the local government has classified the sludge under non-hazardous waste then the test report of sludge analysis may not be necessary. However, landfilling and open burning activity in-house may not be appropriate unless it is clearly identified through sludge analysis that the sludge is non-hazardous in nature.</li> <li>○ If disposal is done via landfilling, open burning, compost, fuel blended, or as fertilizer applied to land, the sludge must be analysed and documented as non-hazardous and suitable for the disposal method</li> </ul> </li> <li>• For off-site disposal, maintain record of invoices or delivery records confirming that the types of disposals selected here reflect what's being used in practice</li> <li>• Train relevant employees on methods of handling and disposing each type of sludge</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• An inventory of the amounts and types (non-hazardous and hazardous) of sludge generated</li> <li>• Lab analyses showing the non-hazardous and hazardous (if applicable) components for the various types of sludge</li> <li>• Documentation showing methods for disposing each type of sludge</li> <li>• For off-site disposal, invoices or delivery records confirming that the types of disposals selected here reflect what's being used in practice</li> <li>• If disposal is done via landfilling, open burning, compost, fuel blended, or as fertilizer applied to land, the sludge must be analysed and documented as non-hazardous and suitable for the disposal method</li> <li>• Permits, if applicable for a particular disposal method</li> </ul>



Additional Notes	Requirements of Question 4 and 5 are similar. Question 4 relates to Hazardous Sludge whereas Question 5 relates to non-hazardous sludge.
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<b>6- Does your facility treat wastewater using Septic before it is discharged?</b>																							
How to answer this question	<p>The user may select (i) Yes, (ii) No, (iii) Unknown while answering this question. On selection of “Yes”, the user is required to answer following;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>If yes, please describe</td> <td>Describe here the treatment using septic system</td> </tr> <tr> <td>Does your facility provide training to all relevant employees regarding the disposal method of septic sludge?</td> <td>Yes/No</td> </tr> <tr> <td>How many employees were trained?</td> <td>Numeric input</td> </tr> <tr> <td>How frequently do you train your employees?</td> <td>Dropdown list</td> </tr> <tr> <td>How does your site unload your septic tank once full?</td> <td></td> </tr> <tr> <td>Describe where it is discharged</td> <td>Text input</td> </tr> <tr> <td>Describe how it is treated after discharge</td> <td>Text input</td> </tr> <tr> <td>Please upload documentation if available</td> <td>Upload field</td> </tr> <tr> <td>Do you have a plan to upgrade your septic tank to a more modern wastewater treatment approach?</td> <td>Yes/No</td> </tr> <tr> <td>If yes, please describe</td> <td>Text input</td> </tr> </tbody> </table>	Questions	Responses	If yes, please describe	Describe here the treatment using septic system	Does your facility provide training to all relevant employees regarding the disposal method of septic sludge?	Yes/No	How many employees were trained?	Numeric input	How frequently do you train your employees?	Dropdown list	How does your site unload your septic tank once full?		Describe where it is discharged	Text input	Describe how it is treated after discharge	Text input	Please upload documentation if available	Upload field	Do you have a plan to upgrade your septic tank to a more modern wastewater treatment approach?	Yes/No	If yes, please describe	Text input
Questions	Responses																						
If yes, please describe	Describe here the treatment using septic system																						
Does your facility provide training to all relevant employees regarding the disposal method of septic sludge?	Yes/No																						
How many employees were trained?	Numeric input																						
How frequently do you train your employees?	Dropdown list																						
How does your site unload your septic tank once full?																							
Describe where it is discharged	Text input																						
Describe how it is treated after discharge	Text input																						
Please upload documentation if available	Upload field																						
Do you have a plan to upgrade your septic tank to a more modern wastewater treatment approach?	Yes/No																						
If yes, please describe	Text input																						
Scoring	The facility should begin planning to upgrade septic system to a more modern form of treatment in order to properly contain pollutants long-term. Facility will be awarded partial points if properly treating and disposing of septic wastewater, but do not yet have a plan to upgrade to a modern treatment system.																						
Input Connection	Independent																						
Output Connection	Independent																						
Keywords	Septic Sludge																						
How to Systematically Fulfill Requirements	<p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Maintain an inventory of sludge generated including quantities and types (hazardous / non-hazardous)</li> <li>• Establish a procedure to regularly assess the characteristics of sludge by laboratory tests, separately mentioning hazardous and non-hazardous components of sludge</li> <li>• Maintain records of wastewater treatments, sludge disposal, and wastewater and sludge quality analysis</li> <li>• Develop and document methodology of handling and disposing each type of</li> </ul>																						

	<p>sludge and attain required permits;</p> <ul style="list-style-type: none"> <li>○ Also describing how the facility unload the septic tank and dispose of the waste once full; and maintain disposal records</li> <li>• Develop a detailed plan of upgrading septic treatment to a modern treatment system</li> <li>• Train relevant employees on methods of handling and disposing each type of sludge</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Documentation (process, schematics of equipment, procedures, responsible persons, etc.) that site treats septic wastewater before it is discharged</li> <li>• Documentation describing how you unload the septic tank and dispose of the waste once full</li> <li>• Any permits if required</li> <li>• Disposal records/invoices for septic tank contents removal if applicable</li> <li>• A time-bound plan that describes the details and milestones for how you are or will be upgrading your septic tank to a more modern wastewater treatment approach</li> <li>• <b>Partial Points:</b> Same as what is required for "yes" except for plans about upgrading from a septic system</li> </ul>
Additional Notes	Requirements of Question 4, 5 and 6 are similar in nature. Question 4 relates to Hazardous Sludge, Question 5 relates to non-hazardous sludge, and Question 6 relates to Septic Sludge.

### 4.3. Level-2

7- Are you reporting against a wastewater standard?															
How to answer this question	<p>The user may select (i) Yes, (ii) No, (iii) Unknown while answering this question.</p> <p>On selection of "Yes", the user is required to fill a table with following questions;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Wastewater Standards</td> <td>                     Pre-filled with following list;                     <ul style="list-style-type: none"> <li>• ZDHC Wastewater Guideline</li> <li>• BSR</li> <li>• IPE</li> <li>• Customer/Brand</li> <li>• Other (excluding local law and regulations)</li> </ul> </td> </tr> <tr> <td>Are you reporting against this standard?</td> <td>Yes/No</td> </tr> <tr> <td>Frequency of sampling</td> <td>Dropdown list</td> </tr> <tr> <td>Have you tested and met all parameters specified in the standard?</td> <td>Yes / No I have tested and did not meet one or more parameter limits</td> </tr> <tr> <td>Are your parameter results available on the standard's platform? (e.g. ZDHC Gateway or IPE database)</td> <td>Yes/No/Not Applicable</td> </tr> <tr> <td>Comments</td> <td>Text input Describe in detail if other selected as wastewater standard</td> </tr> </tbody> </table>	Questions	Responses	Wastewater Standards	Pre-filled with following list; <ul style="list-style-type: none"> <li>• ZDHC Wastewater Guideline</li> <li>• BSR</li> <li>• IPE</li> <li>• Customer/Brand</li> <li>• Other (excluding local law and regulations)</li> </ul>	Are you reporting against this standard?	Yes/No	Frequency of sampling	Dropdown list	Have you tested and met all parameters specified in the standard?	Yes / No I have tested and did not meet one or more parameter limits	Are your parameter results available on the standard's platform? (e.g. ZDHC Gateway or IPE database)	Yes/No/Not Applicable	Comments	Text input Describe in detail if other selected as wastewater standard
Questions	Responses														
Wastewater Standards	Pre-filled with following list; <ul style="list-style-type: none"> <li>• ZDHC Wastewater Guideline</li> <li>• BSR</li> <li>• IPE</li> <li>• Customer/Brand</li> <li>• Other (excluding local law and regulations)</li> </ul>														
Are you reporting against this standard?	Yes/No														
Frequency of sampling	Dropdown list														
Have you tested and met all parameters specified in the standard?	Yes / No I have tested and did not meet one or more parameter limits														
Are your parameter results available on the standard's platform? (e.g. ZDHC Gateway or IPE database)	Yes/No/Not Applicable														
Comments	Text input Describe in detail if other selected as wastewater standard														

	<p>If ZDHC Wastewater Guideline is selected, the user must answer following UNSCORED question:</p> <p><b>Does your test result also show no detection of parameters in Table 2A-N Chemical Groups?</b></p> <ul style="list-style-type: none"> <li>Response options are (i) Yes, (ii) No I have tested and did not meet one or more parameter limits.</li> </ul>
Scoring	<p>If ZDHC is IPE are not applicable, the facility shall not have any negative points if the column “Are your parameter results available on the standard’s platform?” is left blank or marked Not Applicable.</p> <p>If ZDHC Wastewater Guideline is selected, an additional relating detection of parameters in Table 2A-N is asked which is also unscored.</p> <p>If facility arranges the wastewater test reports based on local legal requirements only, no score shall be awarded.</p>
Input Connection	Independent
Output Connection	Independent
Keywords	Septic Sludge, Wastewater Standard
How to Systematically Fulfil Requirements	<p>This question is intended to demonstrate a facility’s current performance with wastewater quality through wastewater standards tracking and reporting. The standards referred here are industry standards and the intention is to improve beyond compliance against local law and regulations.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>Wastewater characteristics must be tested by an approved and accredited 3<sup>rd</sup> party laboratory according to frequency, test parameters, limits, sampling and testing methods of selected standard. Establish a procedure of sampling for each applicable standard</li> <li>Depending on which standard is selected, the facility may be required to upload the test reports to the gateway/portal of that standard (e.g., ZDHC Gateway – Wastewater Module)</li> <li>Test incoming water in case of detection of any detox parameter if ZDHC is selected</li> <li>Establish a procedure to regularly assess the characteristics of wastewater by in-house laboratory for comparison purposes</li> <li>Maintain records of wastewater treatments, and wastewater test reports</li> <li>Analyse trends of wastewater characteristics and make the trends available to all relevant personnel for further decision support</li> <li>Train relevant employees on applicable wastewater standards, their quality limits, and sampling and testing requirements</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>Wastewater test report showing the parameters tracked by the facility (Treated effluent and untreated effluent) should be available. For the ZDHC Wastewater guidance, wastewater testing should be conducted according to the frequency, test parameters, limits, sampling and testing methods. It is</li> </ul>

	<p>recommended to upload the test reports on the ZDHC Gateway – Wastewater Module.</p> <ul style="list-style-type: none"> <li>• Documentation showing that the parameters are recorded and analysed</li> <li>• Sample procedures document</li> </ul>
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<b>8- Have you requested wastewater quality test results from the offsite wastewater treatment plant?</b>	
How to answer this question	<p>The user may select (i) Yes, (ii) No, (iii) Unknown while answering this question.</p> <p>On selection of “Yes”, the user is required to upload documentation or describe the status.</p>
Input Connection	Selection of Offsite treatment in applicability section
Output Connection	Independent
Keywords	Offsite Wastewater Treatment Plant, Offsite wastewater quality tests
How to Systematically Fulfil Requirements	<p>The intent of this question is to create connection and accountability between facility and the offsite wastewater treatment plant that is contracted to treat wastewater. The goal is for the facility to be as proactive as possible to confirm their wastewater is compliant and are not responsible for any violations towards environment. Regardless of the respond outcome from the off-site wastewater treatment plant, the proactive effort from the facility is what is being asked in this question.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Establish a mechanism/process to communicate with off-site treatment plant including attaining the wastewater quality test results</li> <li>• Maintain record of requesting for quality results and other communication with off-site treatment plant</li> <li>• Document if the off-site treatment plant has sent any effluent quality limits for the facility before discharging to the offsite treatment plant.</li> <li>• Keep record of any instances if off-site treatment plan charged facility more due to exceeding any of the limits; and record any corrective actions taken</li> <li>• If, based on attained results, the off-site wastewater treatment plant is not in compliance with limits, the facility must assess if the facility has contributed to the non-compliance, take actions to resolve it, and record the actions</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Recent documentation of your request to receive off-site wastewater treatment plant for wastewater quality records and/or</li> <li>• Recent (within the year, but ideally more frequently) off-site wastewater treatment plant quality records (if provided)</li> </ul>
Additional Notes	<ul style="list-style-type: none"> <li>• If results are not provided on request, the facility is not penalised if facility is able to provide proof of request and denial.</li> <li>• If the off-site wastewater treatment plant posts their effluent online, the factory can answer "Yes" to this question.</li> </ul>

#### 4.4. Level-3

9- Does your facility reuse and/or recycle process wastewater as process water (closed loop)?							
How to answer this question	<p>The user may select (i) Yes, (ii) No, (iii) Unknown while answering this question.</p> <ul style="list-style-type: none"> <li>Answer Yes if facility has wastewater treatment in place to reuse and/or recycle production wastewater back into production processes. The reused and/or recycled water must be used in production processes - other uses like irrigation, toilets are excluded. The actual treatment technologies may include be chemical or biological such as membrane filtration or Zero Liquid Discharge.</li> </ul> <p>On selection of “Yes”, the user is required to answer;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Enter the percentage of wastewater treated and recycled back into your production processes</td> <td>numeric input</td> </tr> <tr> <td>Please describe</td> <td>Describe how the water is recycled/reused</td> </tr> </tbody> </table>	Questions	Responses	Enter the percentage of wastewater treated and recycled back into your production processes	numeric input	Please describe	Describe how the water is recycled/reused
Questions	Responses						
Enter the percentage of wastewater treated and recycled back into your production processes	numeric input						
Please describe	Describe how the water is recycled/reused						
Scoring	<ul style="list-style-type: none"> <li>Reuse/Recycle 50% or more = full points</li> <li>No or unknown = zero points</li> </ul>						
Input Connection	Independent						
Output Connection	Independent						
Keywords	Wastewater reuse/recycling						
How to Systematically Fulfil Requirements	<p>This question is focused on incentivizing the innovative technology needed for reuse/recycling and reducing overall freshwater use footprint.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>Conduct a water efficiency/conservation assessment to identify areas where wastewater could be reused or recycled</li> <li>Assess which of the identified wastewater streams can be reused in processes without any treatment or with basic filtration (e.g., fluff and other suspended solid removal)</li> <li>Assess if any wastewater streams can be treated separately before the wastewater treatment plant (e.g. size/caustic/salt removal) and reused in the process</li> <li>Install wastewater recycling plant to reuse the treated water in process</li> <li>Develop a recycled/reused water flow diagram to show locations where water is recycled from and where it is reused                             <ul style="list-style-type: none"> <li>This diagram may be part of the overall water flow diagram as well</li> </ul> </li> <li>Install sub-meters on reused/recycled water lines and maintain record of water reused/recycled.</li> </ul>						

	<ul style="list-style-type: none"> <li>○ It is recommended to include the locations of these sub-meters in the water flow diagram as well</li> </ul>
<p>Evidence Required</p>	<ul style="list-style-type: none"> <li>• Facility can prove through documented record keeping that they reuse and/or recycle process wastewater as process water. Please refer to documentation in the Water section to evaluate whether the percentages provided here are correct based on water withdrawal and the water balance (if applicable)</li> <li>• List of water reduction achievements according to:             <ul style="list-style-type: none"> <li>○ The location where water is captured for recycling</li> <li>○ The location where recycled water is used</li> <li>○ Flow diagram of recycling process</li> </ul> </li> </ul>
<p>Additional Notes</p>	<ul style="list-style-type: none"> <li>• The facility is termed to have Zero liquid Discharge (ZLD) if no water leaves the facility in liquid form and almost 100% water is recycled/reused. The only loss should be that due to natural evaporation</li> <li>• A facility which is treating the wastewater using Reverse Osmosis (RO) and Nano filtration technologies and reusing 80% of the wastewater but the rejected water from the membrane is being sent to offsite ETPs are not considered as ZLDs as the total dissolved solids of the rejected water from the membrane technologies is considered more hazardous than the usual wastewater discharged.</li> </ul>

## 5. Air Emissions

This section has 07 questions spread across three levels. Responses to questions are required depending upon applicability which is explained in following sub-section.

### 5.1. Applicability

The Air Emissions section begins with an applicability section based on which it is decided which questions are applicable to the facility.

Following are the questions in Applicability section;

<b>Applicability</b>			
How to answer this question	<p>The user is required to select all applicable options (using Yes or No) out of following list. Selection made in these lists defines the applicability and hence scoring scheme;</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <p><b>Does your facility contain any of the following operations equipment?</b></p> <ul style="list-style-type: none"> <li>• Boilers (If yes, select size)                             <ul style="list-style-type: none"> <li>○ Small: less than 50 MW</li> <li>○ Medium: 50 MW - 300 MW</li> <li>○ Large: more than 300 MW</li> <li>○ See <i>Additional Notes on calculating boiler size</i></li> </ul> </li> <li>• Generators</li> <li>• Combustion Engines (e.g. gasoline powered pumps)</li> <li>• Industrial Ovens (for heating/drying/curing)</li> <li>• Combustion Heating (Furnace) and ventilation</li> <li>• Refrigerant containing device (other than air conditioning system)</li> <li>• Air conditioning (Cooling)</li> <li>• Other sources of known air emissions from facility operations</li> <li>• Other sources of volatile organic compounds (VOCs)</li> </ul> </td> <td style="width: 50%; vertical-align: top;"> <p><b>Does your facility conduct any of the following processes or use any of the following substances?</b></p> <ul style="list-style-type: none"> <li>• Yarn spinning or synthetic fibre manufacturing</li> <li>• Finishes (any mechanical or chemical process that occurs after dyeing to affect the look, performance, or feel of the product)</li> <li>• Solvents</li> <li>• Adhesives/cementing</li> <li>• Printing</li> <li>• Dyeing</li> <li>• Tenterframes or other heating process</li> <li>• 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 online during production process, or a facility may have a dedicated room for spot cleaning.)</li> <li>• Sprayed chemicals or paints</li> <li>• Other sources of ozone depleting substances (ODSs)</li> </ul> </td> </tr> </table>	<p><b>Does your facility contain any of the following operations equipment?</b></p> <ul style="list-style-type: none"> <li>• Boilers (If yes, select size)                             <ul style="list-style-type: none"> <li>○ Small: less than 50 MW</li> <li>○ Medium: 50 MW - 300 MW</li> <li>○ Large: more than 300 MW</li> <li>○ See <i>Additional Notes on calculating boiler size</i></li> </ul> </li> <li>• Generators</li> <li>• Combustion Engines (e.g. gasoline powered pumps)</li> <li>• Industrial Ovens (for heating/drying/curing)</li> <li>• Combustion Heating (Furnace) and ventilation</li> <li>• Refrigerant containing device (other than air conditioning system)</li> <li>• Air conditioning (Cooling)</li> <li>• Other sources of known air emissions from facility operations</li> <li>• Other sources of volatile organic compounds (VOCs)</li> </ul>	<p><b>Does your facility conduct any of the following processes or use any of the following substances?</b></p> <ul style="list-style-type: none"> <li>• Yarn spinning or synthetic fibre manufacturing</li> <li>• Finishes (any mechanical or chemical process that occurs after dyeing to affect the look, performance, or feel of the product)</li> <li>• Solvents</li> <li>• Adhesives/cementing</li> <li>• Printing</li> <li>• Dyeing</li> <li>• Tenterframes or other heating process</li> <li>• 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 online during production process, or a facility may have a dedicated room for spot cleaning.)</li> <li>• Sprayed chemicals or paints</li> <li>• Other sources of ozone depleting substances (ODSs)</li> </ul>
<p><b>Does your facility contain any of the following operations equipment?</b></p> <ul style="list-style-type: none"> <li>• Boilers (If yes, select size)                             <ul style="list-style-type: none"> <li>○ Small: less than 50 MW</li> <li>○ Medium: 50 MW - 300 MW</li> <li>○ Large: more than 300 MW</li> <li>○ See <i>Additional Notes on calculating boiler size</i></li> </ul> </li> <li>• Generators</li> <li>• Combustion Engines (e.g. gasoline powered pumps)</li> <li>• Industrial Ovens (for heating/drying/curing)</li> <li>• Combustion Heating (Furnace) and ventilation</li> <li>• Refrigerant containing device (other than air conditioning system)</li> <li>• Air conditioning (Cooling)</li> <li>• Other sources of known air emissions from facility operations</li> <li>• Other sources of volatile organic compounds (VOCs)</li> </ul>	<p><b>Does your facility conduct any of the following processes or use any of the following substances?</b></p> <ul style="list-style-type: none"> <li>• Yarn spinning or synthetic fibre manufacturing</li> <li>• Finishes (any mechanical or chemical process that occurs after dyeing to affect the look, performance, or feel of the product)</li> <li>• Solvents</li> <li>• Adhesives/cementing</li> <li>• Printing</li> <li>• Dyeing</li> <li>• Tenterframes or other heating process</li> <li>• 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 online during production process, or a facility may have a dedicated room for spot cleaning.)</li> <li>• Sprayed chemicals or paints</li> <li>• Other sources of ozone depleting substances (ODSs)</li> </ul>		
Scoring	<p>This section is not scored but affects scoring. The scoring changes according to scheme presented below. Anywhere there is no score listed (blank) means that question was not applicable to that facility;</p>		

Level	Question Number	Applicability Pathway with Points				
		Emissions from operations		Emissions from production	Emissions from both operations and production	
		Emissions from operations only WITH refrigerants	Emissions from operations only WITHOUT refrigerants	Emissions from production only	Emissions from operations and production only WITH refrigerants	Emissions from operations and production only WITH OUT refrigerants
Level 1	#1 (airsourceopstrack)	8.3	12.5		5	6.3
	#2 (airsourceprodtrack)			25	5	6.3
	#3 (airsourcerefrignew)	8.3			5	
	#4 (aircontroldevopshtml)	8.3	12.5		5	6.3
	#5 (aircontroldevprodhtml)			25	5	6.3
Level 2	#6 (airbeyondpermit)	If choose Level 1 (Foundational) option: the total score of level 1 questions will be kept as 25. If choose Level 2 (Strategic) option: 50	If choose Level 1 (Foundational) option: the total score of level 1 questions will be kept as 25. If choose Level 2 (Strategic) option: 50		If choose Level 1 (Foundational) option: the total score of level 1 questions will be kept as 25. If choose Level 2 (Strategic) option: 50	If choose Level 1 (Foundational) option: the total score of level 1 questions will be kept as 25. If choose Level 2 (Strategic) option: 50
Level 3	#7 (airimplementprocess)	If choose Level 3 (Aspirational) for the #6 question: 12.5, plus 12.5 for the #7 question – total 25	If choose Level 3 (Aspirational) for the #6 question: 12.5, plus 12.5 for the #7 question – total 25	50	If choose Level 3 (Aspirational) for the #6 question: 12.5, plus 12.5 for the #7 question – total 25	If choose Level 3 (Aspirational) for the #6 question: 12.5, plus 12.5 for the #7 question – total 25
	Total	100	100	100	100	100

Figure 16: Scoring scheme in Air Emissions section

You may download the [Higg FEM Scoring System Guidance](#) for more details on scoring and applicability.

Input Connection	Independent.
Output Connection	Affects scoring as explained earlier
Keywords	Emissions from operations, Emissions from production processes
How to Systematically Fulfill Requirements	<p>Following are the applicability pathways based on selection made in mentioned questions;</p> <ul style="list-style-type: none"> <li>• If facility have any air-emitting operations (e.g., boiler, engines), facility will answer questions about operating emissions in all levels</li> <li>• If facility have any air-emitting production processes (e.g., solvents or adhesives, spot removing, spray chemicals/paints), facility will answer questions about production emissions in Level 1</li> <li>• If facility doesn't have any facility operation or production air emissions, facility will not need to complete this section.</li> <li>• If facility has air emissions in both operations and production processes, the facility will answer all questions.</li> <li>• Facilities not using refrigerants do not need to answer Question 3.</li> </ul> <p>You may download the <a href="#">Higg FEM Scoring System Guidance</a> for more details on scoring and applicability.</p>
Evidence Required	No evidence needed to be uploaded. However, the facility must be able to demonstrate the validity of selection to the verifier during physical visit. For this purpose, it is suggested to keep the list of equipment and machinery used for operations and production, process flow diagrams, and air emissions record.
Additional Notes	Usually Steam Boilers are rated in Tonnes Per Hour (TPH) Steam Production Capacity. Facilities often get confused in assessing which boiler size in MW their TPH rating would be categorised in. One <b>example calculation</b> is provided below;



	<p>Boiler Capacity = 30 TPH</p> <p>Steam Design* Characteristics = 10 Bar, 180 °C, Saturated Steam</p> <p>Specific Enthalpy of Steam (as per steam tables) = 2776.16 kJ/kg</p> <p>Total energy in 30 TPH steam = 30,000 kg/h x 2776.16 kJ/kg = 83,284,800 kJ/h</p> <p>Conversion Factor: 1 kJ/h = 0.0002777778 kW</p> <p>Boiler Capacity = 83,284,800 kJ/h x 0.0002777778 kW/kJ/h = 23,134 kW</p> <p><b>Boiler Capacity = 23,134 kW ÷ 1,000 = 23.134 MW</b></p> <p>Hence, <b>Boiler Size = Small: less than 50 MW</b></p> <p>* Often the boilers are operated at a pressure lower than maximum design pressure. While calculating the size, the facility must use the maximum design values of steam characteristics and NOT the actual values as using actual values would calculate a smaller boiler size e.g., a 65 TPH boiler at 10 Bar design pressure would be 50.12MW (Medium: 50MW – 300 MW), but if this boiler is operated at 6 Bar pressure, the Enthalpy of Steam would be 2,755.46 kJ/kg which results in Boiler size of 49.75MW (Small: Less than 50 MW).</p>
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## 5.2. Level-1

1- Do you track your air emissions from operations?																									
How to answer this question	<p>The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question.</p> <p>On selecting Yes, the user is required to fill a table with following questions;</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #4F81BD; color: white;">Questions</th> <th style="background-color: #4F81BD; color: white;">Responses</th> </tr> </thead> <tbody> <tr> <td>Select all sources of air emissions relevant to your facility's operations</td> <td>Filled automatically based on selection in applicability section</td> </tr> <tr> <td>Are there emissions from this source?</td> <td>Yes/No/Unknown</td> </tr> <tr> <td>Do you track emissions from this source?</td> <td>Yes/No/Unknown</td> </tr> <tr> <td>What equipment is this source linked to?</td> <td>Text input (if there is more than one source, list all sources (e.g., Boiler 1 and Boiler 2))</td> </tr> <tr> <td>What pollutants are found in this source?</td> <td>Select all applicable from following list; PM10, PM2.5, NOx, SOx, VOC or Total Organic Carbon (TOC), ODS, Hazardous or Toxic Air Pollutants (HAP/TAP), Global Warming Gases (GWG), O<sub>3</sub>, CO, NH<sub>3</sub>, Other Toxic Air Pollutants, Water Vapour/Steam</td> </tr> <tr> <td>Are the pollutants regulated by a government agency?</td> <td>Yes/No</td> </tr> <tr> <td>If the pollutant is regulated by a permit, is it in compliance with the permit?</td> <td>Yes/No/Not Applicable</td> </tr> <tr> <td>If your facility is out of compliance, update the action plan for the substance detected</td> <td>Upload field (Upload required here only if limits do not meet the legal compliance air standard)</td> </tr> <tr> <td>If you cannot upload a copy, please describe the action plan</td> <td>Text input</td> </tr> <tr> <td>If applicable, upload emissions test report(s).</td> <td>Upload field (3<sup>rd</sup> party emission reports to be uploaded here)</td> </tr> <tr> <td>Additional comments</td> <td>Text input (It is advised to always fill such text fields and never leave these blank)</td> </tr> </tbody> </table>	Questions	Responses	Select all sources of air emissions relevant to your facility's operations	Filled automatically based on selection in applicability section	Are there emissions from this source?	Yes/No/Unknown	Do you track emissions from this source?	Yes/No/Unknown	What equipment is this source linked to?	Text input (if there is more than one source, list all sources (e.g., Boiler 1 and Boiler 2))	What pollutants are found in this source?	Select all applicable from following list; PM10, PM2.5, NOx, SOx, VOC or Total Organic Carbon (TOC), ODS, Hazardous or Toxic Air Pollutants (HAP/TAP), Global Warming Gases (GWG), O <sub>3</sub> , CO, NH <sub>3</sub> , Other Toxic Air Pollutants, Water Vapour/Steam	Are the pollutants regulated by a government agency?	Yes/No	If the pollutant is regulated by a permit, is it in compliance with the permit?	Yes/No/Not Applicable	If your facility is out of compliance, update the action plan for the substance detected	Upload field (Upload required here only if limits do not meet the legal compliance air standard)	If you cannot upload a copy, please describe the action plan	Text input	If applicable, upload emissions test report(s).	Upload field (3 <sup>rd</sup> party emission reports to be uploaded here)	Additional comments	Text input (It is advised to always fill such text fields and never leave these blank)
Questions	Responses																								
Select all sources of air emissions relevant to your facility's operations	Filled automatically based on selection in applicability section																								
Are there emissions from this source?	Yes/No/Unknown																								
Do you track emissions from this source?	Yes/No/Unknown																								
What equipment is this source linked to?	Text input (if there is more than one source, list all sources (e.g., Boiler 1 and Boiler 2))																								
What pollutants are found in this source?	Select all applicable from following list; PM10, PM2.5, NOx, SOx, VOC or Total Organic Carbon (TOC), ODS, Hazardous or Toxic Air Pollutants (HAP/TAP), Global Warming Gases (GWG), O <sub>3</sub> , CO, NH <sub>3</sub> , Other Toxic Air Pollutants, Water Vapour/Steam																								
Are the pollutants regulated by a government agency?	Yes/No																								
If the pollutant is regulated by a permit, is it in compliance with the permit?	Yes/No/Not Applicable																								
If your facility is out of compliance, update the action plan for the substance detected	Upload field (Upload required here only if limits do not meet the legal compliance air standard)																								
If you cannot upload a copy, please describe the action plan	Text input																								
If applicable, upload emissions test report(s).	Upload field (3 <sup>rd</sup> party emission reports to be uploaded here)																								
Additional comments	Text input (It is advised to always fill such text fields and never leave these blank)																								

	<p><b>Note:</b> In the future version, Higg FEM will require detailed tracking and reporting of emissions data and the below technical guidance and verification requirements are provided for reference.</p>
Scoring	<ul style="list-style-type: none"> <li>• Full points if all sources are tracked and all emissions are following the permit</li> <li>• Partial Points if compliance issue documentation from permitting office shows that the issue(s) is less than three months old; and if facility has taken actions to achieve compliance</li> <li>• No points if compliance issue documentation from permitting office shows that the issue(s) is more than three months old and has not been resolved</li> </ul>
Input Connection	Selections in Applicability section
Output Connection	Used to calculate baseline values
Keywords	Tracking Air Emissions
How to Systematically Fulfill Requirements	<p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Establish an air emission monitoring and measurement procedure and plan</li> <li>• Identify all operations that have air emissions and develop a procedure for monitoring and measuring various wastewater streams (e.g., Stack emission testing, Estimations, Calculations).</li> <li>• Develop an Air Emissions Inventory showing all areas of air emissions and their measuring /estimating method. Such an inventory may include; <ul style="list-style-type: none"> <li>○ Pollutants known or likely to be present</li> <li>○ Quantity of each pollutant emitted <ul style="list-style-type: none"> <li>▪ See “Additional Notes” for example of calculating quantity</li> </ul> </li> <li>○ Emissions/discharge points</li> <li>○ Control devices and their operating parameters</li> <li>○ Methodology to determine emissions <ul style="list-style-type: none"> <li>▪ The methodology used to determine emissions from each source should be selected and applied by qualified individuals such as a process or environmental engineer</li> </ul> </li> <li>○ Frequency of monitoring</li> <li>○ Compliance with legal regulations (regulated by permit or not, in compliance with regulation or not)</li> <li>○ It is recommended to follow the <a href="#">TEMPLATE</a> referred in How To Higg Guide</li> </ul> </li> <li>• If emissions are tested using any testing device/equipment (e.g., Stack Analyser), the facility should ensure that the equipment is calibrated and used by a qualified professional. Keep record of all test reports.</li> <li>• If estimation techniques are used, the calculation methodology should be clearly defined and be supported by verifiable data. Estimation of emissions can be done by using established online tools or published emission factors by a credible source</li> <li>• Establish a process to ensure that the air emissions inventory is regularly reviewed and kept up to date</li> <li>• Establish a procedure to track of regulatory/permit non-compliances</li> </ul>

	<ul style="list-style-type: none"> <li>• Develop an action plan to achieve compliance and track the implementation and results of taken actions.</li> <li>• Keep records of air emissions tracking data as per monitoring and measurement plan; this data should be up-to-date and readily accessible to relevant personnel in the facility. Further, the data should be available in human readable formats so that same could be presented to verifier as evidence.</li> <li>• Provide training and awareness to key employees on the facility's air emissions data tracking program and how data quality is maintained.</li> <li>• Ensure all monitoring and measuring devices are calibrated and calibration record is maintained</li> </ul> <p>In most cases, local regulations require facilities to test emissions at a frequency defined by the regulation (e.g., quarterly stack analysis). The facility must ensure compliance to the frequency and emissions limits set by local regulation. If air emission testing is also required by other subscribed standards or customers, the facility must follow the stricter limits and frequency requirements</p>
<p>Evidence Required</p>	<p><b>Full Points</b></p> <ul style="list-style-type: none"> <li>• An inventory of emissions to air for ALL sources related to facility operations.</li> <li>• Emission testing/monitoring reports. Testing data compiled in a spreadsheet (e.g., Excel) is ok if the testing reports are available for review as well as the data matches the reported information to all questions answered.</li> <li>• Emission estimation methodology/calculations documented where applicable.</li> <li>• Information entered Higg for each emission source can be verified with appropriate evidence such as equipment sources and quantity of emissions.</li> </ul> <p><b>Partial Points</b></p> <ul style="list-style-type: none"> <li>• Compliance issue documentation from permitting office shows that the issue(s) is less than three months old.</li> <li>• An action plan is completed for any emissions source found out of compliance.</li> </ul>
<p>Additional Notes</p>	<p><b>Quantity of Air Emissions</b></p> <ul style="list-style-type: none"> <li>• Facility must calculate annual emission quantity for emission inventory purposes. Only providing emission test reports or spot test parameters does not fulfil the requirements of this question.</li> </ul> <p><u>Example Calculation for Annual Emission Quantity *</u></p> <p>An engine operates 5,760 hours in one year. Mass flowrate of flue gases is 11,200 kg/h is per engine data sheet and flu gas density is 0.748 kg/m<sup>3</sup>. Stack analysis report shows Carbon Monoxide emission of 495 mg/m<sup>3</sup> at an exhaust temperature of 242 °C.</p> <ul style="list-style-type: none"> <li>• <math>Q_{stack} = \text{Stack volume flow rate (m}^3/\text{h)} = 11,200 \text{ kg/h} \times 0.748 \text{ kg/m}^3 = 8,378 \text{ m}^3/\text{h}</math></li> <li>• <math>C_{gas} = \text{Concentration of Pollutant} = 495 \text{ mg/m}^3 = 0.000495 \text{ kg/m}^3</math></li> <li>• <math>T_{gas} = \text{Flu gas temperature} = 242 \text{ }^\circ\text{C}</math></li> <li>• <math>E_{gas} = \text{Emission of pollutant (kg/h)} = Q_{stack} \times C_{gas} \times [273 \div (273 + T_{gas})]</math></li> </ul>

- =  $8,378 \text{ m}^3/\text{h} \times 0.000495 \text{ kg}/\text{m}^3 \times [273 \div (273+242)] = 2.20 \text{ kg}/\text{h}$
- **Annual Emission of CO** =  $2.20 \text{ kg}/\text{h} \times 5,760 \text{ h}/\text{year} = 12,672 \text{ kg}/\text{year}$

\* This example calculation is based on "[National Pollutant Inventory \(NPI\) Emission Estimation Techniques Manual for Textile and Clothing Industry](#)"

Sometimes users are not aware of stack emission flow rate and instead use intake fuel flow rate to multiply with emission values. This would result in wrong calculation of total emissions as intake flow rate of fuel is much lesser than stack flow rate.

Conversions between ppm and mg/m<sup>3</sup>

Often professionals get confused while converting ppm values into mg/m<sup>3</sup> and vice versa. A common mistake is use one common conversion factor for all types of emissions; whereas, in actual the conversion factor for each gas or aerosol depends on their molecular weight. See following formulae;

- concentration (mg/m<sup>3</sup>) = 0.0409 x concentration (ppm) x molecular weight
- concentration (ppm) = 24.45 x concentration (mg/m<sup>3</sup>) ÷ molecular weight

Example: The Molecular weight of Carbon Monoxide is 28.01 g/mol. If concentration of CO is 100 ppm, the conversion shall be as follows;

- $\text{mg}/\text{m}^3 = 0.0409 \times 100 \text{ ppm} \times 28.01 \text{ g}/\text{mol} = 1.146 \text{ mg}/\text{m}^3$

Conversions can be done online using various converters e.g. <https://www.teeing.com/en/page/library/tools/ppm-mg3-converter>

## 2- Do you track your air emissions from productions?

How to answer this question	<p>The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question.</p> <p>On selecting Yes, the user is required to fill a table with following questions;</p>																						
	<table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Select all sources of air emissions relevant to your facility's operations</td> <td>Filled automatically based on selection in applicability section</td> </tr> <tr> <td>Are there emissions from this source?</td> <td>Yes/No/Unknown</td> </tr> <tr> <td>Emissions source title</td> <td>Text input (title/name of equipment /machinery /process having emissions)</td> </tr> <tr> <td>Do you track emissions from this source?</td> <td>Yes/No/Unknown</td> </tr> <tr> <td>What equipment is this source linked to?</td> <td>Text input (if there is more than one source, list all sources (e.g., Boiler 1 and Boiler 2))</td> </tr> <tr> <td>Pollutant</td> <td>Select all applicable from following list; PM10, PM2.5, NO<sub>x</sub>, SO<sub>x</sub>, VOC or Total Organic Carbon (TOC), ODS, Hazardous or Toxic Air Pollutants (HAP/TAP), Global Warming Gases (GWG), O<sub>3</sub>, CO, NH<sub>3</sub>, Other Toxic Air Pollutants, Water Vapour/Steam</td> </tr> <tr> <td>Is this pollutant regulated by a government agency?</td> <td>Yes/No</td> </tr> <tr> <td>If the pollutant is regulated by a permit, is it in compliance with the permit?</td> <td>Yes/No/Not Applicable</td> </tr> <tr> <td>If your facility is out of compliance, update the action plan for the substance detected</td> <td>Upload field (Upload required here only if limits do not meet the legal compliance air standard)</td> </tr> <tr> <td>If you cannot upload a copy, please describe the action plan</td> <td>Text input</td> </tr> </tbody> </table>	Questions	Responses	Select all sources of air emissions relevant to your facility's operations	Filled automatically based on selection in applicability section	Are there emissions from this source?	Yes/No/Unknown	Emissions source title	Text input (title/name of equipment /machinery /process having emissions)	Do you track emissions from this source?	Yes/No/Unknown	What equipment is this source linked to?	Text input (if there is more than one source, list all sources (e.g., Boiler 1 and Boiler 2))	Pollutant	Select all applicable from following list; PM10, PM2.5, NO <sub>x</sub> , SO <sub>x</sub> , VOC or Total Organic Carbon (TOC), ODS, Hazardous or Toxic Air Pollutants (HAP/TAP), Global Warming Gases (GWG), O <sub>3</sub> , CO, NH <sub>3</sub> , Other Toxic Air Pollutants, Water Vapour/Steam	Is this pollutant regulated by a government agency?	Yes/No	If the pollutant is regulated by a permit, is it in compliance with the permit?	Yes/No/Not Applicable	If your facility is out of compliance, update the action plan for the substance detected	Upload field (Upload required here only if limits do not meet the legal compliance air standard)	If you cannot upload a copy, please describe the action plan	Text input
Questions	Responses																						
Select all sources of air emissions relevant to your facility's operations	Filled automatically based on selection in applicability section																						
Are there emissions from this source?	Yes/No/Unknown																						
Emissions source title	Text input (title/name of equipment /machinery /process having emissions)																						
Do you track emissions from this source?	Yes/No/Unknown																						
What equipment is this source linked to?	Text input (if there is more than one source, list all sources (e.g., Boiler 1 and Boiler 2))																						
Pollutant	Select all applicable from following list; PM10, PM2.5, NO <sub>x</sub> , SO <sub>x</sub> , VOC or Total Organic Carbon (TOC), ODS, Hazardous or Toxic Air Pollutants (HAP/TAP), Global Warming Gases (GWG), O <sub>3</sub> , CO, NH <sub>3</sub> , Other Toxic Air Pollutants, Water Vapour/Steam																						
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If the pollutant is regulated by a permit, is it in compliance with the permit?	Yes/No/Not Applicable																						
If your facility is out of compliance, update the action plan for the substance detected	Upload field (Upload required here only if limits do not meet the legal compliance air standard)																						
If you cannot upload a copy, please describe the action plan	Text input																						

	<p>If applicable, upload emissions test report(s).</p> <p>Additional comments</p>	<p>Upload field (3rd party indoor air quality reports including IH / VOC/ Air Ambient etc.)</p> <p>Text input</p>
<p><b>Note:</b> In the future version, Higg FEM will require detailed tracking and reporting of emissions data and the below technical guidance and verification requirements are provided for reference.</p>		
<p>Scoring</p>	<ul style="list-style-type: none"> <li>• Full points if all sources are tracked and all emissions are following the permit</li> <li>• Partial Points if compliance issue documentation from permitting office shows that the issue(s) is less than three months old; and if facility has taken actions to achieve compliance</li> <li>• No points if compliance issue documentation from permitting office shows that the issue(s) is more than three months old and has not been resolved</li> </ul>	
<p>Input Connection</p>	<p>Selections in Applicability section</p>	
<p>Output Connection</p>	<p>Used to calculate baseline values</p>	
<p>Keywords</p>	<p>Tracking Air Emissions</p>	
<p>How to Systematically Fulfil Requirements</p>	<p>This question tracks the presence of indoor air quality emissions from production processes. This includes fugitive sources from production processes (sources without a chimney that emit into the building outside through windows, doors, etc.).</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• All guidelines related to developing emission inventory, tracking emissions, monitoring compliance, developing procedures and keeping records for Question 1 apply to Question 2 as well</li> <li>• However, Non-point source emissions may require a different methodology to determine the number of pollutants emitted. Note that specific regulatory calculation or reporting methodology may be applicable for fugitive sources. Examples are explained in the “Additional Notes”</li> <li>• In most cases, local regulations require facilities to test emissions at a frequency defined by the regulation (e.g., testing ambient air quality once a year). The facility must ensure compliance to the frequency and emissions limits set by local regulation. If air emission testing is also required by other subscribed standards or customers, the facility must follow the stricter limits and frequency requirements</li> </ul>	
<p>Evidence Required</p>	<p><b>Full Points</b></p> <ul style="list-style-type: none"> <li>• An inventory of emissions to air for ALL sources of emissions from production processes.</li> <li>• Emission testing/monitoring reports. Testing data compiled in a spreadsheet (e.g., Excel) is ok if the testing reports are available for review as well and the data matches the reported information to all questions answered.</li> <li>• Emission estimation methodology/calculations documented where applicable.</li> </ul>	

	<ul style="list-style-type: none"> <li>Information entered Higg for each emission source can be verified with appropriate evidence such as equipment sources and quantity of emissions.</li> </ul> <p><b>Partial Points</b></p> <ul style="list-style-type: none"> <li>Compliance issue documentation from permitting office shows that the issue(s) is less than three months old.</li> <li>An action plan is completed for any emissions source found out of compliance.</li> </ul>
<p>Additional Notes</p>	<p><b>Calculation of Emission (Examples)</b></p> <p>All the examples below (and those in How to Higg Guide) are basic examples demonstrating the principles of estimating emissions. The appropriate methodology should be applied by qualified individuals such as a process or environmental engineer.</p> <div style="display: flex; justify-content: space-around;"> <div style="background-color: #4a90e2; color: white; padding: 10px;"> <p><b>Inventory Based (Potential to Emit PTE)</b></p> <ul style="list-style-type: none"> <li>Estimating maximum possible emissions e.g.;</li> <li>Assuming 100% of a purchased solvent will be emitted as pollutant after use during the process</li> <li>Sometimes Safety Data Sheets provide range of emission in which case highest emission value in the range is used as Potential to Emit</li> <li>Composition of a chemical may be used to calculate PTE e.g.;</li> <li>As per Technical Data Sheet, a Spot Cleaner-X is found to contains 60% VOC by weight.</li> <li>Spot Cleaner-X consumption = 100 kg/y</li> <li>VOC emission = 60 kg/y</li> </ul> </div> <div style="background-color: #27ae60; color: white; padding: 10px;"> <p><b>Inventory-based (Potential to Emit + Mass Balance and/or Abatement)</b></p> <ul style="list-style-type: none"> <li>Taking into account mass balance would mean to see what physically happens during a process, e.g.;</li> <li>If 25% of solvent is recovered from the process, only 75% solvent may be assumed to be emitted</li> <li>Emission abatement</li> <li>If an emission abatement device is used to abate emission of solvent at 90% efficiency, it may be assumed that only 7.5% of solvent is emitted</li> </ul> </div> <div style="background-color: #4caf50; color: white; padding: 10px;"> <p><b>Emissions Factor-based (Factory or Offsite Testing)</b></p> <ul style="list-style-type: none"> <li>Emissions factors represent standard rates of emissions given a certain process. e.g.;</li> <li>A Nitrogen containing "Chemical-X" is mixed with an oxide. On testing emissions, 0.3kg NO<sub>x</sub> is found to be released for each kg of Chemical-X i.e. <b>Emission Factor = 0.3.</b></li> <li>Chemical-X consumption = 1000 kg/year</li> <li>NO<sub>x</sub> emission = 1000kg/y x 0.3 = 300kg/y</li> <li>This method could be cost effective if recipes do not change often; otherwise thousands of emission factors might be needed in a facility</li> </ul> </div> </div>

3- Did your facility add additional refrigerants to any existing equipment during this reporting year?																	
How to answer this question	<p>The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question. Further, the user is required to answer following questions;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Do you track refrigerant use/emissions?</td> <td>Yes</td> </tr> <tr> <td>Select all refrigerants added to existing equipment</td> <td>provide information for all added refrigerants</td> </tr> <tr> <td>Refrigerant</td> <td>Select from list</td> </tr> <tr> <td>Quantity of refrigerant added to existing equipment in this reporting year</td> <td>Numeric entry (annual quantity)</td> </tr> <tr> <td>Unit of measure</td> <td>Dropdown list</td> </tr> <tr> <td>What method was used to track emissions from this source?</td> <td>Measured/ Calculated Leakage Rate / Estimated</td> </tr> <tr> <td>What is your plan for fixing this leak?</td> <td>Explain all planned actions here</td> </tr> </tbody> </table> <p>ONLY answer NO if you did not add additional refrigerants to any existing equipment in the reporting year. Full Point will be granted.</p> <p>If you do not know whether refrigerants were added to any existing equipment in the reporting year, you should answer Unknown.</p> <p>If you know that refrigerants were added, however you do not know the quantity, you should select Yes to the question “Did your facility add additional refrigerants to any existing equipment in the reporting year?”, and select No to the Question “Do you track refrigerant use/emissions?”</p>	Questions	Responses	Do you track refrigerant use/emissions?	Yes	Select all refrigerants added to existing equipment	provide information for all added refrigerants	Refrigerant	Select from list	Quantity of refrigerant added to existing equipment in this reporting year	Numeric entry (annual quantity)	Unit of measure	Dropdown list	What method was used to track emissions from this source?	Measured/ Calculated Leakage Rate / Estimated	What is your plan for fixing this leak?	Explain all planned actions here
Questions	Responses																
Do you track refrigerant use/emissions?	Yes																
Select all refrigerants added to existing equipment	provide information for all added refrigerants																
Refrigerant	Select from list																
Quantity of refrigerant added to existing equipment in this reporting year	Numeric entry (annual quantity)																
Unit of measure	Dropdown list																
What method was used to track emissions from this source?	Measured/ Calculated Leakage Rate / Estimated																
What is your plan for fixing this leak?	Explain all planned actions here																
Scoring	<ul style="list-style-type: none"> <li>• Full points if refrigerant equipment logs are up-to-date and no refrigerant was added in the reporting year</li> <li>• Partial Points if all logs are up-to-date, leakages are identified and quantified, and action plan is in place to repair leakages immediately</li> </ul>																
Input Connection	Independent																
Output Connection	This question will contribute to the GHG-emissions calculation so it’s important for facility to enter accurate data about leak quantities. Please note that GHG result is intended to provide directional insight into opportunities to improve but is not a formal GHG calculation to be used for public reporting.																
Keywords	Emissions from Refrigerants																
How to Systematically Fulfil Requirements	<p>Having to add refrigerants to existing equipment indicates the system has a leak. If CFC-based refrigerants are maintained in the building, you must reduce annual leakage to 5% or less and reduce the total leakage over the remaining life of the equipment to less than 30% of its refrigerant charge.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• All guidelines related to developing emission inventory, tracking emissions, monitoring compliance, developing procedures and keeping records for</li> </ul>																

	<p>Question 1 and 2 apply to Question 3 as well</p> <ul style="list-style-type: none"> <li>• Map out all equipment that use refrigerants as well as all refrigerant storages and establish inventory of refrigerants</li> <li>• Establish procedure to determine usage and leakage of each refrigerant</li> <li>• Establish procedures for regular inspection and maintenance of the refrigerant using and storing equipment for any leakages             <ul style="list-style-type: none"> <li>○ Facility may use modern ultrasonic leakage detectors to detect even minor leakages in such systems</li> <li>○ With proper leakage detection and maintenance records, the facility can identify equipment with high instances of leakages or higher leakage rates despite maintenance. Such equipment should be replaced immediately and upgraded to a better technology.</li> </ul> </li> <li>• Take immediate corrective and preventive actions, evaluate results of the actions and keep records</li> <li>• Evaluate Global Warming Potential (GWP) of all used refrigerants and develop action plan for phasing-out the refrigerants or substituting with a lower GWP refrigerant</li> <li>• Identify if facility uses any refrigerants which are being phased out under an international agreement called the Montreal Protocol (e.g. CFCs and HCFCs) and develop action plan for phasing-out the refrigerants or substituting with a refrigerant with lower GWP</li> </ul>
<p>Evidence Required</p>	<p><b>Full Points</b></p> <ul style="list-style-type: none"> <li>• All refrigerant equipment has a log of equipment servicing including refrigerant replacement that is kept up to date</li> <li>• These records must show that no refrigerants were added in 2020</li> </ul> <p><b>Partial Points</b></p> <ul style="list-style-type: none"> <li>• All refrigerant equipment has a log of equipment servicing including refrigerant replacement that is kept up to date</li> <li>• Equipment logs show the date, specific type and amount of refrigeration added</li> <li>• The source of the leak(s) was identified</li> <li>• An action plan and responsible employee are in place to make sure the leak gets repaired rapidly</li> </ul>
<p>Additional Notes</p>	<p><b>Quantity of Air Emissions</b></p> <p>Amount of refrigerant added to the equipment = Refrigerant Leakage Rate</p> <p><b>Example-1:</b></p> <ul style="list-style-type: none"> <li>• After 1 year of previous recharge, equipment needs 0.5 kg of additional refrigerant recharge. This means Leakage rate is <b>0.5 kg/year</b> for that equipment</li> <li>• Assuming refrigerant used is R-401A having GWP of 1,182.48 (kg-CO<sub>2</sub> equivalent)</li> <li>• <b>Total emission = 0.5 x 1,182.48 = 591.24 kg-CO<sub>2</sub> equivalent/year</b></li> </ul> <p><b>Example-2:</b></p> <ul style="list-style-type: none"> <li>• An equipment having Full Refrigerant Charge Capacity of 5kg needed 1kg refrigerant recharge after 275 days. The leakage rate would be;             <ul style="list-style-type: none"> <li>○ <math>1 \text{ kg} \div 275 \text{ days} \times 365 \text{ days} = \mathbf{1.33 \text{ kg/year}}</math></li> </ul> </li> </ul>



	<ul style="list-style-type: none"> <li>○ <math>1.33 \text{ kg/year} \div 5 \text{ kg-capacity} = 26.6\%</math></li> <li>• Again, assuming same refrigerant as an Example-1;</li> <li>• <b>Total emission = <math>1.33 \times 1,182.48 = 1,572.69 \text{ kg-CO}_2 \text{ equivalent/year}</math></b></li> </ul> <p>Leakage rates may also be used to determine when equipment may need additional service or replacement.</p>
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<b>4- Does your facility have control devices or abatement processes for on-site point source air emissions? If yes, select all point sources of air emissions that have control devices or abatement processes.</b>											
How to answer this question	<p>The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question. On selection of YES, the user is required to answer following questions;</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #4F81BD; color: white;"> <th style="width: 60%;">Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Source</td> <td>Pre-filled based on selection made in questions 1</td> </tr> <tr> <td>Do you have control devices/abatement process for this source?</td> <td>Yes/ Partial Yes/ No/ Unknown</td> </tr> <tr> <td>What control device, abatement process, or safety equipment was used for this source of air emissions?</td> <td>Text input; describe all provisions</td> </tr> <tr> <td>What was the frequency of monitoring?</td> <td>Dropdown list</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>• Answer Yes only if facility have control device(s) installed and in operation for all source of emissions from operations.</li> <li>• Answer Partial Yes if facility have control device(s) installed and in operation for some sources of emissions from operations.</li> <li>• This question does not include controls for indoor air quality emissions from production processes.</li> </ul>	Questions	Responses	Source	Pre-filled based on selection made in questions 1	Do you have control devices/abatement process for this source?	Yes/ Partial Yes/ No/ Unknown	What control device, abatement process, or safety equipment was used for this source of air emissions?	Text input; describe all provisions	What was the frequency of monitoring?	Dropdown list
Questions	Responses										
Source	Pre-filled based on selection made in questions 1										
Do you have control devices/abatement process for this source?	Yes/ Partial Yes/ No/ Unknown										
What control device, abatement process, or safety equipment was used for this source of air emissions?	Text input; describe all provisions										
What was the frequency of monitoring?	Dropdown list										
Scoring	Full Point will be given based on the extent that the facility has abatement processes or controls processes (when technically applicable) for all identified or potential point source/stack emissions to air that result in lesser quantities of emissions that would otherwise be found if no controls were in place. This obviously requires confirmation and therefore monitoring/testing data is needed.										
Input Connection	Selection of point source emissions Question 1										
Output Connection	Independent										
Keywords	Emission Control and Abatement – Operations										
How to Systematically Fulfill Requirements	<p>The intent of this question is to understand if the facility has effective controls in place to manage and limit its emissions to air from all point sources. To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Maintain an up-to-date inventory/ list/ description of emission control or abatement provisions for all point-source air emissions (Examples include</li> </ul>										

	<p>Cyclone Precipitator, Electrostatic Precipitator, Bag Filter, Wet Scrubber, Dry Scrubber, Activated carbon Adsorption etc.)</p> <ul style="list-style-type: none"> <li>Establish procedures for inspection, monitoring and maintenance of control and abatement devices (include in facility's preventative maintenance program) <ul style="list-style-type: none"> <li>This may also include daily visual inspection checklists to promptly identify any problems.</li> </ul> </li> <li>Regularly check effectiveness of the control devices or abatement provisions by testing/monitoring emissions; keep record of all monitoring data <ul style="list-style-type: none"> <li>These test results can be used to predict in time if a control device needs maintenance</li> </ul> </li> <li>Provide training to employees responsible to operate or maintain the control devices and abatement provisions as per developed procedures</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>Schematics, descriptions or procedures for control devices or abatement processes</li> <li>Records of calibration and maintenance for control devices listed</li> <li><b>Partial Points:</b> Same as "yes" but control devices installed for some but not all sources of emissions from operations.</li> </ul>

<p><b>5- Does your facility have control devices or abatement processes for on-site fugitive/non-point source air emissions? If yes, select all fugitive/non-point sources of air emissions that have control devices or abatement processes.</b></p>											
How to answer this question	<p>The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question. On selection of YES, the user is required to answer following questions;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Source</td> <td>Pre-filled based on selection made in questions 2</td> </tr> <tr> <td>Do you have control devices/abatement process for this source?</td> <td>Yes/ Partial Yes/ No/ Unknown</td> </tr> <tr> <td>What control device, abatement process, or safety equipment was used for this source of air emissions?</td> <td>Text input; describe all provisions</td> </tr> <tr> <td>What was the frequency of monitoring?</td> <td>Dropdown list</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>Answer Yes only if facility have control device(s) installed and in operation for all source of emissions from production processes.</li> <li>Answer Partial Yes if facility have control device(s) installed and in operation for some sources of emissions from production processes.</li> <li>This question does not include controls for emissions from operations.</li> </ul>	Questions	Responses	Source	Pre-filled based on selection made in questions 2	Do you have control devices/abatement process for this source?	Yes/ Partial Yes/ No/ Unknown	What control device, abatement process, or safety equipment was used for this source of air emissions?	Text input; describe all provisions	What was the frequency of monitoring?	Dropdown list
Questions	Responses										
Source	Pre-filled based on selection made in questions 2										
Do you have control devices/abatement process for this source?	Yes/ Partial Yes/ No/ Unknown										
What control device, abatement process, or safety equipment was used for this source of air emissions?	Text input; describe all provisions										
What was the frequency of monitoring?	Dropdown list										
Scoring	<p>Full Point will be given based on the extent that the facility has abatement processes or controls (when technically applicable) for all identified or potential fugitive emissions to air that result in lesser quantities of emissions that would otherwise be found if no controls were in place.</p>										
Input Connection	<p>Selection of point source emissions Question 2</p>										

Output Connection	Independent
Keywords	Emission Control and Abatement – Production Processes
How to Systematically Fulfil Requirements	<p>The intent of this question is to understand if the facility has effective controls in place to manage and limit its emissions from non-point or fugitive sources of air emissions.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Maintain an up-to-date inventory/ list/ description of emission control or abatement provisions for all non-point/fugitive emission sources <ul style="list-style-type: none"> <li>○ Abatement process can range from a simple process or a sophisticated device and control equipment depending on the source of air emission and necessity.</li> <li>○ Examples include fume hoods or local exhaust ventilation with additional control devices or abatement processes (e.g., drying room exhaust treated for VOC), solvent recovery systems, adsorption devices, or filters/bag houses capturing the dust / flock etc.</li> <li>○ The requirement is not fulfilled if local exhaust ventilation is installed without control/abatement devices.</li> </ul> </li> <li>• Establish procedures for inspection, monitoring and maintenance of control and abatement devices (include in facility's preventative maintenance program) <ul style="list-style-type: none"> <li>○ This may also include daily visual inspection checklists to promptly identify any problems.</li> </ul> </li> <li>• Regularly check effectiveness of the control devices or abatement provisions by testing/monitoring emissions; keep record of all monitoring data <ul style="list-style-type: none"> <li>○ These test results can be used to predict in time if a control device needs maintenance</li> </ul> </li> <li>• Provide training to employees responsible to operate or maintain the control devices and abatement provisions as per developed procedures</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Schematics, descriptions or procedures for control devices or abatement processes</li> <li>• Records of calibration and maintenance for control devices listed</li> <li>• <b>Partial Points:</b> Same as "yes" but control devices installed for some but not all sources of emissions from production processes.</li> </ul>

### 5.3. Level-2

6- Has your facility gone beyond permit requirements to achieve a higher level of air performance in Nitrogen Oxides (NOx), Sulphur Oxides (SOx), and Particulate Matter (PM)?	
How to answer this question	The user may select (i) Yes, or (ii) No while answering this question.

	<p>On selection of YES, the user is required to answer following questions;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Specify Level</td> <td>Level-1: Foundational Level-2: Strategic Level-3: Aspirational</td> </tr> <tr> <td>Upload emissions testing results for PM, SO<sub>2</sub>, and NO<sub>x</sub></td> <td>Upload field</td> </tr> </tbody> </table> <p>Higg FEM encourages air emissions performance that goes beyond compliance. However, there is not currently an air standard that exists for the apparel, footwear, and textiles industry. If an industry air standard becomes available, the tool will be updated accordingly.</p>	Questions	Responses	Specify Level	Level-1: Foundational Level-2: Strategic Level-3: Aspirational	Upload emissions testing results for PM, SO <sub>2</sub> , and NO <sub>x</sub>	Upload field
Questions	Responses						
Specify Level	Level-1: Foundational Level-2: Strategic Level-3: Aspirational						
Upload emissions testing results for PM, SO <sub>2</sub> , and NO <sub>x</sub>	Upload field						
Input Connection	Independent						
Output Connection	Independent						
Keywords	Managing Emissions Beyond Permit						
How to Systematically Fulfil Requirements	<p>The intent of this question is to demonstrate whether your facility has improved air emissions from combustion devices beyond compliance.</p> <p>The Higg FEM Air section encourages facilities to reduce pollutant limits as far as possible by setting three levels of limits for combustion devices (e.g., boilers and generator) emitting Nitrogen Oxides (NO<sub>x</sub>), Sulphur Oxides (SO<sub>x</sub>) and Particulate Matter (PM).</p> <p>Currently, there is no existing air standard for the apparel, textile, and footwear industry, so The Higg Index Air section leverages a collaboratively developed set of limits that are aligned with the best available air pollutant guidance and provided in following table. If an industry air standard becomes available, the tool will be updated accordingly.</p>						

Small (less than 50 MW)		Level 1 Foundational	Level 2 Strategic	Level 3 Aspirational
	PM	150	100	50
	SO <sub>2</sub>	2000	1000	400
	NO <sub>x</sub>	650	300	200
Medium (50 MW - 300 MW)		Level 1	Level 2	Level 3
	PM	150	80	50
	SO <sub>2</sub>	1500	1000	200
	NO <sub>x</sub>	600	300	150
Large (greater than 300 MW)		Level 1	Level 2	Level 3
	PM	100	50	30
	SO <sub>2</sub>	850	600	150
	NO <sub>x</sub>	510	200	150

**Figure 17: Draft Air Standard for Boilers and Generators (Unit of measure: mg/Nm<sup>3</sup>):**

Facilities can assess different opportunities in reducing emissions at source against these levels of emission limits.

To be able to select right options and go through verification process smoothly, it is important that facility maintains following;

- Develop an action plan to achieve higher level of performance, monitor implementation of action plan and evaluate effectiveness
- Emission testing results which show facility has gone beyond permit requirements to achieve a higher level of air performance in Nitrogen Oxides (NO<sub>x</sub>), Sulphur Oxides (SO<sub>x</sub>), and Particulate Matter (PM)
  - Before selecting the level that facility has achieved, also refer to above table and compare 3<sup>rd</sup> party results with the given table
- Train key employees on methods, techniques and/or technologies used to achieve higher level of performance

Evidence Required	<ul style="list-style-type: none"> <li>• Emission testing results which show facility has gone beyond permit requirements to achieve a higher level of air performance in Nitrogen Oxides (NO<sub>x</sub>), Sulphur Oxides (SO<sub>x</sub>), and Particulate Matter (PM)</li> </ul>
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## 5.4. Level-3

**7- Do you have a process for implementing modernized equipment to reduce or eliminate air emissions and indoor air quality issues at your facility?**

How to answer this question

The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question.  
The facility must either upload relevant documentation or describe the status on

	<p>selecting YES.</p> <p>Select Yes if you have a documented plan to upgrade machinery or if all machinery has been upgraded to the most modern version as this is one of the best ways to control pollutants and minimize air emissions.</p>
Input Connection	<p>Questions 3, 4, 5 and 6.</p> <p>If refrigerant has been added and facility is on foundational level; or if control devices are partially installed; this means the facility has not fully adopted modernized equipment yet, hence “Yes” can’t be selected.</p>
Output Connection	Independent
Keywords	Modernizing Equipment
How to Systematically Fulfill Requirements	<p>The intent is for a facility to be able to share or demonstrate advanced practices to control air pollutants.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Demonstrate full compliance to Level-1 and Level-2 questions</li> <li>• Identify machinery and equipment which need replacement or upgrading due to high emissions</li> <li>• Identify techniques and technologies that results in reducing or eliminating emissions</li> <li>• It is recommended to conduct advanced multi-factor analyses when evaluating feasibility of such equipment (e.g., life-cycle assessment)</li> <li>• Based on detailed feasibility assessment, develop a plan for equipment upgrades or replacements</li> <li>• Keep record and documentation of all recent upgrades that resulted in reduction or elimination of emissions</li> <li>• Keep record of emission test reports of recent upgrades</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Documentation of plans/process for equipment upgrades or documentation of recent upgrades</li> <li>• List of recent equipment upgrades (if applicable)</li> </ul>
Additional Notes	<p>In following typical cases, the facilities are not able to demonstrate that they have a process for implementing modernized equipment to reduce or eliminate air emissions and indoor air quality issues at their facility;</p> <ul style="list-style-type: none"> <li>• Facilities who added refrigerant (Question 3) during the reporting year <ul style="list-style-type: none"> <li>○ Meaning they do not possess modernized equipment as modernized equipment would not need addition of refrigerant</li> </ul> </li> <li>• Facilities who are not able to show achievement of higher level of air performance in Question 6 <ul style="list-style-type: none"> <li>○ Meaning they do not possess advanced equipment and/or machinery (e.g., switching to Circulating Fluidized Bed Combustion Boiler for solid fuels which has significantly higher combustion efficiency and better control of emissions)</li> </ul> </li> </ul>

## 6. Waste

This section has 17 questions distributed in 3 levels and all questions are scored. The facility must answer all questions in Level-1 as “Yes” or “Partial Yes” to open Level-2 and Level-3.

Scoring scheme is provided in the following chart.

Level	Question Number	Score/ Question	Level Weight	Total
Level 1	#1 (wstsourceh), #2 (wstsourceh) #3 (wstsegregatestreams), #4 (wsthstorage), #5 (wstnhstorage), #6 (wstpolhtml) #7 (wsthtrain)	3.57	25%	100%
Level 2	#8 (wstbaseline), #9 (wstbaselinedisp) #10 (wsttarget), #11 (wsttargetdisp) #12 (wstredimpplan), #13 (wstredimp2017) #14(wstredimpdisp)	7.14	50%	
Level 3	#15 (wsthazdispvalidate), #16 (wstdispzerowaste) #17 (wstdispupcycle)	8.33	25%	

Figure 18: Scoring for waste section

### 6.1. Level-1

1- Which non-hazardous waste streams does your site produce? Select all that apply															
How to answer this question	<p>The user is required to select all applicable non-hazardous waste materials from following list;</p> <ul style="list-style-type: none"> <li>• Metal</li> <li>• Plastic</li> <li>• Paper</li> <li>• Cans</li> <li>• Food</li> <li>• Glass</li> <li>• Cartons</li> <li>• Other</li> <li>• All domestic waste combined</li> </ul> <p>After the selection, the user is required answer;</p> <p><b>Do you track your non-hazardous waste streams? (Yes/No/Unknown)</b></p> <p>On selecting Yes, user is required to fill a table with following questions;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Non-hazardous sources</td> <td>Automatically filled as per selections made above</td> </tr> <tr> <td>Do you track this source?</td> <td>Yes/No/Unknown</td> </tr> <tr> <td>Description</td> <td>Text input (Describe in detail if “Other” is selected; also describe what each waste stream contains, e.g., material waste contains fabric, cutting waste, over-lock waste etc.)</td> </tr> <tr> <td>Quantity</td> <td>Numeric input</td> </tr> <tr> <td>Unit of Measure</td> <td>Dropdown list</td> </tr> <tr> <td>Which method was used to track this source?</td> <td>Weighed/Estimated/Unknown</td> </tr> </tbody> </table>	Questions	Responses	Non-hazardous sources	Automatically filled as per selections made above	Do you track this source?	Yes/No/Unknown	Description	Text input (Describe in detail if “Other” is selected; also describe what each waste stream contains, e.g., material waste contains fabric, cutting waste, over-lock waste etc.)	Quantity	Numeric input	Unit of Measure	Dropdown list	Which method was used to track this source?	Weighed/Estimated/Unknown
Questions	Responses														
Non-hazardous sources	Automatically filled as per selections made above														
Do you track this source?	Yes/No/Unknown														
Description	Text input (Describe in detail if “Other” is selected; also describe what each waste stream contains, e.g., material waste contains fabric, cutting waste, over-lock waste etc.)														
Quantity	Numeric input														
Unit of Measure	Dropdown list														
Which method was used to track this source?	Weighed/Estimated/Unknown														

	How was this waste disposed of?	Reuse, Recycle, Energy Recovery, Incineration, On-site incineration, Landfill, On-site landfill/dumping, Physical/chemical/biological treatment, Upcycle, Other
	Describe your waste management and disposal processes for this source.	Text input
Scoring	<ul style="list-style-type: none"> <li>• Full Points if facility is completely tracking all waste streams that facility generates, the quantity of each waste stream and the disposal method of each waste stream.</li> <li>• Partial Points if facility is completely tracking at least one of the waste streams, but not yet tracking all of the sources or the disposal method of each waste stream.</li> </ul>	
Input Connection	Independent	
Output Connection	Waste disposal methods help to determine the waste disposal methods baseline in Question 9; also, this will be used in Questions 13 & 14 to compare if facility has improved the waste as compared with baseline	
Keywords	Non-hazardous waste tracking	
How to Systematically Fulfill Requirements	<p>The intent is to build awareness of all non-hazardous waste types (both production and domestic waste) at your facility and to start tracking the volume each waste type generates.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Conduct a waste assessment by mapping out all business and processes to identify sources of waste and types of waste generated</li> <li>• Develop methodology of treating and disposing each waste as per regulatory requirements or requirements of subscribed standards</li> <li>• Establish procedure to track and record all wastes and develop a waste inventory                         <ul style="list-style-type: none"> <li>○ This could be documented in tabular form showing all types of waste sources, quantities, disposal methods and their measuring /estimating method</li> <li>○ If estimation techniques are used, the calculation methodology should be clearly defined and be supported by verifiable data</li> <li>○ Use consistent units for a waste source; if conversions are used, document standard methodology for conversions using reliable sources</li> <li>○ Use on-site scales, waste invoices/manifests, receipts for waste materials that are sold, etc. to determine the amount of waste generated</li> <li>○ Keep records of waste tracking data; this data should be up-to-date and readily accessible to relevant personnel in the facility. Further, the data should be available in human readable formats so that same could be presented to verifier as evidence.</li> </ul> </li> <li>• Provide training and awareness to key employees on the facility's waste data tracking program and how data quality is maintained; and the procedures in place for tracking non-hazardous waste, including tracking the waste collection process, quantity measurement and type of disposal</li> <li>• Ensure all monitoring and measuring devices (e.g., scales) are calibrated</li> </ul>	



	and calibration record is maintained
Evidence Required	<ul style="list-style-type: none"> <li>• List of ALL non-hazardous waste produced by the facility             <ul style="list-style-type: none"> <li>○ Production Waste</li> <li>○ Packaging waste</li> <li>○ Domestic Waste</li> </ul> </li> <li>• Records for tracking both the quantity and type of disposal (including disposal destination) of ALL non-hazardous waste (e.g., invoices from waste contractors, weighing records compiled in a spreadsheet (e.g., Excel) is ok if supporting evidence is available for review as well). Records must match the reported answers to all questions answered.</li> <li>• Method of tracking the quantity and measurement method for ALL non-hazardous waste</li> <li>• Scale calibration records where applicable (e.g., as per manufacturer's specifications)</li> <li>• Estimation methodology documented where applicable</li> <li>• All non-hazardous waste 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</li> <li>• <b>Partial points:</b> Same requirements as for "Yes" above for at least one non-hazardous waste source at the facility. This must be tracked in full. This means that at least one (but not all) of the sources listed in the Level 1 table have complete answers in all columns and there is evidence to support all of the answers.</li> </ul>

<b>2- Which hazardous waste streams does your site produce? Select all that apply</b>									
How to answer this question	<p>The user is required to select all applicable non-hazardous waste materials from following list;</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <p><b>Production Waste:</b></p> <ul style="list-style-type: none"> <li>• Empty chemical drums and containers</li> <li>• Film and Printing Frame</li> <li>• Wastewater treatment sludge (industrial)</li> <li>• Expired / unused / used chemicals (waste oil, solvents, reactants, etc....)</li> <li>• Compressed Gas Cylinders (refrigerants, etc.)</li> <li>• Contaminated materials (please specify)</li> <li>• Other (please specify)</li> </ul> </td> <td style="width: 50%; vertical-align: top;"> <p><b>Domestic Waste:</b></p> <ul style="list-style-type: none"> <li>• Batteries</li> <li>• Fluorescent light bulb</li> <li>• Ink cartridges</li> <li>• Waste oil and grease (from cooking)</li> <li>• Empty containers (cleaning, sanitizing, pesticides, etc...)</li> <li>• Electronic Waste</li> <li>• Coal combustion residuals (fly ash and bottom ash/coal slag)</li> <li>• Wastewater treatment sludge (household)</li> <li>• Other (please specify)</li> </ul> </td> </tr> </table> <p>After the selection, the user is required answer;</p> <p><b>Do you track your hazardous waste streams? (Yes/No)</b></p> <p>On selecting Yes, user is required to fill a table with following questions;</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #4a7ebb; color: white;"> <th style="width: 50%;">Questions</th> <th style="width: 50%;">Responses</th> </tr> </thead> <tbody> <tr> <td>Hazardous sources</td> <td>Automatically filled as per selections made above</td> </tr> <tr> <td>Do you track this source?</td> <td>Yes/No/Unknown</td> </tr> </tbody> </table>	<p><b>Production Waste:</b></p> <ul style="list-style-type: none"> <li>• Empty chemical drums and containers</li> <li>• Film and Printing Frame</li> <li>• Wastewater treatment sludge (industrial)</li> <li>• Expired / unused / used chemicals (waste oil, solvents, reactants, etc....)</li> <li>• Compressed Gas Cylinders (refrigerants, etc.)</li> <li>• Contaminated materials (please specify)</li> <li>• Other (please specify)</li> </ul>	<p><b>Domestic Waste:</b></p> <ul style="list-style-type: none"> <li>• Batteries</li> <li>• Fluorescent light bulb</li> <li>• Ink cartridges</li> <li>• Waste oil and grease (from cooking)</li> <li>• Empty containers (cleaning, sanitizing, pesticides, etc...)</li> <li>• Electronic Waste</li> <li>• Coal combustion residuals (fly ash and bottom ash/coal slag)</li> <li>• Wastewater treatment sludge (household)</li> <li>• Other (please specify)</li> </ul>	Questions	Responses	Hazardous sources	Automatically filled as per selections made above	Do you track this source?	Yes/No/Unknown
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Hazardous sources	Automatically filled as per selections made above								
Do you track this source?	Yes/No/Unknown								

	<table border="1"> <tr> <td>Description</td> <td>Text input (describe in detail if "Other" was selected)</td> </tr> <tr> <td>Quantity</td> <td>Numeric input</td> </tr> <tr> <td>Unit of Measure</td> <td>Dropdown list</td> </tr> <tr> <td>Which method was used to track this source?</td> <td>Weighed/Estimated/Unknown</td> </tr> <tr> <td>How was this waste disposed of?</td> <td>Reuse, Recycle, Energy Recovery, Incineration, On-site incineration, Landfill, On-site landfill/dumping, Physical/chemical/biological treatment, Upcycle, Other</td> </tr> <tr> <td>Are all hazardous waste transporters, treatment and disposal facilities licensed and permitted?</td> <td>Yes/No/Not Applicable</td> </tr> <tr> <td>Upload a copy of the permit</td> <td>Upload field (Environment Permit of the waste collector by relevant authority)</td> </tr> <tr> <td>Describe your waste management and disposal processes for this source.</td> <td>Text input</td> </tr> </table>	Description	Text input (describe in detail if "Other" was selected)	Quantity	Numeric input	Unit of Measure	Dropdown list	Which method was used to track this source?	Weighed/Estimated/Unknown	How was this waste disposed of?	Reuse, Recycle, Energy Recovery, Incineration, On-site incineration, Landfill, On-site landfill/dumping, Physical/chemical/biological treatment, Upcycle, Other	Are all hazardous waste transporters, treatment and disposal facilities licensed and permitted?	Yes/No/Not Applicable	Upload a copy of the permit	Upload field (Environment Permit of the waste collector by relevant authority)	Describe your waste management and disposal processes for this source.	Text input
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Describe your waste management and disposal processes for this source.	Text input																
Scoring	<ul style="list-style-type: none"> <li>• Full Points if facility is completely tracking all hazardous waste sources AND are disposing of hazardous wastes through a licensed and permitted hazardous waste contractor. Please refer to the guidance below for information on reporting on drums or barrels.</li> <li>• Partial Points if facilities are completely tracking at least one of the hazardous waste sources but are not yet tracking all the sources.</li> </ul>																
Input Connection	Independent																
Output Connection	Waste disposal methods help to determine the waste disposal methods baseline in Question 9; also, this will be used in Questions 13 & 14 to compare if facility has improved the waste as compared with baseline																
Keywords	Non-hazardous waste tracking																
How to Systematically Fulfil Requirements	<p>The intent is to build awareness of all hazardous waste types produced onsite and to track the volume of each waste type generated and the method of disposal.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• The data tracking and reporting principles and guidance provided in the Technical Guidance of Question 1 for non-hazardous wastes should be applied to hazardous waste tracking and reporting.</li> <li>• Establish procedure to safely handle each hazardous waste as per safety data sheets or regulatory guidelines; train all relevant employees on hazardous waste handling procedures and use of personal protective equipment</li> <li>• Keep copies of up-to-date permits for hazardous waste transportation, handling, treatment and disposal</li> </ul>																
Evidence Required	<ul style="list-style-type: none"> <li>• List of ALL hazardous waste produced by the facility <ul style="list-style-type: none"> <li>○ Production Waste</li> <li>○ Packaging waste (e.g., chemical drums and containers)</li> <li>○ Domestic Waste</li> </ul> </li> <li>• Records for tracking both the quantity and type of disposal (including disposal destination) of ALL hazardous waste (e.g., invoices from waste contractors, weighing records compiled in a spreadsheet (e.g., Excel) is ok</li> </ul>																

	<p>as long as supporting evidence is available for review as well). Records must match the reported answers to all questions answered.</p> <ul style="list-style-type: none"> <li>• Method of tracking the quantity and measurement method for ALL hazardous waste.</li> <li>• Permits for hazardous waste handling (if applicable)</li> <li>• Scale calibration records where applicable (e.g. as per manufacturer’s specifications).</li> <li>• Estimation methodology documented where applicable</li> <li>• All hazardous waste 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</li> <li>• <b>Partial points:</b> Same requirements as for "Yes" above for at least one hazardous waste source at the facility. This must be tracked in full. This means that at least one (but not all) of the sources listed in the Level 1 table have complete answers in all columns and there is evidence to support all the answers.</li> </ul>
Additional Notes	<p>An example of contaminated materials can be a piece of cotton or nylon used to clean machines. The fabric is contaminated by hydraulic oil or lubricant oil or ink or chemicals and may be classified as to hazardous waste.</p> <p>Used PPE and Medical waste should also be considered as contaminated waste.</p> <p><b>Note on Drums / Barrels:</b> If you have disposed of empty drums, please enter the total weight of all drums in kilograms or metric tons. For example, if you disposed of 25 empty steel drums that weighed 20 kilograms each, please choose “Empty containers” and enter 500 kilograms (25 drums x 20 kg = 500 kg total).</p> <p>If you have disposed of full drums that contain liquid waste, please enter the volume of the drum (cubic feet, cubic yard, gallons, and meters) or the total weight (kg or metric tons).</p>

<b>3- Does your facility segregate all waste streams into non-hazardous and hazardous waste, and store them separately?</b>	
How to answer this question	The user may select (i) Yes, (ii) No, (iii) Unknown while answering this question.
Input Connection	Independent
Output Connection	Independent
Keywords	Waste Segregation
How to Systematically Fulfill Requirements	<p>The intent is for the facility to segregate hazardous and non-hazardous waste for appropriate management.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Identify all legal and other requirements regarding identifying waste as hazardous or non-hazardous, include these to the legal registry and</li> </ul>

	<p>establish a procedure to identify waste as hazardous or non-hazardous</p> <ul style="list-style-type: none"> <li>• Establish procedures and work instructions for segregating, safe handling and storing hazardous and non-hazardous waste             <ul style="list-style-type: none"> <li>○ Assessing hazards associated to each waste type and risks to personnel, facilities and environment is a good starting point for developing safety procedures</li> </ul> </li> <li>• Allocate and clearly mark locations / places for storage of hazardous and non-hazardous wastes</li> <li>• Ensure provision, maintenance and accessibility of personal protective equipment and other risk control arrangements</li> <li>• Provide training and awareness to all relevant employees on developed procedures, maintain training records and monitor compliance to established procedures. These may include;             <ul style="list-style-type: none"> <li>○ Employees responsible of producing waste</li> <li>○ Employees responsible for directly handling, segregating or storing waste</li> <li>○ Training and awareness may also include awareness posters, safety signs, waste segregation signs etc.</li> </ul> </li> </ul>
<p>Evidence Required</p>	<ul style="list-style-type: none"> <li>• Documentation for the working instructions or operating procedures of collecting generated waste, segregating waste streams (hazardous waste and non-hazardous waste), storing and transporting hazardous waste and non-hazardous waste.</li> <li>• Training materials and record for waste management and handling training</li> </ul>

<p><b>4- Does your facility have well-marked, designated hazardous waste storage areas and containers?</b></p>			
<p>How to answer this question</p>	<p>The user may select (i) Yes, (ii) No, (iii) Unknown while answering this question.</p> <p>On selection of Yes, the user is required to select Yes/No against all applicable options in following checklist;</p> <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top; width: 50%;"> <p><b>Hazardous waste storage area requirements:</b></p> <ul style="list-style-type: none"> <li>• The hazardous waste storage area is ventilated, dry and protected from the weather and fire risk.</li> <li>• The hazardous waste storage area is protected from unauthorized employees (i.e. locked).</li> <li>• Eating, smoking and drinking are not permitted in these areas.</li> <li>• The hazardous waste storage area is clearly marked.</li> <li>• 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.</li> <li>• Flammable substances are kept away from sources of heat or ignition, including the use of grounding and explosion-proof lighting.</li> <li>• Incompatible waste must be segregated.</li> </ul> </td> <td style="vertical-align: top; width: 50%;"> <p><b>Hazardous waste storage container requirements:</b></p> <ul style="list-style-type: none"> <li>• Storage containers are in good condition, appropriate for their contents, closed and clearly labelled with their contents.</li> <li>• Containers must have lids</li> <li>• Containers must be secured to prevent falling and safely stacked</li> <li>• Adequate aisle space must be maintained between containers</li> </ul> </td> </tr> </table>	<p><b>Hazardous waste storage area requirements:</b></p> <ul style="list-style-type: none"> <li>• The hazardous waste storage area is ventilated, dry and protected from the weather and fire risk.</li> <li>• The hazardous waste storage area is protected from unauthorized employees (i.e. locked).</li> <li>• Eating, smoking and drinking are not permitted in these areas.</li> <li>• The hazardous waste storage area is clearly marked.</li> <li>• 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.</li> <li>• Flammable substances are kept away from sources of heat or ignition, including the use of grounding and explosion-proof lighting.</li> <li>• Incompatible waste must be segregated.</li> </ul>	<p><b>Hazardous waste storage container requirements:</b></p> <ul style="list-style-type: none"> <li>• Storage containers are in good condition, appropriate for their contents, closed and clearly labelled with their contents.</li> <li>• Containers must have lids</li> <li>• Containers must be secured to prevent falling and safely stacked</li> <li>• Adequate aisle space must be maintained between containers</li> </ul>
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	<ul style="list-style-type: none"> <li>Spill response equipment including necessary personal protective equipment (PPE) must be located near storage areas including accessible emergency eyewash and/or shower stations.</li> <li>Employees must use appropriate personal protective equipment (PPE) when in these areas.</li> </ul>
Input Connection	Independent
Output Connection	Independent
Keywords	Hazardous Waste Storage
How to Systematically Fulfil Requirements	<p>This intent is to ensure proper storage of non-hazardous waste in all parts of your facility.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>Develop procedures for ensuring hazardous waste storage and status in the storage area records are always kept compliant with the requirements of this question</li> <li>Conduct waste hazard assessment and train employees on how to prevent contamination in hazardous storage area</li> <li>Ensure provision, maintenance and accessibility of personal protective equipment and other safety provisions (especially fire safety) according to the hazards and risk assessment and train relevant employees</li> <li>The facility should have a dedicated location for the hazardous waste storage.             <ul style="list-style-type: none"> <li>The checklist in the question is quite comprehensive and a facility can easily get full marks if the checklist is implemented properly; however, further technical guidance is also provided in the How to Higg Guide.</li> </ul> </li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>Procedures for ensuring hazardous waste storage and status in the storage area records are always kept compliant with the above technical guidance.</li> </ul>

<b>5- Does your facility have well-marked, designated non-hazardous waste storage areas and containers?</b>			
How to answer this question	<p>The user may select (i) Yes, (ii) No, (iii) Unknown while answering this question.</p> <p>On selection of Yes, the user is required to select Yes/No against all applicable options in following checklist;</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <p><b>Non-hazardous waste storage area requirements:</b></p> <ul style="list-style-type: none"> <li>The non-hazardous waste storage area is ventilated, dry and protected from the weather and fire risk, and must be stored on impervious surfaces.</li> <li>The non-hazardous waste storage area</li> </ul> </td> <td style="width: 50%; vertical-align: top;"> <p><b>Non-hazardous waste storage container requirements:</b></p> <ul style="list-style-type: none"> <li>Storage containers are in good condition, appropriate for their contents, closed and clearly labelled with their contents.</li> <li>Containers must be secured to prevent</li> </ul> </td> </tr> </table>	<p><b>Non-hazardous waste storage area requirements:</b></p> <ul style="list-style-type: none"> <li>The non-hazardous waste storage area is ventilated, dry and protected from the weather and fire risk, and must be stored on impervious surfaces.</li> <li>The non-hazardous waste storage area</li> </ul>	<p><b>Non-hazardous waste storage container requirements:</b></p> <ul style="list-style-type: none"> <li>Storage containers are in good condition, appropriate for their contents, closed and clearly labelled with their contents.</li> <li>Containers must be secured to prevent</li> </ul>
<p><b>Non-hazardous waste storage area requirements:</b></p> <ul style="list-style-type: none"> <li>The non-hazardous waste storage area is ventilated, dry and protected from the weather and fire risk, and must be stored on impervious surfaces.</li> <li>The non-hazardous waste storage area</li> </ul>	<p><b>Non-hazardous waste storage container requirements:</b></p> <ul style="list-style-type: none"> <li>Storage containers are in good condition, appropriate for their contents, closed and clearly labelled with their contents.</li> <li>Containers must be secured to prevent</li> </ul>		

	<p>is clearly marked. falling and safely stacked.</p> <ul style="list-style-type: none"> <li>Flammable substances are kept away from sources of heat or ignition, including the use of grounding and explosion-proof lighting.</li> <li>Employees must use appropriate personal protective equipment (PPE) when in these areas</li> </ul>
Input Connection	Independent
Output Connection	Independent
Keywords	Non-hazardous Waste Storage
How to Systematically Fulfill Requirements	<p>This intent is to ensure proper storage of non-hazardous waste in all parts of your facility.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>Develop procedures for ensuring non-hazardous waste storage and status in the storage area records are always kept compliant with the requirements of this question</li> <li>Conduct waste hazard assessment and train employees on how to prevent contamination in hazardous storage area                             <ul style="list-style-type: none"> <li>Non-hazardous wastes can pose contamination risks (e.g., pollution, waste being dispersed by the wind, food waste leachate, soil contamination, groundwater contamination) and risks to workers (e.g., fire, sharp objects)</li> <li>Ensure that waste is not kept for too long</li> </ul> </li> <li>Ensure provision, maintenance and accessibility of personal protective equipment and other safety provisions (especially fire safety) according to the hazards and risk assessment and train relevant employees</li> <li>The facility should have a dedicated location for the non-hazardous waste storage.                             <ul style="list-style-type: none"> <li>The checklist in the question is quite comprehensive and a facility can easily get full marks if the checklist is implemented properly; however, further technical guidance is also provided in the How to Higg Guide.</li> </ul> </li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>Procedures for ensuring non-hazardous waste storage and status in the storage area records are always kept compliant with the above technical guidance.</li> </ul>

6- Does your facility forbid open burning and dumping on-site?					
How to answer this question	<p>The user is required to answer following;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Open burning is forbidden</td> <td>Yes/No</td> </tr> </tbody> </table>	Questions	Responses	Open burning is forbidden	Yes/No
Questions	Responses				
Open burning is forbidden	Yes/No				

	<p>If open burning is not forbidden, please describe the technology used and how you control air emissions</p> <p>Open dumping is forbidden</p> <p>If open dumping is not forbidden, please describe the technology used and how you control air emissions</p>	<p>Text input</p> <p>Yes/No</p> <p>Text input</p>
Input Connection	Independent	
Output Connection	Independent	
Keywords	Waste Burning, Waste Dumping	
How to Systematically Fulfill Requirements	<p>On-site open burning or landfilling of waste can cause contamination in the soil and groundwater, air pollution from smoke emissions and gas generation, and health hazards. The intent is to drive you to eliminate all open burning and on-site dumping at your facility.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Establish strict policy and protocols of forbidding open burning and dumping of wastes</li> <li>• Disseminate the policy to all employees especially those who are responsible for directly handling, storing and disposing wastes</li> <li>• Monitor and record any incidences of open burning and dumping and keep record of corrective and preventive actions taken</li> <li>• Attain authorization/approval/permit from relevant regulatory bodies if waste incineration is carried out at site. Ensure that the process and technology are well controlled and effective provisions of controlling air emissions are available and functional</li> <li>• Maintain record of waste incinerated at site and air emissions quality tests</li> <li>• Attain authorization/approval/permit from relevant regulatory bodies if landfilling is carried out at site.                         <ul style="list-style-type: none"> <li>○ All hazardous waste should be passed on to a licensed and permitted handler (Certified legal contractor) and solid waste should be managed by a qualified third-party vendor that will treat the waste minimizing and controlling all health and environmental impact.</li> <li>○ Final disposal and treatment shouldn't be handled on-site (in the factory premise) by the factory employees.</li> </ul> </li> </ul>	
Evidence Required	<ul style="list-style-type: none"> <li>• Policy for forbidding burning and dumping onsite</li> </ul>	

<b>7- Does your site provide training to all employees whose work involves hazardous waste handling (such as maintenance and custodial staff)?</b>	
How to answer this question	The user may select (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown while answering this question.

	<p>On selecting Yes or Partial Yes, the user is required to answer following;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>                     If yes, please select all topics included in your training:                     <ul style="list-style-type: none"> <li>• Proper handling</li> <li>• Storage and disposal techniques and procedures</li> <li>• Specific operational procedures for waste minimization</li> <li>• Use of personal protective equipment</li> <li>• Other</li> </ul> </td> <td>Select all applicable options using check-boxes</td> </tr> <tr> <td>If Other, please specify</td> <td>Text input</td> </tr> <tr> <td>How many employees were trained?</td> <td>Numeric input (annual numbers)</td> </tr> <tr> <td>How frequently do you train your employees?</td> <td>Dropdown list</td> </tr> <tr> <td>Please upload documentation</td> <td>                     Upload field                      (Please upload complete training records not just on training plan. Ideally, training notification, training day summary, training attendance, training pictures, training material and training evaluation etc.)                 </td> </tr> </tbody> </table>	Questions	Responses	If yes, please select all topics included in your training: <ul style="list-style-type: none"> <li>• Proper handling</li> <li>• Storage and disposal techniques and procedures</li> <li>• Specific operational procedures for waste minimization</li> <li>• Use of personal protective equipment</li> <li>• Other</li> </ul>	Select all applicable options using check-boxes	If Other, please specify	Text input	How many employees were trained?	Numeric input (annual numbers)	How frequently do you train your employees?	Dropdown list	Please upload documentation	Upload field (Please upload complete training records not just on training plan. Ideally, training notification, training day summary, training attendance, training pictures, training material and training evaluation etc.)
Questions	Responses												
If yes, please select all topics included in your training: <ul style="list-style-type: none"> <li>• Proper handling</li> <li>• Storage and disposal techniques and procedures</li> <li>• Specific operational procedures for waste minimization</li> <li>• Use of personal protective equipment</li> <li>• Other</li> </ul>	Select all applicable options using check-boxes												
If Other, please specify	Text input												
How many employees were trained?	Numeric input (annual numbers)												
How frequently do you train your employees?	Dropdown list												
Please upload documentation	Upload field (Please upload complete training records not just on training plan. Ideally, training notification, training day summary, training attendance, training pictures, training material and training evaluation etc.)												
Scoring	<ul style="list-style-type: none"> <li>• Full Points if all topics were included in the training</li> <li>• Partial Points if some (but not all) topics were included in the training</li> </ul>												
Input Connection	Independent												
Output Connection	Independent												
Keywords	Employee training												
How to Systematically Fulfil Requirements	<p>The intent is for facility to educate all necessary workers on appropriate waste handling procedures.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Conduct a training need analysis of all employees whose work involves hazardous waste handling (such as maintenance and custodial staff)                             <ul style="list-style-type: none"> <li>○ A good practice is to base the trainings on job requirements of the workers and relevant knowledge and skill needs</li> <li>○ Department and employee performance reviews also provide good information about skill and training gaps</li> </ul> </li> <li>• Provide sufficient working instruction and signs for handling, segregating and transporting non-hazardous waste</li> <li>• Develop a training calendar and organize trainings regularly (at least quarterly or in a frequency that allows training all new employees according to the turnover rate) delivered by competent personnel; ensuring all relevant workers have attended the training                             <ul style="list-style-type: none"> <li>○ It is recommended to prepare a facility wide training plan covering all environmental subjects</li> </ul> </li> <li>• Each of the mentioned training topics in this question can be further elaborated in multiple sub-topics; examples of which are provided in technical guidance of this question in How to Higg Guide. It is recommended</li> </ul>												



	<p>to elaborate these topics based on following;</p> <ul style="list-style-type: none"> <li>○ Awareness related to environmental performance</li> <li>○ Legal and other requirements</li> <li>○ Occupational safety and health (especially risk and safety provisions)</li> <li>○ Procedures and processes established by the facility</li> <li>● Maintain record of all training and awareness activities including;             <ul style="list-style-type: none"> <li>○ Attendance sheets</li> <li>○ Training content/material</li> <li>○ Evaluation/test results of participants</li> <li>○ Pictures of the training and awareness activities</li> </ul> </li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>● Training documentation including ALL the below:             <ul style="list-style-type: none"> <li>○ Proper handling</li> <li>○ The procedures for identifying, segregating, collecting and transporting hazardous waste</li> <li>○ The procedures of tracking and weighing the quantity of hazardous waste</li> <li>○ Storage and disposal techniques and procedures</li> <li>○ Specific operational procedures for waste minimization</li> <li>○ Personal protective equipment distribution and usage management</li> </ul> </li> <li>● <b>Partial points:</b> Documentation of SOME of the listed training topics</li> </ul>

## 6.2. Level-2

8- Has your facility set a baseline for solid waste?																			
How to answer this question	<p>The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question.</p> <p>On selection of “Yes”, the tool requires to fill two tables (one for Hazardous Waste and one for Non-Hazardous Waste) asking following questions;</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #4F81BD; color: white;"> <th style="width: 50%;">Questions</th> <th style="width: 50%;">Responses</th> </tr> </thead> <tbody> <tr> <td>Non-hazardous / Hazardous waste baseline</td> <td>Filled automatically according to selection in questions 1 and 2</td> </tr> <tr> <td>Have you set a baseline for this source?</td> <td>Yes/No</td> </tr> <tr> <td>Is the baseline absolute or normalized?</td> <td>Normalized/Absolute</td> </tr> <tr> <td>What is the baseline quantity?</td> <td>Text input (annual)</td> </tr> <tr> <td>Unit of measure</td> <td>dropdown list</td> </tr> <tr> <td>Enter the baseline year</td> <td>dropdown list</td> </tr> <tr> <td>How was your baseline calculated?</td> <td>Text input: describe the methodology e.g., Total waste generated divided by total production volume meter/kg or unit</td> </tr> <tr> <td>Was the baseline verified?</td> <td>Yes/No</td> </tr> </tbody> </table>	Questions	Responses	Non-hazardous / Hazardous waste baseline	Filled automatically according to selection in questions 1 and 2	Have you set a baseline for this source?	Yes/No	Is the baseline absolute or normalized?	Normalized/Absolute	What is the baseline quantity?	Text input (annual)	Unit of measure	dropdown list	Enter the baseline year	dropdown list	How was your baseline calculated?	Text input: describe the methodology e.g., Total waste generated divided by total production volume meter/kg or unit	Was the baseline verified?	Yes/No
Questions	Responses																		
Non-hazardous / Hazardous waste baseline	Filled automatically according to selection in questions 1 and 2																		
Have you set a baseline for this source?	Yes/No																		
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What is the baseline quantity?	Text input (annual)																		
Unit of measure	dropdown list																		
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How was your baseline calculated?	Text input: describe the methodology e.g., Total waste generated divided by total production volume meter/kg or unit																		
Was the baseline verified?	Yes/No																		
Input Connection	Waste Question 1 and Question 2																		
Output Connection	Used for setting reduction targets																		

Keywords	Waste Baseline
How to Systematically Fulfil Requirements	<p>Waste baseline is quantitative reference(s) providing a basis for comparison of waste generation over time. A waste baseline is based on data from a specified period and/or conditions, as defined by the organization.</p> <p>For Higg FEM, a baseline should generally comprise of a full calendar year's data.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Establish a procedure of developing, monitoring, verifying and updating the waste baselines, including data records, conditions for revising baselines, measuring methods etc.</li> <li>• Confirm the waste generation data is stable, and sufficient to be used to determine a baseline and establish baselines using the information from the waste generation data, considering a suitable period</li> <li>• Baselines can be Absolute (e.g., 1,500 Tonne/year) or Normalized (e.g., 50 kg/Tonne-production). If the data indicates that relevant variables significantly affect waste generation (e.g., raw material type, variation in process flows, significant change in facility operations or facilities), the facility must carry out normalization of the baselines. Depending on the nature of the activities, normalization can be a simple adjustment, or a more complex procedure.</li> <li>• Baselines should be revised, (i) as per predefined method, or (ii) if there have been major changes in the waste sources or facility's waste generation patterns <ul style="list-style-type: none"> <li>○ If the baseline is used to evaluate performance against a target, the baseline should remain unchanged. The baseline may be revised once the target is achieved, and the baseline is no more relevant.</li> </ul> </li> <li>• The facility should retain information of baselines, relevant variable data and modifications to baselines as documented information</li> <li>• Maintain record of verification of waste baselines e.g., previous Higg FEM Verifications, Internal / external waste assessment by qualified personnel etc.</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Documentation of each waste source's baseline and baseline setting process as well as the related data tracking regarding baseline setting</li> <li>• Ability to demonstrate how baseline data was validated</li> </ul>
Additional Notes	<p>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. The record of verification must be maintained.</p> <p>For waste generation that is not related to production, other normalizing metrics should be used where appropriate (e.g., Waste generated in the canteen can be normalized per meal served or per worker)</p> <p>Facility construction and demolition waste should not be included in the baseline and reduction performance. Also, the reductions are attributable to measures taken by the site.</p>

9- Did you set a baseline for waste disposal methods for your facility's overall waste?															
How to answer this question	<p>The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question.</p> <p>On selection of “Yes”, the tool requires to fill a table asking following questions;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Disposal methods</td> <td>Pre-filled with following; Reuse, Recycle, Energy Recovery, Incineration, On-site incineration, Landfill, On-site landfill/dumping, Physical/chemical/biological treatment, Upcycle, Other</td> </tr> <tr> <td>Have you set a baseline for this method?</td> <td>Yes/No</td> </tr> <tr> <td>What is the baseline quantity?</td> <td>%age waste disposed of using each method. Cumulative sum of all methods should be 100%</td> </tr> <tr> <td>Enter the baseline year</td> <td>dropdown list</td> </tr> <tr> <td>How was your baseline calculated?</td> <td>Text input; describe the methodology</td> </tr> <tr> <td>Was the baseline verified?</td> <td>Yes/No</td> </tr> </tbody> </table>	Questions	Responses	Disposal methods	Pre-filled with following; Reuse, Recycle, Energy Recovery, Incineration, On-site incineration, Landfill, On-site landfill/dumping, Physical/chemical/biological treatment, Upcycle, Other	Have you set a baseline for this method?	Yes/No	What is the baseline quantity?	%age waste disposed of using each method. Cumulative sum of all methods should be 100%	Enter the baseline year	dropdown list	How was your baseline calculated?	Text input; describe the methodology	Was the baseline verified?	Yes/No
Questions	Responses														
Disposal methods	Pre-filled with following; Reuse, Recycle, Energy Recovery, Incineration, On-site incineration, Landfill, On-site landfill/dumping, Physical/chemical/biological treatment, Upcycle, Other														
Have you set a baseline for this method?	Yes/No														
What is the baseline quantity?	%age waste disposed of using each method. Cumulative sum of all methods should be 100%														
Enter the baseline year	dropdown list														
How was your baseline calculated?	Text input; describe the methodology														
Was the baseline verified?	Yes/No														
Input Connection	Waste Question 1 and Question 2														
Output Connection	Used for setting reduction targets														
Keywords	Waste Disposal Methods														
How to Systematically Fulfil Requirements	<p>Setting a baseline (i.e., the annual performance of a set parameter at a defined base year) enables you to have clear reference point for ongoing improvements in waste disposal method tracking and target setting.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>Track and record waste quantity disposed of by each of the listed methods using the verified waste baseline data (see previous question)</li> <li>Confirm the waste generation data is stable, and sufficient to be used to determine a baseline and establish baselines using the information from the waste generation data, considering a suitable period</li> <li>If the data indicates that relevant variables significantly affect waste generation (e.g., raw material type, variation in process flows, significant change in facility operations or facilities), the facility must carry out normalization of the baselines. Depending on the nature of the activities, normalization can be a simple adjustment, or a more complex procedure.</li> <li>Baselines should be revised, (i) as per predefined method, or (ii) if there have been major changes in the waste sources or facility’s waste generation patterns                         <ul style="list-style-type: none"> <li>If the baseline is used to evaluate performance against a target, the baseline should remain unchanged. The baseline may be revised once the target is achieved, and the baseline is no more relevant.</li> </ul> </li> <li>The facility should retain information of baselines, relevant variable data and modifications to baselines as documented information</li> <li>Maintain record of verification of waste baselines e.g., previous Higg FEM</li> </ul>														

	Verifications, Internal / external waste assessment by qualified personnel etc.
Evidence Required	<ul style="list-style-type: none"> <li>Documentation of each the waste disposal's baseline and baseline setting process as well as the related data tracking regarding baseline setting</li> <li>Ability to demonstrate how baseline data was validated (e.g., used Higg FEM 3.0 verified data, used internal validation process)</li> <li>Waste handlers' contract. The records of waste disposal data and process explanation.</li> </ul>
Additional Notes	<p>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. The record of verification must be maintained.</p> <p>For waste generation that is not related to production, other normalizing metrics should be used where appropriate (e.g., Waste generated in the canteen can be normalized per meal served or per worker)</p> <p>To calculate the waste disposal methods baseline, divide the total amount of waste disposed of using a method by the total amount of waste generated. For example:</p> <p>Total waste generated from all sources= 460,555 kg per year</p> <p>Total amount of waste recycled (all relevant sources) = 255,000 kg/year</p> <p>Baseline for recycled waste= 55.3% (255,000 kg/460,555 kg)</p>

<b>10- Does your facility set formal targets to reduce waste quantity?</b>											
How to answer this question	<p>The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question.</p> <p>On selection of "Yes", the tool requires to fill two tables (one for non-hazardous waste and one for hazardous waste) asking following questions;</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #4F81BD; color: white;">Questions</th> <th style="background-color: #4F81BD; color: white;">Responses</th> </tr> </thead> <tbody> <tr> <td>Non-hazardous / hazardous Waste Targets</td> <td>Filled automatically according to selection in question 1 and question 2</td> </tr> <tr> <td>What does your target change for waste generated from this source?</td> <td>Negative percentage for reduction and positive for increase</td> </tr> <tr> <td>What is the target year?</td> <td>dropdown list</td> </tr> <tr> <td>Describe the measures planned to achieve this target</td> <td>Text input</td> </tr> </tbody> </table>	Questions	Responses	Non-hazardous / hazardous Waste Targets	Filled automatically according to selection in question 1 and question 2	What does your target change for waste generated from this source?	Negative percentage for reduction and positive for increase	What is the target year?	dropdown list	Describe the measures planned to achieve this target	Text input
Questions	Responses										
Non-hazardous / hazardous Waste Targets	Filled automatically according to selection in question 1 and question 2										
What does your target change for waste generated from this source?	Negative percentage for reduction and positive for increase										
What is the target year?	dropdown list										
Describe the measures planned to achieve this target	Text input										
Scoring	<ul style="list-style-type: none"> <li>Full Points if facility sets targets for waste quantity that make up 80% or more of total waste generated</li> <li>Partial Points if facility sets targets for waste quantities that make up 50-79% of total waste generated. This is to reward for aiming to reduce your greatest sources of waste generation which will maximize environmental impact.</li> </ul>										
Input Connection	Water Question 1 and Question 2, Water Baseline										
Output Connection	Environmental Action Plan										

Keywords	Waste Reduction Targets
How to Systematically Fulfill Requirements	<p>The intent is to enable facilities in reducing waste generation in a systemic way.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Determine and prioritize opportunities for reducing waste generation</li> <li>• Establish and maintain action plans that include specific actions to achieve waste reduction targets, required resources, responsibilities, timelines and methodology of evaluating results. <ul style="list-style-type: none"> <li>○ It is advised to make a common environmental action plan for all Higg FEM sections for consistency and ease of monitoring.</li> </ul> </li> <li>• Establish targets for all waste sources (at least 80% to score full points) against the waste baselines, based on the formal evaluation of opportunities and action plans. <ul style="list-style-type: none"> <li>○ Facilities can separate targets for waste quantities and disposal methods. This Question focuses on waste quantities for specific sources of waste.</li> </ul> </li> <li>• 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.</li> <li>• Ensure the target is relevant to reducing the site's waste generation (e.g., focuses on the most significant waste generation areas at the site)</li> <li>• Provide training to key personnel on methodology of determining, monitoring and reviewing targets (e.g., based on calculated reductions from evaluations of improvement opportunities)</li> <li>• Conduct (and keep record of) management review meetings to drive continuous improvement and review on-site waste reduction targets (at least on an annual basis).</li> <li>• Management should actively promote or endorse proactive waste conservation e.g., by providing resources, establishing an environmental policy, conducting awareness sessions with employees etc.</li> <li>• Ensure waste data is made available to relevant internal and/or external stakeholders in order to drive accountability for achieving targets</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Supporting documentation that demonstrates targets are based on a formal evaluation of reductions/improvement opportunities (e.g., calculations, waste quantity data and baselines, new/proposed equipment specifications, etc.)</li> <li>• Supporting methodology and calculations to show how the target(s) was calculated</li> <li>• List of measures/actions to be taken to achieve the target</li> <li>• <b>Partial Points:</b> Same requirements as for "Yes" answer but for sources (or one source) totalling 50-79% of waste generation</li> </ul>
Additional Notes	<p>If only one source of waste makes up for more than 80% of waste generation, the facility needs to set target only for this one water source to attain full points.</p>

**11- Did you set a target for improving waste disposal methods for your facility's overall**

<b>waste?</b>													
How to answer this question	<p>The user may select (i) Yes, or (ii) No while answering this question.</p> <p>On selection of “Yes”, the tool requires to fill a table asking following questions;</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #4F81BD; color: white;">Questions</th> <th style="background-color: #4F81BD; color: white;">Responses</th> </tr> </thead> <tbody> <tr> <td>Disposal methods</td> <td>Pre-filled with following; Reuse, Recycle, Energy Recovery, Incineration, On-site incineration, Landfill, On-site landfill/dumping, Physical/chemical/biological treatment, Upcycle, Other</td> </tr> <tr> <td>Did you set a target for improving waste disposal method?</td> <td>Yes/No</td> </tr> <tr> <td>What does your target change for this method of disposal?</td> <td>Negative percentage for reduction and positive for increase</td> </tr> <tr> <td>What is the target year?</td> <td>dropdown list</td> </tr> <tr> <td>Describe the measures planned to achieve this target</td> <td>Text input</td> </tr> </tbody> </table>	Questions	Responses	Disposal methods	Pre-filled with following; Reuse, Recycle, Energy Recovery, Incineration, On-site incineration, Landfill, On-site landfill/dumping, Physical/chemical/biological treatment, Upcycle, Other	Did you set a target for improving waste disposal method?	Yes/No	What does your target change for this method of disposal?	Negative percentage for reduction and positive for increase	What is the target year?	dropdown list	Describe the measures planned to achieve this target	Text input
Questions	Responses												
Disposal methods	Pre-filled with following; Reuse, Recycle, Energy Recovery, Incineration, On-site incineration, Landfill, On-site landfill/dumping, Physical/chemical/biological treatment, Upcycle, Other												
Did you set a target for improving waste disposal method?	Yes/No												
What does your target change for this method of disposal?	Negative percentage for reduction and positive for increase												
What is the target year?	dropdown list												
Describe the measures planned to achieve this target	Text input												
Input Connection	Baseline for Waste disposal methods												
Output Connection	Environmental Action Plan												
Keywords	Waste Reduction Targets												
How to Systematically Fulfil Requirements	<p>The intent is for you to set up at least one target to improvement the waste disposal methods at your facility.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Evaluate which disposal methods are preferred and whether preferred methods are available                             <ul style="list-style-type: none"> <li>○ Increase quantity of waste sent to external recycling contractors and biological treatment (such as non-hazardous production waste recycling and food waste biological treatment) to divert waste from landfill or incineration without energy recovery</li> <li>○ Switch to a disposal/treatment method that recovers usable aspects of the waste (e.g., using incineration with energy recovery as opposed to landfilling)</li> </ul> </li> <li>• Calculate the amount of waste that can be diverted to the preferred method                             <ul style="list-style-type: none"> <li>○ Confirm if the vendor can recycle the materials and has applicable technology and operating permits to do so.</li> </ul> </li> <li>• Establish and maintain waste management plans that include specific actions to achieve set targets, required resources, responsibilities, timelines and methodology of evaluating results.                             <ul style="list-style-type: none"> <li>○ It is advised to make a common environmental action plan for all Higg FEM sections for consistency and ease of monitoring.</li> </ul> </li> <li>• 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.</li> <li>• Ensure the target is relevant to reducing the site’s waste disposal methods (e.g., focuses on the most significant waste generated, or most used disposal method)</li> </ul>												

	<ul style="list-style-type: none"> <li>• Provide training to key personnel on methodology of determining, monitoring and reviewing targets (e.g., based on calculated reductions from evaluations of improvement opportunities)</li> <li>• Conduct (and keep record of) management review meetings to drive continuous improvement and review on-site targets (at least on an annual basis).</li> <li>• Management should actively promote or endorse proactive waste conservation e.g., by providing resources, establishing an environmental policy, conducting awareness sessions with employees etc.</li> <li>• Ensure waste data is made available to relevant internal and/or external stakeholders in order to drive accountability for achieving targets</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Waste diversion improvement strategies/Waste management plan.</li> <li>• Supporting documentation that demonstrates targets are based on a formal evaluation of reductions/improvement opportunities (e.g., waste quantity data and baselines, new/proposed disposal methods, etc.).</li> <li>• Supporting methodology and calculations to show how the target(s) was calculated.</li> <li>• List of measure/actions to be taken to achieve the target.</li> </ul>

<b>12- Does your facility have an implementation plan to reduce waste quantity or improve type of treatment?</b>	
How to answer this question	<p>The user may select (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown while answering this question.</p> <p>On selection of “Yes” or “Partial Yes”, the tool requires user to upload the implementation plan.</p> <ul style="list-style-type: none"> <li>• Answer Yes if an implementation plan is in place that demonstrates facility is taking action to achieve the targeted reductions or improvements</li> <li>• Answer Partial Yes if a plan is in place but facility has not started on all action items</li> </ul>
Input Connection	Targets and Actions identified in Question 10 and Question 11
Output Connection	Environmental Action Plan, Waste Tracking Reports
Keywords	Action Plan
How to Systematically Fulfill Requirements	<p>The intent is for your facility to create an action plan for improving waste management (amount or final disposal).</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Determine and prioritize opportunities for reducing waste use (also required for Question 10) or improving waste disposal methods (also required for Question 11)</li> <li>• Evaluate improvement options based on a set criterion (e.g., payback, return on investment, legal compliance, customer requirements etc.) and select the most suited options</li> </ul>

	<ul style="list-style-type: none"> <li>Establish and maintain action plans that include specific actions to reduce water use, required resources, responsibilities, timelines and methodology of evaluating results. <ul style="list-style-type: none"> <li>It is advised to make a common environmental action plan for all Higg FEM sections for consistency and ease of monitoring.</li> </ul> </li> <li>Conduct a management review of action plan setting process and take necessary decisions to enable timely implementation and desired results</li> <li>Communicate the plans for managing and implementing environmental performance improvements of waste management to key employees and Waste handling contractors</li> <li>Ensure that key employees are aware of their responsibilities and participate in the improvement process. It is advised to keep record of awareness activities (e.g., attendance sheets) and team meetings (minutes of meeting).</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>Plan is in place for managing and implementing environmental performance improvements of waste management.</li> <li><b>Partial Yes:</b> <ul style="list-style-type: none"> <li>Facility is in the process of creating a plan for managing and implementing environmental performance improvements of waste management.</li> </ul> </li> </ul>

**13- Has your facility reduced waste quantity or improved type of treatment in this reporting year, compared with the established baseline?**

How to answer this question	<p>The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question.</p> <p>On selection of “Yes” or “Partial Yes”, the tool requires user to fill two tables (one for non-hazardous and one for hazardous waste) with following questions;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Non-hazardous /Hazardous waste improvements</td> <td>Filled automatically according to selection in question 1 &amp; 2</td> </tr> <tr> <td>Waste source</td> <td>Yes/No Please select No as your answer option for that source if you have no reductions in the last calendar year or are unable to state what your reductions are for a source</td> </tr> <tr> <td>Select a baseline year</td> <td>Dropdown list</td> </tr> <tr> <td>Quantity</td> <td>Numeric input (quantity change) -ve number for reduction and +ve for increase</td> </tr> <tr> <td>Unit of measure</td> <td>Dropdown list</td> </tr> <tr> <td>Percent Change</td> <td>-ve number for reduction and +ve for increase.</td> </tr> <tr> <td>Describe the strategies used to achieve this improvement</td> <td>Text input: describe what measures were taken and how the savings were achieved</td> </tr> </tbody> </table>	Questions	Responses	Non-hazardous /Hazardous waste improvements	Filled automatically according to selection in question 1 & 2	Waste source	Yes/No Please select No as your answer option for that source if you have no reductions in the last calendar year or are unable to state what your reductions are for a source	Select a baseline year	Dropdown list	Quantity	Numeric input (quantity change) -ve number for reduction and +ve for increase	Unit of measure	Dropdown list	Percent Change	-ve number for reduction and +ve for increase.	Describe the strategies used to achieve this improvement	Text input: describe what measures were taken and how the savings were achieved
Questions	Responses																
Non-hazardous /Hazardous waste improvements	Filled automatically according to selection in question 1 & 2																
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Unit of measure	Dropdown list																
Percent Change	-ve number for reduction and +ve for increase.																
Describe the strategies used to achieve this improvement	Text input: describe what measures were taken and how the savings were achieved																
Scoring	<ul style="list-style-type: none"> <li>Full Points if facility made reductions for waste sources that make up 80% or more of total waste generated.</li> <li>Partial Points if facility made reductions for waste sources that make up 50-79% of total waste generated. This is to reward for reducing your greatest sources of waste which will maximize environmental impact.</li> </ul>																



Input Connection	Waste Baselines, Targets, and Action Plans
Output Connection	Independent
Keywords	Monitoring, Tracking, Demonstrated reductions in waste quantity
How to Systematically Fulfil Requirements	<p>Taking action to reduce impacts on site is the primary important goal for this assessment.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Establish procedure of monitoring the progress of implementation and keep record of monitoring activities and results</li> <li>• Conduct a management review of implementation and take necessary decisions to enable timely implementation and desired results</li> <li>• Review the waste source data and aggregated total to ensure the data and any automated calculations are accurate.</li> <li>• Review the actions taken to make improvements and determine if they have resulted in measurable improvements by comparing the data with historical waste generation data to determine the improvement quantity.</li> <li>• Evaluate results of completed actions, verify waste reductions and record the results in form of waste tracking /monitoring reports</li> <li>• Ensure that whole process is inclusive in nature and key employees can explain and demonstrate how the improvement was achieved</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Waste tracking reports and quantity records showing reductions of waste sources that make up more than 80% of your sites total waste.</li> <li>• Evidence of waste reduction initiatives that demonstrate that waste reductions weren't made solely from a decline in production, or number of workers.</li> <li>• <b>Partial Points:</b> Same requirements as for "yes" above but for waste sources (or one source) that make up 50- 79% of the sites total waste.</li> </ul>
Additional Notes	Facility construction and demolition waste should not be included in the baseline and reduction performance. Also, the reductions are attributable to measures taken by the site.

14- Has your facility improved waste disposal methods for overall waste in this reporting year, compared with the baseline?					
How to answer this question	<p>The user may select (i) Yes, or (ii) No while answering this question.</p> <p>On selection of “Yes” or “Partial Yes”, the tool requires user to fill a tables with following questions;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Disposal method improvements</td> <td>Pre-filled with following; Reuse, Recycle, Energy Recovery, Incineration, On-site incineration, Landfill, On-site landfill/dumping, Physical/chemical/biological treatment, Upcycle, Other</td> </tr> </tbody> </table>	Questions	Responses	Disposal method improvements	Pre-filled with following; Reuse, Recycle, Energy Recovery, Incineration, On-site incineration, Landfill, On-site landfill/dumping, Physical/chemical/biological treatment, Upcycle, Other
Questions	Responses				
Disposal method improvements	Pre-filled with following; Reuse, Recycle, Energy Recovery, Incineration, On-site incineration, Landfill, On-site landfill/dumping, Physical/chemical/biological treatment, Upcycle, Other				

	Have you improved this waste disposal method?	Yes/No
	Select a baseline year	Dropdown list
	What was percent change?	-ve number for reduction and +ve for increase.
	Describe the strategies used to achieve this improvement	Text input: describe what measures were taken and how the reductions were achieved
Input Connection	Waste Disposal Methods Baselines, Targets, and Action Plans	
Output Connection	Independent	
Keywords	Improved disposal methods	
How to Systematically Fulfill Requirements	<p>This question provides an opportunity to report quantifiable improvements made in waste disposal methods in this FEM reporting year. By tracking success over the previous year, a facility proves through results the commitment made towards sustainability.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Establish procedure of monitoring the progress of implementation and keep record of monitoring activities and results</li> <li>• Documented methodology that shows how the improvement was calculated (as a percentage of total wastes); ensuring that improvements weren't made solely from a decline in production, or number of employees</li> <li>• Conduct a management review of implementation and take necessary decisions to enable timely implementation and desired results</li> <li>• Review the waste source and disposal method data, and aggregated total to ensure the data and any automated calculations are accurate.</li> <li>• Review the actions taken to make improvements and determine if they have resulted in measurable improvements by comparing the data with historical waste disposal data to determine the improvement quantity.</li> <li>• Evaluate results of completed actions, verify improvements and record the results in form of waste tracking /monitoring reports</li> <li>• Ensure that whole process is inclusive in nature and key employees can explain and demonstrate how the improvement was achieved</li> </ul>	
Evidence Required	<ul style="list-style-type: none"> <li>• Waste quantity and disposal records showing that the reported quantities (as a percentage of total wastes) were diverted to disposal methods which result in reduced environmental impacts.</li> <li>• Documented methodology that shows how the improvement was calculated (as a percentage of total wastes).</li> <li>• Evidence that the improvements are attributable to measures taken by the facility (e.g., collaboration with waste disposal vendors) and weren't made solely from a decline in production, or number of employees.</li> <li>• A description of the plan/strategies used to achieve these improvements.</li> </ul>	
Additional Notes	<p>Common methods of improvements are;</p> <ul style="list-style-type: none"> <li>• Sourcing a new material recycling vendor using advanced technology which enables facility to recycle more waste, hence ultimately reducing waste</li> <li>• Sending waste to be treated through incineration with energy recover instead</li> </ul>	

	<p>of being sent to a landfill or increasing the amount of waste that is for recycling</p> <ul style="list-style-type: none"> <li>• Converting biological waste into fertilizer and biogas by bio-gasification process</li> <li>• Converting waste into other products (down cycling) e.g., filling fabric cuttings into pillow covers or cushions</li> </ul>
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### 6.3. Level-3

15- Does your facility validate the final disposal and treatment of all hazardous wastes?							
How to answer this question	<p>The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question. On selection of “Yes” or “Partial Yes”, the tool requires user to answer following questions;</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #4F81BD; color: white;"> <th style="width: 60%;">Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>If yes, please upload the supporting documentation</td> <td>Upload field</td> </tr> <tr> <td>Describe how you work with your facility's waste contractors to ensure appropriate disposal during the waste treatment.</td> <td>Text input</td> </tr> </tbody> </table>	Questions	Responses	If yes, please upload the supporting documentation	Upload field	Describe how you work with your facility's waste contractors to ensure appropriate disposal during the waste treatment.	Text input
Questions	Responses						
If yes, please upload the supporting documentation	Upload field						
Describe how you work with your facility's waste contractors to ensure appropriate disposal during the waste treatment.	Text input						
Input Connection	Waste Disposal Methods						
Output Connection	Independent						
Keywords	Final disposal/treatment validation						
How to Systematically Fulfill Requirements	<p>The intent is to validate the final disposal and treatment of all hazardous waste. You should be able to describe how you engage with your waste contractors, including your workflow and process to ensure their environmental performance.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Establish a procedure of selecting, monitoring, validating, and excluding waste contractors <ul style="list-style-type: none"> <li>○ While selecting the waste contractor, review the contractors' required qualifications (e.g., permits, approvals, EIA reports), legal compliances, environmental performance, and cost viability of using the contractor</li> <li>○ Facilities should screen, validate and check contractors regularly (at least every three years) if they; <ul style="list-style-type: none"> <li>▪ implement practices to transport waste in a way that is traceable, secure, and waste must remain segregated and properly always labelled</li> <li>▪ have a facility with impermeable surfaces, proper security, and fire/flood protection</li> <li>▪ are not engage in illegal dumping or burning either on or off-site</li> <li>▪ implement human health and safety practices such as providing employee access to personal protective</li> </ul> </li> </ul> </li> </ul>						

	<p>equipment, training, and machine safety</p> <ul style="list-style-type: none"> <li>▪ use optimized waste disposal methods (such as recycling hazardous waste or incinerate hazardous waste with energy recovery) to reduce the impacts to environment.</li> <li>○ Facility must replace the contractor if major violations are found (especially legal records)</li> <li>○ Re-selection of contractor should be based on evidence that the contractor has taken appropriate corrective and preventive actions and that relevant regulatory authority has permitted the contractor to operate again</li> </ul> <ul style="list-style-type: none"> <li>• It is recommended to communicate the criterion to the waste contractors and maintain communication record</li> <li>• Maintain record of validating final disposal of all hazardous waste and waste contractor</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Records of validating final disposal of ALL hazardous waste</li> <li>• Records for validating with contractors every 3 years</li> </ul>
Additional Notes	<p><b>A common mistake:</b> Facilities maintain only the images of the waste collector facility instead of complete audit/ environment performance report which does not fulfil the requirements of this question.</p>

<p><b>16- Has your factory diverted at least 90 percent of all discarded materials from landfills, incinerators and the environment?</b></p>							
How to answer this question	<p>The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question.</p> <p>On selection of “Yes” or “Partial Yes”, the tool requires user to answer following questions;</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #4F81BD; color: white;"> <th style="width: 50%;">Questions</th> <th style="width: 50%;">Responses</th> </tr> </thead> <tbody> <tr> <td>If yes, please upload the supporting documentation</td> <td>Upload field</td> </tr> <tr> <td>Please describe how this is implemented</td> <td>Text input</td> </tr> </tbody> </table>	Questions	Responses	If yes, please upload the supporting documentation	Upload field	Please describe how this is implemented	Text input
Questions	Responses						
If yes, please upload the supporting documentation	Upload field						
Please describe how this is implemented	Text input						
Input Connection	Waste Disposal Methods (Until the disposal method baseline calculation is not correct, it has hard to demonstrate the improvement)						
Output Connection	Independent						
Keywords	Waste diversion / zero waste to landfill						
How to Systematically Fulfil Requirements	<p>The intent is for your facility to divert all waste from landfill or incineration without energy recovery.</p> <p>In order to qualify for this point, the facility must divert at least 90% of all waste from landfill or incineration without energy recovery through optimized alternatives (reduction, reuse, recycling, biological treatment etc.), closed loop material take-back program, or incineration with controlled % energy recovery.</p> <p>To be able to select right options and go through verification process smoothly, it is</p>						

	<p>important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Evaluate and consider all viable and optimized waste diversion options</li> <li>• Establish a process to examine remaining materials and use this information to refine the systems to rethink, redesign, reduce, reuse, and recycle to prevent further discards. If facility can demonstrate proactive thought on remaining materials, this is satisfactory for “zero waste” at this point <ul style="list-style-type: none"> <li>○ This may include internal focus group / brainstorming meetings, expert consultations, consultations with waste contractors</li> <li>○ Record the results in form of action plans, meeting minutes, pictures of sessions and communication records</li> <li>○ The facility may also hire an external qualified consultant to conduct in-depth waste assessment and propose methods</li> </ul> </li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Documentation of all waste streams and waste disposal paths.</li> <li>• Documentation of process to examine and prepare to divert any remaining wastes.</li> </ul>

<b>17- Does your facility upcycle some of its waste or insert its waste into a circular economy system?</b>	
How to answer this question	The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question. If yes, please describe how.
Input Connection	Waste Disposal Methods
Output Connection	Independent
Keywords	Waste Upcycling
How to Systematically Fulfill Requirements	<p>The intent is to encourage the facility to upcycle or establish closed-loop systems, where previously discarded products circle back into the value chain to reduce, reuse and recycle waste generated at the facility.</p> <p>In order to qualify for this, point the facility must divert at least 90% of all waste from landfill or incineration without energy recovery through optimized alternatives (reduction, reuse, recycling, biological treatment), closed loop material take-back program, or incineration with controlled % energy recovery.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility maintains following;</p> <ul style="list-style-type: none"> <li>• Evaluate which of the wastes can be upcycled or inserted into circular economy</li> <li>• Evaluate viable options of upcycling e.g. <ul style="list-style-type: none"> <li>○ Upcycling at site – usually comes with limited options based on available equipment at site</li> <li>○ Outsourcing / sub-contracting to upcycling facilities – this would mean that the facility gets the waste upcycled externally but handles the upcycled products itself (reused or sold).</li> <li>○ Selling the waste to upcycling facilities</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>Track and record quantity of upcycled waste</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>Records to indicate the facility upcycles some of its waste or inserts it back into circular economy</li> </ul>
Additional Notes	<p>Examples of upcycling;</p> <ul style="list-style-type: none"> <li>Shredding pre- and/or post-consumer waste to make yarn</li> <li>Use of waste plastic to make synthetic yarn</li> <li>Recovery of Dyeing from coloured fabric waste (Tencil)</li> <li>Hydrothermal process to separate and recycle cotton and polyester blends into new fibres and cellulose powder (Green Machine, HKRITA and H&amp;M)</li> </ul>

## 7. Chemical Management

### 7.1. Applicability

The Chemicals Management section begins with an applicability section based on which it is decided which questions are applicable to the facility.

Following are the questions in Applicability section;

<b>Applicability</b>	
How to answer this question	<p>The user is required to select all applicable options (using Yes or No) out of following list. Selection made in the list defines the applicability and hence scoring scheme;</p> <p><b>Select all of the processes performed at your facility:</b></p> <ul style="list-style-type: none"> <li>• Dyeing or other wet processing</li> <li>• Printing</li> <li>• Laundry or washing</li> <li>• Cementing or gluing</li> <li>• Fibre extrusion or yarn spinning</li> <li>• Slashing during weaving</li> <li>• Leather tanning</li> <li>• Lamination</li> <li>• Extrusion, assembly, finishing of plastic parts</li> <li>• Metal Finishing</li> <li>• Welding</li> <li>• Other production processes that require chemicals</li> </ul> <ul style="list-style-type: none"> <li>• If any are selected, you are a facility that uses chemicals in production processes.</li> <li>• If Independent is selected, you are a facility that uses chemicals in facility tooling and/or operations only.</li> <li>• Slashing is a Sizing Process; common mistake is that many facilities select No for slashing whereas they have the sizing process</li> </ul>
Scoring	<p>This section is not scored but affects scoring. The scoring changes according to scheme presented below. Anywhere there is no score listed (blank) means that question was not applicable to that facility;</p>

Level	Question Number	Applicability Pathway with Points		
		Chemicals used in production process	No chemicals used in production process (No N/A selected)	No chemicals used in production process (N/A selected for question 2)
Level 1	#1 (chemtrack)	1.923	2.78	3.125
	#2 (chemsds)	1.923	2.78	N/A
	#3 (chemtraining)	1.923	2.78	3.125
	#4 (chememergplan)	1.923	2.78	3.125
	#5 (chemsafetyequip)	1.923	2.78	3.125
	#6 (chemhazardsign)	1.923	2.78	3.125
	#7 (chempurchasereq)	1.923	2.78	3.125
	#8 (chemhealthprogram)	1.923	2.78	3.125
	#9 (chemstorage)	1.923	2.78	3.125
	#10 (chemtrainingRSL)	1.923		
	#11 (chemprocessidentifyRSL)	1.923		
	#12 (chemprocessmonitorRSL)	1.923		
	#13 (chemtraceinventory)	1.923		
Level 2	#14 (chemimproveplan)	16.67	16.67	16.67
	#15 (chemreduceplan)	16.67	16.67	16.67
	#16 (chemsourcelist)	16.67	16.67	16.67
Level 3	#17 (chemcollabalternatives)	3.57	25	25
	#18 (chemtracelotnumber)	3.57		
	#19 (chemanalysishumanenv)	3.57		
	#20 (chemanalysislifecycle)	3.57		
	#21 (chemdocumentedqa)	3.57		
	#22 (chemcontractorsRSL)	3.57		
	#23 (chemdocumentedges)	3.57		
Total		100	100	100

**Figure 19: Scoring scheme in Chemicals Management section**

You may download the [Higg FEM Scoring System Guidance](#) for more details on scoring and applicability.

Input Connection	Independent.
Output Connection	Affects scoring as explained earlier
Keywords	Chemicals used in production; Chemicals used in tooling/operations
How to Systematically Fulfill Requirements	<p>Following are the applicability pathways based on selection made in mentioned questions;</p> <ul style="list-style-type: none"> <li>Chemicals are used in production processes: Facility will answer all questions in all levels</li> <li>Chemicals are not used in production process: Facility will answer the Questions 1 to 9 of level 1, all level 2 questions and the Question 17 of level 3</li> </ul> <p>You may download the <a href="#">Higg FEM Scoring System Guidance</a> for more details on scoring and applicability.</p>
Evidence Required	No evidence needed to be uploaded. However, the facility must be able to demonstrate the validity of selection to the verifier during physical visit. For this purpose, it is suggested to keep the list of equipment and machinery used for operations and production, process flow diagrams, and chemical purchasing records.

## 7.2. Level-1

**1- Does your facility keep an inventory of chemicals used and the suppliers of each chemical**



<b>product?</b>	
How to answer this question	<p>The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question.</p> <p>On selection of “Yes”, the tool requires to answer following questions;</p> <p><b>1a. Check all types of chemicals included in the inventory (Yes/No/Not Applicable)</b></p> <ul style="list-style-type: none"> <li>• All chemicals used in manufacturing processes (including chemicals in production, reactants and additives, and wastewater treatment plant chemicals where applicable)</li> <li>• All chemicals used in tooling/equipment (spot cleaners, lubricants and grease)</li> <li>• All chemicals used to operate and maintain the facility (aside from WWT which is captured above)</li> </ul> <p><b>1b. Does your facility's chemical inventory include chemical identification data? Check all that apply:</b></p> <ul style="list-style-type: none"> <li>• Chemical name and type</li> <li>• Supplier/vendor name and type</li> <li>• Presence of Safety Data Sheet (SDS or MSDS), Global Harmonization System (GHS) compliant or equivalent</li> <li>• Function</li> <li>• Hazard Classification</li> <li>• Where the chemical is used</li> <li>• Storage conditions and location</li> <li>• Quantities of chemicals used</li> </ul> <p><b>1c. Does your facility's chemical inventory include the following data? Select all that apply:</b></p> <ul style="list-style-type: none"> <li>• CAS number or numbers (when in a mixture)</li> <li>• Lot numbers</li> <li>• MRSL compliance</li> <li>• Purchase date</li> <li>• Chemical Expiration dates (if applicable)</li> </ul> <p><b>For data not included in your facility's chemical inventory, is there an action plan for obtaining this data?</b></p> <ul style="list-style-type: none"> <li>• Upload your action plan for obtaining this data.</li> </ul>
Scoring	<ul style="list-style-type: none"> <li>• Full Points if facility has a complete inventory for all applicable chemicals in facility.</li> <li>• Partial Points if                             <ul style="list-style-type: none"> <li>○ Facility tracks all chemicals in a partial inventory</li> <li>○ Facility has a detailed inventory but does not yet track all applicable chemicals</li> </ul> </li> </ul>
Input Connection	Independent
Output Connection	All questions.
Keywords / Operations KPIs	Chemical Inventory Management
How to Systematically	This question ensures a facility understands which chemicals are present on-site. This is a necessary first step to determine which chemicals are hazardous, how to

<p>Fulfil Requirements</p>	<p>manage them safely, and to establish a chemical management system.</p> <p><b>Which facilities should make a chemical inventory?</b></p> <ul style="list-style-type: none"> <li>• Facilities with <b>chemicals in production</b>:             <ul style="list-style-type: none"> <li>○ All chemicals in manufacturing, tooling/equipment, operation and maintenance must be inventoried, with all required information is included, <b>to enable full score</b></li> <li>○ All chemicals in manufacturing must be inventoried <b>to unlock Level 2</b>.</li> <li>○ All chemicals used in tooling/equipment, operation and maintenance also needs to be inventoried, however, the facility can move on to next levels in case these are currently not in place or incomplete.</li> <li>○ All chemicals in manufacturing and tooling/equipment must be inventoried <b>to enable Partial Yes score</b>.</li> </ul> </li> <li>• Facilities that <b>do not use chemicals in production</b> should inventory all chemicals that are related to tooling/equipment category, including spot cleaners, machine grease/lubricants, and effluent treatment plant chemicals.</li> <li>• Facilities with <b>only tooling/operations chemicals</b> <ul style="list-style-type: none"> <li>○ Should inventory all chemicals that are related to tooling/equipment category, including spot cleaners, machine grease/lubricants, and effluent treatment plant chemicals.</li> <li>○ If no chemicals touch any product, and/ or no chemicals are used to maintain or lubricate machines, the facility may <b>select Not Applicable</b></li> </ul> </li> </ul> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Develop and establish a chemical management policy signed off by top management to set direction and scope of chemicals management activities in the facility. This policy may be integrated into the overall environmental management strategy/policy of the facility</li> <li>• Conduct a Process Flow Analysis including (i) processes conducted at the facility, (ii) material inputs and product outputs, (iii) which processes use chemicals, (iv) Type and quantity of chemicals used in processes, and (v) waste streams (non-product outputs)</li> <li>• The facility may also conduct a chemical flow analysis showing (on the facility plan) (i) how chemicals move in the facility for production and non-production activities, and (ii) Understand where and how (storage conditions) chemicals and chemical (containing) wastes are present and stored within the site. Such analyses help in understanding chemical flows, usage patterns, concentration points, and may even be used later for advanced purposes like hazard and risk assessment             <ul style="list-style-type: none"> <li>○ See example in following figure taken from GIZ Resource Efficient Management of Chemicals (REMC) Toolkit</li> </ul> </li> </ul>
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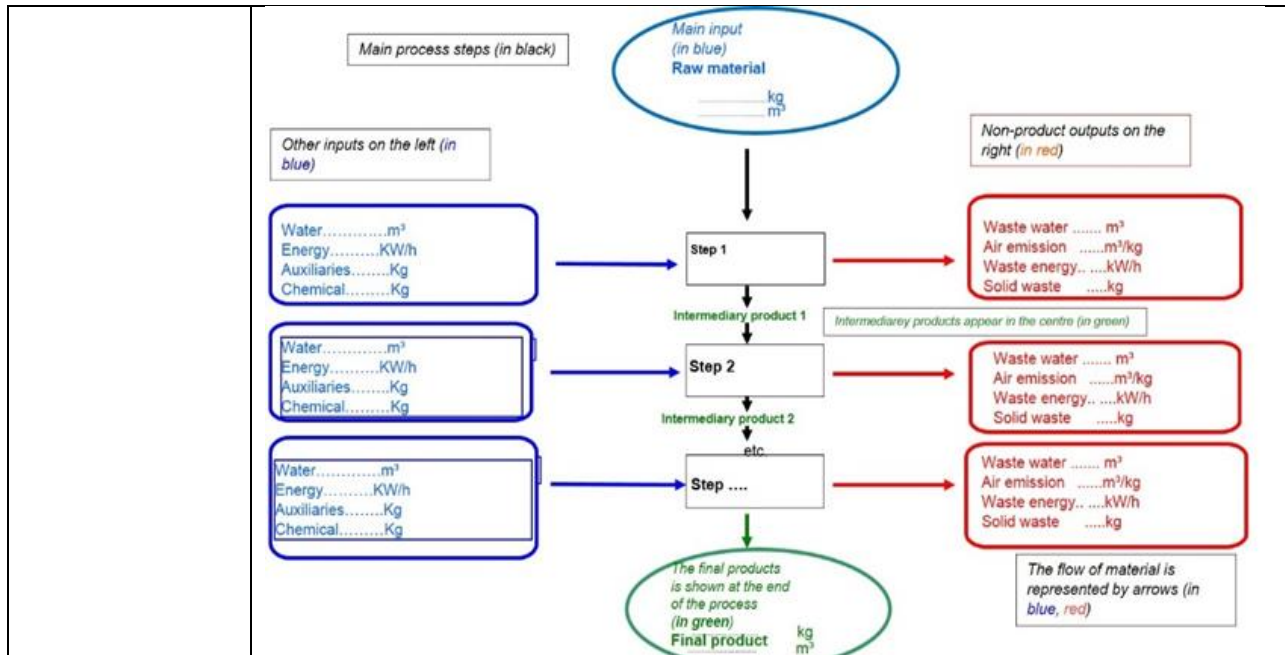
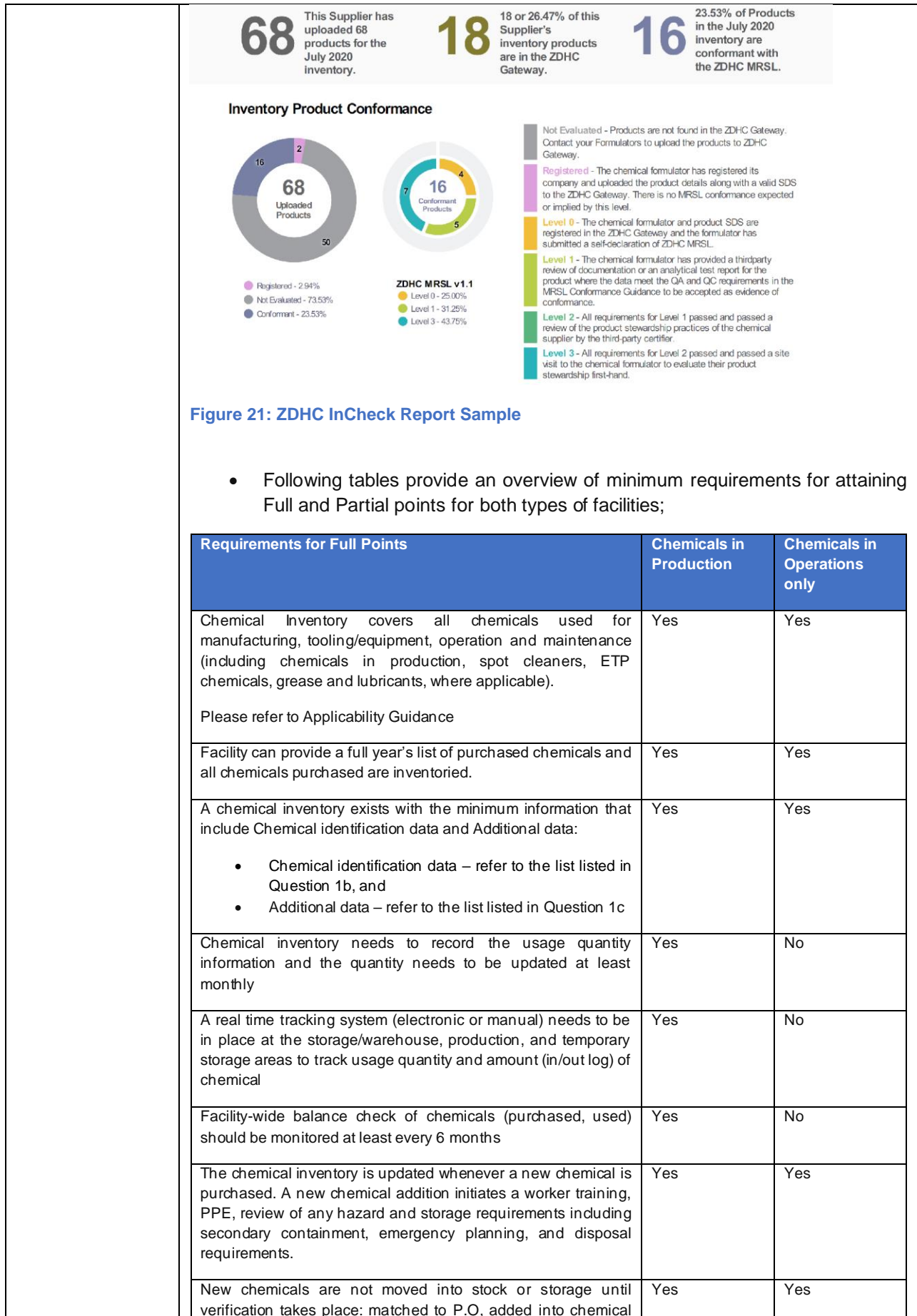


Figure 20: Example of a Process Flow Chart

- Develop a chemical tracking system to (i) segregate chemicals used for production and non-production activities, (ii) keep record of procured chemicals, (iii) keep up-to-date information about quantities of chemicals stored in various locations, and (iv) Record quantities of chemicals used in production and non-production activities
- Develop Chemical Balance based on flow mapping and recorded data
- Establish procedures to collect important chemical information (as listed in questions 1b and 1c); most important of these is Safety Data Sheets (SDS) which is basic tool in establishing a Chemical Information System
  - As the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) has been globally established and a compliance requirement by ZDHC, the facility should try to obtain GHS compliant SDS for all chemicals, especially production chemicals. However, for the purpose of this question, any other established system may also be adopted (e.g., Outdoor Industry Association Chemical Management Framework)
- Classify chemicals as per their hazards (e.g., Physical, Health, Environmental) as per information provided in SDS
- Develop an action plan to collect the required information for all chemicals and hazardous substances with responsibilities and timelines, and monitor the progress
- Keep record of all communication with chemical suppliers and/or manufacturers for attaining the required information.
- Keep up-to-date references for ZDHC Manufacturing Restricted Substances List (MRSL) and check compliance of all chemicals in Chemicals Inventory List (CIL) against MRSL. Following figure presents a sample ZDHC In-Check report showing compliance with ZDHC MRSL



	<p>inventory list, CAS no. screened against MRSL, acceptable for use, assigned to proper storage as per its hazard class and compatibility, and properly labelled.</p>																	
	<table border="1"> <thead> <tr> <th>Requirements for Partial Points</th> <th>Chemicals in Production</th> <th>Chemicals in Operations only</th> </tr> </thead> <tbody> <tr> <td> <p>Chemical Inventory covers all chemicals used for manufacturing, tooling/equipment, operation and maintenance (including chemicals in production, spot cleaners, ETP chemicals, grease and lubricants, where applicable).</p> <p>Please refer to Applicability Guidance</p> </td> <td>Yes</td> <td>Yes</td> </tr> <tr> <td> <p>Facility can provide a full year's list of purchased chemicals and all chemicals purchased at least for manufacturing and tooling/equipment are inventoried.</p> </td> <td>Yes</td> <td>Yes</td> </tr> <tr> <td> <p>A chemical inventory exists with the minimum information that include Chemical identification data</p> <ul style="list-style-type: none"> <li>Chemical identification data – refer to the list listed in Question 1b</li> </ul> </td> <td>Yes</td> <td>Yes</td> </tr> <tr> <td> <p>Chemical inventory needs to record the usage quantity information and the quantity needs to be updated no longer than 2 months at a time.</p> </td> <td>Yes</td> <td>NA (for non-tooling) Facilities</td> </tr> </tbody> </table>	Requirements for Partial Points	Chemicals in Production	Chemicals in Operations only	<p>Chemical Inventory covers all chemicals used for manufacturing, tooling/equipment, operation and maintenance (including chemicals in production, spot cleaners, ETP chemicals, grease and lubricants, where applicable).</p> <p>Please refer to Applicability Guidance</p>	Yes	Yes	<p>Facility can provide a full year's list of purchased chemicals and all chemicals purchased at least for manufacturing and tooling/equipment are inventoried.</p>	Yes	Yes	<p>A chemical inventory exists with the minimum information that include Chemical identification data</p> <ul style="list-style-type: none"> <li>Chemical identification data – refer to the list listed in Question 1b</li> </ul>	Yes	Yes	<p>Chemical inventory needs to record the usage quantity information and the quantity needs to be updated no longer than 2 months at a time.</p>	Yes	NA (for non-tooling) Facilities		
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<p>Evidence Required</p>	<ul style="list-style-type: none"> <li>Uploading following documentation is not necessary, however, these must be available during the verification             <ul style="list-style-type: none"> <li>Chemical Inventory List</li> <li>Safety Data Sheet (SDS or MSDS) – should include availability and date of issuance (Please note that ZDHC does not refer to MSDS and only refers to SDS)                 <ul style="list-style-type: none"> <li>Global Harmonization System (GHS) compliant or equivalent</li> <li>GHS or its equivalent SDS must include chemical product information and composition, hazard classification and symbols, supplier (manufacturer) information, intended use/specific end use, health and safety potential hazards and risks, personal precautions, protective equipment and emergency procedures, first aid measures, symptoms and medical treatment required, methods and material for containment and cleaning up, safe usage and handling methods, spill handling methods, conditions for safe storage including any incompatibilities, chemical toxicity, stability, reactivity, any potential hazardous reaction or decomposition, disposal and waste treatment methods, transport hazard classes and risks.</li> </ul> </li> <li>Permits where applicable for certain sensitive chemicals to be stored or used e.g., explosive materials (ethanol, acetic anhydride, urea etc., as applicable in some countries)</li> <li>List of purchased chemicals and corresponding purchase records for the past full year</li> </ul> </li> </ul>																	

Additional Notes	<p>Some facilities maintain separate inventory templates for (i) managing physical inventory, and (ii) managing Higg FEM, ZDHC, or Customer compliance; usually later is manually updated whenever an external audit is expected. This is usually because of a misconception that all CIL requirements must be on one single sheet, which is difficult to manage in inventory software systems used by facilities. Although ZDHC has provided a CIL template, the facilities may choose to divide the CIL into sub-sections or distribute on multiple sheets. In this case the facility would not need to manually maintain CIL and can integrate the whole CIL with physical inventory management system.</p> <p>The term “Operations” includes (but is not limited to) paints etc. as well that activities which are performed to maintain facility</p>
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<b>2- Does your facility make Safety Data Sheets (SDS) available to employees for all chemicals used?</b>							
How to answer this question	<p>The user may select (i) Yes, (ii) Partial Yes, (iii) No, (iv) Unknown, or (v) Not Applicable while answering this question.</p> <ul style="list-style-type: none"> <li>Select Partial Yes if <u>not all</u> chemicals used for production / manufacturing processes, tooling, effluent treatment chemicals have GHS or equivalent directives.</li> <li>Select Not Applicable if facility does not have any chemicals that may touch product (e.g., cleaning products) and/or do not use chemicals to maintain or lubricate machines.</li> </ul> <p>On selection of “Yes”, the tool requires to answer following questions;</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #4F81BD; color: white;"> <th style="width: 50%;">Questions</th> <th style="width: 50%;">Responses</th> </tr> </thead> <tbody> <tr> <td>Are Safety Data Sheets posted where hazardous chemicals are stored?</td> <td>Yes/No SDS may be posted on notice boards or made available in visible and easy access for chemicals stored at that site.</td> </tr> <tr> <td>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)?</td> <td>Yes/No These may be in form of Work Instructions, or short SDS with mentioned sections in local language</td> </tr> </tbody> </table>	Questions	Responses	Are Safety Data Sheets posted where hazardous chemicals are stored?	Yes/No SDS may be posted on notice boards or made available in visible and easy access for chemicals stored at that site.	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)?	Yes/No These may be in form of Work Instructions, or short SDS with mentioned sections in local language
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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)?	Yes/No These may be in form of Work Instructions, or short SDS with mentioned sections in local language						
Input Connection	Chemicals listed in CIL						
Output Connection	Independent						
Keywords / Operational KPIs	Chemical Handling, Use, & Storage Practices, Employee Training & Communication						
How to Systematically Fulfil Requirements	<p>The facility is expected to have Safety Data Sheets (SDS) available for all chemicals used in the facility. If facility is in a region where GHS has not yet been adopted, an equivalent standard need to be adhered to.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>Establish a process to obtain and maintain up to date SDS of all chemicals;</li> </ul>						

	<p>ensure the SDS and container labels comply to GHS or an equivalent system (SDS must not be older than 3 years)</p> <ul style="list-style-type: none"> <li>○ In cases where certain tooling / cleaning chemicals do not have appropriate GHS compliant / equivalent SDS, look for the label on the product which should provide details of ingredients and hazard symbols on the label. In cases, where appropriate label or SDS is not available, facility should try to obtain as much information about the chemical as possible. The original labels should be compliant to GHS CLP or country specific regulations.</li> </ul> <ul style="list-style-type: none"> <li>● Establish procedure for reviewing and verifying quality of SDS and container labels before any chemical is used, to ensure that all the necessary information contained in the SDS and labels is complete, correlating and clear</li> <li>● Communicate non-conformance to the suppliers and prepare an action plan to ensure compliance, especially, clearly mention requirement for provision of GHS (or equivalent) compliant SDS in the chemical purchase policy and purchase orders             <ul style="list-style-type: none"> <li>○ request updates to chemical supplier at least every 3 years</li> </ul> </li> <li>● SDS may be posted on notice boards or made available in visible and easy access for chemicals stored at each site. If a facility has a system to maintain inventory of SDS on computer systems, the SDS must be readily accessible to the supervisor at site</li> <li>● Translate the SDS in a language understandable to the employees. These may be in form of Work Instructions, or short SDS with sections directly related to operational worker safety and storage requirements, such as first aid, hazard, and flammability information             <ul style="list-style-type: none"> <li>○ One way is to assess the workers' needs for chemical information, clearly marking which workers require access to and translation of which information. This may reduce the effort of translating whole SDS as well as manage easily which chemical information needs to be included in posters</li> </ul> </li> <li>● Display key hazard and safety information according to the SDS at each location designated to each specific chemical</li> <li>● Clearly segregate and mark the chemical storage by hazard classes, post signs for hazards, storage areas, emergency exists, and safety provisions</li> <li>● Ensure all chemical stores have a restriction to entry of irrelevant personnel</li> <li>● Train supervisors and workers in reading the chemical container labels and SDS to enable them to identify hazards of the chemicals and other information needed for their work especially for personal safety, hygiene, proper handling of chemicals to which they are exposed, how to properly dispose, when necessary, storage compatibility, hazard classification etc.</li> <li>● Provide appropriate PPEs, Spill control/containment equipment as per SDS and ensure the employees are trained in using these</li> <li>● Share SDS with emergency response team inside and externally so that adequate preparation for emergencies is planned</li> <li>● Maintain records of all trainings, awareness sessions, assessments and review of CIL and communication with chemical suppliers</li> </ul>
<p>Evidence Required</p>	<ul style="list-style-type: none"> <li>● Following are not required to be uploaded but will be checked during verification             <ul style="list-style-type: none"> <li>○ Chemical Inventory List (CIL)</li> <li>○ Safety Data Sheet (SDS or MSDS), Global Harmonization System</li> </ul> </li> </ul>

	<p>(GHS) compliant or equivalent [skip if uploaded in previous question]</p> <ul style="list-style-type: none"> <li>○ Globally Harmonized System - Classification, Labelling and Packaging (GHS CLP)</li> <li>○ Emergency Response Plans</li> <li>○ Documentation of Spill Control/Containment equipment</li> <li>○ Documentation of Appropriate PPE being utilized by the workforce</li> <li>○ Training documentation</li> <li>○ Accuracies of the above content should be validated</li> </ul>
Additional Notes	<p>Checking quality of SDS is very important. It has been observed that some chemical suppliers do not provide appropriate SDS e.g.</p> <ul style="list-style-type: none"> <li>• Chemical name on SDS is changed but remaining information is same in SDS of all chemicals. Such SDS must not be accepted</li> <li>• Headings of all sections required by GHS are listed but required details are not provided. Such SDS cannot be categorised as GHS compliant.</li> <li>• Chemical supplier does not mention chemical composition in SDS claiming it to be a trade secret. Companies should only purchase chemicals from responsible suppliers who are ready to provide all necessary information. Once the suppliers list their chemicals in ZDHC Gateway, they anyways have to provide the chemical composition.</li> </ul>

<p><b>3- Does your facility train all employees who use chemicals on chemical hazards, risk, proper handling, and what to do in case of emergency or spill?</b></p>							
How to answer this question	<p>The user may select (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown while answering this question.</p> <p>On selection of “Yes”, the tool requires to answer following questions;</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #4F81BD; color: white;"> <th style="width: 50%;">Questions</th> <th style="width: 50%;">Responses</th> </tr> </thead> <tbody> <tr> <td> <p>If yes, please select all topics included in your training:</p> <ul style="list-style-type: none"> <li>• Chemical hazards and identification</li> <li>• MSDS/SDS</li> <li>• Signage</li> <li>• Compatibility and risk</li> <li>• Proper storage and handling</li> <li>• PPEs</li> <li>• Procedure in case of emergency, accidents, or spills</li> <li>• Access restriction to chemical storage areas</li> <li>• Potential environmental impact of the chemicals in tanks</li> <li>• The physical protection provided to employees in the areas where the factory uses, stores and transports these containers</li> <li>• Individual duties associated with monitoring and maintaining this protection</li> </ul> </td> <td> <p>Select all applicable options using check-boxes</p> </td> </tr> <tr> <td> <p>If yes, how many employees were trained</p> </td> <td> <p>Numeric input (annual numbers)</p> </td> </tr> </tbody> </table>	Questions	Responses	<p>If yes, please select all topics included in your training:</p> <ul style="list-style-type: none"> <li>• Chemical hazards and identification</li> <li>• MSDS/SDS</li> <li>• Signage</li> <li>• Compatibility and risk</li> <li>• Proper storage and handling</li> <li>• PPEs</li> <li>• Procedure in case of emergency, accidents, or spills</li> <li>• Access restriction to chemical storage areas</li> <li>• Potential environmental impact of the chemicals in tanks</li> <li>• The physical protection provided to employees in the areas where the factory uses, stores and transports these containers</li> <li>• Individual duties associated with monitoring and maintaining this protection</li> </ul>	<p>Select all applicable options using check-boxes</p>	<p>If yes, how many employees were trained</p>	<p>Numeric input (annual numbers)</p>
Questions	Responses						
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<p>If yes, how many employees were trained</p>	<p>Numeric input (annual numbers)</p>						



	<p>If yes, how frequently do you train your employees?</p> <p>If yes, please upload supporting documents</p>	<p>Dropdown list</p> <p>Upload field</p>
Input Connection	Independent	
Output Connection	Independent	
Keywords / Operational KPIs	Chemical Handling, Use, & Storage Practices, Employee Training & Communication	
How to Systematically Fulfill Requirements	<p>The intent is for the facility to do one training on chemical handling/safety prior for workers handling chemicals.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Conduct a training need analysis of all employees whose work involves directly or indirectly working with hazardous substances                             <ul style="list-style-type: none"> <li>○ A good practice is to base the trainings on job requirements of the workers and relevant knowledge and skill needs</li> <li>○ Department and employee performance reviews also provide good information about skill and training gaps</li> </ul> </li> <li>• Provide sufficient working instruction and signs for identifying, handling, storing and transporting hazardous substances safely</li> <li>• Develop a training calendar and organize trainings regularly (at least quarterly or in a frequency that allows training all new employees according to the turnover rate) delivered by competent personnel; ensuring all workers responsible for chemical related operations have attended the training                             <ul style="list-style-type: none"> <li>○ It is recommended to prepare a facility wide training plan covering all environmental subjects</li> </ul> </li> <li>• Each of the mentioned training topics in this question can be further elaborated in multiple sub-topics. It is recommended to elaborate these topics based on following;                             <ul style="list-style-type: none"> <li>○ Awareness related to environmental performance</li> <li>○ Legal and other requirements</li> <li>○ Occupational safety and health (especially risk and safety provisions)</li> <li>○ Procedures and processes established by the facility</li> </ul> </li> <li>• In addition to the listed topics, it is recommended to train workers on identifying chemical flows in the facility and using basic tools like Eco-mapping to identify and report any hot spots like spillages, leaks, high risk areas or significant non-compliances</li> <li>• Maintain record of all training and awareness activities including;                             <ul style="list-style-type: none"> <li>○ Attendance sheets</li> <li>○ Training content/material</li> <li>○ Evaluation/test results of participants</li> <li>○ Pictures of the training and awareness activities</li> </ul> </li> </ul>	
Evidence Required	<ul style="list-style-type: none"> <li>• Documented training covering all required aspects (for full yes response)                             <ul style="list-style-type: none"> <li>○ Partial documentation OR documented trainings covering only partial topics (for partial yes)</li> </ul> </li> </ul>	

Additional Notes	<p>Basic observations at site may provide clues of training needs of workers. For example,</p> <ul style="list-style-type: none"> <li>• Few chemical containers are stacked in inverted position à means some workers might not be aware of correct stacking position of chemical containers or are not able to read the container labels</li> <li>• During a compliance audit, chemical dispensing worker is found using a full-face mask while dealing with chemicals having low health hazard à indicates that supervisors and workers do not understand (i) which PPEs are appropriate for which type of chemicals, (ii) how to read safety data sheets, how to read chemical container labels</li> <li>• A spill kit with saw dust and cotton-blankets is placed in a chemical store containing organic peroxides à indicates that management and supervisors are not aware of (i) spill and emergency containment requirements of chemicals, (ii) hazardous properties and reactivity of chemicals, and (iii) how to read safety data sheets. This also means that there is no process of reviewing safety and emergency control provisions as per SDS.</li> </ul>
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<b>4- Does your facility have a chemical spill and emergency response plan that is practiced periodically?</b>											
How to answer this question	<p>The user may select (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown while answering this question.</p> <ul style="list-style-type: none"> <li>• Select Partial Yes if you have a chemical spill and emergency response plan, but that does not yet meet all requirements, or you do not have practice drills.</li> <li>• For facilities that do not use chemicals in production: Answer Yes if you meet requirements for chemicals and spill response plans, however twice-annual practice drills are not required.</li> </ul> <p>On selection of “Yes” or “Partial Yes”, the tool requires to answer following questions;</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #4F81BD; color: white;"> <th style="width: 50%;">Questions</th> <th style="width: 50%;">Responses</th> </tr> </thead> <tbody> <tr> <td>How many employees were trained on this topic?</td> <td>Numeric input</td> </tr> <tr> <td>How frequently do you train your employees on this topic?</td> <td>Dropdown list</td> </tr> <tr> <td>Does your facility keep records of all employee and environmental incidents related to chemical spills and emergency response?</td> <td>Yes/ Partial Yes/ No/ Unknown</td> </tr> <tr> <td>Please upload documentation if available</td> <td>Upload field</td> </tr> </tbody> </table>	Questions	Responses	How many employees were trained on this topic?	Numeric input	How frequently do you train your employees on this topic?	Dropdown list	Does your facility keep records of all employee and environmental incidents related to chemical spills and emergency response?	Yes/ Partial Yes/ No/ Unknown	Please upload documentation if available	Upload field
Questions	Responses										
How many employees were trained on this topic?	Numeric input										
How frequently do you train your employees on this topic?	Dropdown list										
Does your facility keep records of all employee and environmental incidents related to chemical spills and emergency response?	Yes/ Partial Yes/ No/ Unknown										
Please upload documentation if available	Upload field										
Input Connection	Chemicals listed in CIL										
Output Connection	Independent										
Keywords / Operational KPIs	Emergency Response Plan (ERP), Accidents & Spills Remediation Plan										
How to Systematically	The expectation is that the facility can clearly demonstrate that workers will know										

Fulfil Requirements	<p>how to respond in the case of a chemical emergency.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Develop and implement specific emergency response plan and procedures based on safety data sheets of chemicals and situational risks; especially considering highly hazardous chemicals. A good emergency response plan may include (minimum) following; <ul style="list-style-type: none"> <li>○ Mapping of areas where spillages and emergencies are possible</li> <li>○ Instructions on how to evacuate the building along with primary and secondary escape routes</li> <li>○ Procedure and responsibility to evacuate workers with disabilities and special medical conditions</li> <li>○ Procedures to control spills or accidental release of hazardous substances and relevant equipment as per SDS</li> <li>○ Frequency and responsibilities of conducting regular emergency and evacuation drills (including drills of controlling spillage or accidental release of hazardous substances)</li> <li>○ Contact names/information for individuals in charge of the evacuation procedure, and their specific duties</li> <li>○ Important contact numbers such as emergency, fire department, emergency response leaders etc. (posted near all phones and important areas)</li> </ul> </li> <li>• Clearly mark all emergency exits and ensure the passages and stairs are unobstructed and unlocked</li> <li>• Provide spill kits and accidental release control equipment in all areas where chemicals are stored, used or disposed of as per SDS and post clear and visible instructions</li> <li>• Devise procedures for fire response and extinguishing as per SDS and provide firefighting equipment suitable to type and quantity of chemicals at site</li> <li>• Maintain first aid provisions like eye/face wash, drench showers, first aid kits, fire blankets, PPEs, fire extinguishers etc. at all areas where chemicals are stored, used or disposed of as per SDS and post clear and visible instructions <ul style="list-style-type: none"> <li>○ Post inspection tags to document monthly checks (especially for first aid kit)</li> <li>○ Written first aid instructions in the local language and a list of all items present with their expiry dates</li> </ul> </li> <li>• Maintain records of all emergency drills</li> <li>• Include chemical spill and emergency response plan and procedures in the training calendar and keep record of all training activities</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• For Yes; <ul style="list-style-type: none"> <li>○ Emergency response plan/procedure exists on paper containing the minimum guidance provided by referencing the ZDHC Chemical Management System Framework Version 1.0 (May 2020) – Chapter 4.3 and the steps to be taken to protect the environment if there is an accidental release of these substances.</li> <li>○ Practice/drill is conducted periodically (at least twice a year) and well documented (not mandatory for chemicals in facility operations only)</li> <li>○ All workers are included in the practice/drill (not mandatory for</li> </ul> </li> </ul>

	<p>chemicals in facility operations only)</p> <ul style="list-style-type: none"> <li>• For Partial Yes;             <ul style="list-style-type: none"> <li>○ Emergency response plan/procedure exists but does not include the minimum guidance provided by referencing the ZDHC Chemical Management System Framework Version 1.0 (May 2020) – Chapter 4.3</li> <li>○ Practice/drill is documented and conducted periodically but less than twice a year</li> </ul> </li> </ul>
Additional Notes	<ul style="list-style-type: none"> <li>• Emergency/Fire exits in stores should allow single push opening from inside the store but no provision of opening from outside to avoid any unrestricted entry during normal operations</li> <li>• Doors and marking at emergency/fire exits should be fire and heat resistant, and marking should illuminate in dark as well, so that workers are able to easily locate and open the doors even in case of a fire</li> <li>• Common mistake is that facilities do not keep record of incidents.</li> </ul>

<p><b>5- 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?</b></p>	
How to answer this question	<p>The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question.</p> <ul style="list-style-type: none"> <li>• For facilities that do not use chemicals in production: This applies to all chemicals that are related to the manufacturing processes, tooling/equipment category, and operating chemicals that do not touch product.</li> </ul>
Input Connection	Chemicals listed in CIL
Output Connection	Independent
Keywords / Operational KPIs	Chemical Handling, Use, & Storage Practices
How to Systematically Fulfil Requirements	<p>The expectation is that the facility uses the Safety Data Sheet (SDS) to define exposure risks and install preventative/emergency equipment and signage in all areas where necessary.</p> <p>Protective and safety equipment may include spill response kits (size, type and location appropriately adapted for the chemical), showers and eyewash tested regularly, fire extinguishers maintained regularly, adapted Personal Protective Equipment (PPE) appropriate for the chemical (based on MSDS/SDS) such as appropriate gloves, protective masks, long handle scoops, etc.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Develop a facility plan showing all areas where chemicals are stored, used, and disposed of. The pictorial plan includes a quick overview of the most critical areas.             <ul style="list-style-type: none"> <li>○ This plan can also be used to mark the safety provisions and</li> </ul> </li> </ul>

- equipment.
  - Further, this plan may be used to conduct Eco-Mapping to identify and report any hot spots like spillages, leaks, high risk areas or significant non-compliances
- Establish procedure to select and maintain PPEs, safety showers, eyewash stations, fire extinguishers, first aid kits, spill containment kits and material, and other safety and emergency provisions that are appropriate for the chemical hazards identified and control gaps at site as per GHS compliant (or equivalent) SDS.
  - Here it must be noted that PPEs are first line of defence against the chemical risks, however, these are not the ultimate solution for risk mitigation.
  - The facility should select best control options first as recommended in SDS or as per risk assessment and provide PPEs for remnants of risk. Please refer to following hierarchy of control as per GIZ REMC Toolkit.

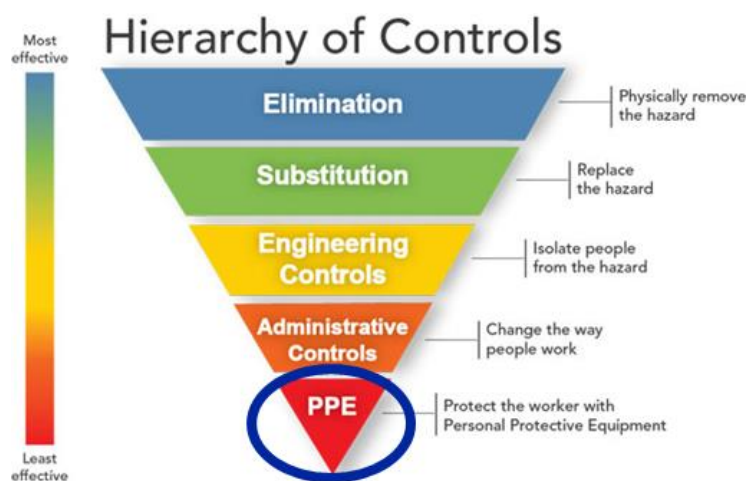


Figure 22: Hierarchy of Risk Control (GIZ REMC Toolkit)

- In case the facility has a very high number of chemicals, and the selection of suitable PPE needs to be considered, it is advisable to select the suitable PPE based on severity and adequacy of the PPE for all the chemicals.
  - This becomes simpler if chemicals are segregated as per their hazard classification and severity of hazard.
- Although not required by this question (required in Question 8); but the facility would only be able to select appropriate risk control options including PPEs if a systematic hazard and risk assessment has not been conducted. There are many methodologies of conducting risk assessment like UNEP Responsible Production Toolkit, ILO Control Banding, [BAuA \(EMKG\) Toolkit for Chemical Control Banding](#) etc. Based on the risk assessment, the Facility Map could be updated to show the risk levels at various areas in the facility.
- Clear signage is important, so facility workers and emergency responders can know immediately whether the stored substance and/or one they handle could expose them to a hazardous property.
- Provide the personal protective equipment in visible and easy access to the workers working at critical areas that involve chemical risks. The equipment must not be locked; should be well-maintained and checked regularly for

	<p>functionality by relevant staff.</p> <ul style="list-style-type: none"> <li>• Train workers on using the PPEs and other risk control provisions and make them aware of dangers of not using appropriate PPEs</li> <li>• Keep an inventory of PPEs clearly showing locations, types, and inspection, replacement and maintenance records</li> <li>• Management and supervisors should conduct regular assessment of PPEs for appropriateness and functionality</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Schedule for internal checks/audit for chemical safety that covers relevant chemical exposure risks and safety equipment, with clear designation of responsibilities and outcome of the checks/audits</li> <li>• Inventory list of PPEs and safety equipment with schedules of stock replenishments, equipment maintenance or replacements, where applicable</li> </ul>
Additional Notes	<p>Often facility managers complain that workers do not use PPEs even when training is provided to them, and appropriate PPEs are placed at right locations. In response, workers complain about heat and subsequent lack of oxygen at site which makes using PPEs very inconvenient. The facilities should opt for better risk control measures (refer to above hierarchy of control) e.g., eliminating or replacing hazardous chemicals, providing local or general exhaust ventilation which would reduce the requirement for PPEs. Taking example of a VOC emission which may require workers to use full face mask in absence of proper ventilation; however, if local exhaust ventilation is provided, the workers might need only an N95 or a simple dust mask which would be comparatively easier to use. Along with this, providing convenient ambient conditions is very important. Facilities should provide proper space cooling and ventilation system to provide good working environment to workers.</p>

<b>6- Does your facility have chemical hazard signage and safe handling equipment in the areas of the facility where chemicals are used?</b>	
How to answer this question	<p>The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question.</p> <ul style="list-style-type: none"> <li>• For facilities that do not use chemicals in production: This applies to all tooling and operations chemicals in your factory.</li> </ul>
Input Connection	Chemicals listed in CIL
Output Connection	Independent
Keywords / Operational KPIs	Chemical Handling, Use, & Storage Practices
How to Systematically Fulfill Requirements	<p>Employees should know immediately whether a substance / chemical is hazardous. To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• The requirements for this question are like Question 5 as it requires the facility to <ul style="list-style-type: none"> <li>○ Develop facility plan showing chemical storages, usage and disposal</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>○ Conduct a chemical risk assessment using SDS and situation at site</li> <li>○ Provide appropriate safety and preventive equipment as per SDS</li> <li>○ And post clear signage</li> <li>● However, this question assesses chemical signage in more detail.</li> <li>● Facility should post signage at all areas where chemicals are stored or used in language understandable to the workers at site</li> <li>● Chemical hazard signage should be displayed appropriately with respect to the chemicals placed and as per the information given in MSDS/SDS Section 2 or Section 3.</li> <li>● Signage should depict the hazard classification(s) of chemicals.</li> <li>● The most critical areas for signage include receiving and delivery, chemical storage areas (centralized warehouse and temporary storage areas), chemical process areas, manufacturing/production areas, waste chemicals storage (including chemical residues and expired chemicals), and laboratories, tool shop, maintenance areas.</li> <li>● Handling equipment should be available at relevant locations and correspond with the safety requirement and hazard communication/signage for each chemical.</li> <li>● Train all workers on reading and understanding the signage</li> <li>● Establish a process for internal checks/audit for chemical safety that covers relevant chemical exposure risks and communication (signage placement and updates), with clear designation of responsibilities</li> <li>● Management and supervisors should conduct regular assessment of signage and assess workers' understanding and record outcome of the checks/audits</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>● Schedule for internal checks/audit for chemical safety that covers relevant chemical exposure risks and communication (signage placement and updates), with clear designation of responsibilities and outcome of the checks/audits</li> </ul>

<b>7- Does your facility select and purchase chemicals based on their hazards and MRSL / RSL requirements?</b>							
How to answer this question	<p>The user may select (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown while answering this question.</p> <ul style="list-style-type: none"> <li>● Answer Yes only if all chemicals purchased meet RSL/MRSL purchasing requirements and you have documentation to support this.</li> <li>● Answer Partial Yes if you purchased chemical(s) that do not have sufficient documentary evidence to prove compliance to MRSL / RSL. And you have clear plan for obtaining the documents from chemical supplier within 6 months or change the chemical supplier who can meet the requirements to increase the % of compliant chemicals meeting MRSL/RSLs.</li> </ul> <p>Further the user is asked following questions;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>If yes, do all chemicals purchased and used in production meet the facility's chemical purchasing policy?</td> <td>Yes/No</td> </tr> <tr> <td>If no, do you have a process or plan for eliminating chemicals that do not meet the</td> <td>Yes/No</td> </tr> </tbody> </table>	Questions	Responses	If yes, do all chemicals purchased and used in production meet the facility's chemical purchasing policy?	Yes/No	If no, do you have a process or plan for eliminating chemicals that do not meet the	Yes/No
Questions	Responses						
If yes, do all chemicals purchased and used in production meet the facility's chemical purchasing policy?	Yes/No						
If no, do you have a process or plan for eliminating chemicals that do not meet the	Yes/No						

	<table border="1"> <tr> <td>facility's chemical purchasing policy?</td> <td></td> </tr> <tr> <td>Please describe the process or plan</td> <td>Text input</td> </tr> <tr> <td>Please upload documentation if available</td> <td>Upload field</td> </tr> </table>	facility's chemical purchasing policy?		Please describe the process or plan	Text input	Please upload documentation if available	Upload field
facility's chemical purchasing policy?							
Please describe the process or plan	Text input						
Please upload documentation if available	Upload field						
Input Connection	Chemicals listed in CIL, MRSL, RSL						
Output Connection	Independent						
Keywords / Operational KPIs	Chemical Selection, Procurement, & Purchasing Practices						
How to Systematically Fulfill Requirements	<p>The intent is to drive the purchase of the compliant chemical / chemical formulation with the least hazard risk for workers, workplace, environment and customer.</p> <ul style="list-style-type: none"> <li>• Technical guidance provided for this question in How to Higg Guide is sufficient and clear enough. No further explanation is needed to be included here. The readers are encouraged to refer to the relevant section of How to Higg Guide</li> <li>• For further guidance, please refer to ZDHC Chemical Management Framework, and <a href="#">ZDHC MRSL Conformance Guidance</a></li> <li>• In general, the facility is advised to; <ul style="list-style-type: none"> <li>○ Create a combined own Facility RSL and MRSL including the requirements of all laws, buyers, ZDHC and other subscribed standards / regulations</li> <li>○ Develop the chemical purchase policy as per ZDHC CMS guidelines and technical guidance of this question</li> <li>○ Establish, document and implement a process for identifying and using preferred suppliers and <b>removing suppliers</b> from the preferred list when appropriate. Communicate expectations to the dye and chemical suppliers to confirm that formulations supplied to the facility are compliant with facility RSL/MRSL.</li> </ul> </li> </ul>						
Evidence Required	<ul style="list-style-type: none"> <li>• Reference requirements for Yes and Partial Yes as described in How to Higg Guide</li> <li>• MRSL(s) applicable to the facility e.g., customer's MRSL, ZDHC MRSL, facility-own MRSL (either create a combined hazard-based and MRSL from all customers or follow the MRSL which is created to cover all requirements of Brands and Retailers.)</li> <li>• RSL</li> <li>• Chemical purchasing procedures and SOPs</li> <li>• Chemical supplier/vendor criteria</li> <li>• ZDHC Gateway Chemical module compliance Levels for 1 - 3</li> <li>• Chemical SDS and TDS</li> <li>• Certificate of analysis test reports of chemical formulation to check any impurities present in chemical composition</li> <li>• Certificate of MRSL conformance and declaration letters stating date of issuance, name of chemical in concern, the MRSL it is declaring compliance against (attached), and chemical test report confirming the conformance</li> <li>• MRSL conformance test reports, where applicable</li> </ul>						



Additional Notes	<b>A common mistake:</b> Facilities have supplier selection procedure however it does not include the requirements of MRSL/RSL.
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<b>8- Does your facility have an environmental and occupational health and safety program specific to chemicals management?</b>	
How to answer this question	The user may select (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown while answering this question. <ul style="list-style-type: none"> <li>Please select Partial Yes if your chemicals health and safety program is complete, but not yet documented in writing.</li> </ul>
Input Connection	EMS Questions 1 and 8
Output Connection	Independent
Keywords / Operational KPIs	Chemical Handling, Use, & Storage Practices
How to Systematically Fulfil Requirements	<p>This program is intended to protect humans and the environment from exposures. The facility should have a process for identifying and controlling the potential health and safety impact from chemicals stored, used and discarded.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>Designate a person or team (as per size of facility) dedicated to chemical management with appropriate qualifications to understand and enact appropriate occupational safety and health measures indicated in the MSDS/SDS and/or Technical Data Sheets (TDS) to protect workers, the community and the environment.</li> <li>Update Legal Registry and Permits Inventory with chemical management related regulations / laws / permit requirements and ensure compliance with routine monitoring and reporting to senior management</li> <li>Conduct a systematic hazard and risk assessment at site considering hazard information in SDS and exposures at site. Conduct the risk assessment for all chemicals and chemical containing wastes, at all locations where chemicals and chemical containing waste are stored, used and disposed of. Also include the impacts to environment by chemicals in wastewater, solid waste and air emissions. <ul style="list-style-type: none"> <li>There are many methodologies of conducting risk assessment like UNEP Responsible Production Toolkit, ILO Control Banding, <a href="#">BAuA (EMKG) Toolkit for Chemical Control Banding</a> etc. Based on the risk assessment, the Facility Map could be updated to show the risk levels at various areas in the facility.</li> <li>A Control Gap assessment base on assessed risks, risk control provisions at site, and control recommendations in SDS may also be conducted to design the environmental and occupational health and safety program</li> </ul> </li> <li>Widely communicate the results of hazard and risk assessment in the facility through awareness sessions, trainings, posters and identification of risks using signage at site. Update chemical inventory list with identified hazards</li> </ul>

	<p>(and/or risks)</p> <ul style="list-style-type: none"> <li>• Develop written procedures for safety and health related to chemical storage, handling, usage, disposal, and environmental controls for waste or discharge to the environment based on risk assessment. <ul style="list-style-type: none"> <li>○ The procedures also need to consider the most likely natural disaster in the region, for example, areas prone to heavy rain and flooding, earthquake, typhoon, etc.</li> <li>○ Update the emergency plan and safety provisions (e.g., PPEs) as per risk assessment and control gap assessment (Questions 4 and 5)</li> </ul> </li> <li>• Provide basic health/wellness process on site or through a third party when hazardous chemicals are handled, or exposure occurs. Facilities may consider hiring an in-house doctor, nurse and first aid team.</li> <li>• Provide systematic training (based on TNA as in Question 3) to safety program responsible persons and key employees, and workers dealing with chemicals, on the safety and health procedures, chemical management system and other subjects <ul style="list-style-type: none"> <li>○ Enrich the TNA based on Risk Assessment to provide detailed training to workers in high-risk areas</li> <li>○ Keep record of all training and awareness activities</li> </ul> </li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Letter of appointment, job description, organization chart</li> <li>• Curriculum Vitae of responsible person/team</li> <li>• EHS procedures related to chemical storage, handling, usage, and disposal</li> <li>• Chemical Inventory with identified hazards with SDS, technical sheets available to and used by EHS personnel</li> <li>• Permits with operating limits and relevant laws governing health and safety requirement for chemical storage, operations, and disposal</li> <li>• Chemical accident and spill records</li> <li>• Health and Safety Log (First Aid and health station)</li> </ul>
Additional Notes	<p><b>A common mistake:</b> Key employee designated to look after chemical management does not have relevant educational background.</p>

<p><b>9- Does your facility have well marked designated chemical storage and temporary storage areas?</b></p>	
How to answer this question	<p>On selection of “Yes”, the tool requires to;</p> <p><b>Select all that apply (Yes/No)</b></p> <ul style="list-style-type: none"> <li>• The chemical storage area is ventilated, dry and protected from the weather and fire risk.</li> <li>• The storage area is protected from unauthorized employees (i.e., locked).</li> <li>• The chemical storage area is clearly marked.</li> <li>• The chemical storage area has easy entry and exit in case of any emergencies.</li> <li>• Storage containers are in good condition, appropriate for their contents, closed and clearly labelled with their contents.</li> <li>• Floor in 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.</li> <li>• Secondary containment is available for solid and liquid chemicals in tanks, drums, and temporary containers (where applicable) to ensure no unintended releases occur.</li> <li>• Incompatible substances (such as strong acids and strong bases) are stored separately.</li> <li>• Flammable substances are kept away from sources of heat or ignition, including the use of grounding and explosion-proof lighting.</li> </ul>

	<ul style="list-style-type: none"> <li>Temporary storage containers are closed and labelled with contents, lot, and hazard class.</li> </ul>
Scoring	<ul style="list-style-type: none"> <li>Full Points if facility meets all storage criteria.</li> <li>Partial Points if facility meets half of all storage criteria.</li> </ul>
Input Connection	Independent
Output Connection	Independent
Keywords / Operational KPIs	Chemical Handling, Use, & Storage Practices
How to Systematically Fulfill Requirements	<p>The expectation is that a facility can clearly demonstrate that all storage areas are well-marked and properly managed to prevent contamination and safety risks.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>Develop procedures for ensuring chemical storage and status in the storage area records are always kept compliant with the requirements of this question</li> <li>Attain and maintain permits needed to store any specific chemicals</li> <li>Design the chemical stores (permanent or temporary) based on hazard and risk assessment (Question 8) and storage compatibility assessment.             <ul style="list-style-type: none"> <li>There are many methodologies for conducting storage compatibility assessment and detailed guidelines are available e.g., Outdoor Industry Association, <a href="#">UK HSE Chemical warehousing: The storage of packaged dangerous substances</a>, <a href="#">TRGS 510 "Storage of hazardous substances in non-stationary containers"</a></li> <li>See following compatibility storage chart as per TRGS510</li> </ul> </li> </ul>

Storage class	10-13	13	12	11	10	8 B	8 A	7	6.2	6.1 D	6.1 C	6.1 B	6.1 A	5.2	5.1 C	5.1 B	5.1 A	4.3	4.2	4.1 B	4.1 A	3	2 B	2 A	1		
Explosive substances	1																									1	
Gases	2 A	2		2			2																			2	3
Aerosol packages	2 B																										
Flammable liquids	3	5		5							6																
Other explosive substances	4.1 A	1	1	1	1	1	1	1																			
Flammable solid or desensitizing explosive substances	4.1 B										6			4	1		4										
Pyrophoric or self-igniting substances	4.2	6			6	6	6	6			6	6															
Substances producing oxidizing gases with water	4.3	6		6	6	6	6	6			6	6															
Highly oxidizing substances	5.1 A																										
Oxidizing substances	5.1 B	7			7	7	7	7			6	6	4	4													
Ammonium nitrate and mixtures containing ammonium nitrate	5.1 C	1	1	1	1	1	1	1																			
Organic peroxides and self-reactive substances	5.2	1			1	1																					
Combustible, acutely toxic substances	6.1 A	5			5																						
Non-combustible acutely toxic substances	6.1 B	5			5																						
Combustible acutely toxic or chronic substances	6.1 C																										
Non-combustible acutely toxic substances or substances with chronic effects	6.1 D																										
Infectious substances	6.2																										
Radioactive substances	7																										
Combustible corrosive substances	8 A																										
Non-combustible corrosive substances	8 B																										
Combustible liquids	10																										
Combustible solids	11																										
Non-combustible liquids	12																										
Non-combustible solids	13																										
Other combustible and non-combustible substances	10-13																										

Separate storage is required  
 Joint storage permitted  
Number Joint storage is only permitted with restrictions (see Number)

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**Figure 23: Chemical Compatibility Storage Chart (TRGS 510)**

- Post the chemical store floor plan with designated places for storing chemicals, emergency exits, safety provisions etc. at a clearly visible location in language understandable to workers (see example in following figure)

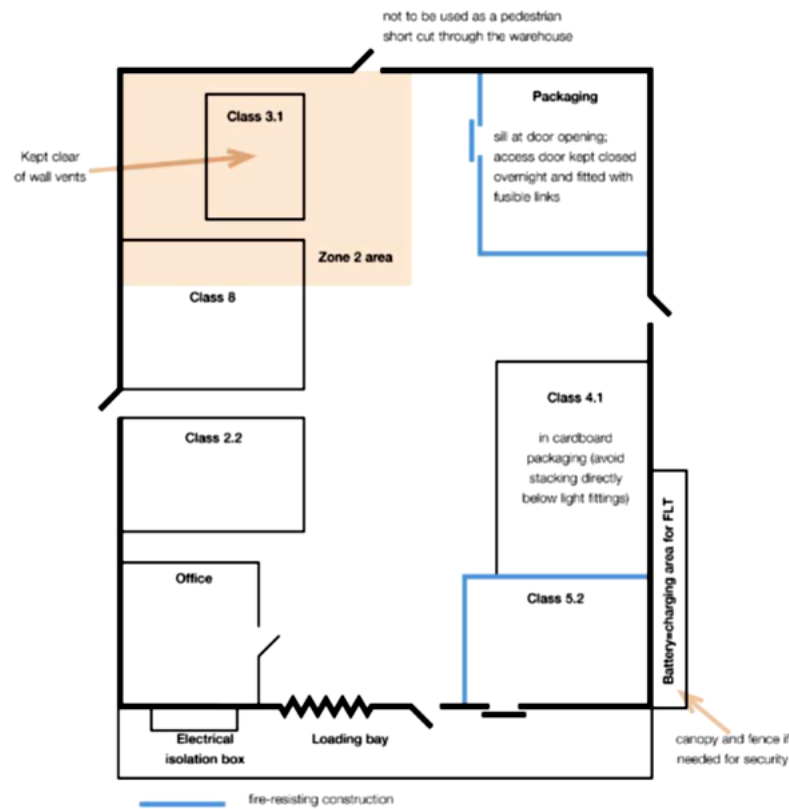


Figure 24: Assigning storage areas as per storage classes (HSE-HSG 71)

- Ensure stores are designed based on First-In-First-Out (FIFO) principal; maintain records showing FIFO implementation, for each chemical specifying date of arrival at storage, lot number, chemical expiration dates, date of dispatch to production, etc.
- Establish a process to regularly conduct audits/inspections of all chemical stores including checklists as in this question
- Establish Standard Operating Procedures for proper chemical storage and train all relevant employees on established procedures especially compatibility requirements
- Ensure provision, maintenance and accessibility of personal protective equipment and other safety provisions (especially fire safety) according to the hazards and risk assessment and train relevant employees in all stores (permanent or temporary)
- The checklist in the question is quite comprehensive and a facility can easily get full marks if the checklist is implemented properly; however, elaborated checklist is provided in technical guidance of this question in the How to Higg Guide.

Evidence Required

- Facility drawing or emergency response plan with local authorities where applicable
- Storage/usage permit with restrictions (if apply)
- Local fire codes

	<ul style="list-style-type: none"> <li>• MSDS/SDS and technical sheets in local language</li> <li>• Chemical labelling on chemical containers (original labelling, no handwritten labels)</li> <li>• Floor plan of chemical storage areas, specifying categorization and placements of different types of chemicals</li> <li>• Storage in/out log, FIFO records, for each chemical specifying date of arrival at storage, lot number, chemical expiration dates, date of dispatch to production, etc.</li> <li>• Management audits/inspections checklists of chemical storage areas</li> <li>• Standard Operating procedures for proper chemical storage</li> </ul>
<p>Additional Notes</p>	<p>A frequently asked question regarding chemical storage is about the capacity of secondary containments. International Finance Corporation (IFC) has published <a href="#">General EHS guidelines</a> including explanation of secondary containment which suggest, “<i>Appropriate secondary containment structures consist of berms, dikes, or walls capable of containing the larger of 110 percent of the largest tank or 25% percent of the combined tank volumes in areas with above-ground tanks with a total storage volume equal or greater than 1,000 liters and will be made of impervious, chemically resistant material. Secondary containment design should also consider means to prevent contact between incompatible materials in the event of a release</i>”. The reason for a larger containment is that in case of full spill, there might be some foam over the spilled liquid and in some cases fire resistant foam might be sprayed over spilled chemical to avoid catching fire. The containment must be able to hold that foam as well.</p> <p>Factories having shortage of storage space may store chemicals in storage racks considering the compatibility requirements, storage conditions recommended in safety data sheet, storage conditions recommended by package manufacturer, and guidelines provided by regulation or other subscribed standards. Specific precautions must be taken to eliminate chances of falling chemical containers from height; and considering ergonomics of chemical handlers. The secondary containment in such case may be built in following ways;</p> <ul style="list-style-type: none"> <li>• Built-into the storage rack below each section to hold spilled chemical as per above mentioned quantity ratios</li> <li>• If chemicals are placed on ground, facilities may provide a smaller containment (~50% volume) below the storage points which flow into a larger containment pit which fulfils the requirement of quantity ratios mentioned above. In such case, it is utmost important to ensure that this containment pit is (i) not connected to any drain including that of wastewater treatment plant, (ii) spillages of only compatible chemicals can flow into a specific containment, (iii) the flow passage and containments are impervious and impermeable, (iv) the spilled materials are not flammable, explosive, combustibles, oxidisers or volatile in liquid and vapour forms.</li> </ul>

<p><b>10- Does your facility train employees responsible for the chemical management system on Restricted Substance Lists (RSLs) and Manufacturing Restricted Substance Lists (MRSLs)?</b></p>	
<p>How to answer this question</p>	<p>The user may select (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown while answering this question</p>

	<ul style="list-style-type: none"> <li>Select Partial Yes if training has been provided but is not yet well-documented.</li> </ul> <p>On selection of “Yes” or “Partial Yes”, the tool requires to answer following questions;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Please select all topics included in your training                             <ul style="list-style-type: none"> <li>MRSL</li> <li>RSL</li> </ul> </td> <td>Select topics that apply.</td> </tr> <tr> <td>Please describe the RSL and MRSL trainings conducted in the last calendar year</td> <td>Text input Describe which topics were covered, how many trainings were conducted, who conducted the training...</td> </tr> <tr> <td>How many employees were trained?</td> <td>Numeric input</td> </tr> <tr> <td>How frequently do you train your employees?</td> <td>Dropdown list</td> </tr> <tr> <td>Please upload documentation if available</td> <td>Upload field</td> </tr> </tbody> </table>	Questions	Responses	Please select all topics included in your training <ul style="list-style-type: none"> <li>MRSL</li> <li>RSL</li> </ul>	Select topics that apply.	Please describe the RSL and MRSL trainings conducted in the last calendar year	Text input Describe which topics were covered, how many trainings were conducted, who conducted the training...	How many employees were trained?	Numeric input	How frequently do you train your employees?	Dropdown list	Please upload documentation if available	Upload field
Questions	Responses												
Please select all topics included in your training <ul style="list-style-type: none"> <li>MRSL</li> <li>RSL</li> </ul>	Select topics that apply.												
Please describe the RSL and MRSL trainings conducted in the last calendar year	Text input Describe which topics were covered, how many trainings were conducted, who conducted the training...												
How many employees were trained?	Numeric input												
How frequently do you train your employees?	Dropdown list												
Please upload documentation if available	Upload field												
Input Connection	Independent												
Output Connection	Independent												
Keywords / Operational KPIs	Employee Training & Communication												
How to Systematically Fulfil Requirements	<p>Before we jump to requiring compliance with RSL, MRSL, we must first introduce the topic and reasoning to workers so a program can be effectively implemented. The facility should hold trainings to ensure that the personnel responsible for MRSL/RSL compliance are competent through appropriate education, training and/or experience.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>Designate a person or team for chemical management and MRSL and RSL compliance with clear job description and responsibilities.                             <ul style="list-style-type: none"> <li>MRSL and RSL trainings must be conducted by a knowledgeable employee</li> </ul> </li> <li>Include MRSL and RSL training and awareness activities in the TNA and formal training plan (Question 3) and conduct trainings as per the plan</li> <li>Training on MRSL and RSL should be provided to (but not limited to) purchasing, production line and technical managers</li> <li>Training of MRSL/RSL in Chemical management should cover the possible source(s) of hazardous chemicals in the facility with complete analysis of risks from the full chemical inventory and available stock. The facility should be in the position to carry out a Root Cause analysis in case of any non-compliance detected.</li> <li>Evaluate understanding of management and key employees MRSL/RSL</li> <li>Maintain record of all trainings related to MRSL and RSL (attendance sheets, training materials etc.)</li> </ul>												
Evidence Required	<ul style="list-style-type: none"> <li>Job Descriptions</li> <li>Training record(s) with names, date, topic of training, brief description of what was trained</li> </ul>												

	<ul style="list-style-type: none"> <li>• Interview / dialogue with management or key employees (including but not limited to purchasing, production line and technical managers):             <ul style="list-style-type: none"> <li>○ Check the understanding of the responsible person</li> <li>○ Difference between MRSL and RSL</li> <li>○ Example of few (minimum of 5) MRSL parameters</li> <li>○ Different MRSL limits for certain parameter (random pick) - what it means and how to manage it</li> <li>○ Which is the main restricted substance derived from dyestuff. (Only for printing/dyeing facilities)</li> <li>○ Where would they find information regarding MRSL or RSL compliant information</li> <li>○ Can they provide one example of a recipe card linked to technical sheet for proper usage</li> <li>○ Knowledge of MRSL document, how it works, and they understand the consequences of using product included in the list</li> </ul> </li> </ul>
Additional Notes	<p><b>A common mistake:</b> Facilities received training via Buyers MRSL/ RSL training program however no records are maintained.</p>

<p><b>11- Does your facility have a documented process to systematically identify, monitor and verify compliance with all products Restricted Substance Lists (RSLs), and segregate chemical formulations materials and products which are non-compliant with RSL?</b></p>	
How to answer this question	<p>The user may select (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown while answering this question.</p> <ul style="list-style-type: none"> <li>• Answer Yes if you can verify RSL compliance by providing evidence of your RSL review process and technical data sheets, inventories that meet RSL requirements, and by providing Letters of RSL Conformance, and/or product test results.</li> <li>• Answer Partial Yes if you can prove RSL conformance but do not yet have an internal review process to systematically monitor RSL</li> </ul>
Input Connection	RSL of buyers/brands, Facility own RSL, CIL
Output Connection	Independent
Keywords / Operational KPIs	Chemical Management Policies, Compliance Procedures, and Commitments
How to Systematically Fulfill Requirements	<p>The expectation is for facilities to incorporate an industry standard such as an AFIRM, AAFA, or major customer RSL(s) into their business practices. When chemicals are used in a process, they should comply with Technical Data Sheet (TDS) requirement(s) that are necessary to achieve the desired RSL outcome.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Gather all applicable RSLs and establish a review process to monitor, update and show compliance to an RSL (may be managed at facility or its parent/corporate group)             <ul style="list-style-type: none"> <li>○ Usually, facilities add columns for each applicable RSL in the</li> </ul> </li> </ul>

	<p>chemical inventory list and mark any non-compliance directly in CIL which is a good way to reduce efforts</p> <ul style="list-style-type: none"> <li>• Ensure that technical data sheets of all chemicals are up to date and provide recommended/maximum concentration limits.             <ul style="list-style-type: none"> <li>○ It is recommended to include provision of TDS as a mandatory requirement in chemical purchase policy and chemical purchase orders.</li> </ul> </li> <li>• Conduct a comprehensive Risk Assessment for RSL and MRSL on basis of the chemical inventory and the SDS information along with the documents provided by the chemical suppliers such as Technical Data Sheets, Certificate of Analysis, Certificate of Conformance, Test reports etc.</li> <li>• The risk assessment document should identify the components present in the composition of the chemical formulation and its concentration levels, any unintentional component present due to the process route or source of chemical and evaluate the possible risks from the process route of production or during the wastewater treatment etc.</li> <li>• Check all chemicals against RSL compliance at least once a year and record results of this assessment</li> <li>• Ensure that process recipes contain chemicals as per technical data sheets.             <ul style="list-style-type: none"> <li>○ There is a risk of RSL non-compliance if concentrations of chemicals in recipe exceed the recommended limits in technical data sheet</li> </ul> </li> <li>• Keep up-to-date Letters of RSL Conformance supported with test/analysis results for all relevant chemicals (may be managed at facility or its parent/corporate group)</li> <li>• Establish a process to formally communicate (and update) RSL to all upstream suppliers e.g., chemical suppliers, raw material suppliers, process sub-contractors; keep record of all such communications</li> <li>• Ensure that all raw materials (yarn, fabric etc.) are compliant to RSL. For this purpose, it is recommended to conduct an RSL compliance assessment of process suppliers as well (may be managed at facility or its parent/corporate group)</li> <li>• Establish a process / procedure to verify that final product complies with RSL e.g.             <ul style="list-style-type: none"> <li>○ Testing the product against customers' RSL. Usually, the customers require the facilities to get the products tested from laboratories designated by the customers in which case, this process is monitored and ensured by the representative of customer</li> <li>○ Facility should get the product tested based on the RSL/MRSL risk assessment if any RSL/MRSL non-compliance risks are identified.</li> </ul> </li> <li>• Establish a failure resolution process that is followed in the event of an RSL test failure. This may include;             <ul style="list-style-type: none"> <li>○ Identifying and tracking source of RSL non-compliance</li> <li>○ Conducting a root-cause analysis for non-compliance</li> <li>○ Communicating to customer and suppliers about the non-conformance and action plan to tackle the issue</li> </ul> </li> <li>• Revising procedures of ensuring RSL compliance as per findings of the root-cause analysis to ensure compliance in future</li> </ul>
<p>Evidence Required</p>	<ul style="list-style-type: none"> <li>• Technical Data/Specification sheets (TDS) for all chemicals.</li> <li>• Recipes for processes where chemicals are used.</li> <li>• Purchased materials list with Letter of Compliance to RSL for all chemicals.</li> <li>• Chemical inventory - verify all chemicals are covered and checked for RSL</li> </ul>



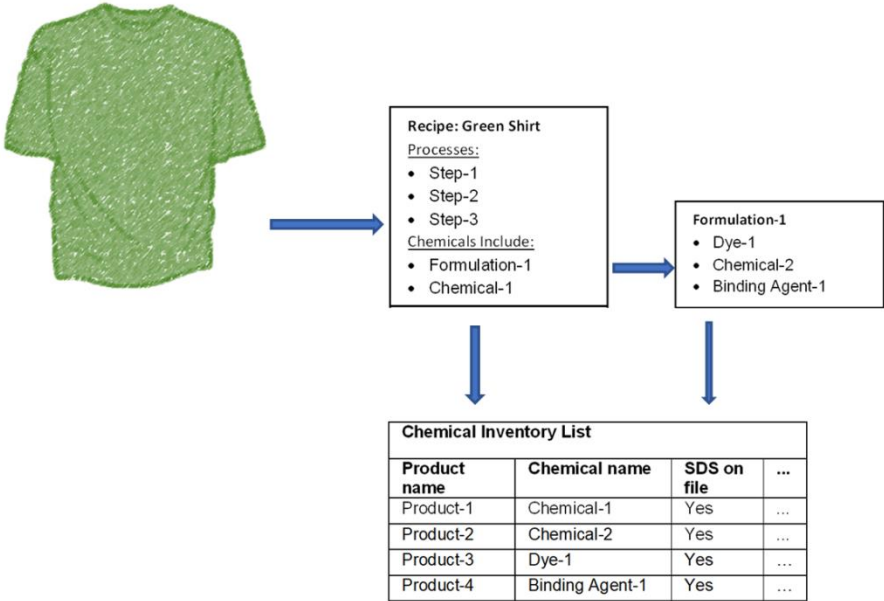
	compliance at least on annual basis, check the dates of previous check.
Additional Notes	<b>A common mistake:</b> Facilities rely on the self-declaration without test reports; no formal written system exists to check RSL/ MRSL throughout the facility.

<b>12- Does your facility have a documented process to systematically monitor, update and demonstrate compliance with Manufacturing Restricted Substance Lists (MRSLs), and segregate chemical formulations materials and products which are non-compliant with MRSL?</b>											
How to answer this question	<p>The user may select (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown while answering this question.</p> <p>In addition, the user is required to answer following question;</p> <table border="1"> <thead> <tr> <th>Questions</th> <th>Responses</th> </tr> </thead> <tbody> <tr> <td>Does your facility require its chemicals suppliers to do the same?</td> <td>Yes/ No/ Unknown</td> </tr> <tr> <td>Does your facility require its washing and printing subcontractors to do the same?</td> <td>Yes/ No/ Unknown/ Not Applicable</td> </tr> <tr> <td>Please describe these processes</td> <td>Text input</td> </tr> <tr> <td>Please upload documentation, if available</td> <td>Upload field</td> </tr> </tbody> </table>	Questions	Responses	Does your facility require its chemicals suppliers to do the same?	Yes/ No/ Unknown	Does your facility require its washing and printing subcontractors to do the same?	Yes/ No/ Unknown/ Not Applicable	Please describe these processes	Text input	Please upload documentation, if available	Upload field
Questions	Responses										
Does your facility require its chemicals suppliers to do the same?	Yes/ No/ Unknown										
Does your facility require its washing and printing subcontractors to do the same?	Yes/ No/ Unknown/ Not Applicable										
Please describe these processes	Text input										
Please upload documentation, if available	Upload field										
Input Connection	ZDHC MRSL, Facility own MRSL, CIL										
Output Connection	Independent										
Keywords / Operational KPIs	Chemical Management Policies, Compliance Procedures, and Commitments										
How to Systematically Fulfil Requirements	<p>The intended behaviour for this question is for facilities to understand MRSLs, which should be used to enable compliant chemical purchases and chemical inventory within the facility, its contractors and subcontractors.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Gather all applicable MRSLs (customer or ZDHC MRSL, legally banned chemicals etc.) and establish a review process to monitor, update and show compliance to legislation and applicable MRSLs (may be managed at facility or its parent/corporate group) <ul style="list-style-type: none"> <li>○ Usually, facilities add columns for each applicable MRSL in the chemical inventory list and mark any non-compliance directly in CIL which is a good way to reduce efforts</li> </ul> </li> <li>• The chemical review process against MRSL is aligned and managed properly across functions in the facility (management, purchasing, lab, production teams) and external parties (subcontractors, suppliers, testing agency, etc.) and responsibilities are assigned properly <ul style="list-style-type: none"> <li>○ The process should also demonstrate how chemicals are reviewed /</li> </ul> </li> </ul>										

	<p>checked against the MRSL prior to purchase.</p> <ul style="list-style-type: none"> <li>○ Chemical review process/methods are robust, i.e., periodical screening through the ZDHC Gateway – Chemical Module (with ZDHC Performance InCheck when possible), certification/Letter of Compliance to MRSL specific to each chemical product with test data/report to support the claim, or adoption of systems that ensures MRSL conformance e.g., Bluesign, etc.</li> <li>○ When non-conforming chemicals are found, a phase out plan is developed accordingly. When ZDHC Gateway - Chemical Module is used for screening, the facility tracks and monitors the Level of Conformance of each chemical screened.</li> <li>○ Following figure presents a sample ZDHC In-Check report showing compliance assessment against ZDHC MRSL</li> </ul> <div style="border: 1px solid #ccc; padding: 10px;"> <div style="display: flex; justify-content: space-around; text-align: center;"> <div style="width: 30%;"> <p><b>68</b> This Supplier has uploaded 68 products for the July 2020 inventory.</p> </div> <div style="width: 30%;"> <p><b>18</b> 18 or 26.47% of this Supplier's inventory products are in the ZDHC Gateway.</p> </div> <div style="width: 30%;"> <p><b>16</b> 23.53% of Products in the July 2020 inventory are conformant with the ZDHC MRSL.</p> </div> </div> <p style="text-align: center;"><b>Inventory Product Conformance</b></p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><b>68</b> Uploaded Products</p> <ul style="list-style-type: none"> <li><span style="color: #e91e63;">●</span> Registered - 2.94%</li> <li><span style="color: #9e9e9e;">●</span> Not Evaluated - 73.53%</li> <li><span style="color: #3f51b5;">●</span> Conformant - 23.53%</li> </ul> </div> <div style="text-align: center;"> <p><b>16</b> Conformant Products</p> <p><b>ZDHC MRSL v1.1</b></p> <ul style="list-style-type: none"> <li><span style="color: #ffc107;">●</span> Level 0 - 25.00%</li> <li><span style="color: #28a745;">●</span> Level 1 - 31.25%</li> <li><span style="color: #17a2b8;">●</span> Level 3 - 43.75%</li> </ul> </div> <div style="font-size: 0.8em;"> <p><span style="color: #9e9e9e;">■</span> Not Evaluated - Products are not found in the ZDHC Gateway. Contact your Formulators to upload the products to ZDHC Gateway.</p> <p><span style="color: #e91e63;">■</span> Registered - The chemical formulator has registered its company and uploaded the product details along with a valid SDS to the ZDHC Gateway. There is no MRSL conformance expected or implied by this level.</p> <p><span style="color: #ffc107;">■</span> Level 0 - The chemical formulator and product SDS are registered in the ZDHC Gateway and the formulator has submitted a self-declaration of ZDHC MRSL.</p> <p><span style="color: #28a745;">■</span> Level 1 - The chemical formulator has provided a thirdparty review of documentation or an analytical test report for the product where the data meet the QA and QC requirements in the MRSL Conformance Guidance to be accepted as evidence of conformance.</p> <p><span style="color: #3f51b5;">■</span> Level 2 - All requirements for Level 1 passed and passed a review of the product stewardship practices of the chemical supplier by the third-party certifier.</p> <p><span style="color: #17a2b8;">■</span> Level 3 - All requirements for Level 2 passed and passed a site visit to the chemical formulator to evaluate their product stewardship first-hand.</p> </div> </div> </div> <p><b>Figure 25: ZDHC InCheck Report Sample</b></p> <ul style="list-style-type: none"> <li>• Establish a process to formally communicate (and update) the expectations to their dye and chemical suppliers that formulations supplied to the facility need to be compliant with MRSL (may be managed at facility or its parent/corporate group)</li> <li>• Establish a process to formally communicate (and update) the expectation of MRSL compliance to the upstream supply base and monitored on at least an annual basis, including subcontracted processing units i.e., washing, printing (if applicable) (may be managed at facility or its parent/corporate group)</li> <li>• Actively monitor MRSL compliance of suppliers and screen it against Chemical Inventory List (CIL) (may be managed at facility or its parent/corporate group).</li> </ul>
<p>Evidence Required</p>	<ul style="list-style-type: none"> <li>• Chemical Inventory List (CIL)</li> <li>• Chemical review policy and process flow</li> <li>• List of non-conforming chemicals</li> <li>• Phase out plan for non-conforming chemicals, if any</li> <li>• MRSLs applicable to the facility e.g., own MRSL, customers' MRSL, or ZDHC MRSL</li> <li>• ZDHC tools for MRSL checks (InCheck Reports, ChemCheck)</li> <li>• Positive lists from chemical suppliers</li> <li>• Email communication or communication trail between facility and its</li> </ul>

	<p>chemical suppliers and subcontractors (if any) regarding MRSL compliance</p> <ul style="list-style-type: none"> <li>• Letter of compliance to MRSL with chemical name, date of issuance, and test reports</li> <li>• Documented periodical screening process against ZDHC Gateway - Chemical Module (where applicable) and the Level of Conformance of each chemical screened. Dated records of previous screenings and schedule of future screening.</li> </ul>
Additional Notes	<b>A common mistake:</b> Facilities rely on the self-declaration without test reports; no formal written system exists to check RSL/ MRSL throughout the facility.

<b>13- Can all of your production chemicals be traced from the manufacturing process back to chemical inventory?</b>	
How to answer this question	<p>The user may select (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown while answering this question.</p> <ul style="list-style-type: none"> <li>• Answer Yes only if your facility can trace all chemicals in production recipes back to the chemical inventory.</li> <li>• Answer Partial Yes if only some of the chemicals in production recipes can be traced back to the chemical inventory</li> </ul>
Input Connection	CIL
Output Connection	Chemicals Management Question 20
Keywords / Operational KPIs	Product Quality / Integrity
How to Systematically Fulfill Requirements	<p>The purpose of traceability is determining whether the chemical components involved in the production can be traced “backward” (Pick out a finished product, whether it is possible to trace the chemical components that are used to produce that particular finished product), and “forward” (Pick out a chemical, whether it is possible to identify all the finished products that are produced by using that chemical).</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Establish documented process of recording issuance to and usage of chemicals at each process in form of recipes and batch cards along the process flow of a product; keep record of all recipe and batch cards</li> <li>• Provide written instructions for proper use of chemicals in all processes including recipe cards, process instructions (where applicable), formulation sheets, containing all traceable information i.e., chemical name, lot number, and quantity, which can be linked back to the facility-wide chemical inventory.</li> <li>• Develop process flow charts for all products which require chemicals in processes, along with process instructions, control parameters and checkpoints, and record quantities of all individual chemicals consumed in each process</li> <li>• Document internal blending / mixing / formulation of chemicals clearly</li> </ul>

	<p>marking for the processes and products the blending / mixing / formulation was performed</p> <ul style="list-style-type: none"> <li>Chemicals listed in each production recipe at each manufacturing step should be traced consistently to relevant records, including chemical mixing process log, lab records (e.g., colour lab, washing lab) where applicable</li> <li>Record the chemical information in the chemical inventory i.e., chemical / formulation name, lot number, MRSL and RSL compliance etc. (refer to Question-1 for expectation related to chemical inventory)</li> <li>Train all relevant workers on reading and using process recipes and the process to record production and chemical consumption</li> <li>Train all managers and supervisors on process of traceability of chemicals</li> </ul> <p>Following schematic diagram presents a sample process of tracing chemicals from manufacturing process back to chemical inventory</p>  <p><b>Recipe: Green Shirt</b>  <u>Processes:</u>          • Step-1          • Step-2          • Step-3  <u>Chemicals Include:</u>          • Formulation-1          • Chemical-1</p> <p><b>Formulation-1</b>          • Dye-1          • Chemical-2          • Binding Agent-1</p> <table border="1"> <thead> <tr> <th colspan="4">Chemical Inventory List</th> </tr> <tr> <th>Product name</th> <th>Chemical name</th> <th>SDS on file</th> <th>...</th> </tr> </thead> <tbody> <tr> <td>Product-1</td> <td>Chemical-1</td> <td>Yes</td> <td>...</td> </tr> <tr> <td>Product-2</td> <td>Chemical-2</td> <td>Yes</td> <td>...</td> </tr> <tr> <td>Product-3</td> <td>Dye-1</td> <td>Yes</td> <td>...</td> </tr> <tr> <td>Product-4</td> <td>Binding Agent-1</td> <td>Yes</td> <td>...</td> </tr> </tbody> </table> <p><b>Figure 26: Sample process of tracing chemicals from manufacturing process back to chemical inventory</b></p>	Chemical Inventory List				Product name	Chemical name	SDS on file	...	Product-1	Chemical-1	Yes	...	Product-2	Chemical-2	Yes	...	Product-3	Dye-1	Yes	...	Product-4	Binding Agent-1	Yes	...
Chemical Inventory List																									
Product name	Chemical name	SDS on file	...																						
Product-1	Chemical-1	Yes	...																						
Product-2	Chemical-2	Yes	...																						
Product-3	Dye-1	Yes	...																						
Product-4	Binding Agent-1	Yes	...																						
<p>Evidence Required</p>	<ul style="list-style-type: none"> <li>Recipe cards, chemical formulation sheets, process instructions (where applicable), containing all traceable information i.e., chemical name, available quantity, and lot number</li> <li>Chemical Inventory</li> <li>Chemical mixing process log, lab records (e.g., colour lab, washing lab, etc.)</li> </ul>																								
<p>Additional Notes</p>	<p>Following are situations usually found in the facilities that result in partial or no score in this question;</p> <ul style="list-style-type: none"> <li>Chemical store requested procurement department to purchase a chemical which is part of existing CIL, but purchaser procured some other similar chemical due to availability or price issue; proper documentation (TDS, SDS) is not available for the chemical. Due to production load, the store issues this chemical to production, records in issuance, but does not list the chemical in CIL as it has not yet gone through the internal approval process.</li> <li>During the process/machine set-up, production supervisor washed a small batch of garments as per pre-set recipe and found out the need to add more softener as desired results were not achieved. Due to production load, the</li> </ul>																								

	supervisor verbally informed the worker to add the softener in newly devised quantity but forgot to update the recipe and batch cards. The chemical consumption record now does not reconcile with intended consumption in recipe.
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### 7.3. Level-2

<b>14- Does your facility have an implementation plan to improve your chemicals management program?</b>	
How to answer this question	The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question.
Input Connection	CIL, EMS Question 2
Output Connection	Independent
Keywords / Operational KPIs	Action Plan; All Operational KPIs
How to Systematically Fulfil Requirements	<p>Considering that relatively few facilities are expected to meet all level 1 chemical management criteria, the most important behaviour that level 2 questions are intended to drive is the development and the implementation of a plan to improve the existing chemical management practices intended to progressively reach the minimum regulatory and industry expectations (Level 1). It may take many facilities years to fully complete all Level 1 requirements for a robust chemicals management program.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Establish a process to conduct management review of chemical management system especially all Level-1 requirements</li> <li>• Enlist all questions where facility could not achieve Full Yes along with reasons based on management review and verifier's comments</li> <li>• Develop an action plan to fulfil all requirements of listed questions along with responsibilities, timelines, and allocated resources</li> <li>• Monitor implementation of the action plan and record results</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Documented plan in place to complete all requirements for every question in level 1</li> <li>• Documented should include which questions were not achieved with a full yes and why</li> <li>• Documented plan should include persons responsible and a targeted date for achieving full yes responses for those questions which were not met</li> </ul>
Additional Notes	Sometimes facilities insist that all questions in level 1 qualify for a "Yes" answer, whereas CIL, MRSL training, RSL/ MRSL, Chemical traceability are rated partial based on current chemical management practices therefore it is always recommended to prepare the chemical improvement plan as per deficiencies in the

	level 1 and chemical objective / target defined in environment strategy in EMS Question 2.
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<b>15- Does your facility have an implementation plan to reduce the use of hazardous chemicals beyond chemicals specified by regulations and/or Restricted Substance Lists / Manufacturing Restricted Substance Lists?</b>	
How to answer this question	<p>The user may select (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown while answering this question.</p> <ul style="list-style-type: none"> <li>• <b>In scope:</b> All production chemicals, focus on on-product chemicals for a cut and sew operation (the most important behaviour is impact on product - should move toward using lists of pre-screened chemicals)</li> <li>• <b>Out of scope:</b> Chemicals which are not focused on the product such as, cleaners, chemicals in cooling tower/boiler excluded.</li> <li>• <b>Answer Partial Yes</b> if implementation plan is available with action checklists but not backed up by strategy (goals, targets, plan, etc.) and no active list, laboratory / pilot production records exist for alternative trials.</li> </ul>
Input Connection	CIL
Output Connection	Independent
Keywords / Operational KPIs	Chemicals & Process Innovation
How to Systematically Fulfil Requirements	<p>Removal of hazardous chemicals through the intentional setting of an action plan with targets, assigned responsibilities and a timeframe for action.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Identify chemicals that are not (yet) part of any RSL or MRSL but are highly hazardous (i.e., looking beyond RSL and MRSL). Such chemicals may be found by; <ul style="list-style-type: none"> <li>○ Consulting lists published by any established organization or authority e.g. <ul style="list-style-type: none"> <li>▪ <a href="#">ZDHC MRSL Candidate List</a></li> <li>▪ Stockholm Convention on Persistent Organic Pollutants</li> <li>▪ ChemSec SIN list</li> <li>▪ Washington State Reporting List of Chemicals of High Concern to Children (CHCC)</li> <li>▪ <a href="#">Subsport European platform</a></li> <li>▪ <a href="#">SVHC (Substance of very high concern)</a></li> <li>▪ Other relevant list for the activity of the facility, such as Bluesign, BSSL, &amp; GOTS etc.</li> </ul> </li> <li>○ Conducting a hazard banding and identifying chemicals that contain very high hazards especially for chronic use and environment <ul style="list-style-type: none"> <li>▪ This question does not require facilities to have in-house expertise to do detailed hazard assessments. Factories can have hazard implementation plans by relying on lists via</li> </ul> </li> </ul> </li> </ul>

	<p>guidance.</p> <ul style="list-style-type: none"> <li>○ Identify chemicals that may contain RSL/MRSL substances (refer to RSL risk assessment in Question 11) <ul style="list-style-type: none"> <li>▪ Not needed for facilities using chemicals in tooling and/or operations only</li> </ul> </li> <li>● Identify alternative chemicals, conduct trials in laboratory or pilot facility, and document the decisions to proceed or decline.</li> <li>● Develop an implementation plan of phasing out identified hazardous chemicals with goals, targets, actions, responsibilities and timelines. The plan should include; <ul style="list-style-type: none"> <li>○ name of the chemical</li> <li>○ hazardous substance contained</li> <li>○ exposure assessment involving estimating the intensity, frequency, duration, and route of exposure to a substance</li> <li>○ action items to phase out usage of such chemical and respective timelines</li> <li>○ list of alternative/substitute chemicals to be used</li> <li>○ timeline for phase-out completion</li> <li>○ monitoring procedure for the alternatives and its performance</li> </ul> </li> <li>● Monitor the implementation and record progress/ results</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>● A hazardous chemical(s) list with an action plan with assigned responsibilities and a timeframe for action.</li> <li>● Alternative chemical trials in laboratory or pilot facility documents with conclusions to proceed or decline.</li> </ul>

<p><b>16- Does your facility source already approved or preferred chemicals from a positives list beyond chemicals specified by regulations and/or Restricted Substance Lists / Manufacturing Restricted Substance Lists?</b></p>	
How to answer this question	<p>The user may select (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown while answering this question.</p> <p><b>For facilities that use chemicals in production:</b></p> <ul style="list-style-type: none"> <li>● Answer Yes only if more than 50% of the chemical formulations in the chemical inventory (% based on the number of chemicals, not the volume) are sourced from a positive list such as ZDHC Chemical Gateway, Bluesign®, GOTS, and/or OEKO-TEX® Eco Passport.</li> <li>● Answer Partial Yes if you have chemicals from a positives list that make up less than 50% of your inventory</li> </ul> <p><b>For facilities that use chemicals in tooling and/or operations only:</b></p> <ul style="list-style-type: none"> <li>● Answer Yes if there is demonstrated evidence that more than 10% of the chemical formulations in the chemical inventory (% based on the number of chemicals, not the volume) is sourced from a positive list</li> <li>● Answer Partial Yes if the chemical formulations in the chemical inventory sourced from a positive list represent less than 10% of the chemical inventory (% based on the number of chemicals, not the volume)</li> </ul>
Input Connection	CIL

Output Connection	Independent
Keywords / Operational KPIs	Chemical Selection, Procurement, & Purchasing Practices
How to Systematically Fulfil Requirements	<p>This question is intended to reward manufacturers who proactively seek chemicals with fewer hazards and risks to replace chemistry that poses greater danger to humans and our environment. These programs typically go above and beyond MRSLs and RSLs which are focused on regulatory risk.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Establish a process to regularly identify and review positive chemical lists. These lists may include; <ul style="list-style-type: none"> <li>○ Lists issued by third party organizations like ZDHC Chemical Gateway, Bluesign®, GOTS, and/or OEKO-TEX® Eco Passport</li> <li>○ Alternatives lists issued by brands</li> </ul> </li> <li>• Clearly identify chemicals in chemical inventory that belong to any positive list. This can be done by including a column of “Positive List” in the CIL and name the list certain chemical belongs to.</li> <li>• Keep record of purchasing the positive list chemicals e.g., purchase orders, contracts with chemical suppliers etc.</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Demonstrate the access to a positive list (example: Bluesign® Bluefinder license)</li> <li>• Chemical inventory listing the chemical formulations and the corresponding chemical supplier. Chemicals sources from a positive list should be identified in the chemical inventory</li> <li>• Purchasing support documents</li> <li>• Purchasing contract language to support sourcing chemicals from positive lists</li> <li>• Process documentation to identify internal and external responsibilities</li> </ul>
Additional notes	<p>Some facilities do not screen chemical by using ZDHC but use other systems like OEKO TEX, GOTS, Bluesign <i>etc.</i> In this case, proper records should be maintained to justify at least 50% chemicals are procured from positive list.</p> <p>InCheck reports of some facilities show less than 50% compliance level and still they mark this question as “Yes” instead of partial.</p>

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## 7.4. Level-3

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<b>17- Does your facility collaborate with brands and/or chemical suppliers to select chemicals for alternatives assessment?</b>	
How to answer this question	<p>The user may select (i) Yes, (ii) No, or (iii) Unknown while answering this question.</p> <p>On selection of “Yes”, the tool requires to;</p> <p><b>Indicate which chemicals (Yes/No)</b></p>



	<ul style="list-style-type: none"> <li>• All chemicals used in manufacturing processes</li> <li>• All chemicals used in tooling/equipment (lubricants and grease)</li> <li>• All chemicals used to operate and maintain the facility</li> </ul>
Scoring	<ul style="list-style-type: none"> <li>• Full Points if facility is collaborating on alternatives for all categories of chemicals.</li> <li>• Partial Points if facility is only prioritizing alternatives for some categories of chemicals.</li> </ul>
Input Connection	CIL, RSL, MRSL, Positive List, Alternative Assessment
Output Connection	Independent
Keywords / Operational KPIs	Chemical Selection, Procurement, & Purchasing Practices
How to Systematically Fulfill Requirements	<p>Question 15 in Level-2 required facilities to look beyond the RSL, MRSL and Legal Compliance and look for alternative chemicals on their own. However, in Level-3, this question requires to externalize the process by including chemical suppliers as well as brands in the initiative to have meaningful results.</p> <p>Collaboration to develop alternatives to the use of chemicals including hazardous substances can take various forms. This criterion measures the ability for facilities to take the ownership of the substitution of hazardous substances by leveraging collaboration.</p> <p>It's critical that value chain partners work together on alternatives in order to prevent a regrettable substitution that results in a product failure or non-compliance.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Establish a process for collaboration regarding chemical alternatives, substances of concern, and/or restricted substance lists in all categories of chemicals listed in this question</li> <li>• The collaboration can be done by various means; some examples are provided below; <ul style="list-style-type: none"> <li>○ Take part in Brands' programs that suggest alternatives and promote trials of better chemicals</li> <li>○ Propose alternate chemicals to brands for their product based on initial trials in process and testing product quality and functionality parameters</li> <li>○ Partner/collaborate with chemical suppliers to do trials of better alternative chemicals suggested by the suppliers</li> <li>○ Share a list of chemicals with chemical suppliers for which alternatives are sought and invite suppliers to propose alternates and conduct trials</li> </ul> </li> <li>• Develop a prioritized list of alternatives for a chemical through a transparent, science-based, simple and reasonable system that evaluates chemicals and/or chemical products</li> <li>• Keep record of all meetings and collaboration activities with customers and chemical suppliers for alternative assessment</li> <li>• Keep management and key employees updated of the progress and the</li> </ul>

	prioritized list of alternatives for chemicals
Evidence Required	<ul style="list-style-type: none"> <li>• Prioritized list of alternatives for chemicals</li> <li>• MRSL/RSL, substances of concern list/candidate list, REACH SVHC List</li> <li>• Minutes from collaborative meeting between facility, customers, and chemical suppliers regarding alternatives</li> </ul>
Additional Notes	<b>A common mistake:</b> Facilities normally collaborate with brands on chemical used in the manufacturing processes, however facilities also select “Yes” for chemical used in the tooling/ equipment’s and to maintain facility.

<b>18- Does your facility contribute a chemical analysis against human and environmental hazard criteria (e.g., persistent, bio-accumulative, and toxic) to this alternatives process?</b>	
How to answer this question	<p>The user may select (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown while answering this question.</p> <ul style="list-style-type: none"> <li>• Answer Yes if a hazardous chemicals assessment has been conducted in the facility and you are using this information to prioritize action and encourage chemical use towards safer alternatives. The assessment must include an evaluation of the hazard associated with a hazardous substance and an assessment of the exposure.</li> <li>• Answer Partial Yes if you have conducted an assessment but have not prioritized further action.</li> </ul>
Input Connection	CIL, RSL, MRSL, Positive List, Alternative Assessment
Output Connection	Independent
Keywords / Operational KPIs	Product Quality / Integrity
How to Systematically Fulfill Requirements	<p>A chemical hazard assessment was also referred in Question 15, however, in Level 3, it is required to conduct a much-detailed hazard assessment and use the results for alternative assessment as well.</p> <p>The alternative process referred in this question is a process done by the facility to identify the chemical products they are using based on its hazards, and then use this knowledge to make a selective decision to reduce, substitute or ultimately phase out this hazardous chemical.</p> <p>Hazardous chemicals are those that show intrinsically hazardous properties—persistent, bio-accumulative, and toxic (PBT); very persistent and very bio-accumulative (vPvB); carcinogenic, mutagenic, and toxic for reproduction (CMR); endocrine disruptors (ED); or chemicals of equivalent concern—not just those that have been regulated or restricted in other jurisdictions.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Conduct a systematic hazard and risk assessment at site considering hazard information in SDS and exposures at site. Conduct the risk assessment for all chemicals and chemical containing wastes, at all</li> </ul>

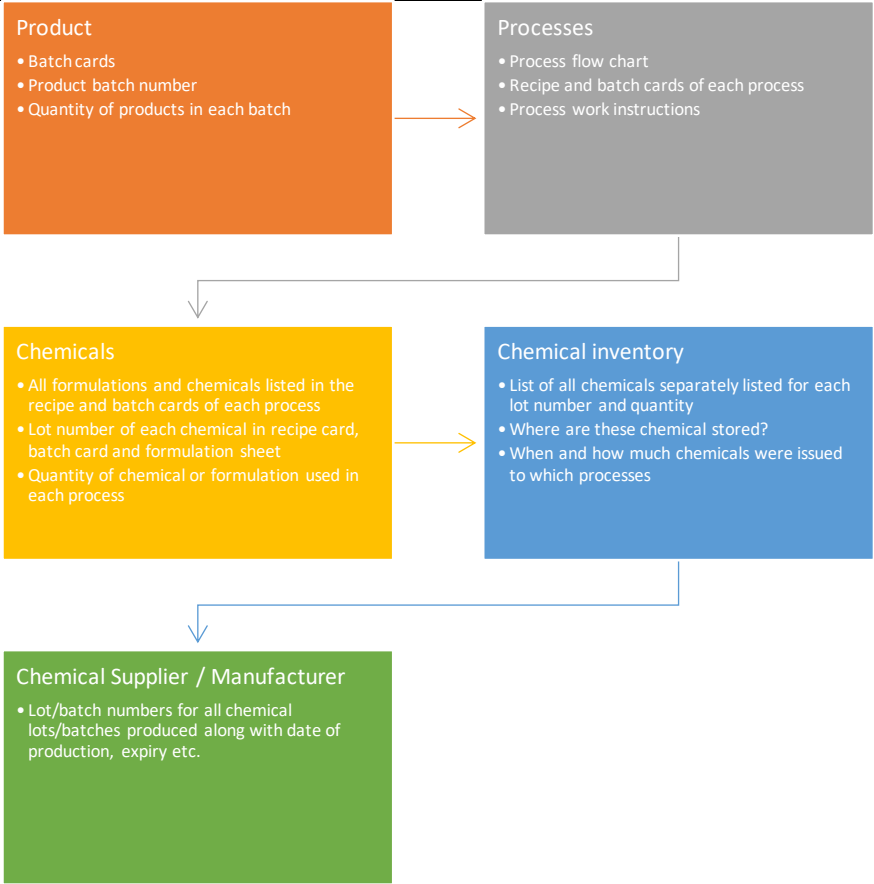
	<p>locations where chemicals and chemical containing waste are stored, used and disposed of. Also include the impacts to environment by chemicals in wastewater, solid waste and air emissions.</p> <ul style="list-style-type: none"> <li>○ There are many methodologies of conducting risk assessment like UNEP Responsible Production Toolkit, ILO Control Banding, <a href="#">BAuA (EMKG) Toolkit for Chemical Control Banding</a> etc. Based on the risk assessment, the Facility Map could be updated to show the risk levels at various areas in the facility.</li> <li>○ <a href="#">IFA GHS Column Model 2020</a> provides an easy way of assessing hazard bands and conduct alternative / substitute assessment</li> </ul> <ul style="list-style-type: none"> <li>● Widely communicate the results of hazard and risk assessment in the facility through awareness sessions, trainings, posters and identification of risks using signage at site. Update chemical inventory list with identified hazards (and/or risks)</li> <li>● Use the chemical hazard assessment to identify and prioritize chemical substances for possible replacement with safer alternatives.</li> <li>● Develop a prioritized list of alternatives for a chemical based on the hazard assessment.</li> <li>● Keep management and key employees updated of the progress and the prioritized list of alternatives for chemicals based on hazard criterion</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>● Hazardous Chemicals assessment report</li> <li>● Evidence the facility has evaluated the alternatives against hazard criteria.</li> </ul>
Additional Notes	<p><b>A common mistake:</b> At times, facilities conduct the chemical risk assessment based only on basic health and safety rules and do not assess severity level of the risk. Having a severity level assessment helps in assessing control gaps and prioritizing risks.</p>

19- Does your facility contribute an analysis of lifecycle impacts to this alternatives process?	
How to answer this question	<p>The user may select (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown while answering this question.</p> <ul style="list-style-type: none"> <li>● Answer Yes if you have evaluated the environmental impacts (e.g., impacts on water usage, energy usage, waste, wastewater, and disposal) of replacing chemicals in your factory.</li> </ul>
Input Connection	CIL, RSL, MRSL, Positive List, Alternative Assessment
Output Connection	Independent
Keywords / Operational KPIs	Chemicals & Process Innovation
How to Systematically Fulfill Requirements	<p>This question focusses on the other resource consumption or production (such as water, energy and waste), as opposed to chemical assessment based on the hazardous properties as referred in Question 18.</p> <p>This action is beyond just chemical management and a more encompassing approach of sustainability which looks at a product life cycle within and beyond the</p>

	<p>facility e.g., water usage, energy usage, waste, wastewater, disposal, etc.</p> <p>The objective of product and chemical life-cycle reviews is to support the product and chemical environmental footprint.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Conduct a life cycle assessment for all proposed alternatives using one of following methodologies;             <ul style="list-style-type: none"> <li>○ Evaluation using the Bluesign® BlueXpert (Link for this is provided in the How to Higg Guide but the link is not valid anymore)</li> <li>○ PLCA/LCA studies</li> <li>○ Documented metrics for water, energy, waste, etc.</li> <li>○ 3rd Party assessments</li> <li>○ Material Flow Cost Accounting</li> </ul> </li> <li>• As a general principal, the facility should include following in the life cycle assessment (LCA)             <ul style="list-style-type: none"> <li>○ Resource consumption and environmental impacts of identified chemicals (which need to be replaced or phased out) e.g., amount of energy and water consumption, waste generation, wastewater generation, disposal costs, pollution load due to waste, wastewater, air emissions, and GHG emissions etc.</li> <li>○ Resource consumption and environmental impacts of alternate chemicals and establishing if the alternate chemicals contribute to reduced resource consumption and environmental impacts</li> <li>○ It is also possible that an alternative selection ends up increasing the energy and water consumption; therefore, it must be calculated and recorded</li> </ul> </li> <li>• Update the prioritized list of alternatives for a chemical based on life cycle assessment</li> <li>• Keep management and key employees updated of the progress and the prioritized list of alternatives for chemicals based on life cycle assessment</li> </ul>
<p>Evidence Required</p>	<ul style="list-style-type: none"> <li>• Evaluation of environmental impacts of chemical alternatives by one of following;             <ul style="list-style-type: none"> <li>○ Evaluation using the Bluesign® BlueXpert (Link for this is provided in the How to Higg Guide but the link is not valid anymore)</li> <li>○ PLCA/LCA studies</li> <li>○ Documented metrics for water, energy, waste, etc.</li> <li>○ 3rd Party assessments</li> <li>○ Material Flow Cost Accounting</li> </ul> </li> </ul>
<p>Additional Notes</p>	<p>An example could be shifting to high fixation dyes which are generally expensive compared to normal dyes but result in reduced process time, water consumption, energy consumption and wastewater discharge. Moreover, high fixation dyes have high fixation rates, so these produce less COD and BOD load for wastewater treatment plant, hence require lesser treatment cost and lesser contribution to sludge generation.</p> <p>BUT it is important to assess these proposed effects while deciding to shift to high fixation dyes. If a facility starts using high fixation dyes as they heard about these positive impacts but did not conduct and record a life cycle assessment themselves, they would not be able to answer YES to this question.</p>

	<p><b>A common mistake:</b> Facilities only present the data based on the processes within the facility boundary but do not collect/maintain data beyond the facility e.g., energy/water used during cultivation/cropping, ginning, spinning etc. and postproduction data based on consumer usage.</p>
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<p><b>20- Can your manufacturing process chemicals be traced from product lot number back to chemical lot number?</b></p>	
How to answer this question	<p>The user may select (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown while answering this question.</p> <ul style="list-style-type: none"> <li>• Answer Yes only if ALL chemicals used in processes or in mixtures can be traced to the temporary/working storage and main warehouse where consistent records are available and maintained to the lot number.</li> <li>• Answer Partial Yes if you can trace some but not all chemicals back to the lot number</li> </ul>
Input Connection	CIL, Batch Cards, Recipe Cards, Formulation Sheets, Question 13
Output Connection	Independent
Keywords / Operational KPIs	Chemicals & Process Innovation
How to Systematically Fulfill Requirements	<p>The intent of this question is same as that of Question 13, i.e., Traceability of chemicals.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Batch cards are available for all product specifying batch number and other relevant information e.g. dates and production quantity</li> <li>• All processes that the product has gone through that involve usage of chemical are identified and the corresponding recipes and batch cards at each process are available and maintained. Process instructions and checkpoints are established and documented.</li> <li>• All chemicals listed in recipes can be traced to the chemical mixing/blending or lab (where applicable), including relevant information e.g., chemical name and quantity used in mixtures</li> <li>• All chemicals used in processes or in mixtures can be traced to the temporary/working storage and main warehouse where consistent records are available and maintained, e.g., storage in/out log with chemical lot number, quantity, and dates (stored and dispatched for usage).</li> <li>• Linkage between the lot number of chemicals used and the product batch number is established for any given product manufactured at the facility</li> </ul>

	 <p><b>Product</b></p> <ul style="list-style-type: none"> <li>• Batch cards</li> <li>• Product batch number</li> <li>• Quantity of products in each batch</li> </ul> <p><b>Processes</b></p> <ul style="list-style-type: none"> <li>• Process flow chart</li> <li>• Recipe and batch cards of each process</li> <li>• Process work instructions</li> </ul> <p><b>Chemicals</b></p> <ul style="list-style-type: none"> <li>• All formulations and chemicals listed in the recipe and batch cards of each process</li> <li>• Lot number of each chemical in recipe card, batch card and formulation sheet</li> <li>• Quantity of chemical or formulation used in each process</li> </ul> <p><b>Chemical inventory</b></p> <ul style="list-style-type: none"> <li>• List of all chemicals separately listed for each lot number and quantity</li> <li>• Where are these chemical stored?</li> <li>• When and how much chemicals were issued to which processes</li> </ul> <p><b>Chemical Supplier / Manufacturer</b></p> <ul style="list-style-type: none"> <li>• Lot/batch numbers for all chemical lots/batches produced along with date of production, expiry etc.</li> </ul> <p><b>Figure 27: Typical traceability process required in CM Question 20</b></p>
Evidence Required	<ul style="list-style-type: none"> <li>• All documents as mentioned above</li> </ul>
Additional Notes	<p>If lot number or batch number is not provided by chemical supplier of a chemical, the facility cannot answer this question with a Full Yes.</p>

<p><b>21- Does your facility have a documented Quality Assurance (QA) Program that includes performance of chemicals?</b></p>	
How to answer this question	<p>The user may select (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown while answering this question.</p> <ul style="list-style-type: none"> <li>• Answer Yes only if you have a process in place to randomly select and verify a chemical's compliance to a known standard such as an MRSL or RSL via an organoleptic and chemical analysis on at least an annual basis.</li> <li>• Answer Partial Yes if your facility utilizes customer testing reports traceable to work orders and recipes to verify chemical supplier conformance.</li> <li>• Facilities having onsite laboratory and performing some basic physical test may select Partial Yes.</li> </ul>
Input Connection	<p>CIL, RSL, MRSL, Positive List</p>
Output Connection	<p>Independent</p>

Keywords / Operational KPIs	Product Quality / Integrity
How to Systematically Fulfil Requirements	<p>The focus should be on whether the chemical being purchased is performing according to its technical data sheet. It is very leading practice for a facility that purchases chemicals to setup a process to really verify the chemical compliance on its own (e.g., screening laboratory test).</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Establish a quality management program that ensures chemicals are evaluated against and meet standards for achieving MRSL and RSL requirements. <ul style="list-style-type: none"> <li>○ i.e., the facility should be able to randomly select and verify a chemicals compliance with RSL and MRSL via an organoleptic and chemical analysis on at least an annual basis.</li> </ul> </li> <li>• Quality management program should include; <ul style="list-style-type: none"> <li>○ the evaluation of the quality and performance efficacy of each chemical formulation used</li> <li>○ ensuring the process recipes of how each chemical formulation are to be used are strictly followed</li> <li>○ process controls are strictly followed</li> <li>○ ongoing assessment of production quality with supporting records.</li> <li>○ Management should review the quality management program, relevant testing results</li> </ul> </li> <li>• Establish a process to review chemical suppliers' analytical test reports</li> <li>• Ensure that the criterion to add/remove chemical suppliers include quality parameters as well as conformance to RSL and MRSL</li> <li>• Maintain record of all test reports according to the manufacturing batch numbers, chemical lot numbers etc. to ensure traceability</li> <li>• Following are the (minimum) analysis recommended to be performed in-house: <ul style="list-style-type: none"> <li>○ pH (except for tanneries where this test is excluded).</li> <li>○ Colour fastness: <ul style="list-style-type: none"> <li>▪ To perspiration</li> <li>▪ To water</li> <li>▪ To rubbing (dry and wet).</li> <li>▪ To saliva (only for baby garments).</li> </ul> </li> <li>○ Ensure the in-house lab has all the necessary equipment to perform a good quality chemical performance and maintain calibration record of all equipment</li> <li>○ Standardise the process of sample taking and testing a chemical recipe</li> <li>○ Randomly send internal results to external lab for accuracy checking</li> </ul> </li> <li>• Following are the (minimum) analysis recommended to be outsourced to an accredited/certified laboratory: <ul style="list-style-type: none"> <li>○ Arylamines</li> <li>○ Formaldehyde</li> <li>○ Composition</li> <li>○ APEO's and PFC's</li> <li>○ Ensure following while selecting a laboratory; <ul style="list-style-type: none"> <li>▪ Laboratories should have certifications or accreditations for</li> </ul> </li> </ul> </li> </ul>

	<p>the tests to be carried out.</p> <ul style="list-style-type: none"> <li>▪ Laboratories should inform their customers in case one of the tests is being outsourced to any other laboratory.</li> <li>▪ Laboratories should regularly participate in correlation studies (“round robin” or blind samples) for the tests they are performing for their customers</li> <li>▪ Laboratories should be able to offer reasonable analysis times</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>• Quality department with associated records such as customer test reports, analytical laboratory test reports by chemical by lot.</li> <li>• Chemical supplier analytical test report.</li> <li>• SOP for purchasing chemicals from qualified suppliers</li> <li>• Quality reports to senior management</li> <li>• In-house records of the analysis performed during last season</li> <li>• Test reports records from external labs of the analysis performed during last season and check that they are in accordance with MRSL requirements</li> <li>• Analysis results traceable to their corresponding internal orders and finished good batch</li> <li>• Does the facility send internal results to external lab for accuracy checking?</li> <li>• All records kept for one year</li> </ul>

<b>22- Do your contractors/subcontractors source already approved or preferred chemicals from a positives list to replace chemicals not already included in RSL/MRSL?</b>	
How to answer this question	<p>The user may select (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown while answering this question.</p> <ul style="list-style-type: none"> <li>• Answer Yes if the facility has a system in place that requires all contractors and subcontractors to have a preferred chemicals list and verify its use.</li> <li>• Answer Partial Yes if facility have an action plan to engage suppliers by requesting the selection of chemicals from a positive list.</li> </ul>
Input Connection	RSL, MRSL, Positive List, Question 15, Question 17
Output Connection	Independent
Keywords / Operational KPIs	Chemical Selection, Procurement, & Purchasing Practices
How to Systematically Fulfil Requirements	<p>Facilities should proactively seek chemicals with fewer hazards and risks to replace chemistry that poses greater danger to humans and our environment (beyond MRSLs and RSLs). This question is intended to reward facilities that have gone above and beyond to also upstream suppliers to use preferred chemicals lists.</p> <p>This question requires facilities to coordinate with contractors and sub-contractors to source the preferred chemicals; like what was required of the facility in question 16. So (almost) all the requirements of Question 16 now apply to the sub-contractors</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p>



	<ul style="list-style-type: none"> <li>Establish a system that requires all contractors and subcontractors to have a preferred chemicals list going beyond Legal, RSL or MRSL requirements</li> <li>Verify use of chemicals from preferred chemicals list or positive list</li> <li>Provide necessary training and handholding to the contractors/sub-contractors to enable their transformation</li> <li>The facility may share the results of alternative assessments (done as part of Questions 15 – Question 19) with contractors/sub-contractors to facilitate them</li> <li>Invite contractors/sub-contractors to take part in Higg FEM and verification (this is not a mandatory criterion but makes it easy to get full marks in this question)</li> <li>Keep record of all communication with contractors/sub-contractors and results of verification of using chemicals from positive list</li> </ul>
Evidence Required	<ul style="list-style-type: none"> <li>Description of the procedures.</li> <li>Communications with the suppliers and subcontractors showing confirming the practice of sourcing chemicals from positive lists</li> <li>If available, Higg verification report from suppliers / subcontractors showing that they meet the criteria CM-2.3 (i.e., Question 16)</li> </ul>

<b>23- Does your facility have documented business goals, processes and actions showing commitment (e.g., equipment, process, choice of substitute chemicals) to new sustainable chemistry innovation?</b>	
How to answer this question	<p>The user may select (i) Yes, (ii) Partial Yes, (iii) No, or (iv) Unknown while answering this question.</p> <ul style="list-style-type: none"> <li>Answer Yes only if you can demonstrate that business decisions take responsible chemical management and innovation into consideration by incorporating responsible chemicals into its own business agreements and documented business goals.</li> <li>Answer Partial Yes if you can otherwise demonstrate that business decisions take responsible chemical management and innovation into consideration.</li> </ul> <p>Further, the tool requires to answer following;</p> <p><b>Does your facility communicate its goals, processes and actions to Brands and Suppliers? (Yes/No/Unknown)</b></p>
Input Connection	<p>EMS Question 2</p> <p>Chemicals Management Question 14 to some extent (related to objective and targets)</p>
Output Connection	<p>Independent</p>
Keywords / Operational KPIs	<p>Chemicals &amp; Process Innovation</p>
How to Systematically Fulfil	<p>In this question, Higg expects the facility can demonstrate that business decisions take responsible chemical management and innovation into consideration. This means facility is not just writing policies but is actively incorporating responsible</p>

<p>Requirements</p>	<p>chemicals into own business agreements. Behaviour will really change once there are business incentives incorporated.</p> <p>To be able to select right options and go through verification process smoothly, it is important that facility ensures following;</p> <ul style="list-style-type: none"> <li>• Establish a CMS strategy that incorporates endorsements from senior leadership that clearly communicate goals and aspirations regarding chemical management, and sets clear direction to consider responsible chemical management and innovation in taking business decisions</li> <li>• Demonstrate that business decisions take responsible chemical management and innovation into consideration.             <ul style="list-style-type: none"> <li>○ This can be demonstrated if factory has invested in innovative technologies or green chemicals, or have set-up a Research and Development process to adopt green chemistry</li> </ul> </li> <li>• Actively incorporate responsible chemicals into own business agreements.             <ul style="list-style-type: none"> <li>○ This can be demonstrated by formally requiring the contractors, sub-contractors, and chemical suppliers to adopt / provide responsible chemicals via contracts or policy communications</li> </ul> </li> <li>• Develop a plan to find new sustainable chemicals.</li> <li>• Communicate the business goals supporting chemicals management to supply chain partners and keep record of all such communications</li> </ul>
<p>Evidence Required</p>	<ul style="list-style-type: none"> <li>• Description or examples of current chemistry R&amp;D projects/investments</li> <li>• Examples of how the facility has incorporated responsible chemistry into own business agreements.</li> <li>• Documented plans and actions regarding business decisions made that take responsible chemicals management and innovation into consideration</li> </ul>
<p>Additional Notes</p>	<p>Facilities that have not invested in advanced technologies like waterless dyeing, plasma dyeing, salt free dyeing etc. and do not have any formal plan in place to work in future with technological advancements should not select “Yes” in this question.</p>

# Index

## A

Accidents & Spills Remediation Plan, 157  
Accounting, 23  
Action Plan, 58, 60, 61, 77, 137, 178  
Annual operating days, 24  
Annual Operational Days, 22  
Annual Reporting, 22  
Annual Volume, 24  
Applicable Industry Sector, 18  
Awareness, 43

## B

Bypass, 91

## C

Chemical Handling, Use, & Storage Practices, 153,  
155, 159, 161, 164, 166  
Chemical Inventory Management, 148  
Chemical Management Policies, Compliance  
Procedures, and Commitments, 172, 174  
Chemical Selection, Procurement, & Purchasing  
Practices, 163, 181, 182, 191  
Chemicals & Process Innovation, 179, 185, 187, 192  
Chemicals used in production, 146  
Chemicals used in tooling/operations, 146  
Communication, 43  
Community, 46, 47  
Competence, 41  
Cut to Pack, 20

## D

Demonstrated reductions in waste quantity, 138  
Dyeing and Printing, 20

## E

Emergency Back-up Plan, 90  
Emergency Response Plan (ERP), 157  
Emission Control and Abatement – Operations, 112  
Emission Control and Abatement – Production  
Processes, 114  
Emissions, 60  
Emissions from operations, 102  
Emissions from production processes, 102  
Emissions from Refrigerants, 110  
Employee training, 129  
Employee Training & Communication, 153, 155, 170

EMS, 32  
Energy Baseline, 54  
Energy Sources, 50  
Energy Target, 58  
Energy Tracking, 50  
Environmental Compliance, 29  
Environmental Management Representative, 32  
Environmental Management Strategy, 33  
Environmental Management Team, 32  
Environmental Permits, 26  
Environmental Violations, 28

## F

Factory Premises, 34  
Final disposal/treatment validation, 141

## G

GHG, 60, 65

## H

Hazardous Sludge, 92  
Hazardous Waste Storage, 125  
Highest Energy Use Factors, 55  
Highest Water Use Factors, 73

## I

Improved disposal methods, 140

## J

Job Description, 41

## L

Leakage, 91  
Long-term decision-making, 33

## M

Managing Emissions Beyond Permit, 115  
Material, 24  
Material Processed, 21  
Material Supplier, 20  
Materials Handled, 21  
Modernizing Equipment, 117  
Monitoring, 61, 63, 78, 138

<b>N</b>	Subcontractors, 44	<b>T</b>
Non-hazardous Sludge, 93		Tracking, 63, 78, 138, 142
Non-hazardous Waste Storage, 126		Tracking Air Emissions, 104, 107
Non-hazardous waste tracking, 120, 122		Tracking Wastewater Volume, 84
<b>O</b>		Tracking Water Sources, 70
Offsite wastewater quality tests, 98		Training, 41, 43
Offsite Wastewater Treatment, 88		<b>V</b>
Offsite Wastewater Treatment Plant, 98		Valid Licence, 26
Onsite Water Treatment, 26		<b>W</b>
<b>P</b>		Waste Baseline, 131
Pay Period, 23		Waste Burning, 128
Payroll, 23		Waste Disposal Methods, 132
Performance Review, 41		Waste diversion / zero waste to landfill, 142
Permit Requirements, 29		Waste Dumping, 128
Permits, 26		Waste Reduction Targets, 134, 135
Product Quality / Integrity, 176, 184, 189		Waste Segregation, 124
<b>R</b>		Waste Upcycling, 143
Records, 28		Wastewater reuse/recycling, 100
Reporting Year, 28		Wastewater Standard, 97
<b>S</b>		Wastewater Treatment, 26, 82
Salary, 23		Wastewater type, 82
SBTi, 66		Water Balance, 80
Science Based Targets, 66		Water Baseline, 72
Scope-3 emissions, 65		Water consumption, 69
Septic Sludge, 95, 97		Water risk, 69
Significant Energy Uses, 55		Water Target, 75
Significant Environmental Impact, 34		Wet Processing, 20
Significant Water Uses, 73		Workers, 23
Status, 29		<b>Z</b>
Stormwater, 87	ZLD, 82	

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