

HIGG FEM 2020

FEM 2020 Water and Waste Calculations

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Reconstructed documentation of how the Higg platform calculated the FEM 2020 water and waste totals, prepared in 2026 from the question definitions and the platform's stored results.

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About this document. This guidance was prepared in 2026 as a good-faith effort to document how the Higg platform calculated the FEM 2020 energy, greenhouse gas, water, waste and refrigerant values. FEM 2020 predates the calculation model maintained by Cascale today: the platform applied its own conversion factors and emission factors and wrote the results back into the assessment as answers, where data consumers see them next to the facility's own answers. What follows is reconstructed from the FEM 2020 question and answer definitions, from those stored results across 16,504 assessments, and from the release history. It may not accurately describe all platform behaviour, in particular edge cases that leave no trace in the data. Statements derived from the data rather than from a specification are marked *observed*, with the number of filings behind them.

Water Data

Facilities flagged each water source used (*yes/no/unknown* per source) and then reported the annual quantity and unit for each source they track. Water is reported for the site as a whole; there is no facility-type or domestic/production split in FEM 2020.

Source	Displayed as	Quantity and unit ref_ids	Platform litre total
watourcesurface	Fresh Surface Water	watourcesurfacequant watourcesurfaceunit	watourcesurfacetotal
watourcerain	Rainwater	watourcerainquant watourcerainunit	watourceraintotal
watourceground	Groundwater	watourcegroundquant watourcegroundunit	watourcegroundtotal
watourceprod	Produced/Process Water	watourceprodquant watourceprodunit	watourceprodtotal
watourcemunicipal	Municipal Water	watourcemunicipalquant watourcemunicipalunit	watourcemunicipaltotal
watourcewastewater	Wastewater from another organization	watourcewastewaterquant watourcewastewaterunit	watourcewastewatertotal
watourcesea	Brackish surface water/seawater	watourceseaquant watourceseaunit	watourceseatotal
watourcecomb	Water- general or unknown origin	watourcecombquant watourcecombunit	watourcecombtal

Units are one of ccf, cuFt, cuYard, gal, liter, m3 and ml. The platform converted every quantity to litres with the factors below (*observed as* $\text{total} \div \text{quantity}$):

Unit	Litres per unit	Filings
m3	1000.0000	15116
liter	1.0000	1865
gal	3.7854	324
cuFt	28.3168	64
ccf	2831.6800	49
cuYard	764.5540	38
ml	0.0010	13

Note on “MI”. The unit displayed as “MI” (megalitres) was converted as 0.001 litres, that is as millilitres, in every FEM cadence through 2022. A facility reporting 5 MI of water had 0.005 litres counted.

Water Aggregates

`watsource[source]total` — litres from one source.

No withdrawal/recycled split was published in FEM 2020; every source counts towards the single total.

`watsourcectotaltotal` — litres across all eight sources. Observed to equal the sum of its components in 96% of 12,831 filings.

`watsourcectotalperday` — `watsourcectotaltotal` divided by the operating days `watopdays`. Observed to equal the sum of its components in 100% of 12,815 filings.

Waste Data

Waste is reported by stream, split into non-hazardous and hazardous streams, each with a quantity and a unit.

Non-hazardous streams

Stream	Displayed as	Quantity and unit ref_ids	Platform kg total
<code>wstsourcehmaterials</code>	Materials	<code>wstsourcehmaterialsquant</code> <code>wstsourcehmaterialsunit</code>	<code>wstsourcehmaterialtotal</code>
<code>wstsourcehmetal</code>	Metal	<code>wstsourcehmetalquant</code> <code>wstsourcehmetalunit</code>	<code>wstsourcehmetaltotal</code>
<code>wstsourcehplastic</code>	Plastic	<code>wstsourcehplasticquant</code> <code>wstsourcehplasticunit</code>	<code>wstsourcehplastictotal</code>
<code>wstsourcehpaper</code>	Paper	<code>wstsourcehpaperquant</code> <code>wstsourcehpaperunit</code>	<code>wstsourcehpapertotal</code>
<code>wstsourcehcans</code>	Cans	<code>wstsourcehcansquant</code> <code>wstsourcehcansunit</code>	<code>wstsourcehcanstotal</code>
<code>wstsourcehfood</code>	Food	<code>wstsourcehfoodquant</code> <code>wstsourcehfoodunit</code>	<code>wstsourcehfoodtotal</code>
<code>wstsourcehglass</code>	Glass	<code>wstsourcehglassquant</code> <code>wstsourcehglassunit</code>	<code>wstsourcehglasstotal</code>
<code>wstsourcehcartons</code>	Cartons	<code>wstsourcehcartonsquant</code> <code>wstsourcehcartonsunit</code>	<code>wstsourcehcartontotal</code>
<code>wstsourcehothier</code>	Other	<code>wstsourcehothierquant</code> <code>wstsourcehothierunit</code>	<code>wstsourcehothertotal</code>
<code>wstsourcehtotaldom</code>	General or unspecified waste	<code>wstsourcehtotaldomquant</code> <code>wstsourcehtotaldomunit</code>	<code>wstsourcehtotaldomtotal</code>

Hazardous streams

Stream	Displayed as	Quantity and unit ref_ids	Platform kg total
<code>wstsourcehprodchemdrum</code>	Empty chemical drums and containers	<code>wstsourcehprodchemdrumquant</code> <code>wstsourcehprodchemdrumunit</code>	<code>wstsourcehprodchemdrumtotal</code>
<code>wstsourcehprodfilmprint</code>	Film and Printing Frame	<code>wstsourcehprodfilmprintquant</code> <code>wstsourcehprodfilmprintunit</code>	<code>wstsourcehprodfilmprinttotal</code>
<code>wstsourcehprodsludge</code>	Wastewater treatment sludge (industrial/domestic)	<code>wstsourcehprodsludgequant</code> <code>wstsourcehprodsludgeunit</code>	<code>wstsourcehprodsludgetotal</code>
<code>wstsourcehprodchem</code>	Expired/unused/used chemicals (waste oil, solvents, reactants, etc.)	<code>wstsourcehprodchemquant</code> <code>wstsourcehprodchemunit</code>	<code>wstsourcehprodchemtotal</code>
<code>wstsourcehprodcompogas</code>	Compressed Gas Cylinders (refrigerants, etc.)	<code>wstsourcehprodcompogasquant</code> <code>wstsourcehprodcompogasunit</code>	<code>wstsourcehprodcompgastotal</code>
<code>wstsourcehprodcontammat</code>	Contaminated materials	<code>wstsourcehprodcontammatquant</code> <code>wstsourcehprodcontammatunit</code>	<code>wstsourcehprodcontammattotal</code>
<code>wstsourcehdombatteries</code>	Batteries	<code>wstsourcehdombatteriesquant</code> <code>wstsourcehdombatteriesunit</code>	<code>wstsourcehdombatteriestotal</code>

Stream	Displayed as	Quantity and unit ref_ids	Platform kg total
wstsourcehdomflight	Fluorescent light bulb	wstsourcehdomflightquant wstsourcehdomflightunit	wstsourcehdomflighttotal
wstsourcehdominkcart	Ink cartridges	wstsourcehdominkcartquant wstsourcehdominkcartunit	wstsourcehdominkcarttotal
wstsourcehdomoilgrease	Waste oil and grease (from cooking)	wstsourcehdomoilgreasequant wstsourcehdomoilgreaseunit	wstsourcehdomoilgreasetotal
wstsourcehdomemptycont	Empty containers (cleaning, sanitizing, pesticides, etc.)	wstsourcehdomemptycontquant wstsourcehdomemptycontunit	wstsourcehdomemptyconttotal
wstsourcehdomelectronic	Electronic waste	wstsourcehdomelectronicquant wstsourcehdomelectronicunit	wstsourcehdomelectronictotal
wstsourcehdomcoalcomb	Coal combustion residuals (fly ash and bottom ash/coal slag)	wstsourcehdomcoalcombquant wstsourcehdomcoalcombunit	wstsourcehdomcoalcombttotal
wstsourcehdomother	Other	wstsourcehdomotherquant wstsourcehdomotherunit	wstsourcehdomothertotal

Non-hazardous streams accept mass units only (g, kg, lb, oz, tonMetric, tonShort); hazardous streams also accept volume units (barrels, ccf, cuFt, cuYard, gal, liter, m3, ml).

The platform converted each quantity to kilograms with these factors (*observed*). Volume units of hazardous waste convert as if the waste had the density of water (1 litre = 1 kg), the “barrels (16 kg/ea)” unit counts 16 kg per barrel, and “Ml” has the same millilitre reading as for water.

Unit	Kilograms per unit	Filings
kg	1.0000	37050
tonMetric	1000.0000	6964
liter	1.0000	1533
barrels	16.0000	824
lb	0.4535	594
tonShort	907.1850	372
m3	1000.0000	267
gal	3.7854	170
g	0.0010	128
ml	0.0010	69
cuFt	28.3168	22
ccf	2831.6800	17
oz	0.0283	14
cuYard	764.5540	13

Waste Aggregates

wstsource[stream]total — kilograms of one stream.

No hazardous / non-hazardous subtotals were published in FEM 2020.

wstsourcectotal — kilograms across every stream. Observed to equal the sum of its components in 90% of 13,055 filings.