Cascale

HIGG FEM 2018

FEM 2018 Water and Waste Calculations

Version reconstructed-2026 · 11 September 2026

Reconstructed documentation of how the Higg platform calculated the FEM 2018 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 2018 energy, greenhouse gas, water, waste and refrigerant values. FEM 2018 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 2018 question and answer definitions, from those stored results across 9,949 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 2018.

Source	Displayed as	Quantity and unit ref_ids	Platform litre total
`watsourcesurface`	Fresh Surface Water	`watsourcesurfacequant` `watsourcesurfaceunit`	`watsourcesurfacetotal`
`watsourcerain`	Rainwater	`watsourcerainquant` `watsourcerainunit`	`watsourceraintotal`
`watsourceground`	Groundwater	`watsourcegroundquant` `watsourcegroundunit`	`watsourcegroundtotal`
`watsourceprod`	Produced/Process Water	`watsourceprodquant` `watsourceprodunit`	`watsourceprodtotal`
`watsourcemunicipal`	Municipal Water	`watsourcemunicipalquant` `watsourcemunicipalunit`	`watsourcemunicipaltotal`
`watsourcewastewater`	Wastewater from another organization	`watsourcewastewaterquant` `watsourcewastewaterunit`	`watsourcewastewatertotal`
`watsourcesea`	Brackish surface water/seawater	`watsourceseaquant` `watsourceseaunit`	`watsourceseatotal`
`watsourcecomb`	Water- general or unknown origin	`watsourcecombquant` `watsourcecombunit`	`watsourcecombtotal`

Unit answers are numeric codes:

Answer code	Unit
1	CCF
2	cu ft
3	cu yard
4	gal
5	liter
6	m3
7	Ml

The platform converted every quantity to litres with the factors below (*observed* as `total ÷ quantity`):

Unit	Litres per unit	Filings
m3	1000.0000	8835
liter	1.0000	1118
gal	3.7854	191
cu ft	28.3168	32
CCF	2831.6800	26

Unit	Litres per unit	Filings
Ml	0.0010	14
cu yard	764.5540	10

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

Water Aggregates

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

No withdrawal/recycled split was published in FEM 2018; every source counts towards the single total.

`watsourcetotaltotal` — litres across all eight sources. Observed to equal the sum of its components in 97% of 7,338 filings.

`watsourcetotalperday` — `watsourcetotaltotal` divided by the operating days `watopdays`. Observed to equal the sum of its components in 100% of 7,338 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
`wstsourcenhmaterials`	Materials	`wstsourcenhmaterialsquant` `wstsourcenhmaterialsunit`	`wstsourcenhmaterialstotal`
`wstsourcenhmetal`	Metal	`wstsourcenhmetalquant` `wstsourcenhmetalunit`	`wstsourcenhmetaltotal`
`wstsourcenhplastic`	Plastic	`wstsourcenhplasticquant` `wstsourcenhplasticunit`	`wstsourcenhplastictotal`
`wstsourcenhpaper`	Paper	`wstsourcenhpaperquant` `wstsourcenhpaperunit`	`wstsourcenhpapertotal`
`wstsourcenhcans`	Cans	`wstsourcenhcansquant` `wstsourcenhcansunit`	`wstsourcenhcanstotal`
`wstsourcenhfood`	Food	`wstsourcenhfoodquant` `wstsourcenhfoodunit`	`wstsourcenhfoodtotal`
`wstsourcenhglass`	Glass	`wstsourcenhglassquant` `wstsourcenhglassunit`	`wstsourcenhglasstotal`
`wstsourcenhcartons`	Cartons	`wstsourcenhcartonsquant` `wstsourcenhcartonsunit`	`wstsourcenhcartonstotal`
`wstsourcenhother`	Other	`wstsourcenhotherquant` `wstsourcenhotherunit`	`wstsourcenhothertotal`
`wstsourcenhtotaldom`	General or unspecified waste	`wstsourcenhtotaldomquant` `wstsourcenhtotaldomunit`	`wstsourcenhtotaldomtotal`

Hazardous streams

Stream	Displayed as	Quantity and unit ref_ids	Platform kg total
`wstsourcehprodchemdrum`	Empty chemical drums and containers	`wstsourcehprodchemdrumquant` `wstsourcehprodchemdrumunit`	`wstsourcehprodchemdrumtotal`
`wstsourcehprodfilmprint`	Film and Printing Frame	`wstsourcehprodfilmprintquant` `wstsourcehprodfilmprintunit`	`wstsourcehprodfilmprinttotal`
`wstsourcehprodsludge`	Wastewater treatment sludge (industrial/domestic)	`wstsourcehprodsludgequant` `wstsourcehprodsludgeunit`	`wstsourcehprodsludgetotal`

Stream	Displayed as	Quantity and unit ref_ids	Platform kg total
wstsourcehprodchem	Expired/unused/used chemicals (waste oil, solvents, reactants, etc.)	wstsourcehprodchemquant wstsourcehprodchemunit	wstsourcehprodchemtotal
wstsourcehprodcompgas	Compressed Gas Cylinders (refrigerants, etc.)	wstsourcehprodcompgasquant wstsourcehprodcompgasunit	wstsourcehprodcompgastotal
wstsourcehprodcontammat	Contaminated materials	wstsourcehprodcontammatquant wstsourcehprodcontammatunit	wstsourcehprodcontammattotal
wstsourcehdombatteries	Batteries	wstsourcehdombatteriesquant wstsourcehdombatteriesunit	wstsourcehdombatteriestotal
wstsourcehdomflolight	Fluorescent light bulb	wstsourcehdomflolightquant wstsourcehdomflolightunit	wstsourcehdomflolighttotal
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	wstsourcehdomcoalcombtotal
wstsourcehother	Other	wstsourcehotherquant wstsourcehotherunit	wstsourcehothertotal

Unit answers are numeric codes; non-hazardous streams use a mass-only set and hazardous streams a set that also allows volumes:

Non-hazardous waste units

Answer code	Unit
1	g
2	kg
3	lb
4	oz
5	ton (metric)
6	ton (short)

Hazardous waste units

Answer code	Unit
1	g
2	kg
3	lb
4	oz
5	ton (metric)
6	ton (short)
7	barrels (16 kg/ea)
8	CCF
9	cu ft
10	cu yard
11	gal

Answer code	Unit
12	liter
13	m3
14	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	24020
ton (metric)	1000.0000	4712
liter	1.0000	1127
lb	0.4535	673
barrels (16 kg/ea)	16.0000	600
ton (short)	907.1850	336
m3	1000.0000	246
gal	3.7854	122
g	0.0010	121
Ml	0.0010	55
CCF	2831.6800	20
cu ft	28.3168	13
cu yard	764.5540	7
oz	0.0283	7

Waste Aggregates

`wstsource[stream]total` — kilograms of one stream.

No hazardous / non-hazardous subtotals were published in FEM 2018.

`wstsourcetotal` — kilograms across every stream. Observed to equal the sum of its components in 95% of 8,761 filings.