Cascale

HIGG FEM 2022

FEM 2022 Water and Waste Calculations

Version reconstructed-2026 · 11 September 2026

Reconstructed documentation of how the Higg platform calculated the FEM 2022 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 2022 energy, greenhouse gas, water, waste and refrigerant values. FEM 2022 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 2022 question and answer definitions, from those stored results across 21,187 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 2022.

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`

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 `total ÷ quantity`):

Unit	Litres per unit	Filings
m3	1000.0000	20332
liter	1.0000	2458
gal	3.7854	423
cuFt	28.3168	83
ccf	2831.6800	48
cuYard	764.5540	23
ml	0.0010	6

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.

`watsourcewithdrawal` — litres from surface, rain, ground, municipal and general/unknown-origin water; `watsourcerecycled` — litres from produced/process water, brackish or sea water and wastewater from another organisation. Observed to equal the sum of its components in 98% of 17,443 filings.

`watsourcetotaltotal` — litres across all eight sources. Observed to equal the sum of its components in 96% of 17,560 filings.

`watsourcetotalperday` — `watsourcetotaltotal` divided by the operating days `watopdays`. Observed to equal the sum of its components in 100% of 17,537 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`
`wstsourcenhwastewaterTreatmentSludge`	Wastewater treatment sludge (Non-Hazardous)	`wstsourcenhwastewaterTreatmentSludge` `wstsourcenhwastewaterTreatmentSludgeunit`	`wstsourcenhwastewaterTreatmentSludgetotal`
`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

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	50861
tonMetric	1000.0000	7809
liter	1.0000	1857
barrels	16.0000	734
lb	0.4535	728
tonShort	907.1850	332
m3	1000.0000	156
gal	3.7854	142
g	0.0010	140
ml	0.0010	78
cuFt	28.3168	11
cuYard	764.5540	7
ccf	2831.6800	6
oz	0.0283	5

Waste Aggregates

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

`wstsourcetotalnonhaz` and `wstsourcetotalhaz` — kilograms across all non-hazardous and all hazardous streams respectively. Observed to equal the sum of its components in 92% of 16,227 filings.

`wstsourcetotal` — kilograms across every stream. Observed to equal the sum of its components in 89% of 17,228 filings.