Grating

ENVIRONMENTAL PRODUCT DECLARATION – EPD

EPD OF MULTIPLE PRODUCTS, BASED ON WORST-CASE PRODUCT,
IN ACCORDANCE WITH ISO 14025:2006 AND EN 15804:2012+A2:2019/AC:2021

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HÄFLA BRUKS AB

General information

Programme information

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Product Category Rules (PCR): CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

(PCR) 2019:14 – Construction products v.1.3.4

PCR review was conducted by: IVL Swedish Environmental Research Institute
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LCA accountability: Jennifer Granström, Felix Jansson and Martyna Mikusinska, Sweco

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Third-party verifier: Katrin Molina-Besch, Miljögiraff AB

Independent third-party verification of the declaration and data, according to ISO 14025:2006
EPD verification by individual verifier

Approved by: The international EPD® System

Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

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The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/ functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD:

Häfla Bruks AB

Contact:

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Description of the organisation:

Häfla Bruks AB is a leading supplier of forged, sheet, and metal products with the widest manufacturing range for expanded metal in the Nordic region, featuring its own hot-dip galvanizing plant. The company's product range primarily includes expanded metal, grating, railings, stairs, ramps, as well as services in sheet metal processing and laser cutting.

Name and location of production site(s):

The production site is Häfla bruks AB and the location of the production site is Rejmyre.
Address: Grenadjärtorpsvägen 6, 612 72 Rejmyre, Sweden

Product information

Product name:

Hot-dip galvanized grating

Product identification:

Hot-dip galvanized steel product

Product description:

This is a multiple-product EPD based on worst-case results that represent Häfla Bruks product family of hot-dip galvanized grating. The background report included two types of grating to represent the different products in the product family. A range from the lightest type with least zinc amount to the heaviest with the highest amount of zinc is represented by these products.

The product included in this EPD is hot-dip galvanized grating produced by Häfla Bruks AB. Häfla have grating for all environments and occasions. Grating that stands strong through the years and can withstand both pedestrian traffic and heavy vehicle traffic. The range includes grating manufactured for use on oil platforms, outside entrances, in floor drains, and on ramps. For more detailed information of the products, please visit www.hafla.se.

UN CPC code:

412

Geographical scope:

The geographical scope for the products is Sweden.

LCA information

Declared unit:

1 kg of hot-dip galvanized grating (worst case)

Time representativeness:

2023

Cut-off criteria:

The general rules for the exclusion of inputs and outflows in LCA are in line with those of EN 15804:2012+A2:2019, Chapter 6.3.6.

Data quality:

The general data quality and robustness of the results are considered to be good. Most of the input data that is important for the result is based on specific information about material and energy flows from Häfla bruks AB and in the case of most of the main materials specific EPD:s or specific gathered data from supplier is used. All generic datasets used come from ecoinvent v3.10 and have been selected based on technical, geographical, and temporal aspects to represent actual processes.

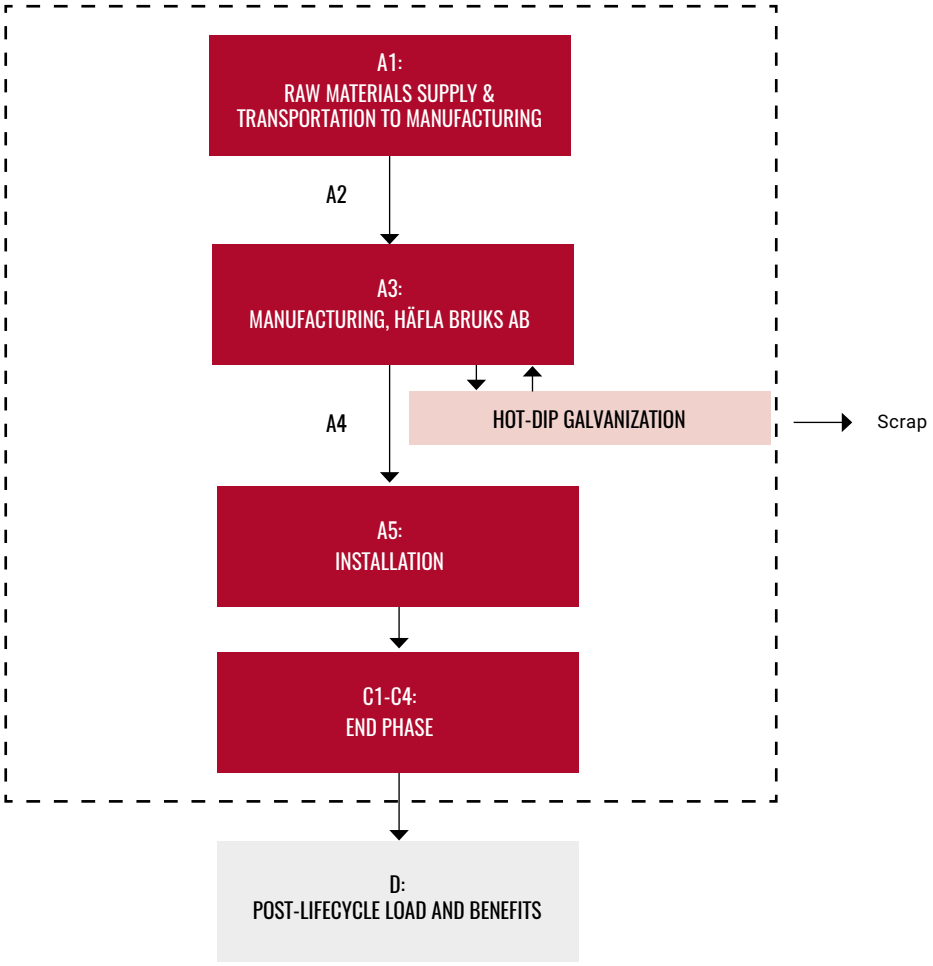
Database(s) and LCA software used:

SimaPro 9.6 and Ecoinvent 3.10. The LCIA results have been calculated with the EN 15804 reference package based on EF 3.1.

Description of system boundaries:

The system boundaries in this LCA are cradle to gate with optional modules. A1-A3 + A4 and A5. C1-C4 and D.

System diagram



MORE INFORMATION:

Infrastructure is included in the underlying datasets for upstream and downstream processes.
Infrastructure for the core process is not included.

Module A1:

Module A1 includes the extraction and processing of input materials. The main component of the product is steel and zinc. The components are collected from a variety of sources with different geographical origins. Specific data from a supplier's EPD have been used for most of the components.

Module A2:

Module A2 includes the impact associated with the transportation of raw materials to production and encompasses both the production and combustion of fuels during transportation. The module includes the direct emissions from the combustion of the diesel used for internal transport. Internal transport, in this case, refers to electric forklifts, where their energy consumption is allocated from the total energy consumption.

Module A3:

Module A3 consists of the manufacturing process for the steel product. It includes the consumption of energy, water, and chemicals.

The production at Häfla bruks facility starts with laser cutting for the incoming components. After that, the material is bent using hydraulic press brakes that can handle all types of bending. The material is then cut and welded together to form a product, which is subsequently hot-dip galvanized through the following steps: alkaline degreasing, pickling in hydrochloric acid, rinsing in water, dipping in flux, draining in a drying zone, and galvanizing in a zinc bath.

The production of the packaging materials used for the delivery of the product to the customer is also included in module A3. Additionally, waste management of the scrap generated during manufacturing is included. Potential impacts from by-products in module A3 are not included in module D in accordance with chapter 6.3.5.2 of EN 15804:2012+A2:2019.

Specific electricity mix is used to assess the environmental impact from the use of energy in the production. The electricity is bought from Göteborg Energi AB without active environmental choice. The electricity mix origins from 78,8% fossil fuels, 14,7% nuclear power and 6,5% renewable sources. The climate impact (GWP-GHG) for the specific electricity mix is 0,524 kg CO2-eq./kWh.

Module A4:

Module A4 consists of a scenario for distribution of the grating to customer. The average distance is based on statistic from actual distribution. The average distance is based on statistic from actual distribution and amounts to 414 km.

Module A5:

Module A5 cover the installation of the grating. The installation for the product is mainly done by manual labour and the environmental impact are assumed negligible for the module. The environmental impact from handling the waste from packaging is included in module A5. All packaging materials are expected to go to incineration.

Module C1: Dismantling

Module C1 includes the manual dismantling of the grating, similar to the assembly in module A5. The dismantling requires a small amount of energy, and in relation to the other processes and materials throughout the lifecycle, the dismantling represents a small portion of the total energy input and output (less than 1%). Therefore, the environmental impact from dismantling has been considered negligible, and no processes for module C1 are included in this LCA.

Module C2:

For transport to waste management, transport distance from market dataset for waste for a European market have been used.

Module C3:

The waste from the steel product is included in module C until the "end-of-waste" state is achieved, or the waste is sent to landfill. It is assumed the 95% of the materials in the grating will be sent for recycling based on statistics from SGU (SGU, 2025).

Module C4:

Module C4 includes the landfilling of the grating. It is assumed that 5% of the materials in the steel product will be sent to landfill based on statistics from SGU (SGU, 2025).

Module D:

Module D includes the impacts associated with the material recycling of the steel in the grating. A benefit arises in the form of avoided production of new steel as raw material for the portion of the steel in the product that is recycled.

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	x	x	x	x	x	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x
Geography	SE/EUR	SE/EUR	SE	SE	SE	-	-	-	-	-	-	-	SE				SE
Specific data used	>90 %			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Steel	0,93	0	0
Zinc	0,07	0	0
Plastic	0	0	0
TOTAL	1	0	0
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
Pallet and paper packaging	0,008	0,8%	0,0014
TOTAL	0,008	0,8%	0,0014

The product does not contain any of the substances from the candidate list of substances of very high concern (SVHC) regulated by the Regulation (EC) No 1907/2006 (REACH) or the Regulation (EC) No 1272/2008 of European parliament.

No cut-off has been applied and a 100% completeness has been reached.

Results of the environmental performance indicators

Environmental impact for 1 kg of steel product. Mandatory environmental impact categories in accordance with EN 15804.

The results for A1-A3 should also consider the results from module C. The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Mandatory impact category indicators according to EN 15804

Average results from all product groups (unit/kg)									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	4,50E+00	8,01E-02	8,76E-04	0,00E+00	1,18E-02	3,18E-02	3,13E-04	-1,25E+00
GWP-biogenic	kg CO_2 eq.	3,94E-03	5,49E-05	7,46E-02	0,00E+00	7,15E-06	3,13E-02	4,31E-08	4,54E-03
GWP-luluc	kg CO_2 eq.	1,89E-03	2,62E-05	1,79E-07	0,00E+00	4,00E-06	2,12E-05	1,61E-07	-2,44E-04
GWP-total	kg CO_2 eq.	4,50E+00	8,02E-02	7,55E-02	0,00E+00	1,18E-02	6,32E-02	3,13E-04	-1,24E+00
ODP	kg CFC 11 eq.	3,94E-08	1,59E-09	7,00E-11	0,00E+00	2,37E-10	3,48E-10	9,04E-12	-5,07E-09
AP	mol H+ eq.	1,56E-02	2,51E-04	7,79E-06	0,00E+00	5,30E-05	1,44E-04	2,22E-06	-4,29E-03
EP-freshwater	kg P eq.	3,45E-04	5,35E-06	1,67E-07	0,00E+00	8,09E-07	9,26E-06	2,60E-08	-4,82E-04
EP-marine	kg N eq.	3,46E-03	8,45E-05	3,95E-06	0,00E+00	2,08E-05	6,40E-05	8,44E-07	-1,03E-03
EP-terrestrial	mol N eq.	3,71E-02	9,19E-04	3,57E-05	0,00E+00	2,27E-04	4,58E-04	9,22E-06	-1,10E-02
POCP	kg NMVOC eq.	1,29E-02	3,93E-04	8,83E-06	0,00E+00	8,14E-05	1,47E-04	3,30E-06	-3,81E-03
ADP-minerals&metals*	kg Sb eq.	1,38E-04	2,56E-07	1,07E-09	0,00E+00	3,66E-08	4,18E-07	4,89E-10	-6,15E-07
ADP-fossil*	MJ	4,50E+01	9,23E-02	5,66E-03	0,00E+00	1,40E-02	9,47E-02	4,74E-04	-1,08E+01
WDP*	m^3	1,14E+00	4,61E-03	1,12E-03	0,00E+00	7,36E-04	1,83E-03	3,35E-04	-7,89E-02

Acronyms: **GWP-fossil** = Global Warming Potential fossil fuels; **GWP-biogenic** = Global Warming Potential biogenic; **GWP-luluc** = Global Warming Potential land use and land use change; **ODP** = Depletion potential of the stratospheric ozone layer; **AP** = Acidification potential, Accumulated Exceedance; **EP-freshwater** = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; **EP-marine** = Eutrophication potential, fraction of nutrients reaching marine end compartment; **EP-terrestrial** = Eutrophication potential, Accumulated Exceedance; **POCP** = Formation potential of tropospheric ozone; **ADP-minerals&metals** = Abiotic depletion potential for non-fossil resources; **ADP-fossil** = Abiotic depletion for fossil resources potential; **WDP** = Water (user) deprivation potential, deprivation-weighted water consumption.

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

The results of the impact categories abiotic depletion of minerals and metals and land use may be highly uncertain in LCAs that include capital goods/infrastructure in generic datasets, in case infrastructure/capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used. To quantify these indicators in currently available generic datasets sometimes lack temporal, technological, and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.

Additional mandatory and voluntary impact category indicators

Mandatory environmental impact categories in accordance with EN 15804.

Average results from all product groups (unit/kg)									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	4,50E+00	8,02E-02	8,76E-04	0,00E+00	1,18E-02	3,18E-02	3,13E-04	- 1,25E+00

[1] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

Resource use indicators

Average results from all product groups (unit/kg)									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2,55E+00	1,91E-02	4,96E-01	0,00E+00	2,91E-03	3,34E-02	7,12E-05	-2,67E-01
PERM	MJ	4,96E-01	0,00E+00	-4,96E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	3,05E+00	1,91E-02	2,26E-04	0,00E+00	2,92E-03	3,34E-02	7,19E-05	-2,67E-01
PENRE	MJ	4,51E+01	9,63E-02	6,12E-03	0,00E+00	1,46E-02	9,81E-02	4,97E-04	-1,14E+01
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	4,51E+01	9,63E-02	6,12E-03	0,00E+00	1,46E-02	9,81E-02	4,97E-04	- 1,14E+01
SM	kg	2,70E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	8,25E-23	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	9,69E-22	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m^3	5,26E-02	1,67E-04	3,71E-05	0,00E+00	2,76E-05	1,31E-04	7,96E-06	-4,43E-03

Acronyms: **PERE** = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; **PERM** = Use of renewable primary energy resources used as raw materials; **PERT** = Total use of renewable primary energy resources; **PENRE** = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; **PENRM** = Use of non-renewable primary energy resources used as raw materials; **PENRT** = Total use of non-renewable primary energy re-sources; **SM** = Use of secondary material; **RSF** = Use of renewable secondary fuels; **NRSF** = Use of non-renewable secondary fuels; **FW** = Use of net fresh water.

Waste indicators

Average results from all product groups (unit/kg)									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	2,88E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste disposed	kg	5,45E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Radioactive waste disposed	kg	2,04E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Output flow indicators

Average results from all product groups (unit/kg)									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,50E-01	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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