



Environmental Product Declaration

In accordance with
ISO 14025:2006 for gasketed
plate heat exchanger (GPHE):

T10-BFM/AQ4T-BFM

From
Alfa Laval Technologies AB



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Programme information

Programme:

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EPDs within the same product category but from different programmes 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. The EPD owner has the sole ownership, liability, and responsibility for the EPD.

Product category rules (PCR):

PCR 2010:08 for Other special- and general-purpose machinery and parts thereof; Product Category Classification: UN CPC 449, 44221 and 43935
PCR Version 4.0
PCR review was conducted by: Lars-Gunnar Lindfors, IVL Svenska Miljöinstitutet, lars-gunnar.lindfors@ivl.se

Life Cycle Assessment (LCA):

LCA accountability: Katrin Molina-Besch & Marcus Wendin, Miljögiraff AB

Third-party verification:

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

EPD verification by certification body

Third-party verifier:
Bureau Veritas Certification Sweden AB
Viktor Hakkarainen - Lead EPD auditor
Axel Cullberg - EPD auditor
Accredit by SWEDAC , Certification number 1236

Approved by:

The International EPD® System

Company information

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Description of the organization:

Alfa Laval is a leading global provider of first-rate products in the areas of heat transfer, separation and fluid handling. With these as its base, Alfa Laval aims to help enhance the productivity and competitiveness of its customers in various industries throughout the world. We define their challenges and deliver products and solutions that meet their requirements – mainly in energy, the environment, food and the marine industry.

Pioneering Positive Impact

The purpose of the Alfa Laval's sustainability strategy is to focus on those areas where Alfa Laval has the largest impact and wants to show leadership as a company. The strategy is divided into four main areas – caring, committed, circularity and climate. These areas reflect the environment, social and governance (ESG) issues that are most significant and where Alfa Laval can contribute most. Each area includes a vision that sets out the ambition.

For the different areas, Alfa Laval has also set long- and short-term targets which are followed up through relevant performance metrics to ensure continuous progress and to meet potential challenges through action. Where applicable, Alfa Laval will encompass the whole value chain in its ambitions including how the products and technologies we put on the market contribute to the sustainable transformation of business and society.

Climate – Net-zero emissions

Alfa Laval aims to achieve net-zero emissions in own operations and across the full value chain by latest 2050.

In focus

- Scope 1 emissions
- Scope 2 emissions
- Scope 3 emission

Caring – Safe inclusive culture

Alfa Laval promotes a safe, inclusive culture both within the company and in its relationships with external partners.

In focus

- Health & Safety
- Inclusion & Diversity
- Human rights

Committed – Ethical conduct

Alfa Laval is committed to honest, respectful and ethical conduct within its organization and in external business relationships.

In focus

- Business principles
- Anti-Bribery, anti-corruption
- Whistleblowing

Circularity – Circular business

Alfa Laval is dedicated to safe-guarding the value of natural resources throughout its value chain.

In focus

- Efficient manufacturing
- Extending product life span
- Reuse/recycle

The product

Product name:

T10-BFM/AQ4T-BFM

Product identification:

T10-BFM/AQ4T-BFM is a gasketed plate heat exchanger (GPHE) optimized for 10 bar design pressure. The product contains channel plates and gaskets which are available in different materials. A specific customer duty determines what materials to use. This EPD is for a T10-BFM/AQ4T-BFM product with 99 stainless steel channel plates and 99 NBR-gaskets with glue free gasket attachment.

Product description:

Alfa Laval plate heat exchangers T10-BFM and AQ4T-BFM are used in virtually all types of industry to effectively heat or cool different fluids. A large selection of plate and gasket materials and types are available.

The functional performance of the declared heat exchangers is at least 1600 kW of heat delivered at minimum 70°C during 30 years of service, in a water-to-water district heating application with a design pressure of 10 bar according to harmonized PED pressure vessel code EN 13445 edition 2021. The unit should be 3rd party certified according to AHRI (www.ahridirectory.org) and with design conditions as described in Table 1 below.

UN CPC code:

UN CPC 43911(heat exchange units)

Geographical scope:

Global

Table 1. Design conditions for the declared heat exchangers

Side Unit	Flow rate kg/h	Inlet temp °C	Outlet temp °C	Allowed Pressure drop kPa
1	--	95	53	30
2	69	50	70	30

Machine description

Functions:

To transfer heat from one or several liquids to another (or several other) liquid(s).

Main components:

Frame plate
 Pressure plate
 Channel plates
 Gaskets
 Bars
 Tightening bolts

Replacement parts:

Gaskets

Size and dimension (length x width x height)

1054x470x714 mm

Weight: 364kg

Technical information

Functional performance:

At least 1600 kW of heat delivered at minimum 70°C during 30 years of service , in a water-to-water district heating application with a design pressure of 10 bar according to harmonized PED pressure vessel code EN 13445 edition 2021. The unit should be 3rd party certified according to AHRI and with design conditions as described in Table 1.

Replacement part consumption :

In water-to-water application (operating conditions as described under functional unit) gaskets are replaced every 15 years.

Chemical products consumption:

Cleaning solution based on phosphoric acid and neutralizing agent used for CIP cycles (see also use phase scenario).

LCA information

Declared unit:

One gasketed plate heat exchanger model T10-BFM and AQ4T-BFM, optimized for 10 bar design pressure according to harmonized PED pressure vessel code EN 13445 edition 2021, with 99 pc 0.4 stainless steel channel plates and NBR gaskets with glue free gasket attachment.

Expected product life:

30 years.

Description of system boundaries:

Cradle to grave and optional module D.

Geographical scope:

Upstream: Global; Core: Sweden; Downstream: Europe

Scenario for customer transport:

The final products are transported by road to customers on the European continent (80% of customers) or sea and road transport to customers in the UK (20%).

Use phase scenario:

Replacement parts (operating conditions as described under functional unit): Gaskets are replaced after 15 years of use. CIP cycles are run in year 7 and year 22. Manual cleaning of plates after 15 years.

Product packaging:

Production of product packaging is included in upstream and end-of-life of product packaging is included in downstream.

End-of-life scenario:

Steel components: 85% recycling and 15% landfill

Plastic and rubber components: 100% incineration with energy recovery.

Compliant with:

This EPD follows the “Book-keeping“ LCA approach which is defined as attributional LCA.

In accordance with ISO14025, ISO 14040 – ISO 14044 and PCR 2010:08, version 4.0.

Cut-off rules:

The following procedure is followed for the exclusion of inputs and output:

- Data for elementary flows to and from the product system contributing to a minimum of 99% of the declared environmental impacts shall be included

A screening and expert judgement showed that the following aspects contribute less than 1% and could be cut-off:

- Production of packaging of raw materials/components
- Minor consumables used in core process

Background data:

The data quality is considered good. All site-specific data for raw materials, energy and waste from the manufacturing process are from 2022 and have been represented with EPDs from suppliers or Ecoinvent datasets. All other environmental aspects have been represented by generic Ecoinvent data.

Used EPD: Cold-rolled austenitic stainless steel, S-P-08506

Foreground data - primary:

Weight and composition of product and product packaging, EPD for steel in channel plates, suppliers' location for inbound transports and to regionalize generic production data for major product components, energy consumption, consumables and waste of manufacturing processes. Information about share of customer geographic markets.

Data quality declaration:

- Time period for specific data in Core: 2022
- System model of generic data: Allocation, cut-off by classification (Ecoinvent 3.9)
- Percentage of proxy data (GWP total): less than 2%

Electricity data:

Electricity consumption in the Core module is represented by Swedish hydro power (100%) modelled with data from Ecoinvent 3.9., certificate from electricity producer is included in LCA report.

Allocation:

Allocation in specific data is done based on total area of channel plates produced in Lund factory in 2022. Allocation key considers also difference in electricity consumption between small, medium and big plates.

Impact Assessment methods:

Potential environmental impacts are calculated with EN 15804 method as implemented in SimaPro 9.5. The chosen indicators follow the methods of the default list of environmental performance indicators (version 2 and characterization factors based on EF 3.1). Resource use values are calculated from Cumulative Energy Demand V1.11.

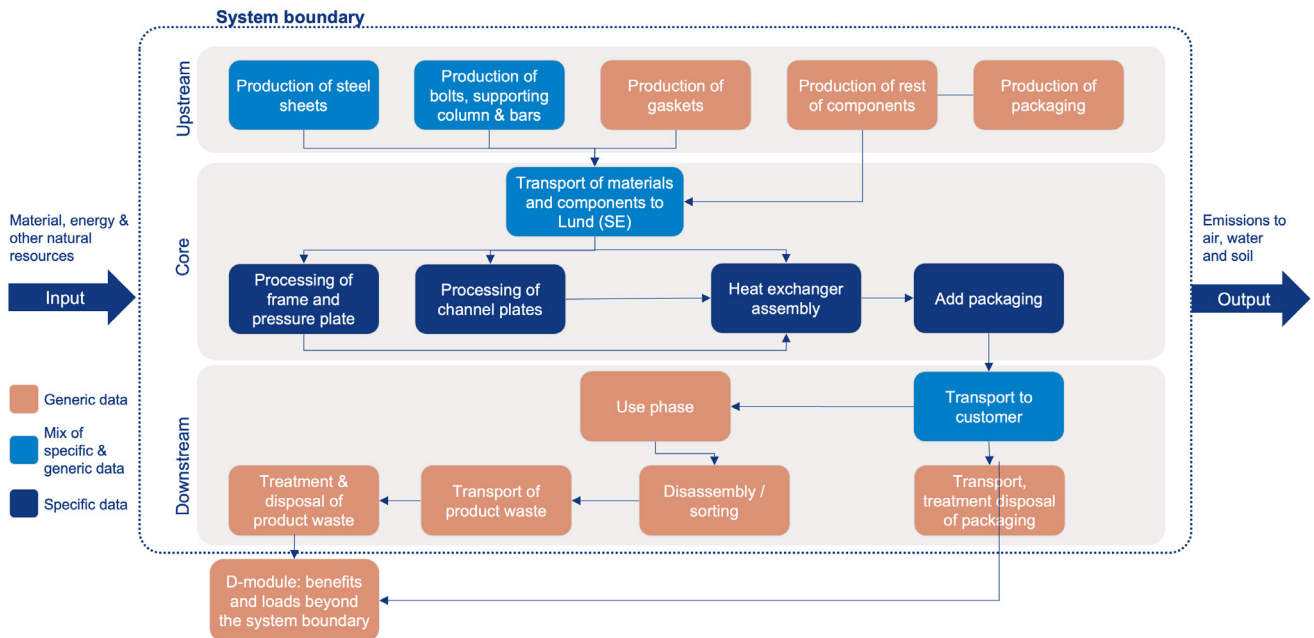
Based on LCA Report:

Miljögraff LCA Report 1335 GPHE (Miljögraff, 2023).

Software & database:

SimaPro 9.5 with Ecoinvent 3.9.1

System diagram:



Content declaration

Product components	[kg/DU]	%	Post consumer material (weight-%)	Renewable material (weight-%)
Steel	350	96%	0	0
Rubber	11.9	3%	0	0
Plastics	1.96	1%	0	0
TOTAL	364			
Packaging (distribution packaging)				
Wooden pallet (for land transport)	20.0		0	100
Wooden pallet (for sea transport)	50.0		0	100
Plywood (for land transport)	20.0		0	100
Wood /for sea transport)	88.0		0	100
Plastic film (for sea transport)	2.00		0	0
TOTAL PACKAGING	40.0 (land transport) 138 (sea transport)			100% (land transport) and 98.5% (sea transport)

Results of the environmental performance indicators

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

Impact category indicators:

Parameter		Unit	Upstream	Core	Down-stream	Total	D-module
Global warming potential (GWP)	Fossil	kg CO2 eq	1.05E+03	1.17E+02	3.09E+02	1.48E+03	-1.65E+02
	Biogenic	kg CO2 eq	-7.77E+01	1.19E+01	8.53E+01	1.94E+01	-1.58E+01
	Land use and land transformation	kg CO2 eq	1.04E+00	1.53E+00	3.38E+00	5.96E+00	-1.17E-01
	TOTAL	kg CO2 eq	9.77E+02	1.30E+02	3.98E+02	1.51E+03	-1.80E+02
Ozone layer depletion (ODP)		kg CFC11 eq	2.55E-05	2.61E-06	1.92E-05	4.72E-05	-3.61E-06
Acidification potential (AP)		mol H+ eq	5.57E+00	5.00E-01	1.39E+00	7.47E+00	-8.13E-01
Eutrophication potential (EP)	Aquatic freshwater	kg P eq	4.82E-02	1.20E-03	5.66E-03	5.50E-02	-1.06E-02
	Aquatic marine	kg N eq	9.52E-01	1.50E-01	3.13E-01	1.42E+00	-1.45E-01
	Aquatic terrestrial	mol N eq	1.08E+01	1.64E+00	3.07E+00	1.55E+01	-1.66E+00
Photochemical oxidant creation potential (POCP)		kg NMVOC eq	4.23E+00	6.77E-01	1.14E+00	6.06E+00	-7.21E-01
Abiotic depletion potential (ADP)	Metals and minerals ¹	kg Sb eq	1.97E-02	8.51E-04	1.86E-03	2.24E-02	-4.95E-05
	Fossil resources ¹	MJ	1.37E+04	1.63E+03	3.84E+03	1.92E+04	-2.25E+03
Water deprivation potential (WDP) ¹		m3 depriv.	4.24E+02	1.22E+01	1.25E+02	5.61E+02	-4.73E+00

¹ The results of the environmental impact indicators for ADPE, ADPF, WDP shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Resource use indicators:

Parameter		Unit	Upstream	Core	Down-stream	Total	D-module
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	2.14E+03	6.98E+02	2.31E+02	3.07E+03	-3.63E+02
	Used as raw materials	MJ, net calorific value	1.13E+03	0.00E+00	0.00E+00	1.13E+03	0.00E+00
	TOTAL	MJ, net calorific value	3.27E+03	6.98E+02	2.31E+02	4.20E+03	-3.63E+02
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	1.41E+04	1.73E+03	4.11E+03	2.00E+04	-2.38E+03
	Used as raw materials	MJ, net calorific value	4.60E+02	0.00E+00	0.00E+00	4.60E+02	0.00E+00
	TOTAL	MJ, net calorific value	1.46E+04	1.73E+03	4.11E+03	2.04E+04	-2.38E+03
Secondary material (optional)	kg	2.88E+02	0.00E+00	0.00E+00	2.88E+02	0.00E+00	
Renewable secondary fuels (optional)	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Non-renewable secondary fuels (optional)	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Net use of fresh water (optional)	m ³	6.25E+00	3.12E-01	2.40E+00	8.97E+00	-5.88E-01	

Waste indicators:

Parameter	Unit	Upstream	Core	Down-stream	Total	D-module
Hazardous waste disposed	kg	3.14E-03	0.00E+00	0.00E+00	3.14E-03	0,00E+00
Non-hazardous waste disposed	kg	5.21E+01	0.00E+00	0.00E+00	5.21E+01	0,00E+00
Radioactive waste disposed	kg	9.80E-03	0.00E+00	0.00E+00	9.80E-03	0,00E+00

Output flow indicators:

Parameter	Unit	Upstream	Core	Down-stream	Total	D-module
Components for reuse	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	4.02E+01	1.06E+01	2.97E+02	3.48E+02	4.02E+01
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ per energy carrier	0.00E+00	4.56E+01	4.74E+02	5.20E+02	0.00E+00
Exported energy, thermal	MJ per energy carrier	0.00E+00	1.06E+02	1.11E+03	1.21E+03	0.00E+00

Other environmental performance indicators:

Parameter	Unit	Upstream	Core	Down-stream	Total	D-module
Particulate Matter (PM)	disease inc.	7.30E-05	9.40E-06	1.74E-05	9.98E-05	-1.32E-05
Ionizing Radiation (IR) ²	kBq U-235 eq	2.86E+01	8.75E-01	3.61E+00	3.31E+01	-7.78E+00
Ecotoxicity Potential – Freshwater (ETP-FW) ³	CTUe	5.21E+03	8.81E+02	1.89E+03	7.98E+03	-2.27E+02
Human Toxicity Potential – Cancer (HTP-C) ³	CTUh	1.03E-05	6.42E-08	2.21E-07	1.06E-05	7.84E-07
Human Toxicity Potential – Non-Cancer (HTP-NC) ³	CTUh	1.49E-05	1.68E-06	3.90E-06	2.04E-05	-5.57E-07
Land use, SQP	Pt	1.30E+04	1.16E+03	2.07E+03	1.62E+04	-1.17E+03

² The impact category for IR deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionising radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

³ The results of the environmental impact indicators for ETP-FW, HTP-C, and HTP-NC shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

References

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