

ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 /
ISO 21930

VENTILATION DETAILS HALLSTRÖMS VERKSTÄDER AB

<i>Programme:</i> The International EPD® System, www.environdec.com	<i>Programme operator:</i> EPD International AB	<i>EPD registration number:</i> S-P-07610
<i>Geographical scope:</i> Sweden	<i>Publication date:</i> 2022-11-17	<i>Valid until:</i> 2027-11-17

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com.



GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer	Hallströms Verkstäder AB
Address	Näldenvägen 23, 835 40 Nälden
Contact details	info@hallstroms.se
Website	http://hallstroms.se/

PRODUCT IDENTIFICATION

Product name	Ventilation details
Additional label(s)	Hallströms VENT
Product number / reference	Not applicable
Place(s) of production	Sweden
CPC code	CPC 412 (Products of iron and steel)

The International EPD System

EPDs within the same product category but from different programmes may not be comparable. An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com.

EPD INFORMATION

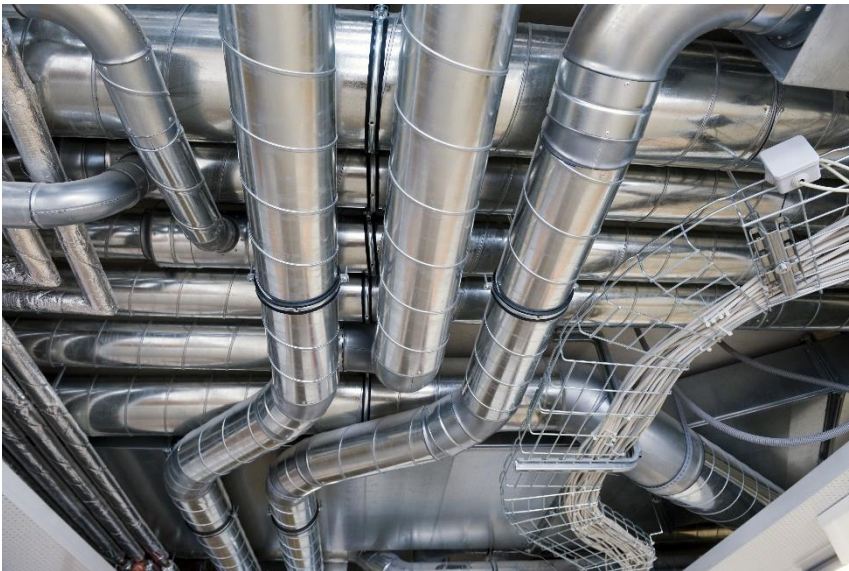
The EPD owner has the sole ownership, liability, and responsibility for the EPD. Construction products EPDs may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

EPD program operator	The International EPD System
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	The CEN standard EN 15804 serves as the core PCR. In addition, the Int'l EPD System PCR 2019:14 Construction products, version 1.11 (05.02.2021) is used.
EPD author	Felix Meyer, Gidås Sustainability Agency
EPD verification	Independent verification of this EPD and data, according to ISO 14025: <input type="checkbox"/> Internal certification <input checked="" type="checkbox"/> External verification <input type="checkbox"/> EPD Process certification <input checked="" type="checkbox"/> EPD Verification
Third party verifier	Silvia Vilčeková, Silcert, s.r.o.
EPD number	S-P-07610
Publication date	2022-11-17
EPD valid until	2027-11-17

PRODUCT INFORMATION

PRODUCT DESCRIPTION

The ventilation details of standard assortment presented in this Group-EPD consist of couplings, bends, T-sections, saddles, reducers and end caps. The products mainly consist of galvanized steel, but also include rubber gaskets in order to create a tight seal.



PRODUCT APPLICATION

Used as an integrated part in building ventilation systems for comfort and industrial applications.

TECHNICAL SPECIFICATIONS

The reference service life of the product is highly dependent on the conditions of use, though average lifespan under normal conditions is minimum 50 years. This is an estimated value based on experience and scientific facts about galvanized steel.

PRODUCT STANDARDS

Produced according to EN 1506 and EN 12237. The product is certified for airtightness class D. Type approval 1666/78. The organisation is certified according to ISO 9001:2015. Material standard SS EN 10346:2015.

PHYSICAL PROPERTIES OF THE PRODUCT

Further information about the products at the company website: <http://hallstroms.se/shop/category/2>.

The declared unit in this EPD refers to the combined average dimension and mass of all ventilation details produced as part of the system. The mass of specific products ranges from 0,1 kg to 63,9 kg. Applying the results on specific products can be done by using the product variation table on page 18 in this document.

ADDITIONAL TECHNICAL INFORMATION

Further information can be found at <http://hallstroms.se/>.

PRODUCT RAW MATERIAL COMPOSITION

Product and Packaging Material	Weight, kg	Post-consumer %	Renewable %	Country Region of origin
Galvanized steel	0,6471	20	0	Sweden
EPDM	0,0279	0	0	Sweden
Packaging				
Wood	0,0024	0	100	Sweden
Cardboard	0,0887	76	100	Sweden
Total	0,7662	26	-	-

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE-CYCLE

MANUFACTURING AND PACKAGING (A1-A3)

The product stage A1-A3 includes:

- Upstream raw material acquisition, transport, and processing of product components
- Transport of product components to manufacturing plant
- The production process at the manufacturing plant including energy and electricity consumption.
- Waste generation from the production process including waste processing up to the end-of-waste state or disposal of waste residues
- Production of packaging

Relevant upstream material, transport and processes of the product components were primarily acquired from product specific EPD data. EPDs not fulfilled according to the standards EN 15804+A1 and +A2 received further modelling with generic data for A1+A2 compliance and representation.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

The finished product from the plant is sent through various logistic platforms to the customer by truck (>32 t, EURO5). Cardboard and wooden waste from the packaging is assumed to be incinerated with energy recovery.

Assumptions made for calculating the impacts occurring during Module A5 are covered in *Averages and Variability* on page 8.

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use phase. Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

The end-of-life stage C1-C4 & D includes:

- Deconstruction/demolition (C1)
- Transport to waste management facility (C2)
- Waste processing for reuse, recovery and/or recycling (C3)
- Waste disposal (C4)

Waste processing and disposal credits are assigned to module D.

Module D includes reuse, recovery and/or recycling potentials conveyed as benefits and net impacts.

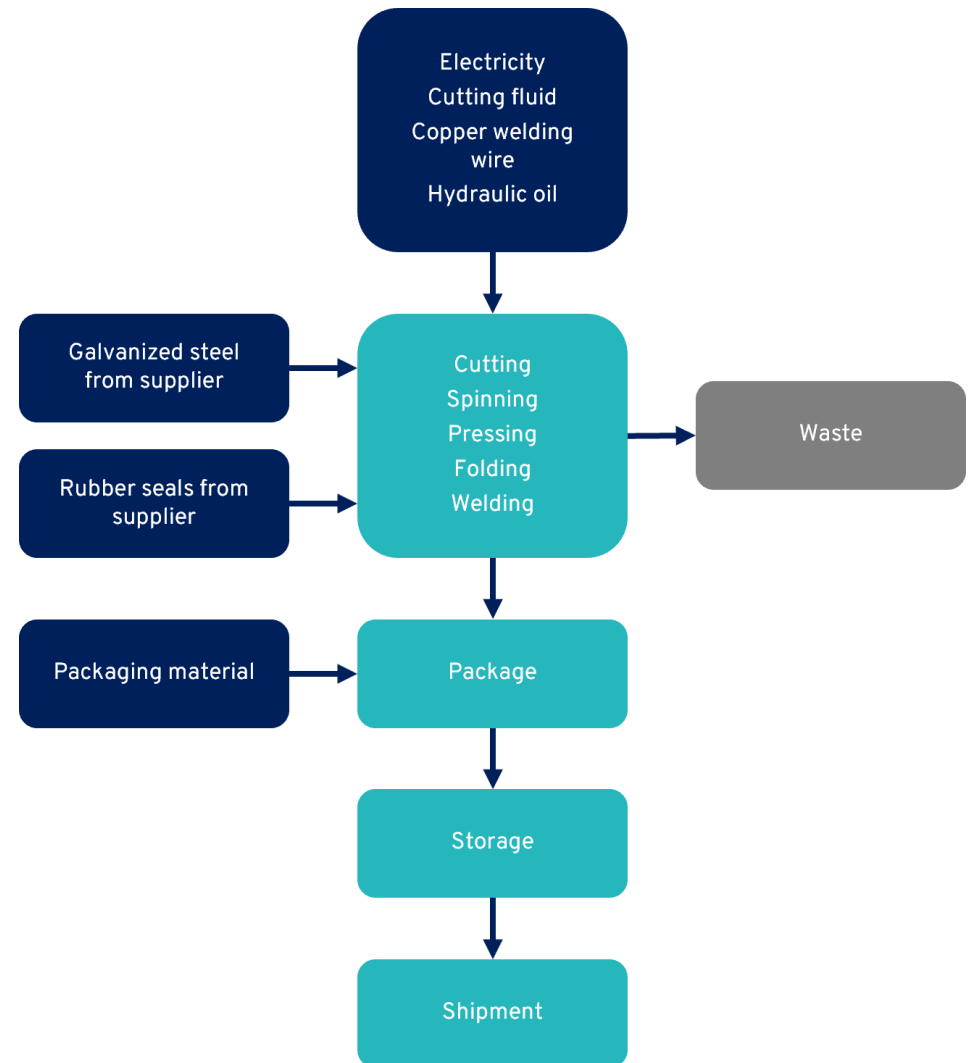
After dismantling the ventilation system at the end of its service life, the scrap metal along with the rubber gaskets are assumed to be transported by truck to a waste treatment facility, where the majority of the steel is recycled. The rest is deposited on a landfill. As the rubber gaskets cannot be easily removed the metal, it is incinerated as part of the metal recycling process. Due to the low amount of rubber in relation to the steel, it does not affect the recycling process or material quality of the steel to a considerable amount.

MANUFACTURING PROCESS

Hallströms Verkstäder AB purchases galvanized steel coils (DX51D+Z275), as well as rubber gaskets and ancillary materials. These include welding wire, hydraulic oil and cutting fluid. Cardboard boxes are ordered and EUR-pallets from incoming materials are re-used as packaging material.

The steel is transported by truck (EURO6 16-32 tonne) to the manufacturing site. The material is slitted to the correct dimensions and worked to the desired shape by cutting, pressing, welding and folding. These processes consume mostly electricity, but also certain amounts of cutting fluid and hydraulic oil. When the detail is shaped to a desired format, a rubber gasket is folded in to create a seal when connected to other details or pipes.

Produced details are placed in cardboard boxes and put on pallets. The boxes are then placed in storage before shipped to customer by truck.



LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	2021
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DECLARED UNIT

Declared unit	1 pcs
Mass per declared unit*	0,675 kg
Reference service life	50

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0,0456

SYSTEM BOUNDARY

This EPD covers the cradle to gate with options scope with the following modules; A1 (Raw material supply), A2 (Transport) and A3 (Manufacturing), A4 (Transport), A5 (Assembly) as well as C1 (Deconstruction), C2 (Transport at end-of-life), C3 (Waste processing) and C4 (Disposal). In addition, module D - benefits and loads beyond the system boundary is included.

*The mass per declared unit is based on an average of all products included in the system for which this EPD is intended. See Annex 3 for details and conversion to specific products.

Product stage		Assembly stage		Use stage								End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
X	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X	X	X
SE	SE	SE	SE	SE	-	-	-	-	-	-	-	SE	SE	SE	SE		SE	
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = ND.

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 and the applied PCR. The study does not exclude any hazardous materials or substances.

The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation.

In this study, as per EN 15804, allocation is conducted in the following order;

1. Allocation should be avoided.
2. Allocation should be based on physical properties (e.g. mass, volume) when the difference in revenue is small.
3. Allocation should be based on economic values.

Allocation used in Ecoinvent 3.6 environmental data sources follows the methodology 'allocation, cut-off by classification'. This methodology is in line with the requirements of the EN 15804 - standard.

Allocation was applied to the electricity consumption during production, where information was provided by the manufacturer that 82 % of the facility's electricity consumption should be allocated to the manufacturing of ventilation details.

AVERAGES AND VARIABILITY

Site-specific data from the reference year acted as the primary source of collection. If inputs or outputs were unknown or unavailable, industry-based and/or similar product EPD datasets were utilized for full compliance with EN15804 +A1 and +A2.

Modelling of data was primarily based on product specific EPDs. Where manufacturer specific data are missing generic data from Ecoinvent was used. This is mostly due to lack of supplier specific data for EN15803+A2 datasets. When generic data was used a systematic assessment was carried out.

Variation between +A1 impact results and +A2 is 0,24 % which is below the 10 % limit according to the programme operator.

Large truck (EURO 6, 16-32 tons) has been adopted within most transport modules in the analysis, unless more specific data was available and provided by the manufacturer. The waste fractions are assumed to go directly to the nearest facility for final disposal, which is assumed to 100 km for most materials based on Saxton (2013) unless more specific data was available and provided by the manufacturer.

Energy requirements during installation of the product were based on an assessment undertaken by the Swedish Environmental Research Institute, IVL (2016). Based on this research, diesel consumption was estimated to 0,015 MJ/DU and electricity consumption to 0,013 MJ/DU for installation of the product.

Particulates from wood chipping processes were assumed to be negligible.

The International EPD System additional data requirements

Data specificity and GWP-GHG variability for GWP-GHG for A1-A5, C1-4, D.

Supply-chain specific data for GWP-GHG	93 %
Variation in GWP-GHG between products	Not relevant
Variation in GWP-GHG between sites	Not relevant

ENVIRONMENTAL IMPACT DATA

Note: additional environmental impact data may be presented in annexes.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total	kg CO ₂ eq	2,11E00	1,15E-01	1,49E-01	2,37E00	4,18E-02	1,02E-02	ND	ND	ND	ND	ND	ND	ND	1,56E-03	6,14E-03	8,87E-02	2,73E-04	-1,33E00
GWP – fossil	kg CO ₂ eq	2,10E00	1,15E-01	1,11E-01	2,33E00	4,18E-02	7,81E-03	ND	ND	ND	ND	ND	ND	ND	1,54E-03	6,13E-03	8,87E-02	2,73E-04	-1,06E00
GWP – biogenic	kg CO ₂ eq	3,89E-03	6,17E-05	3,73E-02	4,12E-02	3,03E-05	2,33E-03	ND	ND	ND	ND	ND	ND	ND	7,15E-06	4,46E-06	2,40E-05	5,41E-07	-2,78E-01
GWP – LULUC	kg CO ₂ eq	1,36E-03	4,15E-05	5,39E-04	1,94E-03	1,26E-05	1,33E-05	ND	ND	ND	ND	ND	ND	ND	1,14E-05	1,85E-06	1,75E-06	8,10E-08	-5,68E-04
Ozone depletion pot.	kg CFC ₁₁ eq	1,46E-07	2,61E-08	1,30E-08	1,85E-07	9,82E-09	1,33E-09	ND	ND	ND	ND	ND	ND	ND	3,81E-10	1,44E-09	2,47E-10	1,12E-10	-4,68E-08
Acidification potential	mol H ⁺ eq	2,60E-02	3,30E-04	9,39E-04	2,73E-02	1,75E-04	4,66E-05	ND	ND	ND	ND	ND	ND	ND	1,52E-05	2,58E-05	1,67E-05	2,59E-06	-4,74E-03
EP-freshwater ³⁾	kg Peq	1,29E-04	9,76E-07	7,65E-06	1,37E-04	3,40E-07	1,11E-07	ND	ND	ND	ND	ND	ND	ND	1,81E-08	4,99E-08	8,22E-08	3,30E-09	-5,59E-05
EP-marine	kg Neq	2,56E-03	6,55E-05	2,12E-04	2,84E-03	5,29E-05	1,76E-05	ND	ND	ND	ND	ND	ND	ND	6,52E-06	7,76E-06	5,51E-06	8,91E-07	-1,01E-03
EP-terrestrial	mol Neq	9,19E-02	7,30E-04	2,97E-03	9,56E-02	5,84E-04	1,89E-04	ND	ND	ND	ND	ND	ND	ND	7,19E-05	8,58E-05	6,14E-05	9,82E-06	-1,04E-02
POCP (“smog”)	kg NMVOCeq	1,02E-02	2,80E-04	5,67E-04	1,10E-02	1,88E-04	5,93E-05	ND	ND	ND	ND	ND	ND	ND	1,96E-05	2,76E-05	1,52E-05	2,85E-06	-4,88E-03
ADP-minerals & metals	kg Sbeq	1,69E-04	3,00E-07	2,70E-06	1,72E-04	7,13E-07	1,88E-07	ND	ND	ND	ND	ND	ND	ND	4,90E-09	1,05E-07	1,97E-08	2,49E-09	-1,44E-05
ADP-fossil resources	MJ	2,47E01	1,65E-01	5,89E00	3,07E01	6,50E-01	1,10E-01	ND	ND	ND	ND	ND	ND	ND	3,92E-02	9,54E-02	2,46E-02	7,63E-03	-9,41E00
Water use ²⁾	m ³ eq depr.	1,23E00	5,68E-03	8,56E-01	2,09E00	2,42E-03	7,93E-04	ND	ND	ND	ND	ND	ND	ND	2,96E-04	3,55E-04	1,48E-03	3,53E-04	-4,94E-01

1) GWP = Global Warming Potential; EP = Eutrophication potential; POCP = Photochemical ozone formation; ADP = Abiotic depletion potential. 2) EN 15804+A2 disclaimer: the results for Abiotic depletion, Water use and optional indicators except Particulate matter, and Ionizing radiation human health, these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicators mentioned (Frischknecht et al., 2000). 3) Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO₄eq.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	2,75E-07	7,31E-09	1,07E-08	2,93E-07	3,78E-09	9,85E-10	ND	ND	ND	ND	ND	ND	ND	3,87E-10	5,55E-10	8,47E-11	5,03E-11	-7,63E-08
Ionizing radiation ⁵⁾	kBq U235seq	7,03E-02	7,59E-03	2,27E-01	3,05E-01	2,84E-03	1,10E-03	ND	ND	ND	ND	ND	ND	ND	7,8E-04	4,17E-04	1,36E-04	3,13E-05	-8,65E-03
Ecotoxicity (freshwater)	CTUe	1,01E02	1,35E00	1,40E01	1,16E02	4,97E-01	1,28E-01	ND	ND	ND	ND	ND	ND	ND	1,86E-02	7,29E-02	1,53E-01	4,81E-03	-4,59E01
Human toxicity, cancer	CTUh	1,64E-08	3,88E-11	1,00E-10	1,65E-08	1,27E-11	5,15E-12	ND	ND	ND	ND	ND	ND	ND	5,62E-13	1,87E-12	1,24E-12	1,14E-13	-4,32E-09
Human tox. non-cancer	CTUh	1,35E-07	1,47E-09	3,47E-09	1,40E-07	5,89E-10	9,72E-11	ND	ND	ND	ND	ND	ND	ND	1,35E-11	8,64E-11	6,87E-11	3,52E-12	7,63E-08
SQP	-	5,26E00	1,47E00	6,48E-01	7,38E00	9,81E-01	2,77E-02	ND	ND	ND	ND	ND	ND	ND	7,87E-04	1,44E-01	4,50E-03	1,30E-02	-2,43E00

4) SQP = Land use related impacts/soil quality. 5) EN 15804+A2 disclaimer for Ionizing radiation, human health. This impact category 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 ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renewables. PER as energy	MJ	1,58E00	2,36E-03	2,21E0	3,79E0	8,18E-03	1,22E-02	ND	ND	ND	ND	ND	ND	ND	9,87E-03	1,20E-03	2,82E-03	6,17E-05	-7,32E-01
Renewables PER as material	MJ	0,00E00	0,00E00	7,52E-2	7,52E-2	0,00E00	0,00E00	ND	ND	ND	ND	ND	ND	ND	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00
Total use of renewables. PER	MJ	1,58E00	2,36E-03	2,29E0	3,87E0	8,18E-03	1,22E-02	ND	ND	ND	ND	ND	ND	ND	9,87E-03	1,20E-03	2,82E-03	6,17E-05	-7,32E-01
Non-renewables. PER as energy	MJ	2,56E01	1,65E-01	5,89E0	3,17E1	6,50E-01	1,10E-01	ND	ND	ND	ND	ND	ND	ND	3,92E-02	9,54E-02	2,46E-02	7,63E-03	-9,41E00
Non-renewables. PER as material	MJ	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00	ND	ND	ND	ND	ND	ND	ND	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00
Total use of non-renewables. PER	MJ	2,56E01	1,65E-01	5,89E0	3,17E1	6,50E-01	1,10E-01	ND	ND	ND	ND	ND	ND	ND	3,92E-02	9,54E-02	2,46E-02	7,63E-03	-9,41E00
Secondary materials	kg	4,05E-02	0,00E00	3,83E-5	4,06E-2	0,00E00	0,00E00	ND	ND	ND	ND	ND	ND	ND	0,00E00	0,00E00	0,00E00	0,00E00	2,22E-01
Renew. secondary fuels	MJ	4,71E-23	0,00E00	0,00E00	4,71E-23	0,00E00	0,00E00	ND	ND	ND	ND	ND	ND	ND	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00
Non-ren. secondary fuels	MJ	5,53E-22	0,00E00	0,00E00	5,53E-22	0,00E00	0,00E00	ND	ND	ND	ND	ND	ND	ND	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00
Use of net fresh water	m ³	3,07E-03	2,84E-05	8,02E-3	1,11E-2	1,35E-4	2,33E-05	ND	ND	ND	ND	ND	ND	ND	6,95E-06	1,99E-05	1,30E-04	8,34E-06	-1,21E-02

6) PER = Primary energy resources

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	3,82E-02	1,69E-04	6,82E-03	4,52E-02	6,32E-04	2,74E-04	ND	ND	ND	ND	ND	ND	ND	3,56E-05	9,27E-05	0,00E00	7,11E-06	-3,19E-01
Non-hazardous waste	kg	1,76E-01	1,17E-02	2,53E-01	4,41E-01	6,99E-02	8,61E-03	ND	ND	ND	ND	ND	ND	ND	6,59E-04	1,03E-02	0,00E00	5,18E-02	-2,9E00
Radioactive waste	kg	4,02E-04	1,13E-06	8,95E-05	4,93E-04	4,46E-06	8,77E-07	ND	ND	ND	ND	ND	ND	ND	4,18E-07	6,55E-07	0,00E00	5,05E-08	-9,16E-06

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00	ND	ND	ND	ND	ND	ND	ND	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00
Materials for recycling	kg	0,00E00	0,00E00	2,00E-01	2,00E-01	0,00E00	0,00E00	ND	ND	ND	ND	ND	ND	ND	0,00E00	0,00E00	5,95E-01	0,00E00	0,00E00
Materials for energy recycling	kg	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00	1,81E-01	ND	ND	ND	ND	ND	ND	ND	0,00E00	0,00E00	2,79E-02	0,00E00	0,00E00
Exported energy	MJ	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00	ND	ND	ND	ND	ND	ND	ND	0,00E00	0,00E00	0,00E00	0,00E00	0,00E00

ENVIRONMENTAL IMPACTS – GWP-GHG - THE INTERNATIONAL EPD SYSTEM

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	kg CO ₂ eq	2,10E00	1,15E-01	1,11E-01	2,33E00	4,18E-02	7,81E-03	ND	ND	ND	ND	ND	ND	ND	1,54E-03	6,13E-03	8,87E-02	2,73E-04	-1,06E00

8) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013) This indicator is almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	LCA study for country specific electricity mixes based on IEA, (OneClick LCA, 2022)
Electricity CO ₂ e / kWh	0,0487
District heating data source and quality	Not applicable
District heating CO ₂ e / kWh	Not applicable

BIBLIOGRAPHY

ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations. Principles and procedures.

ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.

ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.

Ecoinvent database v3.6 (2019) and One Click LCA database.

EN 15804:2012+A2:2019 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.

R., Frischknecht, A., Braunschweig, P., Hofstetter, and P., Suter, 2000, Human health damages due to ionising radiation in life cycle impact assessment, Environmental Impact Assessment Review, Vol 20(2), pp. 159-189.

IES EPD System PCR 2019:14 Construction products, version 1.11 (05.02.2021) is used.

IVL, 2016. *Byggandets klimatpåverkan*. [online] Available at: <https://www.ivl.se/download/18.34244ba71728fcb3f3f8c2/1591705068406/B2260.pdf> [Accessed 27 10 2022]

B., Saxton, 2013, Swedish national and international road good transport 2012, Trafikanalys; Table 7a, Stockholm.

Ventilation details LCA background report 2022-11-07.



ABOUT THE MANUFACTURER

Hallströms Verkstäder AB is a Swedish manufacturer of ventilation systems for comfort and industrial applications located in Näliden and Ås, which are both communities in Jämtland, Sweden. The ventilation tubes for which this EPD is created are made of galvanized steel with a service life of 50 years or more. The benefits of using galvanized steel ventilation systems are the long service life expectancy and the protection from external influences such as corrosion. The material is also very light, which aids in the transportation and installation of the product.

The products are used for ventilation purposes in for instance off-shore applications, chemical industries, the pharmaceutical and food industry, arenas, dwellings and more.

EPD AUTHOR AND CONTRIBUTORS

Manufacturer	Hallströms Verkstäder AB
EPD author	Felix Meyer, Gidås Sustainability Agency
EPD verifier	Silvia Vilčeková, Silcert, s.r.o.
EPD program operator	The International EPD System
Background data	This EPD is based on Ecoinvent 3.6 (cut-off) and One Click LCA databases.
LCA software	The LCA and EPD have been created using One Click LCA Pre-Verified EPD Generator for Construction products

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with EN 15804, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The background report (project report) for this EPD

Why does verification transparency matter? [Read more online.](#)

VERIFICATION OVERVIEW

Following independent third party has verified this specific EPD:

EPD verification information	Answer
Independent EPD verifier	Silvia Vilčeková, Silcert, s.r.o.
EPD verification started on	2022-11-07
EPD verification completed on	2022-11-17
Supply-chain specific data %	93 %
Approver of the EPD verifier	The International EPD System

Author & tool verification	Answer
EPD author	Felix Meyer
EPD Generator module	Construction products
Independent software verifier	Ugo Pretato, Studio Fieschi & soci Srl
Software verification date	2021-05-11

THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of

- the data collected and used in the LCA calculations,
- the way the LCA-based calculations have been carried out,
- the presentation of environmental data in the EPD, and
- other additional environmental information, as present

with respect to the procedural and methodological requirements in ISO 14025:2010 and EN 15804:2012+A2:2019.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.



Silvia Vilčeková, Silcert, s.r.o

VERIFICATION AND REGISTRATION

ISO standard ISO 21930 and CEN standard EN 15804 serves as the core Product Category Rules (PCR)	
PCR	PCR 2019:14 Construction products, version 1.11
PCR review was conducted by:	The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact .
Independent third-party verification of the declaration and data, according to ISO 14025:2006:	Independent verification of this EPD and data, according to ISO 14025: <input type="checkbox"/> Internal certification <input checked="" type="checkbox"/> External verification
Third party verifier	Silvia Vilčeková, Silcert, s.r.o.
	Approved by: The International EPD® System Technical Committee, supported by the Secretariat
Procedure for follow-up during EPD validity involves third party verifier	<input type="checkbox"/> yes <input checked="" type="checkbox"/> no

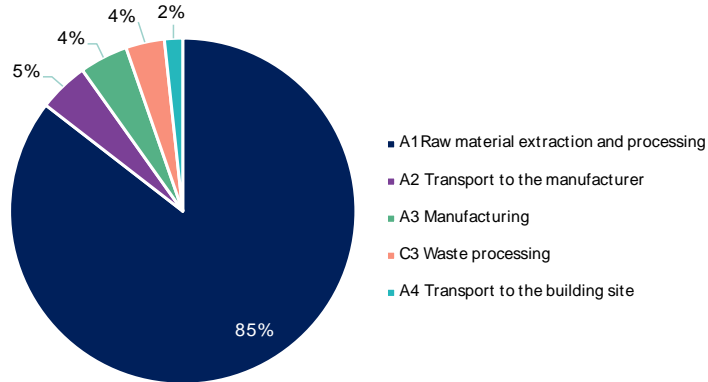
EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: info@environdec.com

ANNEX 1 : ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

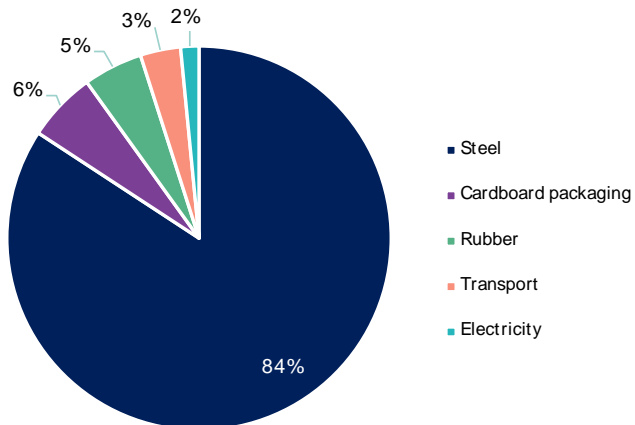
Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO ₂ eq	2,19E00	1,08E-02	1,15E-01	2,32E00	4,14E-02	8,30E-03	ND	ND	ND	ND	ND	ND	ND	1,54E-03	6,08E-03	8,87E-02	2,68E-04	-1,02E00
Ozone depletion Pot.	kg CFC ₁₁ eq	1,52E-08	1,97E-09	1,11E-08	2,83E-08	7,81E-09	1,14E-09	ND	ND	ND	ND	ND	ND	ND	3,72E-10	1,15E-09	2,80E-10	8,90E-11	-3,97E-08
Acidification	kg SO ₂ eq	4,93E-03	2,20E-05	6,12E-04	5,56E-03	8,50E-05	2,53E-05	ND	ND	ND	ND	ND	ND	ND	2,63E-06	1,25E-05	1,27E-05	1,08E-06	-3,82E-03
Eutrophication	kg PO ₄ ³ eq	5,87E-04	4,54E-06	3,04E-04	8,96E-04	1,72E-05	1,30E-05	ND	ND	ND	ND	ND	ND	ND	7,24E-07	2,52E-06	8,94E-06	2,09E-07	-2,52E-03
POCP ("smog")	kg C ₂ H ₄ eq	5,37E-04	1,31E-06	3,18E-05	5,70E-04	5,39E-06	1,70E-06	ND	ND	ND	ND	ND	ND	ND	2,36E-07	7,91E-07	3,80E-07	7,91E-08	-5,39E-04
ADP-elements	kg Sbeq	1,69E-04	3,00E-07	2,70E-06	1,72E-04	7,13E-07	1,88E-07	ND	ND	ND	ND	ND	ND	ND	4,90E-09	1,05E-07	1,97E-08	2,49E-09	-1,44E-05
ADP-fossil	MJ	2,47E01	1,65E-01	5,89E00	3,07E01	6,50E-01	1,10E-01	ND	ND	ND	ND	ND	ND	ND	3,92E-02	9,54E-02	2,46E-02	7,63E-03	-9,41E00

ANNEX 2 : LIFE-CYCLE ASSESSMENT RESULT VISUALIZATION

Global warming potential – Life cycle stages¹

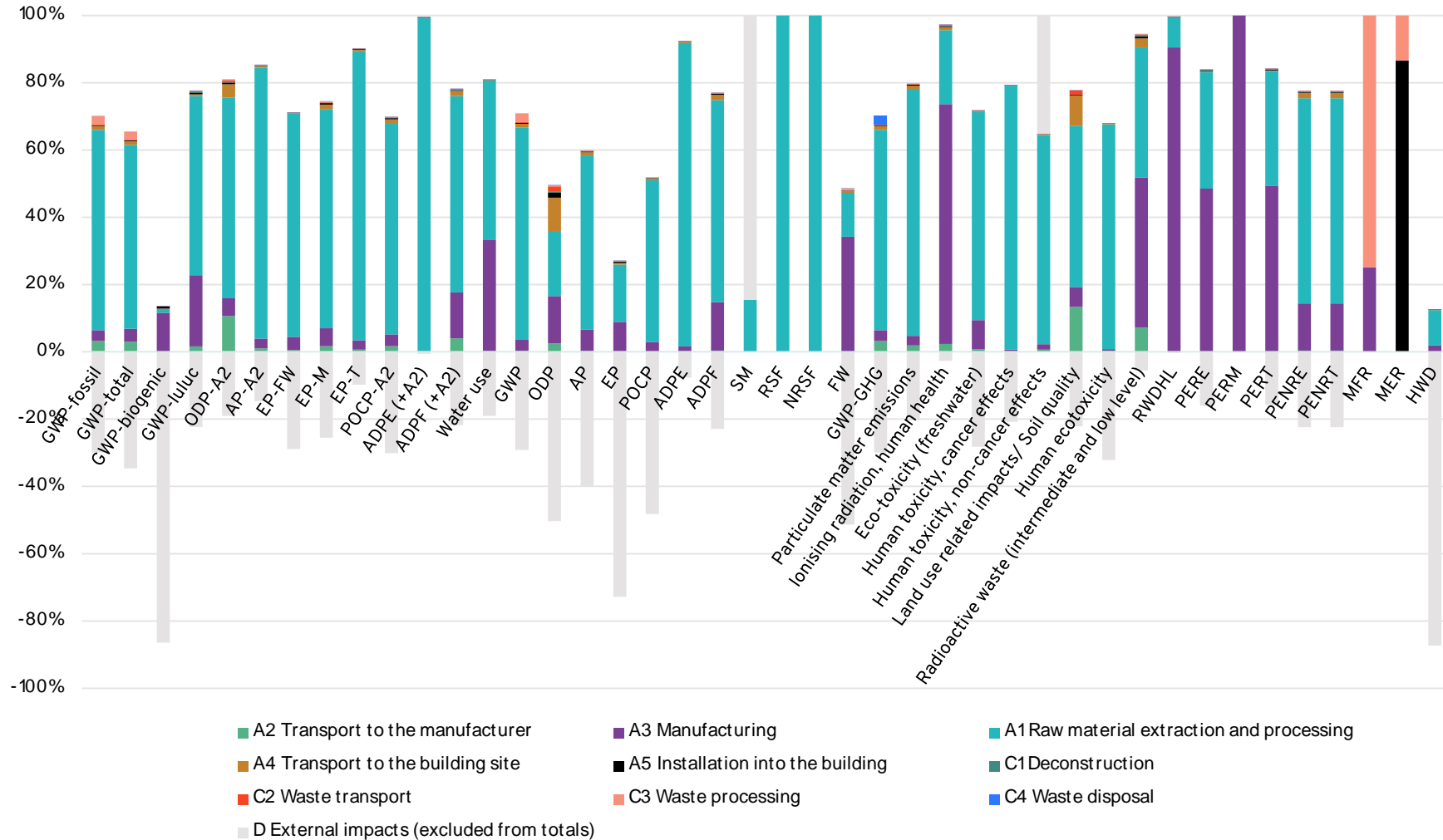


Global warming potential fossil kgCO₂eq – Classifications²



1) Life cycle stages A5, C1, C2, C4 have been excluded from this chart as they each account for less than 0,5 % of GWP. 2) Classifications *Installation, De-construction, Welding, Lubrication* and *Other classifications* each account for less than 0,2 % of GWP. These shares would not have been visible in the charts.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF



ANNEX 3: PRODUCT VARIATIONS

As mentioned in earlier sections, the declared unit and the mass per declared unit for the product in this EPD is an average of all ventilation details included in the product system. The table in this Annex can be used to convert the results of the LCA presented in this EPD to specific components that are available in the Hallströms VENT system. Different product groups have been color coded for better readability and the conversion factor is visible on the right-hand side of the table. The environmental impact for each component can thus be calculated by multiplying the results presented in this EPD by the corresponding conversion factor.

Article	Name	Diameter 1 [mm]	Diameter 2 [mm]	Angle [°]	Mass [kg]	Conversion factor
DA10003	HV 100-90°	100	-	90°	0,4	0,5779
DA10004	HV 125-90°	125	-	90°	0,6	0,8669
DA10005	HV 160-90°	160	-	90°	0,8	1,1558
DA10006	HV 200-90°	200	-	90°	1,2	1,7337
DA10007	HV 250-90°	250	-	90°	2,1	3,0340
DA10008	HV 315-90°	315	-	90°	3,3	4,7677
DA10009	HV 400-90°	400	-	90°	5,8	8,3796
DA10010	HV 500-90°	500	-	90°	8,7	12,5695
DA10011	HV 630-90°	630	-	90°	12,5	18,0596
DA10012	HV 800-90°	800	-	90°	28,2	40,7424
DA10013	HV 1000-90°	1000	-	90°	42,3	61,1136
DA10014	HV 1250-90°	1250	-	90°	63,9	92,3205
DB10003	HV 100-45°	100	-	45°	0,3	0,4334
DB10004	HV 125-45°	125	-	45°	0,3	0,4334
DB10005	HV 160-45°	160	-	45°	0,5	0,7224
DB10006	HV 200-45°	200	-	45°	0,7	1,0113

Article	Name	Diameter 1 [mm]	Diameter 2 [mm]	Angle [°]	Mass [kg]	Conversion factor
DB10007	HV 250-45°	250	-	45°	1,1	1,5892
DB10008	HV 315-45°	315	-	45°	1,6	2,3116
DB10009	HV 400-45°	400	-	45°	3,4	4,9122
DB10010	HV 500-45°	500	-	45°	5	7,2238
DB10011	HV 630-45°	630	-	45°	7,4	10,6913
DB10012	HV 800-45°	800	-	45°	16,2	23,4052
DB10013	HV 1000-45°	1000	-	45°	23,7	34,2410
DB10014	HV 1250-45°	1250	-	45°	35,1	50,7113
DC10003	HV 100-30°	100	-	30°	0,2	0,2890
DC10004	HV 125-30°	125	-	30°	0,3	0,4334
DC10005	HV 160-30°	160	-	30°	0,5	0,7224
DC10006	HV 200-30°	200	-	30°	0,7	1,0113
DC10007	HV 250-30°	250	-	30°	1,1	1,5892
DC10008	HV 315-30°	315	-	30°	1,3	1,8782
DC10009	HV 400-30°	400	-	30°	2	2,8895
DC10010	HV 500-30°	500	-	30°	2,6	3,7564
DC10011	HV 630-30°	630	-	30°	4,4	6,3570
DC10012	HV 800-30°	800	-	30°	9	13,0029
DC10013	HV 1000-30°	1000	-	30°	12,3	17,7706
DC10014	HV 1250-30°	1250	-	30°	21	30,3401
DD10007	HV 250-60°	250	-	60°	1,5	2,1671
DD10008	HV 315-60°	315	-	60°	2,2	3,1785
DD10009	HV 400-60°	400	-	60°	3,6	5,2012
DD10010	HV 500-60°	500	-	60°	5,4	7,8017
DD10011	HV 630-60°	630	-	60°	8,1	11,7026
DD10012	HV 800-60°	800	-	60°	15,2	21,9604
DD10013	HV 1000-60°	1000	-	60°	22,7	32,7962
DE10003	HV 100-15°	100	-	15°	0,3	0,4334
DE10004	HV 125-15°	125	-	15°	0,4	0,5779
DE10005	HV 160-15°	160	-	15°	0,5	0,7224
DE10007	HV 250-15°	250	-	15°	1,1	1,5892
DE10008	HV 315-15°	315	-	15°	1,4	2,0227
DE10009	HV 400-15°	400	-	15°	1,7	2,4561
DE10010	HV 500-15°	500	-	15°	2,7	3,9009
DE10011	HV 630-15°	630	-	15°	4,1	5,9235
DE10012	HV 800-15°	800	-	15°	7,1	10,2578
DE10013	HV 1000-15°	1000	-	15°	10,4	15,0256
DE10014	HV 1250-15°	1250	-	15°	14,3	20,6602
DF10003	HIBK N/N 100-90°	100	-	90°	0,3	0,4334
DF10004	HIBK N/N 125-90°	125	-	90°	0,4	0,5779
DF10005	HIBK N/N 160-90°	160	-	90°	0,7	1,0113

Article	Name	Diameter 1 [mm]	Diameter 2 [mm]	Angle [°]	Mass [kg]	Conversion factor
DF10006	HIBK N/N 200-90°	200	-	90°	1	1,4448
DF10007	HIBK N/N 250-90°	250	-	90°	1,6	2,3116
DF10008	HIBK N/N 315-90°	315	-	90°	2,2	3,1785
DF10009	HIBK N/N 400-90°	400	-	90°	2,4	3,4674
DF10010	HIBK N/N 500-90°	500	-	90°	5,2	7,5128
DF10011	HIBK N/N 630-90°	630	-	90°	7,9	11,4137
DF10012	HIBK N/N 800-90°	800	-	90°	2,4	3,4674
DI10003	HIBKM Muff/N 100-90°	100	-	90°	0,3	0,4334
DI10004	HIBKM Muff/N 125-90°	125	-	90°	0,4	0,5779
DI10005	HIBKM Muff/N 160-90°	160	-	90°	0,7	1,0113
DI10006	HIBKM Muff/N 200-90°	200	-	90°	1	1,4448
DI10007	HIBKM Muff/N 250-90°	250	-	90°	1,6	2,3116
DI10008	HIBKM Muff/N 315-90°	315	-	90°	1,9	2,7451
DI10009	HIBKM Muff/N 400-90°	400	-	90°	2,4	3,4674
DJ10003	HVM 100-45° M/N	100	-	45°	0,2	0,2890
DJ10004	HVM 125-45° M/N	125	-	45°	0,3	0,4334
DJ10005	HVM 160-45° M/N	160	-	45°	0,5	0,7224
HB10303	HVR-A 100 / 100	100	100	-	0,5	0,7224
HB10404	HVR-A 125 / 125	125	125	-	0,7	1,0113
HB10504	HVR-A 160 / 125	160	125	-	0,9	1,3003
HB10505	HVR-A 160 / 160	160	160	-	1	1,4448
HB10605	HVR-A 200 / 160	200	160	-	1,4	2,0227
HB10606	HVR-A 200 / 200	200	200	-	1,5	2,1671
HB10706	HVR-A 250 / 200	250	200	-	1,9	2,7451
HB10707	HVR-A 250 / 250	250	250	-	2	2,8895
HB10807	HVR-A 315 / 250	315	250	-	2,7	3,9009
HB10808	HVR-A 315 / 315	315	315	-	2,8	4,0453
HB10908	HVR-A 400 / 315	400	315	-	5,3	7,6573
HB11008	HVR-A 500 / 315	500	315	-	8,2	11,8471
HC10303	HVR-B 100 / 100	100	100	-	0,6	0,8669
HC10404	HVR-B 125 / 125	125	125	-	0,6	0,8669
HC10504	HVR-B 160 / 125	160	125	-	0,9	1,3003
HC10505	HVR-B 160 / 160	160	160	-	1	1,4448
HC10605	HVR-B 200 / 160	200	160	-	1,4	2,0227
HC10606	HVR-B 200 / 200	200	200	-	1,5	2,1671
HC10706	HVR-B 250 / 200	250	200	-	1,9	2,7451
HC10806	HVR-B 315 / 200	315	200	-	2,6	3,7564
HC10807	HVR-B 315 / 250	315	250	-	2,7	3,9009
HC10908	HVR-B 400 / 315	400	315	-	5,3	7,6573
CA10003	HI 100	100	-	-	0,1	0,1445
CA10004	HI 125	125	-	-	0,2	0,2890

Article	Name	Diameter 1 [mm]	Diameter 2 [mm]	Angle [°]	Mass [kg]	Conversion factor
CA10005	HI 160	160	-	-	0,2	0,2890
CA10006	HI 200	200	-	-	0,3	0,4334
CA10007	HI 250	250	-	-	0,4	0,5779
CA10008	HI 315	315	-	-	0,5	0,7224
CA10009	HI 400	400	-	-	0,9	1,3003
CA10010	HI 500	500	-	-	1,3	1,8782
CA10011	HI 630	630	-	-	1,6	2,3116
CA10012	HI 800	800	-	-	5	7,2238
CA10013	HI 1000	1000	-	-	6	8,6686
CA10014	HI 1250	1250	-	-	7	10,1134
CB10001	HM 63	63	-	-	0,1	0,1445
CB10003	HM 100	100	-	-	0,1	0,1445
CB10004	HM 125	125	-	-	0,1	0,1445
CB10005	HM 160	160	-	-	0,2	0,2890
CB10006	HM 200	200	-	-	0,2	0,2890
CB10007	HM 250	250	-	-	0,3	0,4334
CB10008	HM 315	315	-	-	0,4	0,5779
CB10009	HM 400	400	-	-	0,8	1,1558
CB10010	HM 500	500	-	-	1,2	1,7337
CB10011	HM 630	630	-	-	1,5	2,1671
CB10012	HM 800	800	-	-	3,6	5,2012
CB10013	HM 1000	1000	-	-	5,7	8,2352
CB10014	HM 1250	1250	-	-	7,1	10,2578
CD10003	HIL 100	100	-	-	0,3	0,4334
CD10004	HIL 125	125	-	-	0,3	0,4334
CD10005	HIL 160	160	-	-	0,4	0,5779
CD10006	HIL 200	200	-	-	0,5	0,7224
CD10007	HIL 250	250	-	-	0,9	1,3003
CD10008	HIL 315	315	-	-	1,1	1,5892
CD10009	HIL 400	400	-	-	1,7	2,4561
CD10010	HIL 500	500	-	-	3	4,3343
CD10011	HIL 630	630	-	-	3,7	5,3456
CD10012	HIL 800	800	-	-	9	13,0029
CD10013	HIL 1000	1000	-	-	14,5	20,9491
CE10007	HSK 250	250	-	-	0,4	0,5779
CE10008	HSK 315	315	-	-	0,5	0,7224
CE10009	HSK 400	400	-	-	0,9	1,3003
CE10010	HSK 500	500	-	-	1,1	1,5892
CE10011	HSK 630	630	-	-	1,6	2,3116
CE10012	HSK 800	800	-	-	2,3	3,3230
CE10013	HSK 1000	1000	-	-	3	4,3343

Article	Name	Diameter 1 [mm]	Diameter 2 [mm]	Angle [°]	Mass [kg]	Conversion factor
CE10014	HSK 1250	1250	-	-	2,3	3,3230
CE11003	HSK-G 100	100	-	-	0,1	0,1445
CE11004	HSK-G 125	125	-	-	0,2	0,2890
CE11005	HSK-G 160	160	-	-	0,2	0,2890
CE11006	HSK-G 200	200	-	-	0,3	0,4334
CF10003	HSKM 100	100	-	-	0,1	0,1445
CF10004	HSKM 125	125	-	-	0,1	0,1445
CF10005	HSKM 160	160	-	-	0,2	0,2890
CF10006	HSKM 200	200	-	-	0,3	0,4334
CF10007	HSKM 250	250	-	-	0,3	0,4334
CF10008	HSKM 315	315	-	-	0,4	0,5779
CF10009	HSKM 400	400	-	-	0,8	1,1558
CI10003	HILM 100	100	-	-	0,3	0,4334
CI10004	HILM 125	125	-	-	0,3	0,4334
CI10005	HILM 160	160	-	-	0,4	0,5779
CI10006	HILM 200	200	-	-	0,5	0,7224
CI10007	HILM 250	250	-	-	0,9	1,3003
CI10008	HILM 315	315	-	-	1,1	1,5892
CI10009	HILM 400	400	-	-	1,7	2,4561
CI10010	HILM 500	500	-	-	3,6	5,2012
CI10011	HILM 630	630	-	-	4,6	6,6459
FA10003	HSN 100	100	-	-	0,1	0,1445
FA10004	HSN 125	125	-	-	0,2	0,2890
FA10005	HSN 160	160	-	-	0,2	0,2890
FA10006	HSN 200	200	-	-	0,3	0,4334
FA10007	HSN 250	250	-	-	0,4	0,5779
FA10008	HSN 315	315	-	-	0,6	0,8669
FA10009	HSN 400	400	-	-	1,3	1,8782
CM10003	HSG 100	100	-	-	0,1	0,1445
CM10004	HSG 125	125	-	-	0,1	0,1445
CM10005	HSG 160	160	-	-	0,2	0,2890
CM10006	HSG 200	200	-	-	0,2	0,2890
CM10007	HSG 250	250	-	-	0,3	0,4334
CM10008	HSG 315	315	-	-	0,4	0,5779
CM10009	HSG 400	400	-	-	0,6	0,8669
CM10010	HSG 500	500	-	-	1	1,4448
CM10011	HSG 630	630	-	-	1,3	1,8782
FC10002	HÄL 80	80	-	-	0,1	0,1445
FC10003	HÄL 100	100	-	-	0,1	0,1445
FC10004	HÄL 125	125	-	-	0,2	0,2890
FC10005	HÄL 160	160	-	-	0,3	0,4334

Article	Name	Diameter 1 [mm]	Diameter 2 [mm]	Angle [°]	Mass [kg]	Conversion factor
FC10006	HÄL 200	200	-	-	0,4	0,5779
FC10007	HÄL 250	250	-	-	0,6	0,8669
FC10008	HÄL 315	315	-	-	0,9	1,3003
FC10009	HÄL 400	400	-	-	1,3	1,8782
FC10010	HÄL 500	500	-	-	2,5	3,6119
FC10011	HÄL 630	630	-	-	3,7	5,3456
FC10012	HÄL 800	800	-	-	5,3	7,6573
FC10013	HÄL 1000	1000	-	-	8,4	12,1360
FC10014	HÄL 1250	1250	-	-	12,2	17,6261
FD10003	HÄLM 100	100	-	-	0,1	0,1445
FD10004	HÄLM 125	125	-	-	0,2	0,2890
FD10005	HÄLM 160	160	-	-	0,2	0,2890
FD10006	HÄLM 200	200	-	-	0,2	0,2890
FD10007	HÄLM 250	250	-	-	0,4	0,5779
FD10008	HÄLM 315	315	-	-	0,7	1,0113
FD10010	HÄLM 500	500	-	-	1,9	2,7451
FD10011	HÄLM 630	630	-	-	3,2	4,6233
FD10012	HÄLM 800	800	-	-	6,1	8,8131
FD10013	HÄLM 1000	1000	-	-	8,4	12,1360
FD10014	HÄLM 1250	1250	-	-	12,2	17,6261
IA10302	HPS 100- 80	100	80	-	0,1	0,1445
IA10303	HPS 100- 100	100	100	-	0,2	0,2890
IA10402	HPS 125- 80	125	80	-	0,1	0,1445
IA10403	HPS 125- 100	125	100	-	0,2	0,2890
IA10404	HPS 125- 125	125	125	-	0,3	0,4334
IA10503	HPS 160- 100	160	100	-	0,2	0,2890
IA10504	HPS 160- 125	160	125	-	0,2	0,2890
IA10505	HPS 160- 160	160	160	-	0,4	0,5779
IA10603	HPS 200- 100	200	100	-	0,2	0,2890
IA10604	HPS 200- 125	200	125	-	0,2	0,2890
IA10605	HPS 200- 160	200	160	-	0,4	0,5779
IA10606	HPS 200- 200	200	200	-	0,5	0,7224
IA10703	HPS 250- 100	250	100	-	0,2	0,2890
IA10704	HPS 250- 125	250	125	-	0,3	0,4334
IA10705	HPS 250- 160	250	160	-	0,3	0,4334
IA10706	HPS 250- 200	250	200	-	0,5	0,7224
IA10707	HPS 250- 250	250	250	-	0,8	1,1558
IA10803	HPS 315- 100	315	100	-	0,2	0,2890
IA10804	HPS 315- 125	315	125	-	0,2	0,2890
IA10805	HPS 315- 160	315	160	-	0,3	0,4334
IA10806	HPS 315- 200	315	200	-	0,5	0,7224

Article	Name	Diameter 1 [mm]	Diameter 2 [mm]	Angle [°]	Mass [kg]	Conversion factor
IA10807	HPS 315- 250	315	250	-	0,7	1,0113
IA10808	HPS 315- 315	315	315	-	1,2	1,7337
IA10903	HPS 630/500/400- 100	630/500/400	100	-	0,2	0,2890
IA10904	HPS 400- 125	400	125	-	0,3	0,4334
IA10905	HPS 400- 160	400	160	-	0,4	0,5779
IA10906	HPS 400- 200	400	200	-	0,4	0,5779
IA10907	HPS 400- 250	400	250	-	0,7	1,0113
IA10908	HPS 400- 315	400	315	-	1,2	1,7337
IA10909	HPS 400- 400	400	400	-	1,5	2,1671
IA11004	HPS 500/630- 125	500/630	125	-	0,3	0,4334
IA11005	HPS 500- 160	500	160	-	0,4	0,5779
IA11006	HPS 500- 200	500	200	-	0,5	0,7224
IA11007	HPS 500- 250	500	250	-	0,6	0,8669
IA11008	HPS 500- 315	500	315	-	0,8	1,1558
IA11009	HPS 500- 400	500	400	-	1,2	1,7337
IA11010	HPS 500- 500	500	500	-	1,5	2,1671
IA11108	HPS 800/630- 315	800/630	315	-	0,8	1,1558
IA11109	HPS 630- 400	630	400	-	0,9	1,3003
IA11110	HPS 630- 500	630	500	-	1,4	2,0227
IA11111	HPS 630- 630	630	630	-	2	2,8895
IA11209	HPS 800- 400	800	400	-	0,8	1,1558
IA11210	HPS 800- 500	800	500	-	1,4	2,0227
IA11211	HPS 800- 630	800	630	-	2,3	3,3230
IA11212	HPS 800- 800	800	800	-	4,6	6,6459
IA11308	HPS 1000- 315	1000	315	-	0,6	0,8669
IA11309	HPS 1000- 400	1000	400	-	0,9	1,3003
IA11310	HPS 1000- 500	1000	500	-	1,4	2,0227
IA11311	HPS 1000- 630	1000	630	-	1,9	2,7451
IA11312	HPS 1000- 800	1000	800	-	4,5	6,5014
IA11313	HPS 1000-1000	1000	1000	-	6,4	9,2465
IA11409	HPS 1250- 400	1250	400	-	0,8	1,1558
IA11410	HPS 1250- 500	1250	500	-	1,4	2,0227
IA11412	HPS 1250- 800	1250	800	-	4,5	6,5014
KA10303	HTK 100- 100	100	100	-	0,5	0,7224
KA10403	HTK 125- 100	125	100	-	0,6	0,8669
KA10404	HTK 125- 125	125	125	-	0,8	1,1558
KA10503	HTK 160- 100	160	100	-	0,7	1,0113
KA10504	HTK 160- 125	160	125	-	0,8	1,1558
KA10505	HTK 160- 160	160	160	-	1	1,4448
KA10602	HTK 200- 80	200	80	-	0,9	1,3003
KA10603	HTK 200- 100	200	100	-	0,7	1,0113

Article	Name	Diameter 1 [mm]	Diameter 2 [mm]	Angle [°]	Mass [kg]	Conversion factor
KA10604	HTK 200- 125	200	125	-	1	1,4448
KA10605	HTK 200- 160	200	160	-	1,1	1,5892
KA10606	HTK 200- 200	200	200	-	1,4	2,0227
KA10702	HTK 250- 80	250	80	-	0,8	1,1558
KA10703	HTK 250- 100	250	100	-	1,1	1,5892
KA10704	HTK 250- 125	250	125	-	1,3	1,8782
KA10705	HTK 250- 160	250	160	-	1,4	2,0227
KA10706	HTK 250- 200	250	200	-	1,7	2,4561
KA10707	HTK 250- 250	250	250	-	2	2,8895
KA10802	HTK 315- 80	315	80	-	1,4	2,0227
KA10803	HTK 315- 100	315	100	-	1,2	1,7337
KA10804	HTK 315- 125	315	125	-	1,5	2,1671
KA10805	HTK 315- 160	315	160	-	1,7	2,4561
KA10806	HTK 315- 200	315	200	-	2	2,8895
KA10807	HTK 315- 250	315	250	-	2,3	3,3230
KA10808	HTK 315- 315	315	315	-	3,2	4,6233
KA10903	HTK 400- 100	400	100	-	1,9	2,7451
KA10904	HTK 400- 125	400	125	-	2	2,8895
KA10905	HTK 400- 160	400	160	-	2	2,8895
KA10906	HTK 400- 200	400	200	-	2,4	3,4674
KA10907	HTK 400- 250	400	250	-	3,1	4,4788
KA10908	HTK 400- 315	400	315	-	3,4	4,9122
KA10909	HTK 400- 400	400	400	-	4,1	5,9235
KA11003	HTK 500- 100	500	100	-	2,2	3,1785
KA11004	HTK 500- 125	500	125	-	2,4	3,4674
KA11005	HTK 500- 160	500	160	-	2,5	3,6119
KA11006	HTK 500- 200	500	200	-	3	4,3343
KA11007	HTK 500- 250	500	250	-	3,8	5,4901
KA11008	HTK 500- 315	500	315	-	4,1	5,9235
KA11009	HTK 500- 400	500	400	-	4,7	6,7904
KA11010	HTK 500- 500	500	500	-	5,9	8,5241
KA11104	HTK 630- 125	630	125	-	4,6	6,6459
KA11105	HTK 630- 160	630	160	-	5,2	7,5128
KA11106	HTK 630- 200	630	200	-	5,8	8,3796
KA11107	HTK 630- 250	630	250	-	6,2	8,9575
KA11108	HTK 630- 315	630	315	-	5,9	8,5241
KA11109	HTK 630- 400	630	400	-	6,6	9,5355
KA11110	HTK 630- 500	630	500	-	8,6	12,4250
KA11111	HTK 630- 630	630	630	-	10,1	14,5921
KA11207	HTK 800- 250	800	250	-	8,8	12,7139
KA11208	HTK 800- 315	800	315	-	11,5	16,6148

Article	Name	Diameter 1 [mm]	Diameter 2 [mm]	Angle [°]	Mass [kg]	Conversion factor
KA11209	HTK 800- 400	800	400	-	12,8	18,4930
KA11210	HTK 800- 500	800	500	-	14,6	21,0936
KA11211	HTK 800- 630	800	630	-	16,5	23,8386
KA11212	HTK 800- 800	800	800	-	21,3	30,7735
KA11309	HTK 1000- 400	1000	400	-	13	18,7820
KA11310	HTK 1000- 500	1000	500	-	15,8	22,8273
KA11311	HTK 1000- 630	1000	630	-	18,6	26,8726
KA11312	HTK 1000- 800	1000	800	-	24,3	35,1078
KA11313	HTK 1000-1000	1000	1000	-	29,9	43,1985
KA11410	HTK 1250- 500	1250	500	-	23,4	33,8075
KA11411	HTK 1250- 630	1250	630	-	27,5	39,7311
KA11412	HTK 1250- 800	1250	800	-	34,5	49,8444
KA11413	HTK 1250-1000	1250	1000	-	37	53,4563
KA11414	HTK 1250-1250	1250	250	-	43,2	62,4139
KB10303	HXX 100- 100	100	100	-	0,7	1,0113
KB10403	HXX 125- 100	125	100	-	0,8	1,1558
KB10404	HXX 125- 125	125	125	-	0,9	1,3003
KB10503	HXX 160- 100	160	100	-	0,9	1,3003
KB10504	HXX 160- 125	160	125	-	1,1	1,5892
KB10505	HXX 160- 160	160	160	-	1,3	1,8782
KB10603	HXX 200- 100	200	100	-	1	1,4448
KB10604	HXX 200- 125	200	125	-	1,2	1,7337
KB10605	HXX 200- 160	200	160	-	1,4	2,0227
KB10606	HXX 200- 200	200	200	-	1,7	2,4561
KB10704	HXX 250- 125	250	125	-	1,5	2,1671
KB10705	HXX 250- 160	250	160	-	1,7	2,4561
KB10706	HXX 250- 200	250	200	-	2	2,8895
KB10707	HXX 250- 250	250	250	-	2,6	3,7564
KB10804	HXX 315- 125	315	125	-	1,5	2,1671
KB10805	HXX 315- 160	315	160	-	1,8	2,6006
KB10806	HXX 315- 200	315	200	-	2,2	3,1785
KB10807	HXX 315- 250	315	250	-	2,9	4,1898
KB10808	HXX 315- 315	315	315	-	3,5	5,0567
KB10905	HXX 400- 160	400	160	-	2,4	3,4674
KB10906	HXX 400- 200	400	200	-	2,7	3,9009
KB10907	HXX 400- 250	400	250	-	3,5	5,0567
KB10908	HXX 400- 315	400	315	-	4,4	6,3570
KB10909	HXX 400- 400	400	400	-	5,2	7,5128
KB11007	HXX 500- 250	500	250	-	4,4	6,3570
KB11008	HXX 500- 315	500	315	-	5,1	7,3683
KB11009	HXX 500- 400	500	400	-	5,9	8,5241

Article	Name	Diameter 1 [mm]	Diameter 2 [mm]	Angle [°]	Mass [kg]	Conversion factor
KB11010	HXX 500- 500	500	500	-	7,2	10,4023
KB11107	HXX 630- 250	630	250	-	6,8	9,8244
KB11109	HXX 630- 400	630	400	-	8	11,5581
KB11110	HXX 630- 500	630	500	-	10	14,4477
KB11209	HXX 800- 400	800	400	-	12,4	17,9151
KB11210	HXX 800- 500	800	500	-	15,8	22,8273
KM10303	HTKM 100- 100	100	100	-	0,5	0,7224
KM10404	HTKM 125- 125	125	125	-	0,7	1,0113
KM10505	HTKM 160- 160	160	160	-	1	1,4448
KM10605	HTKM 200- 160	200	160	-	1,2	1,7337
KM10606	HTKM 200- 200	200	200	-	1,4	2,0227
JA10302	HFC 100- 80	100	80	-	0,2	0,2890
JA10403	HFC 125- 100	125	100	-	0,2	0,2890
JA10503	HFC 160- 100	160	100	-	0,3	0,4334
JA10504	HFC 160- 125	160	125	-	0,3	0,4334
JA10603	HFC 200- 100	200	100	-	0,4	0,5779
JA10604	HFC 200- 125	200	125	-	0,4	0,5779
JA10605	HFC 200- 160	200	160	-	0,4	0,5779
JA10705	HFC 250- 160	250	160	-	0,6	0,8669
JA10706	HFC 250- 200	250	200	-	0,6	0,8669
JA10806	HFC 315- 200	315	200	-	0,8	1,1558
JA10807	HFC 315- 250	315	250	-	0,8	1,1558
JA10906	HFC 400- 200	400	200	-	1,8	2,6006
JA10907	HFC 400- 250	400	250	-	1,7	2,4561
JA10908	HFC 400- 315	400	315	-	1,4	2,0227
JA11007	HFC 500- 250	500	250	-	2,5	3,6119
JA11008	HFC 500- 315	500	315	-	1,6	2,3116
JA11009	HFC 500- 400	500	400	-	2,3	3,3230
JA11108	HFC 630- 315	630	315	-	3,6	5,2012
JA11109	HFC 630- 400	630	400	-	3,5	5,0567
JA11110	HFC 630- 500	630	500	-	3,3	4,7677
JA11208	HFC 800- 315	800	315	-	8,9	12,8584
JA11209	HFC 800- 400	800	400	-	8,1	11,7026
JA11210	HFC 800- 500	800	500	-	7,1	10,2578
JA11211	HFC 800- 630	800	630	-	5,9	8,5241
JA11310	HFC 1000- 500	1000	500	-	11,8	17,0482
JA11311	HFC 1000- 630	1000	630	-	10,8	15,6035
JA11312	HFC 1000- 800	1000	800	-	9,9	14,3032
JA11411	HFC 1250- 630	1250	630	-	19,4	28,0285
JA11412	HFC 1250- 800	1250	800	-	15,7	22,6828
JA11413	HFC 1250-1000	1250	1000	-	12,3	17,7706

Article	Name	Diameter 1 [mm]	Diameter 2 [mm]	Angle [°]	Mass [kg]	Conversion factor
JA11504	HFC 150- 125	150	125	-	0,3	0,4334
JB10302	HFCM 100- 80	100	80	-	0,1	0,1445
JB10403	HFCM 125- 100	125	100	-	0,2	0,2890
JB10503	HFCM 160- 100	160	100	-	0,3	0,4334
JB10504	HFCM 160- 125	160	125	-	0,2	0,2890
JB10603	HFCM 200- 100	200	100	-	0,4	0,5779
JB10604	HFCM 200- 125	200	125	-	0,4	0,5779
JB10605	HFCM 200- 160	200	160	-	0,4	0,5779
JB10705	HFCM 250- 160	250	160	-	0,6	0,8669
JB10706	HFCM 250- 200	250	200	-	0,6	0,8669
JB10805	HFCM 315- 160	315	160	-	0,7	1,0113
JB10806	HFCM 315- 200	315	200	-	0,6	0,8669
JB10807	HFCM 315- 250	315	250	-	0,7	1,0113
JB10906	HFCM 400- 200	400	200	-	1,8	2,6006
JB10907	HFCM 400- 250	400	250	-	1,7	2,4561
JB10908	HFCM 400- 315	400	315	-	1,4	2,0227
JB11004	HFCM 500- 125	500	125	-	2,9	4,1898
JB11005	HFCM 500- 160	500	160	-	2,9	4,1898
JB11006	HFCM 500- 200	500	200	-	3,8	5,4901
JB11007	HFCM 500- 250	500	250	-	2,6	3,7564
JB11008	HFCM 500- 315	500	315	-	2,4	3,4674
JB11009	HFCM 500- 400	500	400	-	2,3	3,3230
JB11108	HFCM 630- 315	630	315	-	4,2	6,0680
JB11109	HFCM 630- 400	630	400	-	3,6	5,2012
JB11110	HFCM 630- 500	630	500	-	3,3	4,7677
JB11209	HFCM 800- 400	800	400	-	8,1	11,7026
JB11210	HFCM 800- 500	800	500	-	7,1	10,2578
JB11211	HFCM 800- 630	800	630	-	5,9	8,5241
JB11310	HFCM 1000- 500	1000	500	-	11,8	17,0482
JB11311	HFCM 1000- 630	1000	630	-	10,8	15,6035
JB11312	HFCM 1000- 800	1000	800	-	9,9	14,3032
JB11411	HFCM 1250- 630	1250	630	-	19,4	28,0285
JB11413	HFCM 1250-1000	1250	1000	-	12,3	17,7706
JC10402	HFB 125- 80	125	80	-	0,5	0,7224
JC10403	HFB 125- 100	125	100	-	0,5	0,7224
JC10503	HFB 160- 100	160	100	-	0,5	0,7224
JC10504	HFB 160- 125	160	125	-	0,5	0,7224
JC10604	HFB 200- 125	200	125	-	0,6	0,8669
JC10605	HFB 200- 160	200	160	-	0,6	0,8669
JC10704	HFB 250- 125	250	125	-	1,1	1,5892
JC10705	HFB 250- 160	250	160	-	0,9	1,3003

Article	Name	Diameter 1 [mm]	Diameter 2 [mm]	Angle [°]	Mass [kg]	Conversion factor
JC10706	HFB 250- 200	250	200	-	0,9	1,3003
JC10805	HFB 315- 160	315	160	-	1,8	2,6006
JC10806	HFB 315- 200	315	200	-	1,5	2,1671
JC10807	HFB 315- 250	315	250	-	1,4	2,0227
JC10906	HFB 400- 200	400	200	-	2,7	3,9009
JC10907	HFB 400- 250	400	250	-	2,6	3,7564
JC10908	HFB 400- 315	400	315	-	2,1	3,0340
JC11005	HFB 500- 160	500	160	-	4	5,7791
JC11006	HFB 500- 200	500	200	-	3,9	5,6346
JC11007	HFB 500- 250	500	250	-	3,9	5,6346
JC11008	HFB 500- 315	500	315	-	3,6	5,2012
JC11009	HFB 500- 400	500	400	-	3,5	5,0567
JC11105	HFB 630- 160	630	160	-	10,4	15,0256
JC11106	HFB 630- 200	630	200	-	9,8	14,1587
JC11107	HFB 630- 250	630	250	-	8,1	11,7026
JC11109	HFB 630- 400	630	400	-	5,4	7,8017
JC11110	HFB 630- 500	630	500	-	5	7,2238
JC11209	HFB 800- 400	800	400	-	12,2	17,6261
JC11210	HFB 800- 500	800	500	-	10,5	15,1700
JC11211	HFB 800- 630	800	630	-	8,9	12,8584
JC11311	HFB 1000- 630	1000	630	-	15,8	22,8273
JC11312	HFB 1000- 800	1000	800	-	14,9	21,5270
JC11413	HFB 1250-1000	1250	1000	-	18,5	26,7282
JD10403	HFBM 125- 100	125	100	-	0,5	0,7224
JD10503	HFBM 160- 100	160	100	-	0,5	0,7224
JD10504	HFBM 160- 125	160	125	-	0,5	0,7224
JD10604	HFBM 200- 125	200	125	-	0,7	1,0113
JD10605	HFBM 200- 160	200	160	-	0,6	0,8669
JD10703	HFBM 250- 100	250	100	-	1,1	1,5892
JD10705	HFBM 250- 160	250	160	-	0,9	1,3003
JD10706	HFBM 250- 200	250	200	-	0,9	1,3003
JD10804	HFBM 315- 125	315	125	-	2	2,8895
JD10805	HFBM 315- 160	315	160	-	1,8	2,6006
JD10806	HFBM 315- 200	315	200	-	1,5	2,1671
JD10807	HFBM 315- 250	315	250	-	1,2	1,7337
JD10906	HFBM 400- 200	400	200	-	2,7	3,9009
JD10907	HFBM 400- 250	400	250	-	2,6	3,7564
JD10908	HFBM 400- 315	400	315	-	2,1	3,0340
JD11007	HFBM 500- 250	500	250	-	0,39	0,5635
JD11008	HFBM 500- 315	500	315	-	3,6	5,2012
JD11009	HFBM 500- 400	500	400	-	3,5	5,0567

Article	Name	Diameter 1 [mm]	Diameter 2 [mm]	Angle [°]	Mass [kg]	Conversion factor
JD11108	HFBM 630- 315	630	315	-	6,3	9,1020
JD11109	HFBM 630- 400	630	400	-	5,4	7,8017
JD11110	HFBM 630- 500	630	500	-	5	7,2238
JD11209	HFBM 800- 400	800	400	-	12,2	17,6261
JD11210	HFBM 800- 500	800	500	-	10,5	15,1700
JD11311	HFBM 1000- 630	1000	630	-	15,8	22,8273
JD11312	HFBM 1000- 800	1000	800	-	14,9	21,5270
JD11412	HFBM 1250- 800	250	800	-	23,6	34,0965
JE10907	HFE 400- 250	400	250	-	1,6	2,3116
JE10908	HFE 400- 315	400	315	-	1,5	2,1671
JE11009	HFE 500- 400	500	400	-	1,9	2,7451
JE11110	HFE 630- 500	630	500	-	2,8	4,0453
JE11209	HFE 800- 400	800	400	-	5,4	7,8017
JE11211	HFE 800- 630	800	630	-	4,7	6,7904
JE11312	HFE 1000- 800	1000	800	-	4,8	6,9349
JF10906	HFEM 400- 200	400	200	-	1,6	2,3116
JF10907	HFEM 400- 250	400	250	-	1,6	2,3116
JF10908	HFEM 400- 315	400	315	-	1,5	2,1671
JF11110	HFEM 630- 500	630	500	-	2,8	4,0453
JF11209	HFEM 800- 400	800	400	-	5,1	7,3683
JF11210	HFEM 800- 500	800	500	-	4,7	6,7904
IB10802	HPSR 315- 80	315	80	-	0,2	0,2890
IB10902	HPSR 400- 80	400	80	-	0,2	0,2890
IB10909	HPSR 400- 400	400	400	-	2,3	3,3230
IB11002	HPSR 500- 80	500	80	-	0,2	0,2890
IB11009	HPSR 500- 400	500	400	-	2,3	3,3230
IB11010	HPSR 500- 500	500	500	-	3,3	4,7677
IB11102	HPSR 630- 80	630	80	-	0,2	0,2890
IB11109	HPSR 630- 400	630	400	-	2,4	3,4674
IB11110	HPSR 630- 500	630	500	-	3,4	4,9122
IB11111	HPSR 630- 630	630	630	-	4,5	6,5014
IB11202	HPSR 800- 80	800	80	-	0,3	0,4334
IB11203	HPSR 800- 100	800	100	-	0,3	0,4334
IB11204	HPSR 800- 125	800	125	-	0,4	0,5779
IB11205	HPSR 800- 160	800	160	-	0,5	0,7224
IB11206	HPSR 800- 200	800	200	-	0,6	0,8669
IB11207	HPSR 800- 250	800	250	-	0,9	1,3003
IB11208	HPSR 800- 315	800	315	-	1,2	1,7337
IB11209	HPSR 800- 400	800	400	-	2,5	3,6119
IB11210	HPSR 800- 500	800	500	-	3,6	5,2012
IB11211	HPSR 800- 630	800	630	-	4,9	7,0794

Article	Name	Diameter 1 [mm]	Diameter 2 [mm]	Angle [°]	Mass [kg]	Conversion factor
IB11212	HPSR 800- 800	800	800	-	6,9	9,9689
IB11302	HPSR 1000- 80	1000	80	-	0,2	0,2890
IB11303	HPSR 1000- 100	1000	100	-	0,3	0,4334
IB11304	HPSR 1000- 125	1000	125	-	0,4	0,5779
IB11305	HPSR 1000- 160	1000	160	-	0,6	0,8669
IB11306	HPSR 1000- 200	1000	200	-	0,8	1,1558
IB11307	HPSR 1000- 250	1000	250	-	1,2	1,7337
IB11308	HPSR 1000- 315	1000	315	-	1,9	2,7451
IB11309	HPSR 1000- 400	1000	400	-	2,9	4,1898
IB11310	HPSR 1000- 500	1000	500	-	3,9	5,6346
IB11311	HPSR 1000- 630	1000	630	-	6,2	8,9575
IB11312	HPSR 1000- 800	1000	800	-	9,2	13,2918
IB11313	HPSR 1000-1000	1000	1000	-	14,1	20,3712
IB11403	HPSR 1250- 100	1250	100	-	0,3	0,4334
IB11404	HPSR 1250- 125	1250	125	-	0,4	0,5779
IB11405	HPSR 1250- 160	1250	160	-	0,6	0,8669
IB11406	HPSR 1250- 200	1250	200	-	0,8	1,1558
IB11407	HPSR 1250- 250	1250	250	-	1,2	1,7337
IB11408	HPSR 1250- 315	1250	315	-	1,9	2,7451
IB11409	HPSR 1250- 400	1250	400	-	2,9	4,1898
IB11410	HPSR 1250- 500	1250	500	-	3,9	5,6346
IB11411	HPSR 1250- 630	1250	630	-	6,3	9,1020
IB11412	HPSR 1250- 800	1250	800	-	9,3	13,4363
IB11413	HPSR 1250-1000	1250	1000	-	14,4	20,8046
IB11414	HPSR 1250-1250	1250	1250	-	21,9	31,6404