ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

ERVA Rectangular Variable Air Volume Damper, FläktGroup AB

EPD of a product with a scaling table for different sizes.
Included products: ERVA sizes 20x20, 30x25, 40x30, 60x40, 80x50, 100x80, and ERPA sizes 20x20, 30x25, 40x30, 60x40, 80x50, 100x80.

EPD HUB, HUB-6247

Published on 08.05.2026, last updated on 08.05.2026, valid until 07.05.2031

Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.2 (24 Mar 2025) and JRC characterization factors EF 3.1.

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	FläktGroup AB
Address	Slovanská 781, 463 12 Liberec - Vesec, Czech Republic
Contact details	info-cz@flaktgroup.com
Website	www.flaktgroup.com

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804:2012+A2:2019/AC:2021 and ISO 14025
PCR	EPD Hub Core PCR Version 1.2, 24 Mar 2025
Sector	Construction product
Category of EPD	Third party verified EPD
Parent EPD number	-
Scope of the EPD	Cradle to gate with options, A4-A5, B6, and modules C1-C4, D
EPD author	Doubravka Šimáňová; FläktGroup
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD verifier	Sarah Curpen as an authorized verifier for EPD Hub

This EPD is intended for business-to-business and/or business-to-consumer communication. The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT

Product name	FläktGroup ERVA Rectangular Variable Air Volume Damper
Product reference	ERVA-7-060-040-1-2
Place(s) of raw material origin	Europe
Place of production	Czech republic
Place(s) of installation and use	Europe
Period for data	calendar year 2024
Averaging in EPD	No grouping
Variation in GWP-fossil for A1-A3 (%)	-
GTIN (Global Trade Item Number)	08595736321045
A1-A3 Specific data (%)	8,3

ENVIRONMENTAL DATA SUMMARY

Declared unit	One unit of ERVA-7-060-040-1-2
Declared unit mass	10,9 kg
Mass of packaging	4,2 kg
GWP-fossil, A1-A3 ($kgCO_2e$)	57,5
GWP-total, A1-A3 ($kgCO_2e$)	53,7
Secondary material, inputs (%)	15,3
Secondary material, outputs (%)	78,2
Total energy use, A1-A3 (kWh)	241
Net freshwater use, A1-A3 (m^3)	0,81

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

ABOUT FLÄKTGROUP

FläktGroup designs and manufactures ventilation and air treatment products for use in commercial and industrial buildings. The company is headquartered in Germany and operates production facilities in Europe, Asia and the United States.

FOR WELLBEING, SAFETY, AND ENVIRONMENT

Today, we spend more than 90% of our time indoors, and the air we breathe has a big impact on our performance, well-being, and comfort. Our buildings need mechanical ventilation and air treatment to deliver safe and comfortable building spaces. At the same time, buildings account for up to 40% the energy consumption, where ventilation systems play a big part. With this in mind, FläktGroup aims to approach ventilation and air treatment with consideration for indoor environments, energy use, and environmental aspects throughout the building lifecycle.

PRODUCT DESCRIPTION

ERVA is a rectangular VAV damper for the OPTIVENT system used to control and regulate both supply air and extract air flow. It is suitable for a wide range of applications, such as managing room temperature and air quality, and can operate with variable or constant airflow rates, including forced shut-off when required. The damper consists of an aluminium multileaf damper and measuring pipe tube, steel sheet metal casing, and a controller mounted on the device.

ERVA is supplied as standard with a Modbus 327VMZ controller, other options are available on request. The damper is offered in flange or slip joint versions with short body construction for easy installation. ERVA is available in both insulated and non-insulated versions. The size range covers widths from 20 to 160 cm and heights from 10 to 100 cm.

PRODUCTS INCLUDED IN THE SCALING TABLE:
Some of the sizes are included in the scaling table for modules A1–A3 and the equation for estimating the GWP impact (A1-A3) for the remaining sizes is provided in Annex I.
Included in the scaling table is also shown the GWP (A1 – A3) for certain sizes of the rectangular pressure control damper ERPA, and an equation for estimating the impact of other sizes is provided.

While there are differences in material quantities between ERPA and ERVA, these differences relate only to the amount of materials used, not to the type of materials, suppliers, or manufacturing processes, which remain identical. The supply chain, production processes, and material specifications are consistent across all variants. All electronic components (e.g. actuators, cables) are identical in both composition and weight for each model and size.

ERPA is a rectangular pressure control damper for the OPTIVENT system. It is designed for use in ducting systems where constant pressure is required or when unsymmetrical ductwork needs to be balanced. Like the ERVA model, it is available with either flange or slip joint connections,
and the same control equipment can be used. The size range covers widths from 20 to 160 cm and heights from 10 to 100 cm.

Further information can be found at:
www.flaktgroup.com

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	90	Europe
Minerals	-	-
Fossil materials	10	Europe
Bio-based materials	-	-

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	1,268

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	One unit of of rectangular damper with an electric actuator.
Mass per declared unit	10,9 kg
Functional unit	Air flow control from one rectangular damper with 327VMZ-MB controller during 25 years of use in standby mode, assuming continuous operation.
Reference service life	25 years

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

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

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		
x	x	x	x	x	ND	ND	ND	ND	ND	x	ND	x	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Not declared = ND.

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

The VaV rectangular damper is manufactured from galvanized steel sheets, transported by truck from the steel manufacturer. The sheets are cut using either a laser cutter or punching machine and mechanically formed to create the damper body, which is assembled with rivets and bolts. Supplied components, including an aluminium multi-leaf damper, PVC measurement tubes, and an electric actuator, are fitted to the body.

The ERVA and ERPA dampers have the same material composition; they differ only in the quantity of individual components. The ERVA variant includes aluminium measuring pipes and has a longer body. Transport assumptions for supplied components are based on supplier distances, with transport modes estimated from supplier data or statistics from the transport provider.

Production losses consist primarily of steel scrap (≈20 %) and PVC residues, which are collected and transported to external material recycling facilities. A standard transport distance of 50 km is applied in the model, reflecting that recycling takes place at several nearby locations within this distance.

After assembly, the damper is packaged in a cardboard box, cushioned with reused cardboard pieces, and placed on a custom wooden pallet for shipment. The manufacturing process uses electricity from the national grid, based on the company's annual electricity invoice. A location-based approach is used in modelling the electricity mix utilized in the factory.

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 transport distance is calculated based on a weighted average of sales, ensuring a representative distribution of transportation impacts.
The product is supplied ready for installation (A5), with no raw material waste generated during the installation process. Installation is performed manually or with power tools, requiring only a negligible amount of energy.

Packaging materials used for transport, such as cardboard and wooden pallets, are sent to waste treatment and managed according to the average end-of-life scenario in the EU.
Based on EUROSTAT data from 2021, 32% of wooden pallets are recycled, 30% are incinerated with energy recovery, and the remaining 38% are landfilled. For cardboard waste, 83% is recycled, 8% is incinerated, and the remaining 9% is landfilled.

PRODUCT USE AND MAINTENANCE (B6)

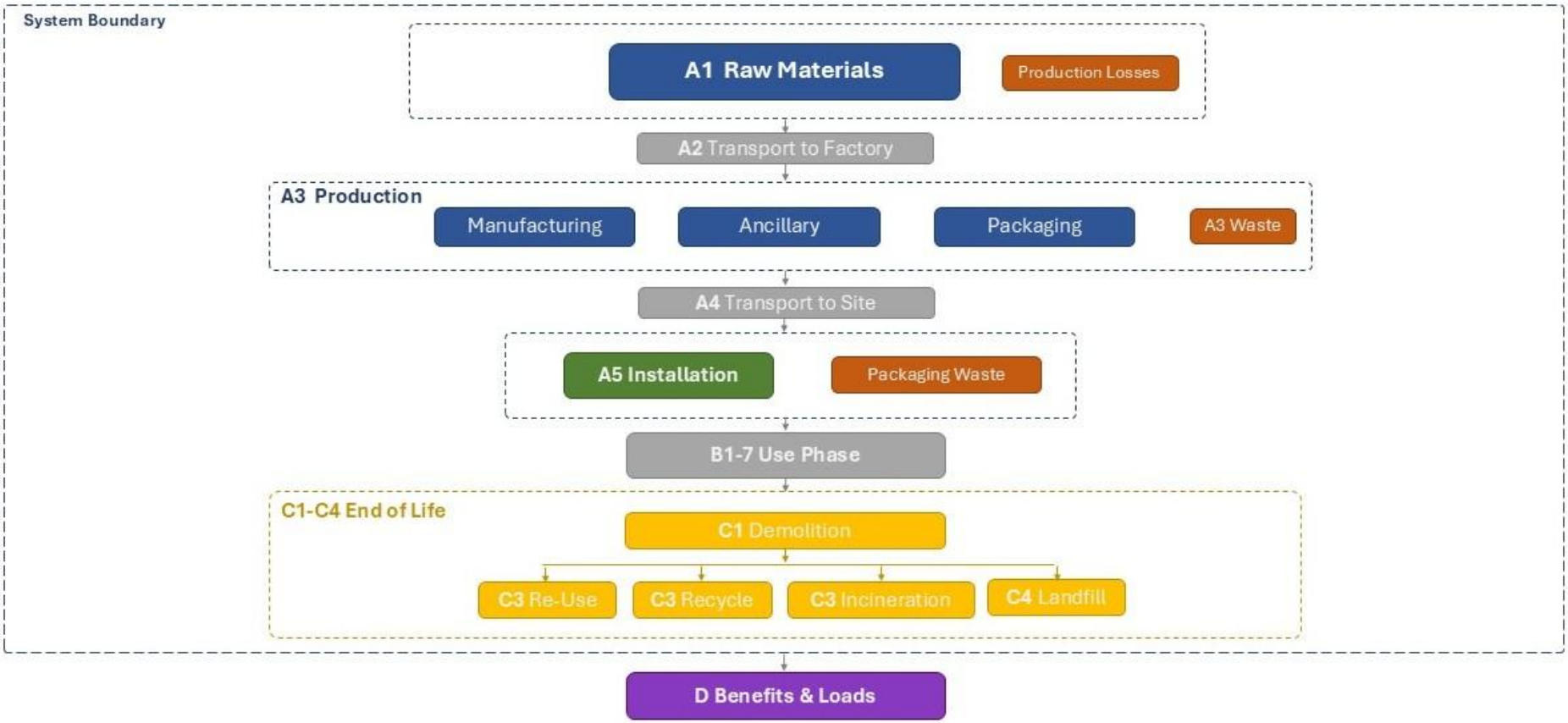
The product can be mechanically cleaned with a nylon brush during the ductwork cleaning. No further maintenance is required. Replacement of components or parts is not included.
Electricity consumption during the use phase is calculated over 25 years, based on measured data from the OPTIVENT ULTRA´s controller in stand-by mode.
Location-based approach has been used for electricity. The electricity mix used in the scenario reflects a weighted average based on 2024 sales.

The use phase may vary based on individual usage habits. The module B6 results shown in this EPD represent only a specific scenario. Therefore, it is recommended to evaluate the environmental impact of the use phase separately for each project. Replacement of components or parts has not been included in this assessment.
Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

At the end of its life, the ERVA rectangular damper is assumed to be dismantled into separate material fractions using electrical tools (deconstruction energy is considered negligible).The separated materials (steel, aluminium, plastics and actuator) are then transported 50 km to a local recycling facility. A 50 km transport distance is used because the actual end-of-life location is unknown and highly dependent on the installation site. (C2). Waste processing (C3) and disposal (C4) are modelled with consideration of the markets where the VaV Damper was mostly sold in 2024. The electronic components are assumed to be dismantled separately and treated in accordance with EN 50693. The recycling rates for the rest of the materials are based on the following sources: data for steel is from the World Steel Association (85% recycling rate), aluminium (90% for aluminium parts and 76% for aluminium in electronic parts) from the International Aluminium Institute (IAI) and electronic parts (39%) from European Environment Agency. For Copper (60% recycled), ABS (20% recycled; 40% incinerated with energy recovery), the data are based on the ecoinvent database, and the same approach is applied for PVC (34% recycled; 41% incinerated).
The recycled materials are then credited in module D.

SYSTEM DIAGRAM



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard 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.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

VALIDATION OF DATA

Data collection for production, transport, and packaging was conducted using time and site-specific information, as defined in the general information section on page 1 and 2. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product's manufacturing stage. The analysis was performed in One Click LCA EPD Generator, with the 'Cut-Off, EN 15804+A2' allocation method, and characterization factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	No allocation
Packaging material	No allocation
Ancillary materials	Allocated by mass or volume
Manufacturing energy and waste	Allocated by mass or volume

PRODUCT & MANUFACTURING SITES GROUPING

Type of grouping	No grouping
Grouping method	Not applicable
Variation in GWP-fossil for A1-A3, %	-

This EPD is product and factory specific and does not contain average calculations. The environmental impact data presented are specific for the product ERVA-7-060-040-1-2
The calculated GWP-GHG for other included rectangular dampers and sizes for modules A1-A3 is shown in the Scaling table in Annex 1.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator for EPD Hub V3 and EPD Process Certification v3.2.4. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10.1/3.11/3.12 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1/3.11/3.12 environmental data sources follow the methodology 'allocation, Cut-off, EN 15804+A2'.

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ENVIRONMENTAL IMPACT DATA

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. The results are based on the functional unit.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	5,10E+01	8,68E-01	1,79E+00	5,37E+01	4,43E+00	4,79E+00	ND	ND	ND	ND	ND	3,34E+01	ND	1,63E-01	1,24E-01	1,62E+00	2,86E-01	-2,28E+01
GWP – fossil	kg CO_2e	5,03E+01	8,68E-01	6,35E+00	5,75E+01	4,43E+00	1,41E-01	ND	ND	ND	ND	ND	3,28E+01	ND	1,63E-01	1,24E-01	1,62E+00	2,86E-01	-2,15E+01
GWP – biogenic	kg CO_2e	3,70E-01	1,69E-04	-4,62E+00	-4,25E+00	8,89E-04	4,65E+00	ND	ND	ND	ND	ND	1,16E-01	ND	-8,96E-06	2,56E-05	-6,72E-04	-6,17E-05	-9,34E-01
GWP – LULUC	kg CO_2e	3,67E-01	3,08E-04	6,05E-02	4,28E-01	1,59E-03	1,84E-04	ND	ND	ND	ND	ND	4,19E-01	ND	1,58E-05	4,75E-05	2,72E-04	2,05E-05	-3,82E-01
Ozone depletion pot.	kg CFC_{-11}e	4,02E-05	1,73E-08	4,10E-07	4,07E-05	8,81E-08	2,05E-09	ND	ND	ND	ND	ND	6,35E-07	ND	1,73E-10	2,28E-09	3,20E-09	5,40E-10	-3,51E-07
Acidification potential	mol H^+e	8,05E-01	2,12E-03	2,37E-02	8,31E-01	9,40E-03	7,63E-04	ND	ND	ND	ND	ND	2,05E-01	ND	1,19E-04	3,02E-04	2,66E-03	1,84E-04	-1,30E-01
EP-freshwater[2)]	kg Pe	4,50E-03	5,80E-05	5,67E-03	1,02E-02	2,98E-04	3,91E-05	ND	ND	ND	ND	ND	2,84E-02	ND	3,94E-06	8,72E-06	1,31E-04	4,45E-06	-1,17E-02
EP-marine	kg Ne	6,71E-02	6,02E-04	7,34E-03	7,51E-02	2,26E-03	7,98E-04	ND	ND	ND	ND	ND	3,23E-02	ND	3,91E-05	8,23E-05	6,92E-04	5,48E-04	-1,94E-02
EP-terrestrial	mol Ne	2,56E+00	6,52E-03	5,71E-02	2,63E+00	2,44E-02	2,93E-03	ND	ND	ND	ND	ND	3,00E-01	ND	4,53E-04	8,92E-04	7,26E-03	7,64E-04	-1,87E-01
POCP ("smog")[3)]	kg NMVOCe	1,96E-01	3,45E-03	2,22E-02	2,22E-01	1,55E-02	1,00E-03	ND	ND	ND	ND	ND	9,51E-02	ND	1,00E-04	4,73E-04	2,10E-03	2,41E-04	-7,57E-02
ADP-minerals & metals[4)]	kg Sbe	7,23E-02	2,83E-06	1,53E-05	7,23E-02	1,47E-05	5,63E-07	ND	ND	ND	ND	ND	7,43E-04	ND	1,37E-07	4,08E-07	1,37E-05	6,02E-08	-4,88E-04
ADP-fossil resources	MJ	5,99E+02	1,23E+01	1,02E+02	7,14E+02	6,23E+01	1,86E+00	ND	ND	ND	ND	ND	1,10E+03	ND	1,66E-01	1,75E+00	2,96E+00	4,41E-01	-2,97E+02
Water use[5)]	m^3e depr.	2,44E+01	6,06E-02	4,21E+00	2,87E+01	3,09E-01	6,21E-02	ND	ND	ND	ND	ND	3,89E+01	ND	9,18E-03	8,57E-03	1,80E-01	2,06E-02	-3,23E+01

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of 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 indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

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	6,83E-06	6,52E-08	1,50E-07	7,04E-06	3,26E-07	1,83E-08	ND	ND	ND	ND	ND	9,28E-07	ND	1,33E-09	9,50E-09	3,46E-08	2,89E-09	-1,53E-06
Ionizing radiation[6]	kBq U235e	2,79E+00	1,62E-02	1,58E+00	4,39E+00	8,03E-02	4,94E-03	ND	ND	ND	ND	ND	4,92E+01	ND	5,09E-04	2,03E-03	1,79E-02	6,15E-04	-3,82E+00
Ecotoxicity (freshwater)	CTUe	1,53E+04	1,63E+00	4,31E+02	1,57E+04	8,28E+00	1,69E+01	ND	ND	ND	ND	ND	1,53E+02	ND	1,84E+00	2,43E-01	6,18E+00	6,48E+01	-5,15E+02
Human toxicity, cancer	CTUh	9,03E-05	1,44E-10	5,04E-09	9,03E-05	7,44E-10	1,07E-10	ND	ND	ND	ND	ND	1,57E-08	ND	6,12E-11	2,09E-11	2,64E-10	3,15E-11	-3,06E-08
Human tox. non-cancer	CTUh	2,10E-05	7,63E-09	3,76E-08	2,10E-05	3,94E-08	5,36E-09	ND	ND	ND	ND	ND	8,12E-07	ND	4,07E-09	1,11E-09	1,43E-08	2,75E-09	-3,03E-07
SQP[7]	-	1,04E+02	7,59E+00	3,98E+02	5,10E+02	3,76E+01	1,66E+00	ND	ND	ND	ND	ND	2,68E+02	ND	2,45E-01	1,10E+00	5,23E+00	7,55E-01	-3,44E+01

6) 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; 7) SQP = Land use related impacts/soil quality.

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
Renew. PER as energy[8]	MJ	1,50E+02	2,17E-01	2,36E+01	1,73E+02	1,09E+00	-6,33E+01	ND	ND	ND	ND	ND	4,45E+02	ND	2,23E-02	2,88E-02	4,76E-01	9,79E-03	-9,78E+01
Renew. PER as material	MJ	7,68E-03	0,00E+00	5,31E+01	5,31E+01	0,00E+00	-5,31E+01	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	-3,84E-03	-3,84E-03	8,18E+00
Total use of renew. PER	MJ	1,50E+02	2,17E-01	7,67E+01	2,27E+02	1,09E+00	-1,16E+02	ND	ND	ND	ND	ND	4,45E+02	ND	2,23E-02	2,88E-02	4,72E-01	5,95E-03	-8,96E+01
Non-re. PER as energy	MJ	5,85E+02	1,23E+01	9,51E+01	6,93E+02	6,23E+01	1,86E+00	ND	ND	ND	ND	ND	1,10E+03	ND	1,66E-01	1,75E+00	-1,90E+01	-1,37E+01	-2,99E+02
Non-re. PER as material	MJ	2,40E+01	0,00E+00	2,42E+00	2,64E+01	0,00E+00	-2,54E+00	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	-1,17E+01	-1,21E+01	2,15E+00
Total use of non-re. PER	MJ	6,09E+02	1,23E+01	9,75E+01	7,19E+02	6,23E+01	-6,81E-01	ND	ND	ND	ND	ND	1,10E+03	ND	1,66E-01	1,75E+00	-3,07E+01	-2,58E+01	-2,97E+02
Secondary materials	kg	1,64E+00	5,57E-03	1,33E+00	2,97E+00	2,89E-02	1,61E-03	ND	ND	ND	ND	ND	1,90E-01	ND	1,97E-04	8,03E-04	3,69E-03	1,74E-04	6,25E+00
Renew. secondary fuels	MJ	3,72E-03	6,78E-05	1,39E+00	1,39E+00	3,65E-04	1,39E-05	ND	ND	ND	ND	ND	1,20E-03	ND	9,78E-05	1,02E-05	1,60E-04	3,62E-06	-8,44E-04
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	3,01E-04	3,01E-04	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	7,21E-01	1,68E-03	7,73E-02	8,00E-01	8,48E-03	-4,07E-03	ND	ND	ND	ND	ND	1,09E+00	ND	2,00E-04	2,38E-04	3,93E-03	-2,22E-03	-6,91E-01

8) 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	1,15E+01	1,74E-02	2,18E-01	1,17E+01	9,05E-02	1,62E-02	ND	ND	ND	ND	ND	2,15E+00	ND	1,53E-02	2,68E-03	6,02E-02	5,65E-03	-5,22E+00
Non-hazardous waste	kg	1,35E+02	3,72E-01	2,63E+01	1,61E+02	1,91E+00	4,50E+00	ND	ND	ND	ND	ND	1,40E+02	ND	6,91E-02	5,45E-02	1,26E+00	3,78E+00	-6,16E+01
Radioactive waste	kg	2,01E-03	4,03E-06	4,14E-04	2,43E-03	1,99E-05	1,22E-06	ND	ND	ND	ND	ND	1,13E-02	ND	1,26E-07	5,03E-07	4,53E-06	1,51E-07	-1,02E-03

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	1,02E-03	0,00E+00	6,34E-05	1,08E-03	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	1,06E-02	0,00E+00	7,07E-04	1,13E-02	0,00E+00	1,96E+00	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	8,52E+00	0,00E+00	0,00E+00
Materials for energy rec	kg	1,62E-05	0,00E+00	5,60E-04	5,76E-04	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	6,88E-04	0,00E+00	3,78E-03	4,46E-03	0,00E+00	5,24E+00	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	5,92E+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	2,20E+00	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	2,49E+00	0,00E+00	0,00E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,04E+00	ND	ND	ND	ND	ND	0,00E+00	ND	0,00E+00	0,00E+00	3,43E+00	0,00E+00	0,00E+00

ADDITIONAL INDICATOR – GWP-GHG

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG[9)]	kg CO_2e	5,07E+01	8,68E-01	6,41E+00	5,80E+01	4,43E+00	1,41E-01	ND	ND	ND	ND	ND	3,32E+01	ND	1,63E-01	1,24E-01	1,62E+00	2,86E-01	-2,18E+01

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. In addition, the characterisation factors for the flows – CH4 fossil, CH4 biogenic and Dinitrogen monoxide – were updated. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterisation factor for biogenic CO2 is set to zero.

SCENARIO DOCUMENTATION
DATA SOURCES

Manufacturing energy scenario documentation

1. Market for diesel, Albania, Ecoinvent, 0.93 kgCO2e/kg
2. Heat production, natural gas, at industrial furnace >100kW, Albania, Ecoinvent, 0.0773 kgCO2e/MJ
3. Heat, from municipal waste incineration to generic market for heat district or industrial, other than natural gas, Czech Republic, Ecoinvent
4. Market for electricity, high voltage, Czech Republic, Ecoinvent, 0.62 kgCO2e/kWh

Transport scenario documentation - A4 (Transport resources)

1. Transport, freight, lorry 16-32 metric ton, EURO6, 1543,0 km
2. Transport, freight, sea, container ship, 44.0 km

Transport scenario documentation A4

Scenario parameter	Value
Capacity utilization (including empty return) %	50
Bulk density of transported products	1,26E+02
Volume capacity utilization factor	1

Installation scenario documentation - A5 (Installation waste)

1. Treatment of waste paperboard, unsorted, sorting, Ecoinvent, Materials for recycling, 1.0 kg
2. Treatment of waste packaging paper, municipal incineration, Ecoinvent, 0.096 kg
3. – 4. Exported Energy: Electricity, Ecoinvent, 0.19+2.01 MJ
5. – 6. Exported Energy: Thermal, Ecoinvent, 0.28+2.76 MJ
7. Treatment of waste packaging paper, sanitary landfill, Ecoinvent, 0.11 kg
8. Treatment of waste wood, post-consumer, sorting and shredding, Ecoinvent, Materials for recycling, 0.96 kg
9. Treatment of waste wood, untreated, municipal incineration, Ecoinvent, 0.9 kg
10. Treatment of waste wood, untreated, sanitary landfill, Ecoinvent, 1.14 kg

End-of-life scenario documentation - C1-C4 (Data source)

1. Treatment of used industrial electronic device, manual dismantling, Ecoinvent, 0.57438 kg
2. – 6. Sorting and pressing of iron scrap, Ecoinvent, Materials for recycling, 0.24+0.028+0.0023+0.047+3.22 kg
7. – 11. Treatment of scrap steel, inert material landfill, Ecoinvent, 0.06+0.018+8.2E-4+0.031+0.86 kg
12. – 14. Sorting and pressing of iron scrap, Ecoinvent, Materials for recycling, 0.02+8.2E-4+4.87 kg
15. Treatment of scrap steel, municipal incineration, Ecoinvent, 0.0066 kg
16. Treatment of scrap steel, inert material landfill, Ecoinvent, 0.0066 kg
17. Treatment of inert waste, sanitary landfill, Ecoinvent, 0.0844 kg
18. – 20. Treatment of waste polyethylene, for recycling, unsorted, sorting, Ecoinvent, Materials for recycling, 0.029+0.042+0.02 kg
21. – 22. Treatment of waste polypropylene, municipal incineration, Ecoinvent, 0.062+0.091 kg
23.-29. Exported Energy: Electricity, Ecoinvent, 0.32+0.48+0.016+0.043+1.014+0.085+0.53 MJ
30. – 36. Exported Energy: Thermal, Ecoinvent, 0.45+0.65+0.023+0.059+1.4+0.12+0.73 MJ
37. – 39. Treatment of waste polyethylene, sanitary landfill, Ecoinvent, 0.034+0.49+0.015 kg
40. – 43. Treatment of waste plastic, mixture, sanitary landfill, Ecoinvent, 0.031+0.0014+0.1+0.046 kg
44. – 45. Treatment of waste aluminium, sanitary landfill, Ecoinvent, 9.8E-4+0.36 kg
46. Treatment of waste polyethylene, for recycling, unsorted, sorting, Ecoinvent, Materials for recycling, 0.0014 kg
47. – 50. Treatment of waste plastic, mixture, municipal incineration, Ecoinvent, 0.0029+0.0014+0.21+0.1 kg
51. Treatment of waste polyurethane seal, sorting plant, Ecoinvent, Materials for recycling, 0.001 kg
52. Treatment of waste polyurethane, municipal incineration, Ecoinvent, 0.0088 kg
53. Treatment of waste polyurethane, sanitary landfill, Ecoinvent, 0.0036 kg
54. Treatment of waste polyvinylchloride, municipal incineration, Ecoinvent, 0.025 kg
55. Treatment of waste rubber, unspecified, municipal incineration, Ecoinvent, 0.13 kg

Scenario information	Value
Scenario assumptions e.g. transportation	50 km by lorry

THIRD-PARTY VERIFICATION STATEMENT

EPD Hub declares that this EPD is verified in accordance with ISO 14025 by an independent, third-party verifier. The project report on the Life Cycle Assessment and the report(s) on features of environmental relevance are filed at EPD Hub. EPD Hub PCR and ECO Platform verification checklist are used.

EPD Hub is not able to identify any unjustified deviations from the PCR and EN 15804+A2 in the Environmental Product Declaration and its project report.

EPD Hub maintains its independence as a third-party body; it was not involved in the execution of the LCA or in the development of the declaration and has no conflicts of interest regarding this verification.

The company-specific data and upstream and downstream data have been examined as regards plausibility and consistency. The publisher is responsible for ensuring the factual integrity and legal compliance of this declaration.

The software used in creation of this LCA and EPD is verified by EPD Hub to conform to the procedural and methodological requirements outlined in ISO 14025:2010, ISO 14040/14044, EN 15804+A2, and EPD Hub Core Product Category Rules and General Program Instructions.

Verified tools

Tool verifier: Magaly Gonzalez Vazquez
Tool verification validity: 27 March 2025 - 26 March 2028

Sarah Curpen as an authorized verifier for EPD Hub Limited 08.05.2026

ANNEX I:

This is a scaling table of multiple Rectangular Volume Control Dampers, based on the results of a product ERVA 060x040. The table below shows the calculated Global Warming Potential (GWP-GHG) results for the climate impact in modules A1-A3 (Cradle-to-gate) for selected damper sizes. It was modelled for each mentioned size using OneClick LCA software.
The impact (GWP total: A1-A3, EN 15804+A2) for damper sizes not listed can be estimated using the scaling factor based on the equations provided. The equations were created using a linear model of the units included in the table below.

The equation for each damper type are as follows (width and height in cm):

$$\text{Factor ERVA} = 0{,}01214 \cdot \text{width} + 0{,}00195 \cdot \text{height} + 0{,}1932$$

$$\text{Factor ERPA} = 0{,}008 \cdot \text{width} + 0{,}00429 \cdot \text{height} + 0{,}18228$$

Product Name	Size		Product code	Total weight	A1-A3, EN 15804+A2			Scaling factor A1-A3 GWP -total (kg CO2e)
	Width (cm)	Height (cm)			GWP-total (kg CO2e)	GWP-fossil (kg CO2e)	GWP-biogenic (kg CO2e)	
ERVA (size 60x40 reference product) 	20	20	ERVA-7-020-020-1-2	4,7 kg	25,52	26,78	-1,43	0,47
	30	25	ERVA-7-030-025-1-2	5,9 kg	33,48	34,96	-1,71	0,61
	40	30	ERVA-7-040-030-1-2	8,1 kg	40,94	43,51	-2,83	0,76
	60	**40**	**ERVA-7-060-040-1-2**	**10,9 kg**	**53,66**	**57,51**	**-4,28**	**1,00**
	80	50	ERVA-7-080-050-1-2	13,0 kg	65,74	69,46	-4,26	1,21
	100	80	ERVA-7-100-080-1-2	17,1 kg	84	91,88	-8,64	1,60
ERPA 	20	20	ERPA-7-020-020-1	4,1 kg	23,00	24,27	-1,43	0,42
	30	25	ERPA-7-030-025-1	5,6 kg	29,50	30,99	-1,72	0,54
	40	30	ERPA-7-040-030-1	6,7 kg	33,98	36,57	-2,88	0,64
	60	40	ERPA-7-060-040-1	9,3 kg	44,81	48,67	-4,28	0,85
	80	50	ERPA-7-080-050-1	11,2 kg	55,25	59,00	-4,28	1,03
	100	80	ERPA-7-100-080-1	15,1 kg	71,23	79,15	-8,66	1,38