

# ENVIRONMENTAL PRODUCT DECLARATION

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

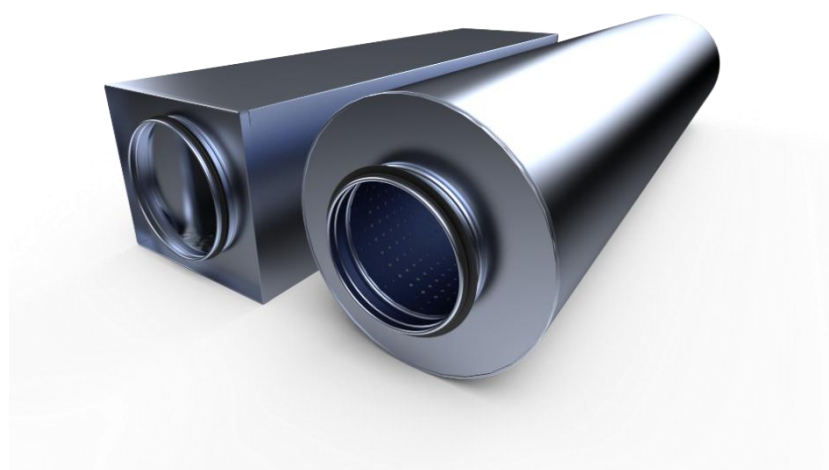
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Program operator	The Building Information Foundation RTS sr
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EPD valid until	20.3.2029

### SILENCERS AND ISOLATED DUCTS

LCA SUPPORT



 **ETS NORD**



## GENERAL 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.

EPDs within the same product category but from different programmes may not be comparable.

### EPD program operator

The Building Information Foundation RTS sr  
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### Publishing date

20.3.2024

### Valid until

20.3.2029

### Product category rules

The CEN standard EN 15804 serves as the core PCR. In addition, the RTS PCR (English version, 26.8.2020) is used.

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### Verification date

27 February 2024

Independent verification of this EPD and data, according to ISO 14025:2010:

Internal  External

### Manufacturer

ETS Nord AS

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ETS NORD is one of the largest companies in Northern Europe specializing in comprehensive ventilation solutions.

With significant product development and our own production, we are at the forefront of creating a new and sustainable future for indoor comfort, in a customer-oriented and responsible way.

### Place of production

Tallinn, Estonia

### Products

Silencers and isolated ducts

### Declared unit

1 kg

### Mass of declared unit

1 kg

### Data period

2022



# PRODUCT INFORMATION

<b>Product name</b>	Silencers and isolated ducts with glass wool Silencers and isolated ducts with polyester insulation Silencers and isolated ducts with stone wool
<b>Place of production</b>	Tallinn, Estonia

## PRODUCT DESCRIPTION AND APPLICATION

The products of the NORDsilencer product group are designed to reduce unwanted noise in ducts. The product group includes silencers for both rectangular and round ventilation systems. Silencers consist typically of sheet metal body, ventilation duct connections and sound absorption material.

Silencers provide effective noise protection and create a comfortable living and working environment. The use of silencers is especially important in public buildings with large and powerful ventilation ducts.

## TECHNICAL SPECIFICATIONS AND PRODUCT STANDARDS

Physical dimensions of products can vary. Noise reduction has been tested according to ISO 7235. Synthetic insulation material corresponds to the purity class M1 of building materials.

## PRODUCT RAW MATERIAL COMPOSITION PER DECLARED UNIT

Raw material category	Amount, mass- % and material origin*
<b>Metals</b>	70-85%
<b>Minerals</b>	0-28%
<b>Fossil materials</b>	2-15%
<b>Bio-based materials</b>	0%
<b>Total</b>	100%

Product components	Silencers and isolated ducts with glass wool amount, mass%*	Silencers and isolated ducts with polyester insulation amount, mass%*	Silencers and isolated ducts with stone wool amount, mass%*	Material origin
<b>Galvanized steel</b>	80%	85%	71%	Europe
<b>Glass wool</b>	18%	-	-	Europe
<b>Stone wool</b>	-	-	28%	Europe
<b>Polyester insulation</b>	-	13%	-	Europe
<b>Total</b>	100%	100%	100%	

\* Order of magnitude, not exact composition. All values are rounded.

The scrap content of the steel is 6.2% for products with stone wool and 8.2% for other products.

The products do not contain any biogenic carbon. The packaging does contain biogenic carbon.

<b>Biogenic carbon content in product</b>	0 kg
<b>Biogenic carbon content in packaging</b>	<0.01 kg (all products)

Note. 1 kg biogenic carbon is equivalent to 44/12 kg of biogenic CO<sub>2</sub>.

## SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0.1 % (1000 ppm).

## MANUFACTURING PROCESS

NTF 125-600 Silencers and NTP 125-600 Silencers manufacturing process is identical. The difference is only in the sound absorption material used. The body of these silencers are produced from zinc-coated steel. Parts that make up the body are cut out using laser cutting, automatic punching and shearing machine and mechanical cutting from coil

of sheet metal. Next step is die bending. The sound absorption material is cut to size using a bandsaw. The outer part of silencer is folded and closed with a mechanical joint to give the rectangular shape. Silencers are then assembled. NRF 50 160-900 Silencers parts are cut out with laser cutting and mechanical cutting from coil of sheet metal. The outer part of silencer is rolled to a desired diameter and then welded together with stichwelding technology. Parts and sound absorption material are assembled then to make up the NRF 50 160-900 Silencers.

Figure 1. Manufacturing process



## PRODUCT LIFE-CYCLE AND LIFE-CYCLE ASSESSMENT

<b>Period for data</b>	2022
<b>Declared unit</b>	1 kg
<b>Mass per declared unit</b>	1 kg
<b>Mass of packaging</b>	0.2 kg (products with stone wool) 0.3 kg (all other products)

All products are averages of silencers and isolations ducts with the same type of insulations material.

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.

Co-product allocation has not been used.

The data sources for the study are Ecoinvent 3.8 (2021) and One Click LCA databases. The tools used for the study were One Click LCA and Open LCA.

### SYSTEM BOUNDARY

The scope of the EPD is cradle to gate with options (A1-A4), modules C1-C4 and module D.

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	MND	MND	MND	MND	MND	MND	MND	MND	x	x	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

Modules not declared = MND. Modules not relevant = MNR.

### 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.

Vehicle capacity utilization volume factor is assumed to be 1, which means full load. In reality, it may vary but as role of transportation emission in total results is small and so the variety in load is assumed to be negligible. Empty returns are not taken into account as it is assumed that return trip is used by transportation company to serve the needs of other clients.

Fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. All fuel and energy use was allocated based on production volume. The electricity used in the plant is grid energy and this has been modelled based on Estonian residual mix for 2020-2022. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

<b>Electricity data source and quality</b>	Modelled electricity based on Estonian residual mix for 2020-2022
<b>Specific emissions</b>	0.64 kg CO <sub>2</sub> e/kWh

### 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 transportation distance is defined according to RTS PCR - from the place of manufacture to Helsinki, Finland. According to the manufacturer, transportation doesn't cause losses as products are packaged properly. The final product is transported 425 km (75 km by ferry, 50 km by lorry). Vehicle capacity utilization volume factor is assumed to be 1.

<b>Vehicle type used for transport and distance</b>	125 km (75 km by ferry, 50 km by lorry)
<b>Specific transport emissions</b>	Ferry: 0.11 kg CO <sub>2</sub> e Lorry: 0.17 kg CO <sub>2</sub> e
<b>Capacity utilisation (including empty returns)</b>	100%
<b>Volume capacity utilisation factor</b>	1

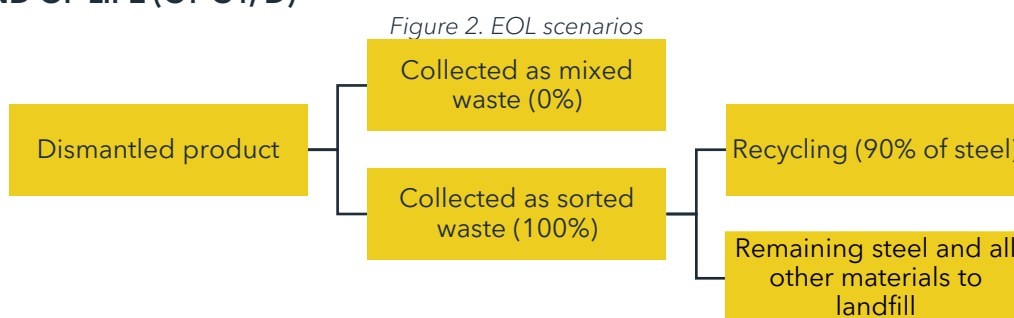
A5 has not been declared.

### 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)



Demolition is not assumed to require any energy or resources. It is assumed that the dismantled product is transported 100 km by lorry. All waste is assumed to be collected as sorted waste. 90% of metals are sent to waste treatment and recycled. All other materials are landfilled.

Any material that left the product system in C3 has been considered in module D. Only net flows are considered. Waste packaging from A5 has not been considered. Module D scenario is representative of Europe.

The scrap content of the steel was 8.2%. The recycled steel can be used to produce new steel products.

<b>EOL mass of product</b>		1 kg	
<b>Collection</b>	<b>Collected separately</b>	1 kg (all products)	
	<b>Collected with mixed waste</b>	0 kg (all products)	
<b>Recovery</b>	<b>Re-use</b>	0 kg (all products)	
	<b>Recycling</b>	0.72 kg silencers and isolated ducts with glass wool 0.88 kg silencers and isolated ducts with polyester insulation 0.64 kg silencers and isolated ducts with stone wool	
		<b>Incineration with energy recovery</b>	0 kg (all products)
		<b>Disposal</b>	<b>Incineration without energy</b>
	<b>Landfill</b>	0.28 kg silencers and isolated ducts with glass wool 0.12 kg silencers and isolated ducts with polyester insulation 0.36 kg silencers and isolated ducts with stone wool	
<b>Total</b>		1 kg	

<b>Scenario assumptions e.g. transportation</b>	End-of-life product is transported 100 km with an average lorry
Note. All values in the table are rounded.	

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# SILENCERS AND ISOLATED DUCTS WITH GLASS WOOL (1 kg)

## CORE ENVIRONMENTAL IMPACT INDICATORS - EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential - total	kg CO2e	3.71E+0	1.72E-2	0.00E+0	1.70E-2	7.18E-4	2.04E-3	-1.06E+0
Global warming potential - fossil	kg CO2e	3.69E+0	1.72E-2	0.00E+0	1.70E-2	7.16E-4	2.04E-3	-1.06E+0
Global warming potential - biogenic	kg CO2e	1.41E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Global warming potential - LULUC	kg CO2e	3.57E-3	8.87E-6	0.00E+0	6.50E-6	1.52E-6	1.98E-6	-1.65E-4
Ozone depletion potential	kg CFC-11e	2.91E-7	3.64E-9	0.00E+0	3.80E-9	4.49E-11	6.91E-10	-4.08E-8
Acidification potential	mol H+e	7.58E-2	3.11E-4	0.00E+0	6.70E-5	4.34E-6	1.77E-5	-4.28E-3
Eutrophication potential - freshwater	kg Pe	1.64E-4	8.92E-8	0.00E+0	1.20E-7	6.88E-8	2.58E-8	-4.34E-5
Eutrophication potential - marine	kg Ne	5.55E-3	7.95E-5	0.00E+0	2.00E-5	7.24E-7	6.00E-6	-9.02E-4
Eutrophication potential - terrestrial	mol Ne	3.01E-1	8.82E-4	0.00E+0	2.20E-4	8.68E-6	6.66E-5	-1.06E-2
Photochemical ozone formation ("smog")	kg NMVOCe	1.56E-2	2.35E-4	0.00E+0	6.80E-5	2.32E-6	1.93E-5	-5.26E-3
Abiotic depletion potential - minerals & metals	kg Sbe	2.32E-4	4.10E-8	0.00E+0	5.90E-8	6.66E-9	5.63E-9	-2.00E-5
Abiotic depletion potential - fossil resources	MJ	4.78E+1	2.33E-1	0.00E+0	2.47E-1	1.45E-2	4.87E-2	-9.18E+0
Water use	m3e depr.	1.74E+0	8.56E-4	0.00E+0	1.10E-3	3.69E-4	2.22E-4	-1.91E-1

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 experienced with the indicator.

## USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Renewable primary energy resources as energy	MJ	4.00E+0	2.47E-3	0.00E+0	3.50E-3	2.68E-3	6.51E-4	-7.70E-1
Renewable primary energy resources as material	MJ	1.24E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Total use of renewable primary energy resources	MJ	4.12E+0	2.47E-3	0.00E+0	3.50E-3	2.68E-3	6.51E-4	-7.70E-1
Non-renewable primary energy resources as energy	MJ	4.72E+1	2.33E-1	0.00E+0	2.47E-1	1.45E-2	4.87E-2	-9.19E+0
Non-renewable primary energy resources as material	MJ	6.07E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-4.40E-1	0.00E+0
Total use of non-renewable primary energy resources	MJ	4.78E+1	2.33E-1	0.00E+0	2.47E-1	1.45E-2	-3.92E-1	-9.19E+0
Secondary materials	kg	4.17E-1	8.64E-5	0.00E+0	8.30E-5	3.76E-6	1.41E-5	1.27E+0
Renewable secondary fuels	MJ	4.74E-3	5.90E-7	0.00E+0	9.10E-7	1.38E-8	4.81E-7	-9.87E-5
Non-renewable secondary fuels	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of net fresh water	m3	4.20E-2	2.22E-5	0.00E+0	3.10E-5	1.16E-5	5.43E-5	-2.17E-3

## END OF LIFE - WASTE

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	9.78E-1	2.74E-4	0.00E+0	2.80E-4	5.64E-5	0.00E+0	-3.55E-1
Non-hazardous waste	kg	6.65E+0	3.59E-3	0.00E+0	4.90E-3	3.11E-3	2.76E-1	-1.73E+0
Radioactive waste	kg	1.43E-4	1.63E-6	0.00E+0	1.70E-6	1.01E-7	0.00E+0	3.29E-6

## END OF LIFE - OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for recycling	kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.24E-1	0.00E+0	0.00E+0
Materials for energy recovery	kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported energy	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

## ENVIRONMENTAL IMPACTS - EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global Warming Potential	kg CO2e	3.57E+0	1.67E-2	0.00E+0	1.60E-2	7.09E-4	1.92E-3	-1.00E+0
Ozone depletion potential	kg CFC-11e	2.74E-7	2.85E-9	0.00E+0	3.00E-9	3.84E-11	5.50E-10	-4.61E-8
Acidification	kg SO2e	4.50E-2	2.50E-4	0.00E+0	5.20E-5	3.62E-6	1.32E-5	-3.55E-3
Eutrophication	kg PO43e	1.43E-2	3.08E-5	0.00E+0	1.20E-5	2.53E-6	3.64E-6	-1.78E-3
Photochemical ozone formation ("smog")	kg C2H4e	1.28E-3	6.69E-6	0.00E+0	2.10E-6	1.45E-7	5.53E-7	-5.92E-4
Abiotic depletion potential - elements	kg Sbe	2.23E-4	3.97E-8	0.00E+0	5.80E-8	6.64E-9	5.51E-9	-2.01E-5
Abiotic depletion potential - fossil	MJ	4.68E+1	2.33E-1	0.00E+0	2.47E-1	1.44E-2	4.94E-2	-9.18E+0

## KEY INFORMATION PER KG

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential - total	kg CO2e	3.71E+0	1.72E-2	0.00E+0	1.70E-2	7.18E-4	2.04E-3	-1.06E+0
Global warming potential - fossil	kg CO2e	3.69E+0	1.72E-2	0.00E+0	1.70E-2	7.16E-4	2.04E-3	-1.06E+0
Global warming potential - biogenic	kg CO2e	1.41E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Abiotic depletion potential - minerals & metals	kg Sbe	2.32E-4	4.10E-8	0.00E+0	5.90E-8	6.66E-9	5.63E-9	-2.00E-5
Abiotic depletion potential - fossil	MJ	4.78E+1	2.33E-1	0.00E+0	2.47E-1	1.45E-2	4.87E-2	-9.18E+0
Water use	m3e depr.	1.74E+0	8.56E-4	0.00E+0	1.10E-3	3.69E-4	2.22E-4	-1.91E-1
Secondary materials	kg	4.17E-1	8.64E-5	0.00E+0	8.30E-5	3.76E-6	1.41E-5	1.27E+0
Biogenic carbon in product (A3)	kg C	0.00E+0	N/A	N/A	N/A	N/A	N/A	N/A
Biogenic carbon in packaging (A3)	kg C	3.84E-3	N/A	N/A	N/A	N/A	N/A	N/A

# SILENCERS AND ISOLATED DUCTS WITH POLYESTER INSULATION (1 kg)

## CORE ENVIRONMENTAL IMPACT INDICATORS - EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential - total	kg CO2e	3.77E+0	1.72E-2	0.00E+0	1.70E-2	7.57E-4	1.31E-3	-1.31E+0
Global warming potential - fossil	kg CO2e	3.76E+0	1.72E-2	0.00E+0	1.70E-2	7.55E-4	1.31E-3	-1.31E+0
Global warming potential - biogenic	kg CO2e	1.48E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Global warming potential - LULUC	kg CO2e	3.37E-3	8.88E-6	0.00E+0	6.50E-6	1.60E-6	1.31E-6	-2.03E-4
Ozone depletion potential	kg CFC-11e	1.28E-6	3.65E-9	0.00E+0	3.80E-9	4.73E-11	3.81E-10	-5.03E-8
Acidification potential	mol H+e	7.79E-2	3.12E-4	0.00E+0	6.70E-5	4.58E-6	1.06E-5	-5.28E-3
Eutrophication potential - freshwater	kg Pe	1.73E-4	8.94E-8	0.00E+0	1.20E-7	7.25E-8	1.91E-8	-5.36E-5
Eutrophication potential - marine	kg Ne	5.62E-3	7.96E-5	0.00E+0	2.00E-5	7.63E-7	3.57E-6	-1.11E-3
Eutrophication potential - terrestrial	mol Ne	3.10E-1	8.83E-4	0.00E+0	2.20E-4	9.15E-6	3.93E-5	-1.31E-2
Photochemical ozone formation ("smog")	kg NMVOCe	1.64E-2	2.35E-4	0.00E+0	6.80E-5	2.44E-6	1.14E-5	-6.49E-3
Abiotic depletion potential - minerals & metals	kg Sbe	2.36E-4	4.11E-8	0.00E+0	5.90E-8	7.02E-9	4.17E-9	-2.47E-5
Abiotic depletion potential - fossil resources	MJ	5.00E+1	2.33E-1	0.00E+0	2.47E-1	1.53E-2	2.86E-2	-1.13E+1
Water use	m3e depr.	1.82E+0	8.58E-4	0.00E+0	1.10E-3	3.89E-4	1.67E-4	-2.35E-1

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 experienced with the indicator.

## USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Renewable primary energy resources as energy	MJ	4.02E+0	2.48E-3	0.00E+0	3.50E-3	2.82E-3	5.00E-4	-9.50E-1
Renewable primary energy resources as material	MJ	1.31E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Total use of renewable primary energy resources	MJ	4.16E+0	2.48E-3	0.00E+0	3.50E-3	2.82E-3	5.00E-4	-9.50E-1
Non-renewable primary energy resources as energy	MJ	4.83E+1	2.33E-1	0.00E+0	2.47E-1	1.53E-2	2.86E-2	-1.13E+1
Non-renewable primary energy resources as material	MJ	3.23E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-3.05E+0	0.00E+0
Total use of non-renewable primary energy resources	MJ	5.16E+1	2.33E-1	0.00E+0	2.47E-1	1.53E-2	-3.02E+0	-1.13E+1
Secondary materials	kg	3.67E-1	8.65E-5	0.00E+0	8.30E-5	3.97E-6	1.05E-5	1.57E+0
Renewable secondary fuels	MJ	4.73E-3	5.91E-7	0.00E+0	9.10E-7	1.45E-8	4.05E-7	-1.22E-4
Non-renewable secondary fuels	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of net fresh water	m3	4.30E-2	2.22E-5	0.00E+0	3.10E-5	1.22E-5	3.10E-5	-2.68E-3

## END OF LIFE - WASTE

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	1.01E+0	2.75E-4	0.00E+0	2.80E-4	5.95E-5	0.00E+0	-4.38E-1
Non-hazardous waste	kg	6.66E+0	3.59E-3	0.00E+0	4.90E-3	3.28E-3	1.19E-1	-2.13E+0
Radioactive waste	kg	1.48E-4	1.63E-6	0.00E+0	1.70E-6	1.07E-7	0.00E+0	4.06E-6

## END OF LIFE - OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for recycling	kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.81E-1	0.00E+0	0.00E+0
Materials for energy recovery	kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported energy	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

## ENVIRONMENTAL IMPACTS - EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global Warming Potential	kg CO2e	3.63E+0	1.67E-2	0.00E+0	1.60E-2	7.48E-4	1.19E-3	-1.23E+0
Ozone depletion potential	kg CFC-11e	9.29E-7	2.85E-9	0.00E+0	3.00E-9	4.04E-11	2.98E-10	-5.68E-8
Acidification	kg SO2e	4.59E-2	2.50E-4	0.00E+0	5.20E-5	3.81E-6	7.98E-6	-4.38E-3
Eutrophication	kg PO43e	1.45E-2	3.08E-5	0.00E+0	1.20E-5	2.67E-6	2.62E-6	-2.19E-3
Photochemical ozone formation ("smog")	kg C2H4e	1.27E-3	6.70E-6	0.00E+0	2.10E-6	1.53E-7	3.22E-7	-7.31E-4
Abiotic depletion potential - elements	kg Sbe	2.37E-4	3.98E-8	0.00E+0	5.80E-8	7.00E-9	4.05E-9	-2.48E-5
Abiotic depletion potential - fossil	MJ	5.30E+1	2.33E-1	0.00E+0	2.47E-1	1.52E-2	2.86E-2	-1.13E+1

## KEY INFORMATION PER KG

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential - total	kg CO2e	3.77E+0	1.72E-2	0.00E+0	1.70E-2	7.57E-4	1.31E-3	-1.31E+0
Global warming potential - fossil	kg CO2e	3.76E+0	1.72E-2	0.00E+0	1.70E-2	7.55E-4	1.31E-3	-1.31E+0
Global warming potential - biogenic	kg CO2e	1.48E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Abiotic depletion potential - minerals & metals	kg Sbe	2.36E-4	4.11E-8	0.00E+0	5.90E-8	7.02E-9	4.17E-9	-2.47E-5
Abiotic depletion potential - fossil	MJ	5.00E+1	2.33E-1	0.00E+0	2.47E-1	1.53E-2	2.86E-2	-1.13E+1
Water use	m3e depr.	1.82E+0	8.58E-4	0.00E+0	1.10E-3	3.89E-4	1.67E-4	-2.35E-1
Secondary materials	kg	3.67E-1	8.65E-5	0.00E+0	8.30E-5	3.97E-6	1.05E-5	1.57E+0
Biogenic carbon in product (A3)	kg C	0.00E+0	N/A	N/A	N/A	N/A	N/A	N/A
Biogenic carbon in packaging (A3)	kg C	4.05E-3	N/A	N/A	N/A	N/A	N/A	N/A



# SILENCERS AND ISOLATED DUCTS WITH STONE WOOL (1 kg)

## CORE ENVIRONMENTAL IMPACT INDICATORS - EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential - total	kg CO2e	3.17E+0	1.71E-2	0.00E+0	1.70E-2	6.32E-4	2.43E-3	-9.54E-1
Global warming potential - fossil	kg CO2e	3.16E+0	1.71E-2	0.00E+0	1.70E-2	6.30E-4	2.43E-3	-9.54E-1
Global warming potential - biogenic	kg CO2e	8.62E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Global warming potential - LULUC	kg CO2e	2.59E-3	8.83E-6	0.00E+0	6.50E-6	1.34E-6	2.34E-6	-1.48E-4
Ozone depletion potential	kg CFC-11e	2.32E-7	3.62E-9	0.00E+0	3.80E-9	3.95E-11	8.59E-10	-3.67E-8
Acidification potential	mol H+e	6.44E-2	3.10E-4	0.00E+0	6.70E-5	3.82E-6	2.16E-5	-3.85E-3
Eutrophication potential - freshwater	kg Pe	1.38E-4	8.88E-8	0.00E+0	1.20E-7	6.05E-8	2.92E-8	-3.91E-5
Eutrophication potential - marine	kg Ne	4.55E-3	7.91E-5	0.00E+0	2.00E-5	6.37E-7	7.32E-6	-8.12E-4
Eutrophication potential - terrestrial	mol Ne	2.51E-1	8.78E-4	0.00E+0	2.20E-4	7.64E-6	8.13E-5	-9.54E-3
Photochemical ozone formation ("smog")	kg NMVOCe	1.36E-2	2.34E-4	0.00E+0	6.80E-5	2.04E-6	2.36E-5	-4.74E-3
Abiotic depletion potential - minerals & metals	kg Sbe	1.91E-4	4.08E-8	0.00E+0	5.90E-8	5.86E-9	6.38E-9	-1.80E-5
Abiotic depletion potential - fossil resources	MJ	3.95E+1	2.32E-1	0.00E+0	2.47E-1	1.27E-2	5.96E-2	-8.27E+0
Water use	m3e depr.	1.43E+0	8.52E-4	0.00E+0	1.10E-3	3.25E-4	2.50E-4	-1.72E-1

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 experienced with the indicator.

## USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Renewable primary energy resources as energy	MJ	3.39E+0	2.46E-3	0.00E+0	3.50E-3	2.36E-3	7.27E-4	-6.93E-1
Renewable primary energy resources as material	MJ	7.63E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Total use of renewable primary energy resources	MJ	3.47E+0	2.46E-3	0.00E+0	3.50E-3	2.36E-3	7.27E-4	-6.93E-1
Non-renewable primary energy resources as energy	MJ	3.90E+1	2.32E-1	0.00E+0	2.47E-1	1.27E-2	5.96E-2	-8.27E+0
Non-renewable primary energy resources as material	MJ	5.21E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-3.70E-1	0.00E+0
Total use of non-renewable primary energy resources	MJ	3.95E+1	2.32E-1	0.00E+0	2.47E-1	1.27E-2	-3.10E-1	-8.27E+0
Secondary materials	kg	2.21E-1	8.60E-5	0.00E+0	8.30E-5	3.31E-6	1.60E-5	1.14E+0
Renewable secondary fuels	MJ	5.85E-3	5.87E-7	0.00E+0	9.10E-7	1.21E-8	5.16E-7	-8.89E-5
Non-renewable secondary fuels	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of net fresh water	m3	3.35E-2	2.21E-5	0.00E+0	3.10E-5	1.02E-5	6.69E-5	-1.96E-3

## END OF LIFE - WASTE

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	8.54E-1	2.73E-4	0.00E+0	2.80E-4	4.97E-5	0.00E+0	-3.20E-1
Non-hazardous waste	kg	5.61E+0	3.57E-3	0.00E+0	4.90E-3	2.74E-3	3.63E-1	-1.56E+0
Radioactive waste	kg	1.12E-4	1.62E-6	0.00E+0	1.70E-6	8.91E-8	0.00E+0	2.96E-6

## END OF LIFE - OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for recycling	kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	6.37E-1	0.00E+0	0.00E+0
Materials for energy recovery	kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported energy	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

## ENVIRONMENTAL IMPACTS - EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global Warming Potential	kg CO2e	3.05E+0	1.66E-2	0.00E+0	1.60E-2	6.24E-4	2.31E-3	-9.01E-1
Ozone depletion potential	kg CFC-11e	2.21E-7	2.83E-9	0.00E+0	3.00E-9	3.37E-11	6.88E-10	-4.15E-8
Acidification	kg SO2e	3.86E-2	2.49E-4	0.00E+0	5.20E-5	3.18E-6	1.61E-5	-3.20E-3
Eutrophication	kg PO43e	1.20E-2	3.06E-5	0.00E+0	1.20E-5	2.23E-6	4.16E-6	-1.60E-3
Photochemical ozone formation ("smog")	kg C2H4e	1.16E-3	6.66E-6	0.00E+0	2.10E-6	1.27E-7	6.78E-7	-5.33E-4
Abiotic depletion potential - elements	kg Sbe	1.90E-4	3.95E-8	0.00E+0	5.80E-8	5.84E-9	6.26E-9	-1.81E-5
Abiotic depletion potential - fossil	MJ	3.87E+1	2.32E-1	0.00E+0	2.47E-1	1.27E-2	6.07E-2	-8.27E+0

## KEY INFORMATION PER KG

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential - total	kg CO2e	3.17E+0	1.71E-2	0.00E+0	1.70E-2	6.32E-4	2.43E-3	-9.54E-1
Global warming potential - fossil	kg CO2e	3.16E+0	1.71E-2	0.00E+0	1.70E-2	6.30E-4	2.43E-3	-9.54E-1
Global warming potential - biogenic	kg CO2e	8.62E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Abiotic depletion potential - minerals & metals	kg Sbe	1.91E-4	4.08E-8	0.00E+0	5.90E-8	5.86E-9	6.38E-9	-1.80E-5
Abiotic depletion potential - fossil	MJ	3.95E+1	2.32E-1	0.00E+0	2.47E-1	1.27E-2	5.96E-2	-8.27E+0
Water use	m3e depr.	1.43E+0	8.52E-4	0.00E+0	1.10E-3	3.25E-4	2.50E-4	-1.72E-1
Secondary materials	kg	2.21E-1	8.60E-5	0.00E+0	8.30E-5	3.31E-6	1.60E-5	1.14E+0
Biogenic carbon in product (A3)	kg C	0.00E+0	N/A	N/A	N/A	N/A	N/A	N/A
Biogenic carbon in packaging (A3)	kg C	2.35E-3	N/A	N/A	N/A	N/A	N/A	N/A