epd-norge
Global program operatør

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

RM-O-M



TROX

The Norwegian EPD Foundation

Owner of the declaration:
TROX Group

Product:
RM-O-M

Declared unit:
1 pcs

This declaration is based on Product Category Rules:
CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR 030:2021 Part B for ventilation components

Program operator:
The Norwegian EPD Foundation

Declaration number:
NEPD-5689-4949

Registration number:
NEPD-5689-4949

Issue date:
02.01.2024

Valid to:
02.01.2029

EPD software:
LCAno EPD generator ID: 141304

General information

Product

RM-O-M

Owner of the declaration:

TROX Group
Contact person: Alina Buchner
Phone: +49 2845 2020
e-mail: productsustainability-de@troxgroup.com

Program operator:

The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303 Oslo, Norway
Phone: +47 977 22 020
web: www.epd-norge.no

Manufacturer:

TROX Group

Declaration number:

NEPD-5689-4949

Place of production:

TROX Group
Heinrich-Trox-Platz 1
47506 Neukirchen-Vluyn, Germany

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR 030:2021 Part B for ventilation components

Management system:

ISO 9001, ISO 14001:2015, ISO 50001:2018

Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Organisation no:

DE 120250070

Declared unit:

1 pcs RM-O-M

Issue date:

02.01.2024

Declared unit with option:

A1-A3, A4, C1, C2, C3, C4, D

Valid to:

02.01.2029

Year of study:

2022

Functional unit:

Comparability:

EPDs of construction products may not be comparable if they do not comply with EN 15804 and are not seen in a building context.

General information on verification of EPD from EPD tools:

Independent verification of data, other environmental information and the declaration according to ISO 14025:2010, § 8.1.3 and § 8.1.4. Verification of each EPD is made according to EPD-Norway's guidelines for verification and approval requiring that tools are i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPD-Norway, and iii) the process is reviewed annually by an independent third party verifier. See Appendix G of EPD-Norway's General Programme Instructions for further information on EPD tools

Development and verification of EPD:

The declaration is created using EPD tool lca.tools ver EPD2022.03, developed by LCA.no. The EPD tool is integrated in the company's management system and has been approved by EPD Norway.

Developer of EPD: Doeres Heuvens

Reviewer of company-specific input data and EPD: Michael Weise

Verification of EPD tool:

Independent third party verification of the EPD tool, background data and test-EPD in accordance with EPDNorway's procedures and guidelines for verification and approval of EPD tools.

Third party verifier:

Alexander Borg, Asplan Viak AS

(no signature required)

Approved:

Product

Product description:

In order to prevent the spread of smoke in buildings through ventilation and air-conditioning systems, it is important to detect smoke at an early stage. The duct smoke detector RM-O-M is used to control and trigger fire dampers or smoke protection dampers. The duct smoke detector operates on the principle of light scattering and detects the smoke regardless of its temperature, so that fire dampers close before their release temperature is reached. The fire dampers or smoke control dampers are closed in the event of interrupting the supply voltage to the spring return actuator (alarm relay R1).

Product specification

For more information download the product data sheet.

Materials	kg	%
Chemical	0,073	6,28
Electronic - Printed wiring board	0,18	16,0068
Glass fibre reinforced plastic, polyamide	0,013	1,18
Metal - Aluminium	0,19	16,86
Metal - Galvanized Steel	0,0093	0,80
Metal - Stainless steel	0,0085	0,73
Plastic - Acrylonitrile butadiene styrene (ABS)	0,48	41,91
Plastic - Polycarbonate (PC)	0,11	10,068
Plastic - Polypropylene (PP)	0,0026	0,22
Product label - supercalendered	0,0010	0,090
Rubber, synthetic	0,067	5,82
Total	1,16	100,00

Packaging	kg	%
Packaging - Cardboard	0,42	88,30
Packaging - Paper	0,06	11,67
Packaging - Plastic	0,00	0,02
Total incl. packaging	1,63	100,00

Technical data:

Internal fuse: 500 mA, slow-blow.
maximum cross-section of connection cable: 2.5 mm².
Relay contact FD Alarm (fire alarm), motherboard: 230 V AC/24 V DC; 8A.
Relay contact Sys Fail (system error), motherboard: 24 V DC; 1A.
Relay contact Alarm BMS*, EM-RELAY: 24 V DC; 1A.
Relay contact Airflow (airflow monitoring), EM-RELAY: 24 V DC; 1A.
Relay contact Pollution (monitoring of pollution level), EM-RELAY: 24 V DC; 1A.
IP protection level: IP 42.
Protection class (230V AC/24 V DC): II (protective insulation) / III (protective extra-low voltage).
Minimum length air guide profile: 90 mm (600 mm in scope of delivery).
permissible airflow velocity: 1.0 3 20 m/s.
Alarm threshold for volume flow rate: 0.8 m/s.
Alarm threshold for increased contamination: > 70 %.
Operating temperature: -10 to 65 °C.
Relative humidity: 5 % to 90 %, no condensation.
Storage temperature: -20 to 70 °C.
Weight: maximum 1.1 kg (without air guide profile).
Dimensions: 340 × 144 × 80 mm (L × W × H).
EC conformity: Construction Products Regulation (EU) no. 305/2011.
Approvals:
EN 54-27:2015 Fire detection systems - Smoke detectors for monitoring ventilation ducts.
General building inspectorate licence Z-78.6-252
VdS approval number G223017.

*BMS: Building Management System = Management and control equipment (MCE).

Market:

Germany

Reference service life, product

Reference service life, building or construction works

LCA: Calculation rules

Declared unit:

1 pcs RM-O-M

Cut-off criteria:

All major raw materials and all the essential energy is included. The production processes for raw materials and energy flows with very small amounts (less than 1%) are not included. These cut-off criteria do not apply for hazardous materials and substances.

Allocation:

The allocation is made in accordance with the provisions of EN 15804. Energy, water and waste production in-house is allocated equally among all products through mass allocation. Effects of primary production of recycled materials is allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

Data quality:

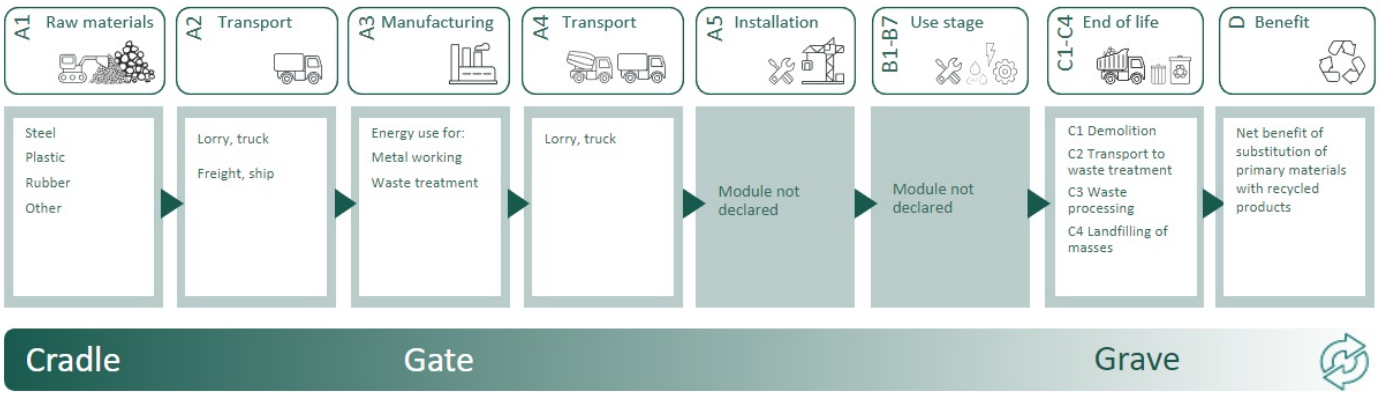
Specific data for the product composition are provided by the manufacturer. The data represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on EPDs according to EN 15804 and different LCA databases. The data quality of the raw materials in A1 is presented in the table below.

Materials	Source	Data quality	Year
Chemical	ecoinvent 3.6	Database	2019
Electronic - Printed wiring board	ecoinvent 3.6	Database	2019
Glass fibre reinforced plastic, polyamide	Modified ecoinvent 3.6	Database	2019
Metal - Aluminium	ecoinvent 3.6	Database	2019
Metal - Galvanized Steel	Modified ecoinvent 3.6	Database	2019
Metal - Stainless steel	ecoinvent 3.6	Database	2019
Packaging - Cardboard	ecoinvent 3.6	Database	2019
Packaging - Paper	ecoinvent 3.6	Database	2019
Packaging - Plastic	ecoinvent 3.6	Database	2019
Plastic - Acrylonitrile butadiene styrene (ABS)	ecoinvent 3.6	Database	2019
Plastic - Polycarbonate (PC)	ecoinvent 3.6	Database	2019
Plastic - Polypropylene (PP)	ecoinvent 3.6	Database	2019
Product label - supercalendered	ecoinvent 3.6	Database	2019
Rubber, synthetic	ecoinvent 3.6	Database	2019

System boundaries (X=included, MND=module not declared, MNR=module not relevant)

Product stage			Construction installation stage		Use stage							End of life stage				Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

System boundary:



Additional technical information:

For monitoring air ducts and preventing smoke transmission via air ducts of ventilation and air-conditioning systems.
Monitors air ducts in conjunction with a fire alarm system or management and control equipment (MBE).
Flexible use in round and square air ducts with a diameter or height of 100 mm or more.
to provide the control input signal for fire dampers and smoke protection dampers.
With alarm and fault memory in case of power failure.
Suitable for controlling fans.
Optionally with remote display module for operating and status messages with intuitive operating function.
Display of the degree of pollution in %.
With configurable integrated airflow monitoring.
Functional test of the smoke detector by means of test gas can be carried out without auxiliary means on the unit.
Individual expandability via extensive optional accessories.
Supply voltage 230 V AC or 24 V DC.
Can be integrated into an MBE via interface modules.
Can be individually configured and ordered for every application.
VdS recognition number G223017/EN 54-27:2015.
DIBt approval Z-78.6-252 applied for

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Transport from production place to user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 16-32 tonnes, EURO 6 (km)	36,7 %	800	0,043	l/tkm	34,40

De-construction demolition (C1)	Unit	Value			
Demolition of building per kg of ventilation product (kg)	kg/DU	1,29			

Transport to waste processing (C2)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 16-32 tonnes, EURO 6 (km)	36,7 %	50	0,043	l/tkm	2,15

Waste processing (C3)	Unit	Value			
Waste treatment per kg Plastics, incineration (kg)	kg	0,065			
Waste treatment per kg Rubber, municipal incineration with fly ash extraction (kg)	kg	0,033			
Waste treatment per kg plastic, industrial electronics, municipal incineration with fly ash extraction (kg)	kg	0,24			
Waste treatment per kg Polypropylene (PP), incineration (kg)	kg	0,0013			
Materials to recycling (kg)	kg	0,19			
Waste treatment per kg Hazardous waste, incineration (kg)	kg	0,13			

Disposal (C4)	Unit	Value			
Landfilling of ashes from incineration of Plastics, process per kg ashes and residues (kg)	kg	0,0015			
Waste, plastic, mixture, to landfill (kg)	kg	0,34			
Landfilling of ashes from incineration of Rubber, municipal incineration with fly ash extraction (kg)	kg	0,0017			
Landfilling of ashes from incineration per kg plastic, industrial electronics, From municipal incineration with fly ash extraction (kg)	kg	0,016			
Landfilling of ashes from incineration of Polypropylene (PP), process per kg ashes and residues (kg)	kg	0,000038			
Waste, scrap steel, to landfill (kg)	kg	0,00085			
Landfilling of ashes from incineration per kg Hazardous waste, from incineration (kg)	kg	0,024			
Waste, hazardous waste, to landfill (kg)	kg	0,12			
Waste, aluminium, to landfill (kg)	kg	0,014			

Benefits and loads beyond the system boundaries (D)	Unit	Value			
Substitution of electricity (MJ)	MJ	0,45			
Substitution of thermal energy, district heating (MJ)	MJ	6,82			
Substitution of primary steel with net scrap (kg)	kg	0,010			
Substitution of primary aluminium with net scrap (kg)	kg	0,18			

LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document.

Environmental impact									
	Indicator	**Unit**	A1-A3	A4	C1	C2	C3	C4	D
	GWP-total	kg CO_2 -eq	2,94E+01	2,14E-01	1,71E-03	1,33E-02	1,29E+00	7,93E-02	-1,71E+00
	GWP-fossil	kg CO_2 -eq	2,92E+01	2,13E-01	1,71E-03	1,33E-02	1,29E+00	7,90E-02	-1,67E+00
	GWP-biogenic	kg CO_2 -eq	1,29E-01	8,83E-05	3,20E-07	5,52E-06	1,02E-03	3,33E-05	-7,53E-03
	GWP-luluc	kg CO_2 -eq	8,24E-02	7,60E-05	1,35E-07	4,75E-06	7,77E-05	2,46E-04	-3,21E-02
	ODP	kg CFC11 -eq	2,54E-06	4,83E-08	3,69E-10	3,02E-09	3,55E-08	3,17E-09	-2,88E-03
	AP	mol H+ -eq	2,33E-01	6,13E-04	1,79E-05	3,83E-05	6,45E-04	1,83E-04	-1,13E-02
	EP-FreshWater	kg P -eq	5,08E-03	1,70E-06	6,22E-09	1,07E-07	7,21E-06	1,39E-06	-6,68E-05
	EP-Marine	kg N -eq	2,89E-02	1,21E-04	7,88E-06	7,58E-06	1,99E-04	8,40E-05	-1,50E-03
	EP-Terrestial	mol N -eq	3,29E-01	1,36E-03	8,65E-05	8,48E-05	2,10E-03	4,72E-04	-1,65E-02
	POCP	kg NMVOC -eq	9,95E-02	5,20E-04	2,38E-05	3,25E-05	5,42E-04	2,00E-04	-5,51E-03
	ADP-minerals&metals[1]	kg Sb-eq	1,68E-03	5,89E-06	2,62E-09	3,68E-07	1,11E-06	2,11E-07	1,90E-06
	ADP-fossil[1]	MJ	3,92E+02	3,23E+00	2,35E-02	2,02E-01	1,34E+00	4,47E-01	-2,12E+01
	WDP[1]	m^3	1,75E+03	3,12E+00	4,99E-03	1,95E-01	4,98E+00	2,42E+00	-9,34E+02

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

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

1. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator

Remarks to environmental impacts

Additional environmental impact indicators

Indicator		Unit	A1-A3	A4	C1	C2	C3	C4	D
	PM	Disease incidence	1,33E-06	1,31E-08	4,73E-10	8,17E-10	7,38E-09	3,11E-09	-1,34E-07
	IRP[2]	kgBq U235 -eq	1,39E+00	1,41E-02	1,01E-04	8,81E-04	5,82E-03	1,19E-03	-9,31E-02
	ETP-fw[1]	CTUe	1,70E+03	2,39E+00	1,28E-02	1,49E-01	6,99E+00	1,01E+01	-2,81E+01
	HTP-c[1]	CTUh	3,44E-08	0,00E+00	0,00E+00	0,00E+00	3,48E-10	1,31E-10	-4,21E-09
	HTP-nc[1]	CTUh	1,52E-06	2,61E-09	1,20E-11	1,63E-10	8,03E-09	1,25E-09	-4,95E-08
	SQP[1]	dimensionless	1,01E+02	2,26E+00	2,98E-03	1,41E-01	4,97E-01	1,24E+00	-3,96E+00

PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Potential Soil Quality Index (dimensionless)

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

1. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator
2. 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.

Resource use									
Indicator		Unit	A1-A3	A4	C1	C2	C3	C4	D
	PERE	MJ	4,50E+01	4,62E-02	1,27E-04	2,89E-03	2,25E-01	1,18E-01	-1,10E+01
	PERM	MJ	8,15E-03	0,00E+00	0,00E+00	0,00E+00	-8,15E-03	0,00E+00	0,00E+00
	PERT	MJ	4,92E+01	4,62E-02	1,27E-04	2,89E-03	2,17E-01	1,18E-01	-1,10E+01
	PENRE	MJ	3,67E+02	3,23E+00	2,35E-02	2,02E-01	1,34E+00	4,48E-01	-2,12E+01
	PENRM	MJ	3,00E+01	0,00E+00	0,00E+00	0,00E+00	-2,77E+01	0,00E+00	0,00E+00
	PENRT	MJ	3,92E+02	3,23E+00	2,35E-02	2,02E-01	-2,64E+01	4,48E-01	-2,12E+01
	SM	kg	3,29E-01	0,00E+00	1,15E-05	0,00E+00	0,00E+00	2,83E-03	0,00E+00
	RSF	MJ	8,91E-01	1,65E-03	3,13E-06	1,03E-04	5,00E-03	4,43E-04	-3,25E-03
	NRSF	MJ	2,69E-02	5,91E-03	4,60E-05	3,69E-04	0,00E+00	2,56E-02	-1,84E-01
	FW	m^3	3,98E-01	3,45E-04	1,21E-06	2,16E-05	1,66E-03	3,67E-04	-4,49E-02

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = Total use of non renewable primary energy resources; SM = Use of secondary materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Waste

Indicator		Unit	A1-A3	A4	C1	C2	C3	C4	D
	HWD	kg	1,20E-01	1,66E-04	6,92E-07	1,04E-05	0,00E+00	1,44E-01	6,74E-03
	NHWD	kg	4,64E+00	1,57E-01	2,78E-05	9,81E-03	1,31E-01	3,95E-01	-4,88E-01
	RWD	kg	1,12E-03	2,20E-05	1,63E-07	1,37E-06	0,00E+00	5,81E-07	-8,71E-05

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

End of life - Output flow

Indicator		Unit	A1-A3	A4	C1	C2	C3	C4	D
	CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	MFR	kg	7,51E-01	0,00E+00	1,13E-05	0,00E+00	1,98E-01	3,09E-05	0,00E+00
	MER	kg	2,99E-02	0,00E+00	3,51E-08	0,00E+00	4,09E-01	7,55E-07	0,00E+00
	EEE	MJ	2,16E-02	0,00E+00	1,20E-07	0,00E+00	4,51E-01	4,90E-05	0,00E+00
	EET	MJ	3,27E-01	0,00E+00	1,82E-06	0,00E+00	6,82E+00	7,41E-04	0,00E+00

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported energy electrical; EET = Exported energy thermal

"Reading example: 9,0 E-03 = 9,0*10-3 = 0,009"
*INA Indicator Not Assessed

Biogenic Carbon Content

Indicator	Unit	At the factory gate
Biogenic carbon content in product	kg C	2,75E-04
Biogenic carbon content in accompanying packaging	kg C	0,00E+00

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO2

Additional requirements

Greenhouse gas emissions from the use of electricity in the manufacturing phase

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (A3).

Electricity mix	Source	Amount	Unit
Electricity, market mix (kWh) - Germany	ecoinvent 3.6	585,93	g CO2-eq/kWh

Dangerous substances

The product contains dangerous substances, more than 0,1% by weight, given by the REACH Candidate List, see table:

Name	CASNo	Amount
Lead	7439-92-1	> 1.0% w/w
Cadmium	7440-43-9	> 1.0% w/w

Indoor environment

Additional Environmental Information

Additional environmental impact indicators required in NPCR Part A for construction products								
Indicator	**Unit**	A1-A3	A4	C1	C2	C3	C4	D
GWPIOBC	kg CO_2 -eq	2,95E+01	2,14E-01	1,71E-03	1,33E-02	1,29E+00	7,95E-02	-1,64E+00

GWP-IOBC: Global warming potential calculated according to the principle of instantaneous oxidation. In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.

Bibliography

ISO 14025:2010 Environmental labels and declarations - Type III environmental declarations - Principles and procedures.
ISO 14044:2006 Environmental management - Life cycle assessment - Requirements and guidelines.
EN 15804:2012+A2:2019 Environmental product declaration - Core rules for the product category of construction products.
ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products.
ecoinvent v3, Allocation, cut-off by classification, Swiss Centre of Life Cycle Inventories.
Iversen et al., (2021) eEPD v2021.09 Background information for EPD generator tool system verification, LCA.no Report number: 07.21
Graafland and Iversen (2022) EPD generator for NPCR 030 Ventilation components, Background information for EPD generator application and LCA data, LCA.no report number: 12.22
NPCR Part A: Construction products and services. Ver. 2.0. April 2021, EPD-Norge.
NPCR 030 Part B for Ventilation components, Ver. 1.0, 18.05.2021, EPD Norway.

epd-norge Global program operatør	**Program operator and publisher** The Norwegian EPD Foundation Post Box 5250 Majorstuen, 0303 Oslo, Norway	Phone: e-mail: web:	+47 977 22 020 post@epd-norge.no www.epd-norge.no
TROX	**Owner of the declaration:** TROX Group Heinrich-Trox-Platz 1, 47506 Neukirchen-Vluyn, Germany	Phone: e-mail: web:	+49 2845 2020 productsustainability-de@troxgroup.com https://www.trox.de/en
LCA.no	**Author of the Life Cycle Assessment** LCA.no AS Dokka 6A, 1671 Kråkerøy, Norway	Phone: e-mail: web:	+47 916 50 916 post@lca.no www.lca.no
LCA.no	**Developer of EPD generator** LCA.no AS Dokka 6A, 1671 Kråkerøy, Norway	Phone: e-mail: web:	+47 916 50 916 post@lca.no www.lca.no
ECO PLATFORM EPD VERIFIED	ECO Platform ECO Portal	web: web:	www.eco-platform.org ECO Portal