epd-norge
Global program operatør

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

TFM

TROX TECHNIK
The art of handling air

The Norwegian EPD Foundation

Owner of the declaration:
TROX Group

Product:
TFM

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-8302-7980-EN

Registration number:

NEPD-8302-7980-EN

Issue date: 04.12.2024

Valid to: 04.12.2029

EPD software:
LCAno EPD generator ID: 270866

General information

Product

TFM

Owner of the declaration:

TROX Group
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Manufacturer:

TROX Group
Heinrich-Trox-Platz 1
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Declaration number:

NEPD-8302-7980-EN

Place of production:

TROX GmbH - Werk Anholt
Gendringer Str. 85
46419 Isselburg, 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 TFM

Issue date:

04.12.2024

Declared unit with option:

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

Valid to:

04.12.2029

Year of study:

2023

Functional unit:

-

Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804 and 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: David Meiering

Reviewer of company-specific input data and EPD: Jule Dallmann

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:

Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:

Particulate filter modules for ceilings as a final filter stage with Mini Pleat filter panels for the separation of suspended particles.
For critical air cleanliness and critical hygiene requirements, suitable for ceiling installation.

For more information see:
https://www.trox.de/en/particulate-filter-modules-for-ceilings/tfm-f349cc946f7a2866

Product specification

Particulate filter modules type TFM for ceiling installation as a final filter stage and for air distribution in clean room technology. Individual casings with pre-drilled joints can be combined to form modular ceiling tiles. Fitting of filter elements for the separation of suspended particles such as aerosols, toxic dusts, viruses and bacteria from the supply or extract air. Casing with connection from above through spigot with lip seal. Flexible suspension with variable mounting points. Particulate filter module with special clamping mechanism with 2 fixing points for dimensions 600 x 600 or 4 fixing points for dimensions 600 x 900 and 600 x 1200. The TFM casings are suitable for mounting filters with flat or fluid seals. Casing with integrated sealing seat testing facility; measuring tube inside for sampling for particle measurement; pressure measurement points for monitoring the operating pressure difference. Diffuser face plate made of perforated sheet metal with perimeter return edge, powder-coated RAL 9010 (pure white) with 4-point fixing. Leakage test for each casing.

This EPD declares the environmental data of the product series TFM. The following represents a representative dataset of the default variant TFM/600x600

Materials	kg	%
Adhesive and sealant	0,08	0,40
LLDPE - Linear Low Density Polyethylene	0,00	0,01
Metal - Copper	0,06	0,30
Metal - Galvanized Steel	2,82	14,18
Plastic - Polyamide	0,02	0,11
Plastic - Polypropylene (PP)	0,00	0,01
Powder coating	0,26	1,31
Rubber, synthetic	0,03	0,13
Wood - Medium Density Fibreboard (MDF)	0,26	1,31
Metal - Stainless steel	0,02	0,10
Metal - Steel	16,34	82,14
Plastic - Polycarbonate (PC)	0,00	0,01
Total	19,89	100,00

Packaging	kg	%
Packaging - Cardboard	0,60	28,57
Packaging - Pallet	1,50	71,43
Total incl. packaging	21,99	100,00

Technical data:

For technical data see:
https://www.trox.de/en/particulate-filter-modules-for-ceilings/tfm-f349cc946f7a2866#technical-information

Market:

Europe.

Reference service life, product

20-25 years.

Reference service life, building or construction works

60 years.

LCA: Calculation rules

Declared unit:

1 pcs TFM

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:

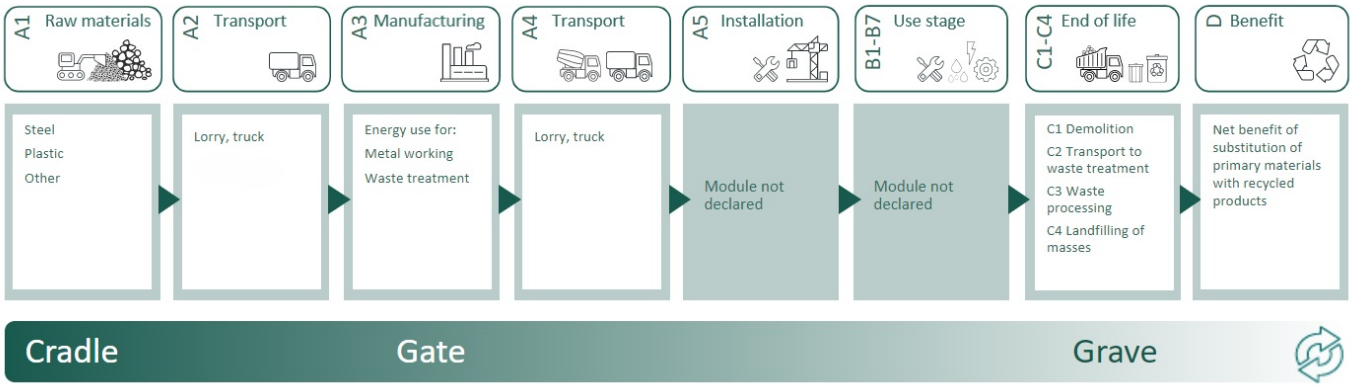
Specific data for the product composition are provided by the manufacturer. The data represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on EPDs according to EN 15804 and different LCA databases. The data quality of the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

Materials	Source	Data quality	Year
Adhesive and sealant	ecoinvent 3.6	Database	2019
LLDPE - Linear Low Density Polyethylene	ecoinvent 3.6	Database	2019
Metal - Copper	ecoinvent 3.6	Database	2019
Metal - Galvanized Steel	ecoinvent 3.6	Database	2019
Metal - Galvanized Steel	ecoinvent 3.6	Database	2020
Metal - Stainless steel	ecoinvent 3.6	Database	2019
Metal - Steel	ecoinvent 3.6	Database	2019
Packaging - Cardboard	ecoinvent 3.6	Database	2019
Packaging - Pallet	ecoinvent 3.6	Database	2019
Plastic - Polyamide	ecoinvent 3.6	Database	2019
Plastic - Polycarbonate (PC)	ecoinvent 3.6	Database	2019
Plastic - Polypropylene (PP)	ecoinvent 3.6	Database	2019
Powder coating	ecoinvent 3.6	Database	2019
Rubber, synthetic	ecoinvent 3.6	Database	2019
Wood - Medium Density Fibreboard (MDF)	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:

Particulate filter modules for ceilings as a final filter stage with Mini Pleat filter panels for the separation of suspended particles. Use in laboratories, medical areas, or production rooms in the pharmaceutical and food industries.
Individual casings can be combined modularly to form ceiling tiles.
Easy, time-saving, and secure filter change due to special press-in frame.
For mounting filters with flat or fluid seal.
With sealing integrity test facility for filter elements.
Integrated differential pressure measuring points.
Internal measuring tube to sample particles for measurement.
Spigot with lip sealFlexible suspension.
For air cleanliness classes 5 to 8 according to ISO 14644-1.
Meets the hygiene requirements of VDI 6022.
Leakage classes: L1 according to DIN EN 1886 and D according to DIN EN 15727.

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	19,90			

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			
Materials to recycling (kg)	kg	17,32			
Waste treatment per kg Polypropylene (PP), incineration (kg)	kg	0,00			
Waste treatment per kg Plastics, incineration (kg)	kg	0,01			
Waste treatment per kg Rubber, municipal incineration with fly ash extraction (kg)	kg	0,01			
Waste treatment per kg Polyethylene (PE), incineration (kg)	kg	0,00			
Waste treatment per kg Wood, incineration with fly ash extraction (kg)	kg	0,26			
Waste treatment per kg Hazardous waste, incineration (kg)	kg	0,17			

Disposal (C4)	Unit	Value			
Waste treatment per kg Copper slag, to landfill, residual material landfill (kg)	kg	0,01			
Waste, scrap steel, to landfill (kg)	kg	0,22			
Substitution of primary steel with net scrap (kg)	kg	1,63			
Waste, aluminium, to landfill (kg)	kg	0,06			
Landfilling of ashes from incineration of Polypropylene (PP), process per kg ashes and residues (kg)	kg	0,00			
Waste, plastic, mixture, to landfill (kg)	kg	0,03			
Landfilling of ashes from incineration of Plastics, process per kg ashes and residues (kg)	kg	0,00			
Landfilling of ashes from incineration of Rubber, municipal incineration with fly ash extraction (kg)	kg	0,00			
Landfilling of ashes from incineration of Polyethylene (PE), process per kg ashes and residues (kg)	kg	0,00			
Landfilling of ashes from incineration of Wood, process per kg ashes and residues (kg)	kg	0,00			
Landfilling of ashes from incineration per kg Hazardous waste, from incineration (kg)	kg	0,03			
Waste, hazardous waste, to landfill (kg)	kg	0,17			

Benefits and loads beyond the system boundaries (D)	Unit	Value			
Substitution of primary copper with net scrap (kg)	kg	0,05			
Substitution of primary steel with net scrap (kg)	kg	12,87			
Substitution of electricity (MJ)	MJ	0,20			
Substitution of thermal energy, district heating (MJ)	MJ	3,05			

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	6,97E+01	2,88E+00	2,62E-02	1,80E-01	8,94E-01	-1,74E+00	-1,43E+01
	GWP-fossil	kg CO_2 -eq	6,98E+01	2,87E+00	2,62E-02	1,80E-01	4,52E-01	-1,74E+00	-1,43E+01
	GWP-biogenic	kg CO_2 -eq	-1,38E-01	1,19E-03	4,92E-06	7,44E-05	4,42E-01	-9,51E-04	-8,35E-03
	GWP-luluc	kg CO_2 -eq	4,52E-02	1,02E-03	2,07E-06	6,40E-05	9,62E-05	-4,83E-04	-7,07E-03
	ODP	kg CFC11 -eq	5,31E-06	6,51E-07	5,67E-09	4,07E-08	4,37E-08	-5,37E-08	-1,29E-03
	AP	mol H+ -eq	3,97E-01	8,26E-03	2,74E-04	5,16E-04	6,04E-04	-8,72E-03	-8,86E-02
	EP-FreshWater	kg P -eq	4,07E-03	2,30E-05	9,55E-08	1,44E-06	9,12E-06	-1,09E-04	-9,95E-04
	EP-Marine	kg N -eq	6,66E-02	1,63E-03	1,21E-04	1,02E-04	1,38E-04	-1,80E-03	-1,54E-02
	EP-Terrestial	mol N -eq	9,45E-01	1,83E-02	1,33E-03	1,14E-03	1,54E-03	-1,84E-02	-1,61E-01
	POCP	kg NMVOC -eq	3,00E-01	7,00E-03	3,66E-04	4,38E-04	4,22E-04	-8,78E-03	-7,42E-02
	ADP-minerals&metals[1]	kg Sb-eq	1,18E-02	7,94E-05	4,03E-08	4,96E-06	1,34E-06	-3,08E-05	-3,46E-04
	ADP-fossil[1]	MJ	8,46E+02	4,35E+01	3,61E-01	2,72E+00	1,62E+00	-1,46E+01	-1,20E+02
	WDP[1]	m^3	2,66E+03	4,20E+01	7,67E-02	2,63E+00	5,97E+00	9,58E+01	7,37E+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	5,23E-06	1,76E-07	7,26E-09	1,10E-08	8,98E-09	-1,46E-07	-1,22E-06
	IRP[2]	kgBq U235 -eq	2,42E+00	1,90E-01	1,55E-03	1,19E-02	7,27E-03	7,72E-03	4,80E-02
	ETP-fw[1]	CTUe	2,93E+03	3,22E+01	1,97E-01	2,01E+00	7,86E+00	-6,18E+01	-9,57E+02
	HTP-c[1]	CTUh	4,36E-07	0,00E+00	0,00E+00	0,00E+00	3,73E-10	-8,34E-09	-7,05E-08
	HTP-nc[1]	CTUh	2,68E-06	3,52E-08	1,79E-10	2,20E-09	2,74E-09	1,99E-07	1,28E-06
	SQP[1]	dimensionless	5,41E+02	3,04E+01	4,58E-02	1,90E+00	6,29E-01	2,69E-01	-1,27E+01

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	9,65E+01	6,22E-01	1,95E-03	3,89E-02	2,87E-01	-1,08E+00	-1,16E+01
	PERM	MJ	1,66E+00	0,00E+00	0,00E+00	0,00E+00	-1,66E+00	0,00E+00	0,00E+00
	PERT	MJ	9,82E+01	6,22E-01	1,95E-03	3,89E-02	-1,38E+00	-1,08E+00	-1,16E+01
	PENRE	MJ	8,47E+02	4,35E+01	3,61E-01	2,72E+00	1,62E+00	-1,46E+01	-1,20E+02
	PENRM	MJ	1,57E+00	0,00E+00	0,00E+00	0,00E+00	-1,57E+00	0,00E+00	0,00E+00
	PENRT	MJ	8,48E+02	4,35E+01	3,61E-01	2,72E+00	4,17E-02	-1,46E+01	-1,20E+02
	SM	kg	2,17E+00	0,00E+00	1,77E-04	0,00E+00	0,00E+00	3,67E-03	3,15E-02
	RSF	MJ	3,17E+00	2,23E-02	4,81E-05	1,39E-03	6,33E-03	6,55E-02	5,14E-01
	NRSF	MJ	3,94E+01	7,96E-02	7,07E-04	4,97E-03	0,00E+00	1,92E+00	1,48E+01
	FW	m^3	6,20E-01	4,65E-03	1,86E-05	2,91E-04	1,57E-03	-3,38E-03	-3,43E-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	5,44E-01	2,24E-03	1,06E-05	1,40E-04	0,00E+00	1,64E-01	-7,48E-02
	NHWD	kg	2,45E+01	2,11E+00	4,28E-04	1,32E-01	1,70E-01	-3,85E-01	-5,85E+00
	RWD	kg	2,33E-03	2,96E-04	2,51E-06	1,85E-05	0,00E+00	5,02E-06	3,66E-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	7,67E-01	0,00E+00	1,74E-04	0,00E+00	1,73E+01	2,66E-06	-1,23E-03
	MER	kg	2,49E-01	0,00E+00	5,40E-07	0,00E+00	4,45E-01	6,72E-08	-1,62E-04
	EEE	MJ	1,48E-01	0,00E+00	1,85E-06	0,00E+00	2,02E-01	3,73E-06	-3,97E-04
	EET	MJ	2,23E+00	0,00E+00	2,80E-05	0,00E+00	3,05E+00	5,65E-05	-6,01E-03

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	1,20E-01
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	> 0.1% 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	7,01E+01	2,88E+00	2,62E-02	1,80E-01	4,53E-01	-2,64E+00	-2,13E+01

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

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ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products.
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NPCR 030 Part B for Ventilation components, Ver. 1.0, 18.05.2021, EPD Norway.

EN ISO 9001:2015 - Quality management systems.
EN ISO 14001:2015 - Environmental management systems.
EN ISO 50001:2018 - Energy management systems.

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