epd-norge
Global program operatør

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

VFL

TROX® TECHNIK
The art of handling air

The Norwegian EPD Foundation

Owner of the declaration:
TROX Group

Product:
VFL

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-5558-4850-EN

Registration number:

NEPD-5558-4850-EN

Issue date: 13.12.2023

Valid to: 13.12.2028

EPD Software:
LCA.no EPD generator ID: 128449

General information

Product

VFL

Program operator:

Post Box 5250 Majorstuen, 0303 Oslo, Norway
The Norwegian EPD Foundation
Phone: +47 23 08 80 00
web: post@epd-norge.no

Declaration number: NEPD-5558-4850-EN

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

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.

Declared unit:

1 pcs VFL

Declared unit with option:

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

Functional unit:

-

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

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

Owner of the declaration:

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

Manufacturer:

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

Place of production:

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

Management system:

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

Organisation no:

DE 120250070

Issue date: 13.12.2023

Valid to: 13.12.2028

Year of study:

2022

Comparability:

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

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: Philipp Ceulaers

Reviewer of company-specific input data and EPD: Phil Niklas

Approved:

Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:

Volume flow limiter for insertion into ducting.
Circular, mechanical self-powered controllers for insertion into ducting, for the quick and easy balancing of constant volume flow rates in ventilation and air conditioning systems.

For more infomation see: https://www.trox.de/en/cav-controller%C2%A0/vfl-4ad4bbefb8d5a207

Product specification

Circular volume flow limiters in 7 nominal sizes, made of high-quality plastic, to limit and control volume flows in air conditioning systems. Ready-to-commission unit which consists of the casing with setpoint scale and the control mechanism with leaf spring and low-friction, silicone-free bellows. Easy insertion into circular ducts to EN 1506 or EN 13180; secure fit ensured by a lip seal. Aerodynamically tested and factory set to a reference volume flow rate. Can be subsequently accurately adjusted within a volume flow rate range of at least 5 : 1.

This EPD includes the environmental data of the product series VFL.
The following represents a representative dataset of the most sold variant in the declared sales year (VFL/100).

Materials	kg	%
Metal - Stainless steel	0,00	0,66
Others	0,00	0,09
Plastic - Polycarbonate (PC)	0,10	90,67
Plastic - Polyoxymethylene (POM)	0,00	0,08
Plastic - Polyurethane (PUR)	0,00	0,41
Rubber, synthetic	0,01	8,08
Total	0,11	

Packaging	kg	%
Packaging - Cardboard	0,30	42,86
Packaging - Paper	0,40	57,14
Total incl. packaging	0,81	

Technical data:

Nominal sizes: 80 – 250 mm
Volume flow rate range: 4 to 212 l/s or 14 to 764 m^3/h
Volume flow rate control range: < 20 to 100 % of the nominal volume flow rate
Volume flow rate accuracy: approx. ± 10 % of the nominal volume flow rate
Minimum differential pressure: 30 Pa
Maximum differential pressure: 300 Pa

For more technical data see: https://www.trox.de/en/cav-controller%C2%A0/vfl-4ad4bbefb8d5a207

Market:

Europe

Reference service life, product

25 years

Reference service life, building or construction works

60 years

LCA: Calculation rules

Declared unit:

1 pcs VFL

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:

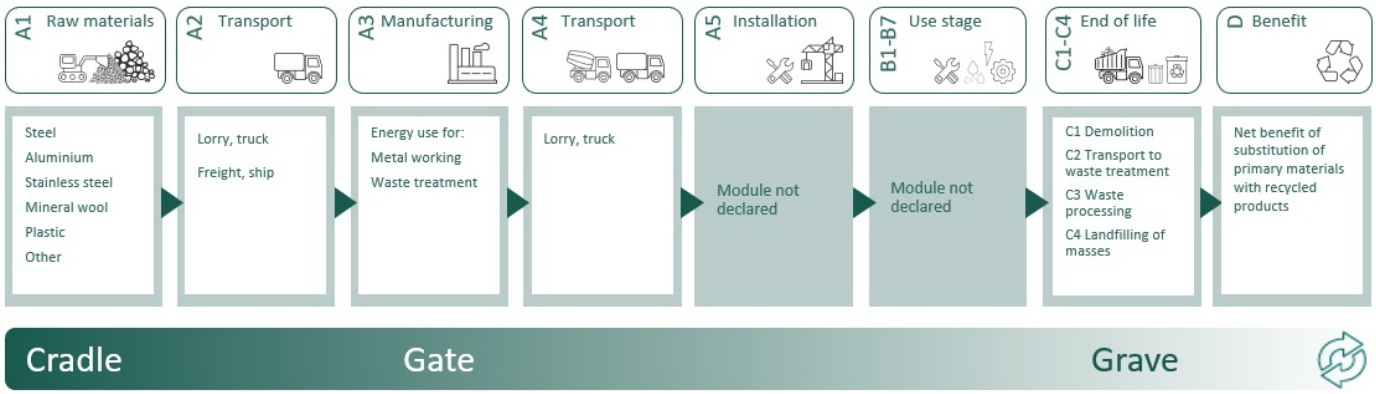
Specific data for the product composition are provided by the manufacturer. The data represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on EPDs according to EN 15804 and different LCA databases. The data quality of the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

Materials	Source	Data quality	Year
Metal - Stainless steel	ecoinvent 3.6	Database	2019
Others	ecoinvent 3.6	Database	2019
Packaging - Cardboard	ecoinvent 3.6	Database	2019
Packaging - Paper	ecoinvent 3.6	Database	2019
Plastic - Polycarbonate (PC)	ecoinvent 3.6	Database	2019
Plastic - Polyoxymethylene (POM)	ecoinvent 3.6	Database	2019
Plastic - Polyurethane (PUR)	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:

Circular, mechanical self-powered controllers for insertion into ducting, for the quick and easy balancing of constant volume flow rates in ventilation and air conditioning systems.
Unique damper blade edge for acoustic optimisation.
Simple and quick commissioning on site.
Range of volume flow rate setpoints for each nominal size.
Precise and simple setting of volume flow rates using a scale.
Best accuracy among controllers for insertion.
Suitable for low airflow velocities from 0.8 m/s.
Any installation orientation; maintenance-free.

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	0,11			

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	0,00			
Waste treatment per kg Hazardous waste, incineration (kg)	kg	0,00			
Waste treatment per kg Plastics, incineration (kg)	kg	0,05			
Waste treatment per kg Polyoxymethylene (POM), incineration with fly ash extraction (kg)	kg	0,00			
Waste treatment per kg Rubber, municipal incineration with fly ash extraction (kg)	kg	0,00			

Disposal (C4)	Unit	Value			
Landfilling of ashes from incineration of Plastics, process per kg ashes and residues (kg)	kg	0,00			
Landfilling of ashes from incineration of Polyoxymethylene (POM), 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 per kg Hazardous waste, from incineration (kg)	kg	0,00			
Waste, plastic, mixture, to landfill (kg)	kg	0,05			
Waste, scrap steel, to landfill (kg)	kg	0,00			

Benefits and loads beyond the system boundaries (D)	Unit	Value			
Substitution of electricity (MJ)	MJ	0,01			
Substitution of primary steel with net scrap (kg)	kg	0,00			
Substitution of thermal energy, district heating (MJ)	MJ	0,09			

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	2,87E+00	1,05E-01	1,41E-04	6,59E-03	1,28E-01	6,08E-03	-1,06E-03
	GWP-fossil	kg CO_2 -eq	2,83E+00	1,05E-01	1,41E-04	6,59E-03	1,28E-01	6,08E-03	-1,04E-03
	GWP-biogenic	kg CO_2 -eq	3,31E-02	4,36E-05	2,64E-08	2,73E-06	3,14E-05	5,56E-07	-1,36E-06
	GWP-luluc	kg CO_2 -eq	7,07E-03	3,75E-05	1,11E-08	2,34E-06	2,02E-06	1,22E-07	-1,82E-05
	ODP	kg CFC11 -eq	1,89E-07	2,39E-08	3,00E-11	1,49E-09	8,01E-10	1,67E-10	-3,81E-05
	AP	mol H+ -eq	1,11E-02	3,03E-04	1,47E-06	1,89E-05	1,84E-05	4,50E-06	-6,87E-06
	EP-FreshWater	kg P -eq	2,28E-04	8,42E-07	5,12E-10	5,26E-08	8,30E-08	5,88E-09	-7,82E-08
	EP-Marine	kg N -eq	2,26E-03	5,99E-05	6,49E-07	3,75E-06	6,85E-06	7,92E-06	-1,94E-06
	EP-Terrestial	mol N -eq	2,59E-02	6,70E-04	7,12E-06	4,19E-05	6,88E-05	1,83E-05	-2,06E-05
	POCP	kg NMVOC -eq	6,76E-03	2,57E-04	1,96E-06	1,61E-05	1,69E-05	6,46E-06	-6,78E-06
	ADP-minerals&metals[1]	kg Sb -eq	2,65E-05	2,91E-06	2,16E-10	1,82E-07	3,23E-08	4,13E-09	-1,41E-08
	ADP-fossil[1]	MJ	3,97E+01	1,59E+00	1,93E-03	9,96E-02	2,18E-02	1,24E-02	-1,18E-02
	WDP[1]	m^3	2,20E+02	1,54E+00	4,11E-04	9,63E-02	8,87E-02	1,06E-01	-6,63E-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	1,52E-07	6,45E-09	3,90E-11	4,03E-10	1,04E-10	8,50E-11	-3,04E-10
	IRP[2]	kgBq U235 -eq	1,09E-01	6,97E-03	8,29E-06	4,35E-04	8,44E-05	5,99E-05	-4,59E-05
	ETP-fw[1]	CTUe	1,09E+02	1,18E+00	1,06E-03	7,38E-02	3,27E-01	1,52E-02	-6,94E-02
	HTP-c[1]	CTUh	1,08E-09	0,00E+00	0,00E+00	0,00E+00	9,00E-12	0,00E+00	-3,00E-12
	HTP-nc[1]	CTUh	4,18E-08	1,29E-09	1,00E-12	8,10E-11	2,07E-10	1,10E-11	1,50E-11
	SQP[1]	dimensionless	1,10E+02	1,11E+00	2,46E-04	6,97E-02	4,55E-03	4,67E-02	-5,03E-02

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	1,38E+01	2,28E-02	1,05E-05	1,43E-03	2,16E-03	5,81E-04	-4,65E-02
	PERM	MJ	7,77E-04	0,00E+00	0,00E+00	0,00E+00	-7,77E-04	0,00E+00	0,00E+00
	PERT	MJ	2,19E+01	2,28E-02	1,05E-05	1,43E-03	1,38E-03	5,81E-04	-4,65E-02
	PENRE	MJ	3,97E+01	1,59E+00	1,93E-03	9,96E-02	2,18E-02	1,24E-02	-1,18E-02
	PENRM	MJ	2,72E+00	0,00E+00	0,00E+00	0,00E+00	-2,72E+00	0,00E+00	0,00E+00
	PENRT	MJ	3,97E+01	1,59E+00	1,93E-03	9,96E-02	-2,69E+00	1,24E-02	-1,18E-02
	SM	kg	1,08E-01	0,00E+00	9,50E-07	0,00E+00	0,00E+00	5,81E-06	0,00E+00
	RSF	MJ	7,80E-01	8,16E-04	2,57E-07	5,10E-05	5,37E-05	1,21E-05	1,05E-05
	NRSF	MJ	1,52E-02	2,92E-03	3,79E-06	1,82E-04	0,00E+00	3,89E-05	-2,19E-03
	FW	m^3	4,27E-02	1,70E-04	9,96E-08	1,07E-05	4,86E-05	1,59E-05	-5,67E-05

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	1,21E-02	8,22E-05	5,69E-08	5,14E-06	0,00E+00	1,75E-04	-3,03E-06
	NHWD	kg	9,83E-01	7,75E-02	2,29E-06	4,84E-03	1,00E-04	5,33E-02	-3,87E-04
	RWD	kg	1,19E-04	1,09E-05	1,34E-08	6,79E-07	0,00E+00	8,13E-08	-3,77E-08

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	9,33E-07	0,00E+00	6,36E-04	4,75E-06	0,00E+00
	MER	kg	2,99E-02	0,00E+00	2,89E-09	0,00E+00	4,45E-03	1,16E-07	0,00E+00
	EEE	MJ	2,16E-02	0,00E+00	9,92E-09	0,00E+00	5,94E-03	7,53E-06	0,00E+00
	EET	MJ	3,27E-01	0,00E+00	1,50E-07	0,00E+00	8,99E-02	1,14E-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	2,62E-05
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	Data source	Amount	Unit
Electricity, market mix (kWh) - Germany	ecoinvent 3.6	585,93	g CO2-eq/kWh

Dangerous substances

The product contains no substances given by the REACH Candidate list.

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	2,94E+00	1,05E-01	1,41E-04	6,59E-03	1,28E-01	6,22E-03	-1,31E-03

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

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