



# Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

# **KSFS**





The Norwegian EPD Foundation

Owner of the declaration:

**TROX Group** 

**Product:** 

KSFS

**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-8301-7983-EN

Registration number:

NEPD-8301-7983-EN

Issue date: 04.12.2024

Valid to: 04.12.2029

**EPD** software:

LCAno EPD generator ID: 194201



## **General information**

Product

KSFS

**Program operator:** 

The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303 Oslo, Norway

Phone: +47 977 22 020 web: www.epd-norge.no

**Declaration number:** 

NEPD-8301-7983-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 KSFS

Declared unit with option:

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

**Functional unit:** 

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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: Alina Buchner 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:

04.12.2024

Valid to:

04.12.2029

Year of study:

2023

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: David Meiering

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

Approved:

Håkon Hauan

Managing Director of EPD-Norway



#### **Product**

# **Product description:**

Ducted particulate filter for Mini Pleat filter panels, Mini Pleat filter cells, and activated carbon filter cells. Fitting of filter elements for the separation of suspended particles in areas with critical requirements.

For more information see:

https://www.trox.de/en/ducted-particulate-filters-for-critical-requirements/ksfs-d27e8a0e089344fd

#### **Product specification**

Ducted particulate filters KSFS for critical requirements as filter casings for installation into the ductwork of ventilation systems. Fitting of filter elements for the separation of suspended particles such as aerosols, toxic dusts, viruses and bacteria from the supply or extract air; also for the fitting of activated carbon filter cells for the adsorption of gaseous odorous substances and contaminants. Filter casings are available as one-stage construction or two-stage construction for the fitting of fine dust filters as prefilter stage and of particulate filters as second filter stage. Ducted particulate filter KSFS with robust, doubled-edged connecting flanges with pre-drilled holes. Clamping mechanism made of stainless steel with tensioning lever for uniform sealing integrity between the casing and filter element. Filter casing with sealing integrity test facility, available with optional double-groove service board and plastic service bag for contamination-free filter change. The cover plate is fitted with a profiled seal and 4 clamping screws with star grips. Pressure measurement points are part of the supply package but must be set up on site by others. Leakage classes D according to EN 15727 and L1 according to EN 1886. Leakage test for every casing. Optional: Filter casing KSFS with explosion protection, use in areas with a potentially explosive atmosphere of zones 1 and 2, as well as zones 21 and 22 (Ex II 2G Ex IIC T6 Gb and Ex II 2D Ex IIIB T80 °C Db). The filter casings must be connected to the earth potential. All conductive and dissipative parts must be connected together and grounded. Conductive dusts are excluded from the application. Under no circumstances should metallic foreign materials enter the filter casing.

Materials	kg	%
Adhesive and sealant	0,10	0,16
Metal - Galvanized Steel	2,13	3,47
Plastic	0,80	1,30
Plastic - Polyethylene (LDPE)	2,00	3,27
Plastic - Polyethylene terephthalate (PET)	0,00	0,00
Plastic - Polyphenyl ether (PPE)	0,77	1,25
Plastic - Polyvinyl chloride (PVC)	0,04	0,06
Powder coating	0,25	0,41
Rubber, synthetic	0,80	1,30
Metal - Brass	0,45	0,73
Metal - Stainless steel	4,53	7,39
Metal - Steel	49,46	80,63
Plastic - Polycarbonate (PC)	0,01	0,02
Total	61,34	100,00
Packaging	ka -	%
	kg	
Packaging - Cardboard	4,00	32,26

Packaging	kg	%
Packaging - Cardboard	4,00	32,26
Packaging - Pallet	8,00	64,52
Packaging - Paper	0,40	3,23
Total incl. packaging	73,74	100,00

## Technical data:

For technical data see:

https://www.trox.de/en/ducted-particulate-filters-for-critical-requirements/ksfs-d27e8a0e089344fd#technical-information and the state of the state

## 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 KSFS

## **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.

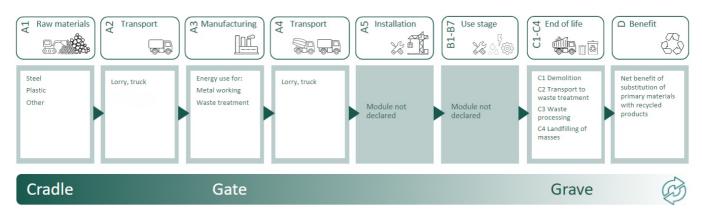
Materials	Source	Data quality	Year
Adhesive and sealant	ecoinvent 3.6	Database	2019
Metal - Brass	ecoinvent 3.6	Database	2019
Metal - Galvanized Steel	ecoinvent 3.6	Database	2020
Metal - Stainless steel	ecoinvent 3.6	Database	2019
Metal - Steel	ecoinvent 3.6	Database	2019
Packaging - Cardboard	ecoinvent 3.6	Database	2019
Packaging - Pallet	ecoinvent 3.6	Database	2019
Packaging - Paper	ecoinvent 3.6	Database	2019
Plastic	ecoinvent 3.6	Database	2019
Plastic - Polycarbonate (PC)	ecoinvent 3.6	Database	2019
Plastic - Polyethylene (LDPE)	ecoinvent 3.6	Database	2019
Plastic - Polyethylene terephthalate (PET)	ecoinvent 3.6	Database	2019
Plastic - Polyphenyl ether (PPE)	ecoinvent 3.6	Database	2019
Plastic - Polyvinyl chloride (PVC)	ecoinvent 3.6	Database	2019
Powder coating	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	Refu <i>r</i> b ishment	Operational energy use	Operational water use	De- construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery- Recycling-potential
A1	A2	A3	A4	A5	B1	B2	В3	B4	B5	В6	В7	C1	C2	C3	C4	D
Χ	Χ	Χ	Χ	MND	MND	MND	MND	MND	MND	MND	MND	X	Χ	X	Χ	X

## System boundary:



#### Additional technical information:

Ducted particulate filter for Mini Pleat filter panels, Mini Pleat filter cells, and activated carbon filter cells. For installation into the ductwork of ventilation systems. Used in medicine, biology, the pharmaceuticals industry, and sensitive technical areas.

Ducted particulate filter made of sheet steel with decontaminable powder coating RAL9010 and clamping mechanism made of stainless steel. Robust, welded construction with doubled-edged perimeter flanges with pre-drilled holes ensures secure sealing.

One-stage or two-stage casing, for the fitting of fine dust filters as prefilter stage and of particulate filters as second filter stage.

Secure sealing and convenient handling due to tensioning lever for a consistent contact pressure and hence sealing integrity between the casing and filter element.

With sealing integrity test facility for filter elements

Optional equipment and accessories:

Optional double-groove service board for contamination-free filter change ('safe change').

Plastic service bag with O-ring for contamination-free filter change.

Explosion-proof construction for protection zones 1 and 2, as well as 21 and 22.



# LCA: Scenarios and additional technical information

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

Capacity utilisation	Distance (km)	Fuel/Energy Consumption	Unit	Value
(incl. return) %	` ′			(Liter/tonne) 34,40
		0,0 13	ij tkiri	31,10
kg	61,34			
Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
36,7 %	50	0,043	l/tkm	2,15
Unit	Value			
kg	50,91			
kg	0,79			
kg	0,18			
kg	1,00			
kg	0,02			
kg	0,40			
kg	0,00			
Unit	Value			
kg	4,93			
kg	0,68			
kg	0,04			
kg	0,03			
kg kg	0,03			
kg	0,02			
kg kg	0,02 2,21			
kg kg kg	0,02 2,21 0,18			
kg kg kg kg	0,02 2,21 0,18 0,04			
kg kg kg kg	0,02 2,21 0,18 0,04			
kg kg kg kg kg	0,02 2,21 0,18 0,04 0,00			
kg kg kg kg kg kg kg kg kg	0,02 2,21 0,18 0,04 0,00 0,02 0,00 Value			
kg	0,02 2,21 0,18 0,04 0,00 0,02 0,00  Value 39,41			
kg kg kg kg kg kg kg kg kg	0,02 2,21 0,18 0,04 0,00 0,02 0,00 Value			
	(incl. return) % 36,7 %  Unit kg  Capacity utilisation (incl. return) % 36,7 %  Unit kg	(incl. return) %         Distance (km)           36,7 %         800           Unit         Value           kg         61,34           Capacity utilisation (incl. return) %         Distance (km)           36,7 %         50           Unit         Value           kg         50,91           kg         0,79           kg         0,18           kg         1,00           kg         0,02           kg         0,40           kg         0,00           Unit         Value           kg         4,93           kg         0,68	Capacity utilisation (incl. return) %   800   0,043	Capacity utilisation (incl. return) %   Box   Box



## **LCA: Results**

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

Environ	mental impact								
	Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
	GWP-total	kg CO <sub>2</sub> -eq	2,16E+02	9,64E+00	8,09E-02	6,03E-01	6,56E+00	-5,12E+00	-4,45E+01
	GWP-fossil	kg CO <sub>2</sub> -eq	2,15E+02	9,64E+00	8,09E-02	6,02E-01	6,56E+00	-5,11E+00	-4,44E+01
	GWP-biogenic	kg CO <sub>2</sub> -eq	8,73E-01	3,99E-03	1,52E-05	2,49E-04	1,12E-03	-2,93E-03	-2,92E-02
	GWP-luluc	kg CO <sub>2</sub> -eq	1,59E-01	3,43E-03	6,37E-06	2,14E-04	1,41E-04	-2,09E-03	-2,84E-02
	ODP	kg CFC11 -eq	2,46E-05	2,18E-06	1,75E-08	1,36E-07	6,28E-08	-1,61E-07	-1,60E-02
Œ.	AP	mol H+ -eq	1,33E+00	2,77E-02	8,46E-04	1,73E-03	1,41E-03	-2,65E-02	-2,98E-01
	EP-FreshWater	kg P -eq	1,33E-02	7,70E-05	2,94E-07	4,81E-06	1,12E-05	-3,32E-04	-3,34E-03
	EP-Marine	kg N -eq	2,17E-01	5,48E-03	3,73E-04	3,42E-04	4,71E-04	-5,19E-03	-4,92E-02
<del></del>	EP-Terrestial	mol N -eq	2,67E+00	6,13E-02	4,10E-03	3,83E-03	5,07E-03	-5,57E-02	-5,22E-01
	POCP	kg NMVOC -eq	9,90E-01	2,35E-02	1,13E-03	1,47E-03	1,28E-03	-2,67E-02	-2,35E-01
	ADP-minerals&metals <sup>1</sup>	kg Sb-eq	2,49E-02	2,66E-04	1,24E-07	1,66E-05	2,17E-06	-9,31E-05	-5,93E-03
	ADP-fossil <sup>1</sup>	МЈ	2,72E+03	1,46E+02	1,11E+00	9,11E+00	2,33E+00	-4,45E+01	-3,78E+02
<u>%</u>	WDP <sup>1</sup>	$m^3$	6,53E+03	1,41E+02	2,37E-01	8,81E+00	9,79E+00	2,88E+02	2,20E+03

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

## **Remarks to environmental impacts**

<sup>&</sup>quot;Reading example: 9,0 E-03 = 9,0\*10-3 = 0,009"

<sup>\*</sup>INA Indicator Not Assessed

<sup>1.</sup> 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



Additional	Additional environmental impact indicators											
li li	ndicator	Unit	A1-A3	A4	C1	C2	C3	C4	D			
	PM	Disease incidence	1,68E-05	5,90E-07	2,24E-08	3,69E-08	1,27E-08	-4,42E-07	-3,89E-06			
	IRP <sup>2</sup>	kgBq U235 -eq	7,36E+00	6,37E-01	4,77E-03	3,98E-02	9,65E-03	2,36E-02	9,41E-02			
4	ETP-fw <sup>1</sup>	CTUe	1,09E+04	1,08E+02	6,08E-01	6,75E+00	1,80E+01	-3,00E+02	-3,21E+03			
48.* *** <b>!</b>	HTP-c <sup>1</sup>	CTUh	1,64E-06	0,00E+00	0,00E+00	0,00E+00	6,12E-10	-2,49E-08	-2,21E-07			
₩ <u>B</u>	HTP-nc <sup>1</sup>	CTUh	9,52E-06	1,18E-07	5,52E-10	7,37E-09	9,41E-09	6,40E-07	3,58E-06			
	SQP <sup>1</sup>	dimensionless	2,43E+03	1,02E+02	1,41E-01	6,37E+00	7,78E-01	2,45E-01	-5,78E+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)

<sup>&</sup>quot;Reading example: 9,0 E-03 = 9,0\*10-3 = 0,009" \*INA Indicator Not Assessed

<sup>1.</sup> 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

<sup>2.</sup> 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									
li	ndicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
	PERE	MJ	3,84E+02	2,09E+00	6,02E-03	1,30E-01	3,48E-01	-3,52E+00	-5,16E+01
	PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Ţ,	PERT	MJ	3,84E+02	2,09E+00	6,02E-03	1,30E-01	3,48E-01	-3,52E+00	-5,16E+01
	PENRE	MJ	2,61E+03	1,46E+02	1,11E+00	9,11E+00	2,33E+00	-4,45E+01	-3,78E+02
. Ag	PENRM	MJ	1,31E+02	0,00E+00	0,00E+00	0,00E+00	-1,30E+02	0,00E+00	0,00E+00
IA.	PENRT	MJ	2,72E+03	1,46E+02	1,11E+00	9,11E+00	-1,27E+02	-4,45E+01	-3,78E+02
	SM	kg	5,78E+00	0,00E+00	5,47E-04	0,00E+00	0,00E+00	3,81E-03	-6,53E-02
2	RSF	MJ	5,32E+00	7,46E-02	1,48E-04	4,66E-03	7,79E-03	1,97E-01	1,54E+00
	NRSF	MJ	1,09E+02	2,67E-01	2,18E-03	1,67E-02	0,00E+00	5,74E+00	4,44E+01
<b>⊗</b>	FW	m <sup>3</sup>	1,96E+00	1,56E-02	5,73E-05	9,74E-04	5,09E-03	-1,03E-02	-1,35E-01

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 resources used as raw materials; PENRM = Use of non renewable primary energy resources; SM = Use of secondary materials; RESF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water

<sup>&</sup>quot;Reading example: 9,0 E-03 = 9,0\*10-3 = 0,009" \*INA Indicator Not Assessed



End of life - Waste									
In	dicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
	HWD	kg	1,75E+00	7,51E-03	3,28E-05	4,70E-04	0,00E+00	1,93E-01	-2,34E-01
Ī	NHWD	kg	9,79E+01	7,09E+00	1,32E-03	4,43E-01	1,76E-01	7,97E-01	-1,81E+01
₩	RWD	kg	7,24E-03	9,92E-04	7,73E-06	6,20E-05	0,00E+00	1,86E-05	6,89E-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 flo	End of life - Output flow											
Indicat	or	Unit	A1-A3	A4	C1	C2	C3	C4	D			
<b>@▷</b>	CRU	kg	0,00E+00									
\$\dagger\$	MFR	kg	7,67E-01	0,00E+00	5,37E-04	0,00E+00	5,09E+01	2,01E-04	-8,80E-03			
DØ	MER	kg	2,49E-01	0,00E+00	1,66E-06	0,00E+00	1,60E+00	4,92E-06	-1,06E-03			
<b>₹</b>	EEE	MJ	1,48E-01	0,00E+00	5,71E-06	0,00E+00	2,51E+00	3,15E-04	-6,68E-03			
DØ	EET	MJ	2,23E+00	0,00E+00	8,63E-05	0,00E+00	3,80E+01	4,76E-03	-1,01E-01			

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										
Unit	At the factory gate									
kg C	0,00E+00									
kg C	0,00E+00									
	kg C									

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-eg/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 <sub>2</sub> -eq	2,16E+02	9,64E+00	8,09E-02	6,03E-01	6,56E+00	-7,81E+00	-6,60E+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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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.

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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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ECO PLATFORM	ECO Platform	web:	www.eco-platform.org
EPD	ECO Portal	web:	ECO Portal
VERIFIED			