epd-norge
Global program operatør

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

FKRS-EU



TROX

The Norwegian EPD Foundation

Owner of the declaration:
TROX Group

Product:
FKRS-EU

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:

Registration number:

Issue date:

Valid to:

EPD software:
LCAno EPD generator ID: 61644

General information

Product

FKRS-EU

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:

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 FKRS-EU

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: Alina Buchner
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Manufacturer:

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

Place of production:

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

Management system:

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

Organisation no:

DE 120250070

Issue date:

Valid to:

Year of study:

2022

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.

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: Michael Weise

Reviewer of company-specific input data and EPD: Doeres Heuvens

Approved:

Product

Product description:

Compact dimensions – ideal for restricted spaces.

Small circular fire damper for shutting off air ducts between 2 fire compartments,available in 10 nominal sizes.

For more informations see: https://www.trox.de/en/fire-dampers/fkrs-eu-e44c04db778f79a6

Product specification

Circular fire damper that meets the requirements of the European product standard EN 15650. Tested for fire resistance properties to EN 1366-2 (negative pressure of 300 Pa and 500 Pa), with CE marking.
With the Declaration of Performance (DoP), the fire damper manufacturer provides evidence of the respective installation conditions, such as in, on and away from walls or ceilings, with the essential features such as size, supporting structure, type of construction and installation and the respective associated performance classes according to classification standard DIN EN 13501-3.
The ready-to-use unit contains a release device and a replaceable, fire-resistant damper blade that can be arranged with installation position 0 - 360 degrees depending on the use. Classification (depending on application):
EI 30 (ve, ho i <-> o) S to EI 120 (ve, ho i <-> o) S.

This EPD includes the environmental data of the product series FKRS-EU.
The following represents a representative dataset of the.most sold variant in the declared sales year (FKRS-EU/100/Z43).

Materials	kg	%
Chemical	0,098	3,18
Fire-, heat- and UV-stabilizers	0,026	0,85
Glass fibre reinforced plastic, polyamide	0,0071	0,22
Metal - Galvanized Steel	1,030	33,26
Metal - Stainless steel	0,050	1,63
Metal - Steel	0,13	4,26
Motor	1,20	38,72
Plastic	0,0058	0,18
Plastic - Polyamide	0,000050	0,0016
Plastic - Polycarbonate (PC)	0,0012	0,038
Plastic - Polyethylene terephthalate (PET)	0,50	16,13
Plastic - Polyoxymethylene (POM)	0,020	0,66
Plastic - Polyvinyl chloride (PVC)	0,000030	0,00096
Rubber, natural (Latex)	0,00070	0,022
Rubber, synthetic	0,024	0,78
Total	3,098	100,00

Packaging	kg	%
Packaging - Cardboard	2,00	30,71
Packaging - Pallet	4,50	69,10
Packaging - Plastic	0,01	0,18
Total incl. packaging	9,61	100,00

Technical data:

Nominal sizes:100 – 315 mm.
Casing length: 400 mm.
Volume flow rate range: Up to 770 l/s / up to 2770 m^3/h.
Differential pressure range: Up to 1500 Pa.
Temperature range (1, 3, 4): -20 to 50 °C.
Release temperature: 72 °C or 95 °C (for warm air ventilation systems).
Upstream velocity (2): = 8 m/s with standard version.
= 10 m/s version with spring return actuator.
1 Temperatures may differ for units with attachments. Details for other applications are available on request.
2 Data apply to uniform upstream and downstream conditions of the fire dampers.
3 Non-condensing operation and without moisture entry via the outdoor air intake.
4 For FKRS-EU in Ex version, see supplementary operating instructions.

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 FKRS-EU

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:

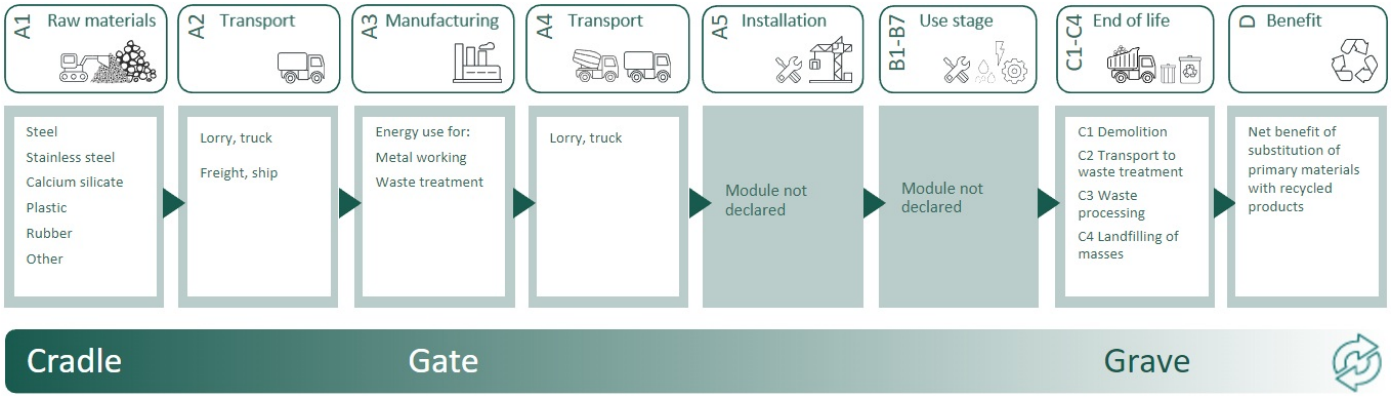
Specific data for the product composition are provided by the manufacturer. The data represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on EPDs according to EN 15804 and different LCA databases. The data quality of the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

Materials	Source	Data quality	Year
Chemical	ecoinvent 3.6	Database	2019
Fire-, heat- and UV-stabilizers	ecoinvent 3.6	Database	2019
Glass fibre reinforced plastic, polyamide	Modified 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
Motor	Modified ecoinvent 3.6	Database	2019
Packaging - Cardboard	ecoinvent 3.6	Database	2019
Packaging - Pallet	ecoinvent 3.6	Database	2019
Packaging - Plastic	ecoinvent 3.6	Database	2019
Plastic	ecoinvent 3.6	Database	2019
Plastic - Polyamide	ecoinvent 3.6	Database	2019
Plastic - Polycarbonate (PC)	ecoinvent 3.6	Database	2019
Plastic - Polyethylene terephthalate (PET)	ecoinvent 3.6	Database	2019
Plastic - Polyoxymethylene (POM)	ecoinvent 3.6	Database	2019
Plastic - Polyvinyl chloride (PVC)	ecoinvent 3.6	Database	2019
Rubber, natural (Latex)	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:

Small circular fire damper for shutting off air ducts between 2 fire compartments, available in 10 nominal sizes.
Nominal sizes: 100 – 315 mm.
Low differential pressure and sound power level.
Explosion-proof construction (ATEX) as an option.
Optional use as upstream shutter of an air transfer unit.
Optional use as air transfer damper.
Optional stainless steel casing or powder-coated casing for increased corrosion protection.
Integration into the central BMS with TROXNETCOM.
Universal installation options.

Optional equipment and accessories:
Electric actuator 24 V/230 V.
Release temperature 72/95 °C

Useful additions:
Duct smoke detectors.

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	2,60			

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 Polyethylene terephthalate (PET), incineration with fly ash extraction (kg)	kg	0,25			
Waste treatment per kg Polyvinylchloride (PVC), incineration with fly ash extraction (kg)	kg	0,000015			
Waste treatment per kg Hazardous waste, incineration (kg)	kg	0,013			
Waste treatment per kg Bulk iron waste, excluding reinforcement, sorting plant (kg)	kg	1,20			
Waste treatment per kg Rubber, municipal incineration with fly ash extraction (kg)	kg	0,012			
Waste treatment per kg Plastics, incineration (kg)	kg	0,0070			
Materials to recycling (kg)	kg	2,17			
Waste treatment per kg Polyoxymethylene (POM), incineration with fly ash extraction (kg)	kg	0,010			

Disposal (C4)	Unit	Value			
Waste treatment per kg Copper slag, to landfill, residual material landfill (kg)	kg	0,019			
Waste, aluminium, to landfill (kg)	kg	0,0075			
Waste, hazardous waste, to average treatment - A3, inkl. transp. (kg)	kg	0,013			
Landfilling of ashes from incineration of Polyethylene terephthalate (PET), process per kg ashes and residues (kg)	kg	0,0055			
Landfilling of ashes from incineration per kg Hazardous waste, from incineration (kg)	kg	0,0025			
Landfilling of ashes from incineration of Polyvinylchloride (PVC), process per kg ashes and residues (kg)	kg	0,0000023			
Waste, scrap steel, to landfill (kg)	kg	0,20			
Landfilling of ashes from incineration of Polyoxymethylene (POM), process per kg ashes and residues (kg)	kg	0,00022			
Landfilling of ashes from incineration of Plastics, process per kg ashes and residues (kg)	kg	0,00016			
Waste, plastic, mixture, to landfill (kg)	kg	0,27			
Waste, hazardous waste, to landfill (kg)	kg	0,098			
Landfilling of ashes from incineration of Rubber, municipal incineration with fly ash extraction (kg)	kg	0,00065			

Benefits and loads beyond the system boundaries (D)	Unit	Value			
Substitution of primary copper with net scrap (kg)	kg	0,073			
Substitution of thermal energy, district heating (MJ)	MJ	4,39			
Substitution of primary steel with net scrap (kg)	kg	0,94			
Substitution of electricity (MJ)	MJ	0,29			
Substitution of primary aluminium with net scrap (kg)	kg	0,097			

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	1,67E+01	1,26E+00	3,44E-03	7,85E-02	6,22E-01	6,30E-02	-2,13E+00
	GWP-fossil	kg CO_2 -eq	1,65E+01	1,26E+00	3,44E-03	7,85E-02	6,22E-01	6,27E-02	-2,10E+00
	GWP-biogenic	kg CO_2 -eq	2,01E-01	5,20E-04	6,45E-07	3,25E-05	8,46E-05	4,13E-05	-5,42E-03
	GWP-luluc	kg CO_2 -eq	3,43E-02	4,47E-04	2,71E-07	2,79E-05	9,33E-06	2,02E-04	-1,80E-02
	ODP	kg CFC11 -eq	1,34E-06	2,84E-07	7,43E-10	1,78E-08	4,19E-09	3,44E-09	-1,86E-03
	AP	mol H+ -eq	1,66E-01	3,61E-03	3,60E-05	2,26E-04	1,56E-04	1,44E-04	-4,07E-02
	EP-FreshWater	kg P -eq	1,38E-03	1,00E-05	1,25E-08	6,27E-07	8,11E-07	1,12E-06	-2,98E-04
	EP-Marine	kg N -eq	2,06E-02	7,14E-04	1,59E-05	4,46E-05	6,61E-05	6,79E-05	-3,08E-03
	EP-Terrestial	mol N -eq	3,26E-01	7,99E-03	1,74E-04	4,99E-04	6,78E-04	3,78E-04	-3,85E-02
	POCP	kg NMVOC -eq	7,32E-02	3,06E-03	4,79E-05	1,91E-04	1,67E-04	1,58E-04	-1,32E-02
	ADP-minerals&metals[1]	kg Sb-eq	4,41E-03	3,47E-05	5,28E-09	2,17E-06	1,41E-07	1,63E-07	-1,82E-04
	ADP-fossil[1]	MJ	2,34E+02	1,90E+01	4,73E-02	1,19E+00	1,96E-01	3,75E-01	-2,17E+01
	WDP[1]	m^3	9,62E+02	1,84E+01	1,01E-02	1,15E+00	2,33E+00	1,26E+00	-4,38E+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	1,40E-06	7,69E-08	9,52E-10	4,80E-09	1,28E-09	2,64E-09	-2,18E-07
	IRP[2]	kgBq U235 -eq	7,03E-01	8,30E-02	2,03E-04	5,19E-03	9,21E-04	1,04E-03	-4,85E-02
	ETP-fw[1]	CTUe	1,25E+03	1,41E+01	2,59E-02	8,80E-01	8,25E-01	5,63E+00	-3,44E+02
	HTP-c[1]	CTUh	6,42E-08	0,00E+00	0,00E+00	0,00E+00	4,60E-11	5,47E-10	-1,10E-08
	HTP-nc[1]	CTUh	1,36E-06	1,54E-08	2,30E-11	9,61E-10	1,03E-09	3,16E-08	-2,47E-07
	SQP[1]	dimensionless	8,59E+02	1,33E+01	6,01E-03	8,30E-01	6,89E-02	1,05E+00	-6,62E+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	6,39E+01	2,72E-01	2,56E-04	1,70E-02	3,22E-02	9,63E-02	-7,58E+00
	PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PERT	MJ	1,43E+02	2,72E-01	2,56E-04	1,70E-02	3,22E-02	9,63E-02	-7,58E+00
	PENRE	MJ	2,21E+02	1,90E+01	4,73E-02	1,19E+00	1,96E-01	3,75E-01	-2,17E+01
	PENRM	MJ	1,35E+01	0,00E+00	0,00E+00	0,00E+00	-1,60E-03	0,00E+00	0,00E+00
	PENRT	MJ	2,34E+02	1,90E+01	4,73E-02	1,19E+00	1,94E-01	3,75E-01	-2,17E+01
	SM	kg	2,18E+00	0,00E+00	2,32E-05	0,00E+00	1,32E-05	2,16E-03	5,13E-02
	RSF	MJ	1,24E+00	9,72E-03	6,30E-06	6,08E-04	7,07E-04	4,72E-04	4,02E-02
	NRSF	MJ	5,60E-01	3,48E-02	9,27E-05	2,17E-03	1,41E-05	2,31E-02	9,70E-01
	FW	m^3	1,94E-01	2,03E-03	2,44E-06	1,27E-04	2,87E-04	2,93E-04	-3,10E-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	1,22E-01	9,79E-04	1,39E-06	6,12E-05	1,53E-06	1,11E-01	-3,72E-03
	NHWD	kg	5,13E+00	9,23E-01	5,61E-05	5,77E-02	1,33E-02	5,23E-01	-7,68E-01
	RWD	kg	6,95E-04	1,29E-04	3,29E-07	8,08E-06	1,55E-07	7,03E-07	-4,59E-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	1,29E+00	0,00E+00	2,28E-05	0,00E+00	2,18E+00	2,92E-03	-2,01E-03
	MER	kg	1,34E-03	0,00E+00	7,08E-08	0,00E+00	2,86E-01	1,89E-06	-2,64E-04
	EEE	MJ	2,96E-02	0,00E+00	2,43E-07	0,00E+00	2,91E-01	4,49E-05	-6,48E-04
	EET	MJ	4,48E-01	0,00E+00	3,67E-06	0,00E+00	4,39E+00	6,79E-04	-9,80E-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	0,00E+00
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, Germany (kWh)	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
2-methylimidazole	693-98-1	> 0.1% w/w
Lead monoxide (lead oxide)	1317-36-8	> 0.1% w/w
Diboron trioxide	1303-86-2	> 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	1,67E+01	1,26E+00	3,44E-03	7,85E-02	6,22E-01	3,64E-02	-2,51E+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

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NPCR 030 Part B for Ventilation components, Ver. 1.0, 18.05.2021, EPD Norway.

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