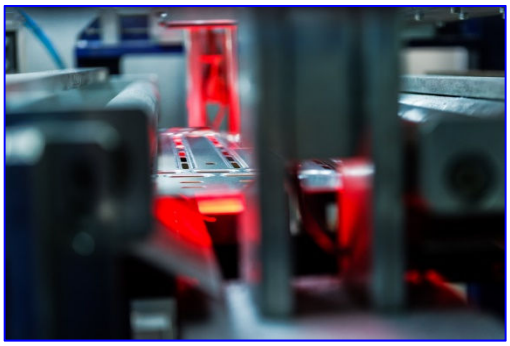
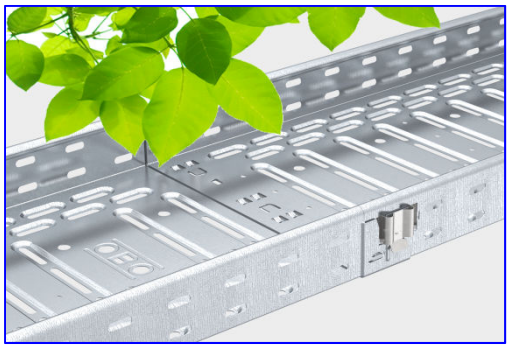
Environmental Product Declaration (EPD)

Declaration code: EPD-KTS-GB-17.1

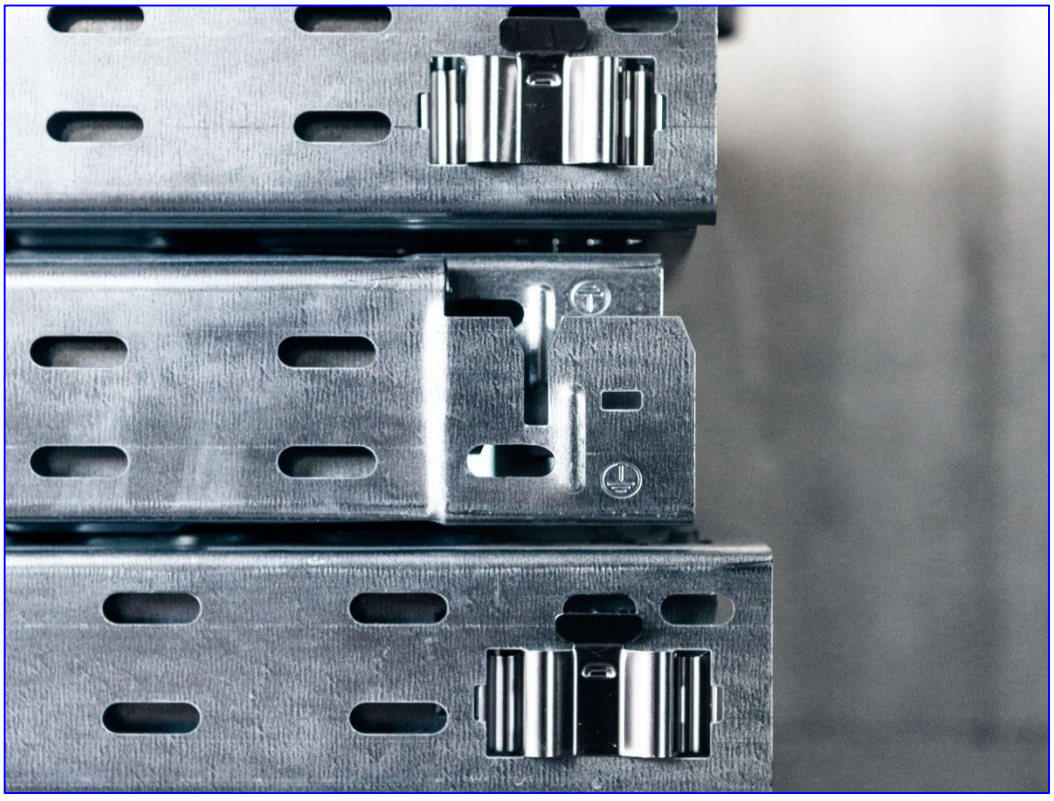




OBO Bettermann Produktion Deutschland GmbH & Co. KG

Cable support systems

Cable tray system



Basis:

DIN EN ISO 14025
EN15804

Company EPD **E**nvironmental **P**roduct **D**eclaration

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www.ift-rosenheim.de/
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Environmental Product Declaration (EPD)

Declaration code: EPD-KTS-GB-17.1

Programme operator	ift Rosenheim GmbH Theodor Gietl Straße 7-9 D-83026 Rosenheim		
Practitioner of the LCA	LCEE Life Cycle Engineering Experts GmbH Berliner Allee 58 64295 Darmstadt		
Declaration holder	OBO Bettermann Produktion Deutschland GmbH & Co. KG Huinger Ring 52 58710 Menden	Note:Additional declaration holders are stated on page 3.	
Declaration code	EPD-KTS-GB-17.1		
Designation of declared product	Cable tray system		
Scope	Cable tray systems are used for safe routing of cables and lines.		
Basis	This EPD was prepared on the basis of EN ISO 14025:2011 and EN 15804:2012+A1:2013. In addition, the "Allgemeiner Leitfaden zur Erstellung von Typ II Umweltproduktdeklarationen" (Guidance on Preparing Type III Environmental Product Declarations) applies. The Declaration is based on the PCR documents “PCR Part A” PCR-A-0.2:2018 and “cable support systems for cables and lines” PCR-KTS-1.1:2016		
Validity	Publication date: 02.04.2019	Last revision: 02.04.2019	Next revision: 02.04.2024
	This verified Company Environmental Product Declaration (company EPD) applies solely to the specified products and is valid for a period of 5 years from the date of publication in accordance with DIN EN 15804.		
LCA basis	The LCA was prepared in accordance with DIN EN ISO 14040 and DIN EN ISO 14044. The base data includes both the data collected at the production site of OBO Bettermann Produktion Deutschland GmbH & Co. KG and the generic data derived from the “GaBi 8” database. LCA calculations were carried out for the included “cradle to gate life cycle with options (cradle to gate with options)” including all upstream processes (e.g. raw material extraction, etc.).		
Notes	The “Conditions and Guidance on the Use of ift Test Documents” apply. The declaration holder assumes full liability for the underlying data, certificates and verifications.		

Prof. Ulrich Sieberath Director of Institute	Frank Stöhr Independent verifier

Additional declaration holder:

- OBO Bettermann Russia OOO
  Nauchnyj proyezd 19
  RUS-117246 Moscow

1 General product information

Product definition

The EPD relates to the product group cable support systems and applies to:

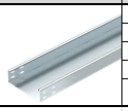
1 running metre Cable tray system.
produced by the company
OBO Bettermann Produktion Deutschland GmbH & Co. KG.

The average unit is declared as follows:
Directly used material flows are determined using the number of pieces produced and are assigned to the declared unit. All other inputs and outputs in the production are scaled to the declared unit in their entirety. The reference period is the year 2018.

The validity of the EPD is restricted to the following Cable tray systems:

- EKS
- DKS
- IKS
- LKS
- LKSU
- MKS
- MKSU
- MKSM
- MKSMU
- SKS
- SKSU
- SKSM
- SKSMU
- RKS
- RKSM

Product group: Cable support systems

Type	Side height in mm	Widths in mm												Surface / material			
		50	75	100	150	200	300	400	500	550	600	750	900	FS	FT	A2	A4
LKSU 	60			x	x	x	x	x	x		x			x			

Type	Side height in mm	Widths in mm												Surface / material			
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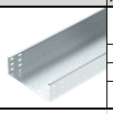
MKSU 	60			x	x	x	x	x						x	x		
				x		x	x	x	x		x					x	
	85			x		x	x	x	x		x			x	x		

Type	Side height in mm	Widths in mm												Surface / material			
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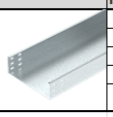
SKSU 	60			x		x	x	x	x		x			x	x		
	85			x		x	x	x	x		x			x	x		
	110			x		x	x	x	x	x				x	x		

Type	Side height in mm	Widths in mm												Surface / material			
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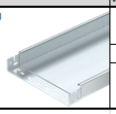
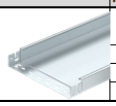
MKSMU 	60			x	x	x	x	x	x		x			x	x		
				x		x	x	x	x		x					x	
	85			x		x	x	x	x		x			x	x		
	110			x	x	x	x	x	x		x			x	x		
				x		x	x	x	x		x					x	

Type	Side height in mm	Widths in mm												Surface / material			
		50	75	100	150	200	300	400	500	550	600	750	900	FS	FT	A2	A4
SKSMU 	60			x	x	x	x	x	x		x			x	x		
				x		x	x	x	x		x					x	
	85			x		x	x	x	x		x			x	x		
	110			x	x	x	x	x	x		x			x	x		

Type	Side height in mm	Widths in mm												Surface / material			
		50	75	100	150	200	300	400	500	550	600	750	900	FS	FT	A2	A4
LKS 	60	x	x	x	x	x								x			

Type	Side height in mm	Widths in mm												Surface / material			
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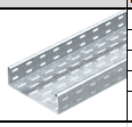
LKS 	60							x	x		x			x			

Type	Side height in mm	Widths in mm												Surface / material			
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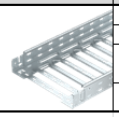
MKS 	35	x		x	x	x	x							x	x		
	60	x		x	x	x	x	x	x		x			x	x		
		x		x	x	x	x	x	x		x					x	
	85			x		x	x	x	x		x			x	x		
	110			x		x	x	x	x	x				x			
				x		x	x	x			x					x	

Type	Side height in mm	Widths in mm												Surface / material			
		50	75	100	150	200	300	400	500	550	600	750	900	FS	FT	A2	A4
SKS 	60			x	x	x	x	x	x		x			x			
		x		x	x	x	x	x	x		x				x		
				x		x	x	x	x		x					x	x
	85			x		x	x	x	x		x			x	x		
				x		x											x
	110			x		x	x	x	x	x				x			
				x		x	x	x	x	x	x				x		

Type	Side height in mm	Widths in mm												Surface / material			
		50	100	150	200	300	400	500	550	600	750	900		FS	FT	A2	A4
MKSM 	60		x	x	x	x	x	x		x				x	x		
	85		x		x	x	x	x		x				x	x		
	110		x	x	x	x	x	x		x				x	x		
			x		x	x	x	x		x						x	

Type	Side height in mm	Widths in mm												Surface / material			
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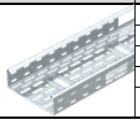
IKS 	60		x		x	x	x							x			

Type	Side height in mm	Widths in mm												Surface / material			
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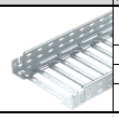
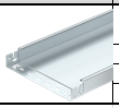
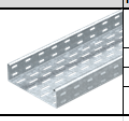
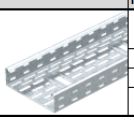
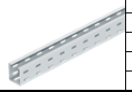
SKSM 	60		x	x	x	x	x	x		x				x	x		
			x		x	x	x	x		x						x	x
	85		x		x	x	x	x		x				x	x		
	110		x	x	x	x	x	x		x				x	x		

Type	Side height in mm	Widths in mm												Surface / material			
		50	75	100	150	200	300	400	500	550	600	750	900	FS	FT	A2	A4
SKSMU 	60			x	x	x	x	x	x		x			x	x		
				x		x	x	x	x		x					x	
	85			x		x	x	x	x		x			x	x		
	110			x	x	x	x	x	x		x			x	x		

Type	Side height in mm	Widths in mm												Surface / material			
		50	100	150	200	300	400	500	550	600	750	900		FS	FT	A2	A4
EKS 	60		x		x	x	x	x		x				x			
			x		x	x	x	x		x	x	x			x		

Type	Side height in mm	Widths in mm												Surface / material			
		50	100	150	200	300	400	500	550	600	750	900		FS	FT	A2	A4
DKS 	60		x		x	x	x	x		x				x	x		
			x		x	x	x									x	x
	85		x		x	x	x	x		x					x		

Type	Side height in mm	Widths in mm												Surface / material			
		50	75	100	150	200	300	400	500	550	600	750	900	FS	FT	A2	A4
RKSM 	35			x		x	x							x			
	60			x	x	x	x	x	x		x			x	x	x	x

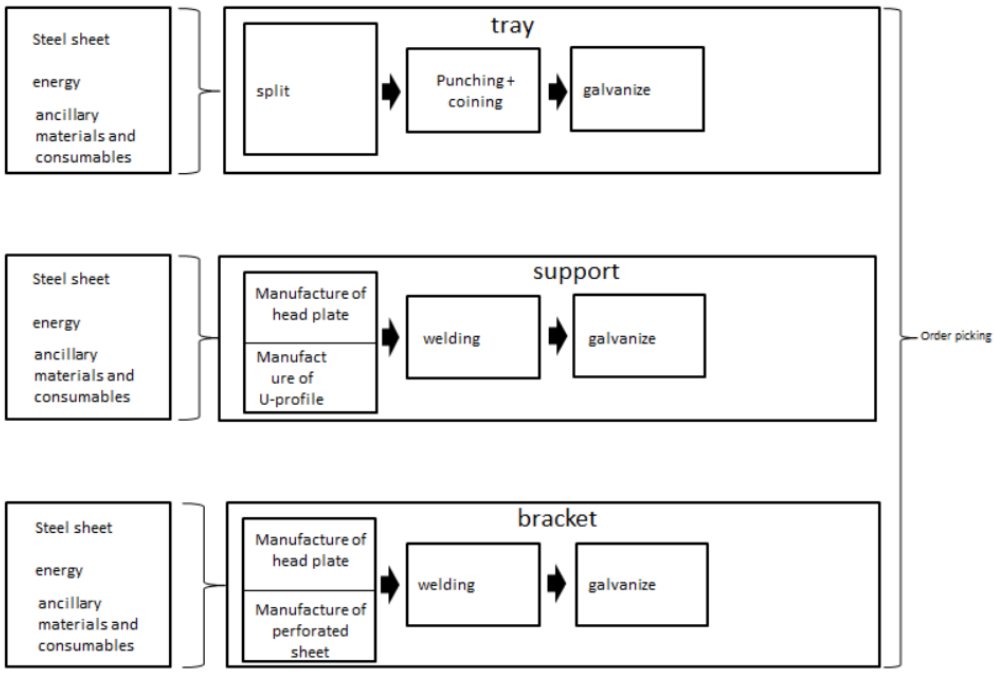
Type	Side height in mm	Widths in mm												Surface / material			
		50	75	100	150	200	300	400	500	550	600	750	900	FS	FT	A2	A4
RKS 	35	x												x			
	60	x	x											x			

Product description

Cable tray with quick connections, including all the relevant connection components for time-saving and economic installation, with beaded straight base perforation (7 x 20 mm), for bracket mounting. From 200 mm width with transverse beading (7 x 32 mm) for cable ventilation and easy installation.
With 11 mm perforation for direct threaded rod suspension. Continuous side perforation (7 x 20 mm) as connector perforation.
The stock length is 3,050 mm. The usable length is 3,000 mm when combined.

For a detailed product description refer to the manufacturer specifications at www.obo-bettermann.com or the product specifications of the respective offer/quotation.

Product manufacture



Application

The cable tray systems are used for the safe routing of cables and lines in electrical installations in different fields of industry and the private sector.

Management systems

The following management systems are in place:

- Quality management system to DIN EN ISO 9001:2015
- Environmental management system to DIN EN ISO 14001:2015

Additional information

Material thickness: 1.5 mm
Height of cable tray system: 110 mm
Width of cable tray system: 600 mm
Loadbearing capacity as a function of suspension spacing (1.5 m): 3 kN/m
Mass per m: 13.1 kg

For additional verification of applicability or conformity refer to the CE marking and the documents accompanying the product, if applicable.

2 Materials used

Primary materials

The primary materials used are listed in the LCA (see Section 7).

Declarable substances

The product contains no substances from the REACH candidate list (declaration dated 09.01.2019).

All relevant safety data sheets are available from the company OBO Bettermann Produktion Deutschland GmbH & Co. KG .

3 Construction process stage

Processing recommendations, installation

Observe the instructions for assembly/installation, operation, service/maintenance and disassembly. See www.obo-bettermann.com

4 Use stage

Emissions to the environment

No emissions to indoor air, water and soil are known (if applicable, VOC emissions).

Reference service life (RSL)

The RSL information was provided by the manufacturer. The RSL shall refer to the declared technical and functional performance of the product within the building. It shall be established in accordance with specific rules set out in the European product standards and shall also take into account ISO 15686-1, -2, -7 and -8. Where European product standards provide guidance on determining RSL, such guidance shall have priority. If it is not possible to determine the service life as the RSL in accordance with ISO 15686, the table “Nutzungsdauern von Bauteilen zur Lebenszyklusanalyse nach BNB” (service life of building components for life cycle analysis in accordance with the sustainable construction evaluation system) can be used. For further information and explanations refer to www.nachhaltigesbauen.de.

For this EPD the following applies:
The reference service life (RSL) can be determined for a “cradle to gate with options” EPD only if all of the modules A1-A3 and B1-B5 are specified;
The reference service life (RSL) of the Cable tray systems from OBO Bettermann Produktion Deutschland GmbH & Co. KG is not specified.

5 End-of-life stage

Possible end-of-life stages

The Cable tray system is shipped to central collecting points. There the products are generally shredded and sorted into their original pure components. The end-of-life stage depends on the site where the products are used and is therefore subject to the local regulations. Observe the locally applicable regulatory requirements.

This EPD represents the end-of-life modules according to the market situation. Specific parts of steel are recycled. Residual fractions are sent to landfill.

Disposal routes

The LCA includes the average disposal routes.

All life cycle scenarios are detailed in the Annex.

6 Life Cycle Assessment (LCA)

Environmental product declarations are based on life cycle assessments (LCAs) which use material and energy flows for the calculation and subsequent representation of environmental impacts.

Such a life cycle assessment was developed as the basis for the Cable tray system. The LCA is in conformity with EN 15804 and the international standards DIN EN ISO 14040, DIN EN ISO 14044, ISO 21930 and EN ISO 14025.

The LCA is representative of the products presented in the Declaration and the specified reference period.

6.1 Definition of goal and scope

Goal

The goal of the LCA is to demonstrate the environmental impacts of Cable tray systems. In accordance with EN 15804, the environmental impacts covered by this Environmental Product Declaration are presented for the entire product life cycle in the form of basic information. Apart from these, no other environmental impacts have been specified/presented.

Data quality, data availability and geographical and time-related system boundaries

The specific data originate exclusively from the fiscal year 2018. They were collected on-site at the plant located in RUS-117246 105 Moscow and originate in parts from company records and partly from values directly obtained by measurement. In addition, specific data from pre-suppliers were collected and taken into account.

The generic data originate from the “GaBi ts” software (Version 8.70.18), "Professional Datenbank und Baustoff Datenbank" (professional data base and building materials data base). The last update of both databases was in 2018. Data from before this date originate also from this databases and are not more than 4 years old. No other generic data were used for the calculation.
Data gaps were either filled with comparable data or conservative assumptions, or the data were cut off in compliance with the 1% rule.
The life cycle was modelled using the sustainability software tool “GaBi ts” for the development of life cycle assessments.

Scope / system boundaries	The system boundaries refer to the supply of raw materials and purchased parts, manufacture/production and end-of-life stage of the Cable tray systems (cradle to gate with options). No additional data from pre-suppliers or other sites were taken into consideration.
Cut-off criteria	All company data collected, i.e. all commodities/input and raw materials used, the thermal energy and electricity consumption, were taken into consideration except for packaging, detergents and flux. The boundaries cover only the product-relevant data. Building sections/parts of facilities that are not relevant to the manufacture of the products, were excluded. The transport distances of the pre-products for 100% of the mass of the Cable tray system were taken into consideration. As the pre-products are delivered by hauliers, capacity utilisation is assumed to be high (85%). The criteria for the exclusion of inputs and outputs as set out in EN 15804 are fulfilled. It can be assumed that the total of negligible processes per life cycle stage does not exceed 1 percent of the mass/primary energy. This way the total of negligible processes does not exceed 5 percent of the energy and mass input. The life cycle calculation also includes material and energy flows that account for less than 1 percent.

6.2 Inventory analysis

Goal	All material and energy flows are described below. The processes covered are presented as input and output parameters and refer to the declared/functional units.
Life cycle stages	The Annex shows the entire life cycle of the Cable tray systems. The product stage “A1 – A3”, construction process stage “A4 – A5”, end-of-life stage “C1 – C4” and the benefits and loads beyond the system boundaries ”D” are considered.
Benefits	The below benefits have been defined as per EN 15804: • Benefits from recycling
Allocation procedures Allocation of co-products	The manufacture of Cable tray systems does not produce any allocations.
Allocations for re-use, recycling and recovery	If the Cable tray systems are reused/recycled and recovered during the product stage (rejects), the units are shredded as necessary and then sorted into their original pure components. This is realised by various process plants, e.g. magnetic separators. The system boundaries of the Cable tray systems were set following their disposal, reaching their end-of-waste status.

Allocations beyond life cycle boundaries

Use of recycled materials in the manufacturing process was based on the current market-specific situation. In parallel to this, a recycling potential was taken into consideration that reflects the economic value of the product after recycling (recyclate) .
The system boundary set for the recycled material refers to collection.

Secondary material

The use of secondary material in module A3 by the company OBO Bettermann Produktion Deutschland GmbH & Co. KG was not considered. Secondary material is not used.

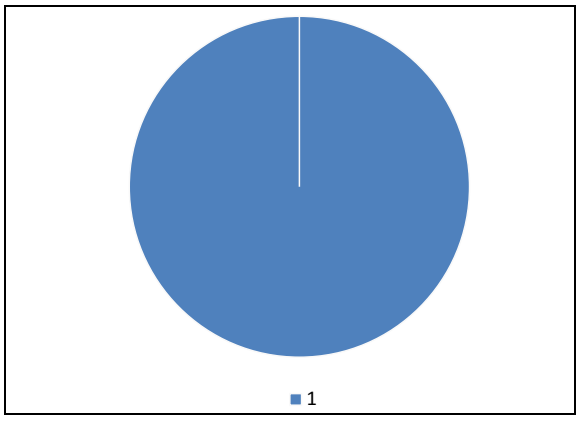
Inputs

The LCA includes the following production-relevant inputs:

Energy
The electricity mix is based on “Strommix Ungarn” (Hungary electricity mix) and “Strommix Indien” (India electricity mix). Gas is based on “Erdgas Ungarn“ (Hungary natural gas) and “Erdgas Indien“ (India natural gas).
A portion of the process heat is used for space heating at the production site. However, this cannot be quantified, so a “worst case” figure was used for the product.

Water
The water consumed by the individual process steps for the production of the Cable tray systems amounts to a total of 0.04 ml per running metre of the unit.
The consumption of fresh water specified in Section 6.3 originates (among others) from the upstream processes of the pre-products.

Raw material/pre-products
The chart below shows the share of raw materials/pre-products in %.



No.	Material	Mass in %
1	Sheet steel	100

Ancillary materials and consumables
68.2 g ancillary materials and consumables are required for 1 running metre of Cable tray system.

Product packaging
Packaging was not included in the calculation due to its very marginal quantity.

Outputs

The LCA includes the following production-relevant outputs per 1 running metre of Cable tray system :

Waste
Secondary raw materials were included in the benefits.
See Section 6.3 Impact assessment.

Waste water
The manufacture of 1 running metre of Cable tray system does not produce any waste water.

6.3 Impact assessment

Goal

The impact assessment covers both inputs and outputs. The impact categories applied are named below:

Impact categories

The models for impact assessment were applied as described in EN 15804-A1.
The impact categories presented in the EPD are as follows:

- Depletion of abiotic resources (fossil fuels);
- Depletion of abiotic resources (elements);
- Acidification of soil and water;
- Ozone depletion;
- Global warming;
- Eutrophication;
- Photochemical ozone creation.

Waste

The waste generated during the production of 1 running metre of Cable tray system is evaluated and shown separately for the fractions trade wastes, special wastes and radioactive wastes. Since waste handling is modelled within the system boundaries, the amounts shown refer to the deposited wastes. A portion of the waste indicated is generated during the manufacture of the pre-products.

Results per 1 running metre of Cable tray system							
Environmental impacts	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP	kg CO_2-equiv.	36.10	0.00	4.51E-02	5.77E-02	8.34E-03	-20.30
ODP	kg R11-equiv.	1.32E-07	0.00	2.09E-16	2.56E-13	1.88E-15	-7.74E-08
AP	kg SO_2-equiv.	8.31E-02	0.00	6.12E-05	1.64E-04	4.91E-05	-4.61E-02
EP	kg PO_4^{3-}-equiv.	7.92E-03	0.00	5.83E-06	1.53E-05	6.78E-06	-4.32E-03
POCP	kg C_2H_4-equiv.	1.19E-02	0.00	1.32E-06	1.02E-05	3.82E-06	-6.84E-03
ADPE	kg Sb-equiv.	9.46E-04	0.00	5.73E-10	2.95E-08	3.17E-09	-2.3E-06
ADPF	MJ	399.00	0.00	0.61	1.74	6.84E-02	-129.00
Use of resources	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	19.50	0.00	1.95E-03	0.61	1.07E-02	-7.97
PERM	MJ	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ	19.50	0.00	1.95E-03	0.40	1.38E-02	-7.97
PENRE	MJ	414.00	0.00	0.61	1.05	0.11	-222.00
PENRM	MJ	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	414.00	0.00	0.61	1.05	0.11	-222.00
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ	0.00	0.00	0.00	0.00	0.00	0.00
FW	m^3	12.70	0.00	2.89E-03	0.28	5.96E-03	-5.48
Waste categories and output material flows	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	6.48	0.00	4.14E-03	13.30	0.54	-1.36
RWD	kg	1.48E-03	0.00	1.39E-07	1.74E-04	1.61E-06	-3.61E-06
Cru	kg	0.00	0.00	0.00	0.00	0.00	0.00
MFR	kg	0.39	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00
EEE	MJ	0.00	0.00	0.00	0.00	0.00	0.00
EET	MJ	0.00	0.00	0.00	0.00	0.00	0.00

Key:
GWP – global warming potential **ODP** – ozone depletion potential **AP** - acidification potential of soil and water **EP** - eutrophication potential **POCP** - photochemical ozone creation potential **ADPE** - abiotic depletion potential – non fossil resources **ADPF** - abiotic depletion potential – fossil resources **PERE** - use of renewable primary energy **PERM** - use of renewable primary energy resources **PERT** - total use of renewable primary energy resources **PENRE** - use of non-renewable primary energy **PENRM** - use of non-renewable primary energy resources **PENRT** - total use of non-renewable primary energy resources **SM** - use of secondary material **RSF** - use of renewable secondary fuels **NRSF** - use of non-renewable secondary fuels **FW** - net use of fresh water **HWD** - hazardous waste disposed **NHWD** – non-hazardous waste disposed **RWD** - radioactive waste disposed **CRU** - components for re-use **MFR** - materials for recycling **MER** - materials for energy recovery **EEE** - exported electrical energy **EET** - exported thermal energy

6.4 Interpretation, LCA presentation and critical review

Evaluation

Calculation of the scenarios was based on a service life of < 50 years. The scenarios of the research project "EPDs für transparente Bauelemente“ (EPDs for transparent building components) were furthermore used (1).

In almost all categories the environmental impacts of 1 running metre of cable tray system are dominated by the sheet steel used. The environmental impacts from expenditure for production and transport are very marginal.

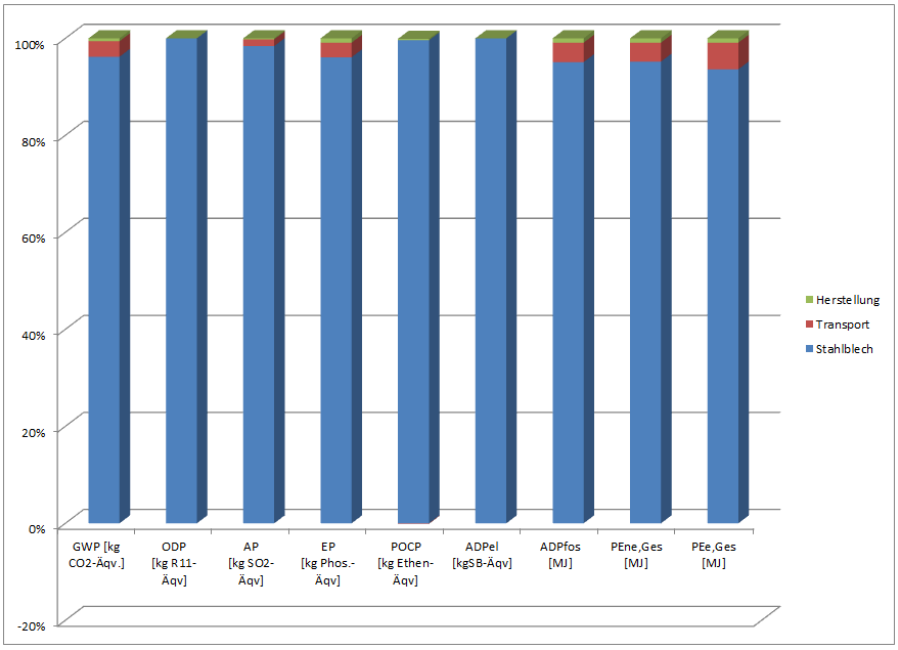
As regards the recycling of cable tray systems, for steel almost 40 - 56 % of the environmental impacts during manufacture can be assigned as benefits to scenario D.

The environmental impacts have multiplied as compared to the results presented in the EPD prepared 5 years ago. The reason for this is that the weight of the cable tray system assessed five years ago was many times lighter.

The diagram below shows the allocation of the main environmental impacts.

The values obtained from the LCA calculation are suitable for the certification of buildings, as necessary.

Diagram



Report

The LCA underlying this EPD was developed according to the requirements of DIN EN ISO 14040 and DIN EN ISO 14044 as well as EN 15804 and EN ISO 14025. It is not addressed to third parties for confidentiality reasons. It is deposited with the ift Rosenheim. The results and conclusions reported to the target group are complete, correct, without bias and transparent. The results of the study are not designed to be used for comparative statements intended for publication.

Critical review

The LCA and of the report were critically reviewed by Frank Stöhr, an independent verifier, in the course of verification of the EPD.

7 General information regarding the EPD

Comparability

This EPD was prepared in accordance with EN 15804 and is therefore only comparable to those EPDs that also comply with the requirements set out in EN 15804.
Any comparison must refer to the building context and the same boundary conditions of the various life cycle stages.
For comparison of construction product EPDs, the rules set out in EN 15804 (Clause 5.3) apply.

The detailed results of the products were summarised on the basis of conservative assumptions and differ form the average results. Identification of the product groups and the resulting variations are documented in the background report.

Communication

The communications format of this EPD meets the requirements of EN 15942:2012 and is therefore also the basis for B2B communication. Only the nomenclature has been changed according to EN 15804.

Verification

Verification of the Environmental Product Declaration is documented in accordance with the ift "Richtlinie zur Erstellung von Typ III Umweltproduktdeklarationen" (Guidance on preparing Type III Environmental Product Declarations) in accordance with the requirements set out in EN ISO 14025.

The Declaration is based on the PCR documents “PCR Part A” PCR-A-0.2:2018 and “cable support systems for cables and lines” PCR-KTS-1.1:2016

The European standard EN 15804 serves as the core PCR [a)]
Independent verification of the declaration and statements according to EN ISO 14025:2010 ☒ internal ☐ external
Independent third party verifier: [b)] Frank Stöhr
[a)] Product category rules [b)] Optional for business-to-business communication, Mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)

Revisions of this document

No.	Date	Note:	Practitioner of the LCA	Verifier
1	02.04.2019	Internal verification and approval	Zwick	Stöhr
2				
3				

8 Bibliography

1. **Research project.** *Research project "EPDs für transparente Bauelemente" (EPDs for transparent building components) -Final report.* Rosenheim ift Rosenheim GmbH, 2011 SF-10.08.18.7-09.21/II 3-F20-09-1-067.
2. **Klöpffer, W und Grahl, B.** *Ökobilanzen (LCA).* Weinheim: Wiley-VCH-Verlag, 2009.
3. **Hütter, A.** *Verkehr auf einen Blick. (Transport at a glance).* Wiesbaden : Federal Statistical Office, 2013
4. **Eyerer, P. and Reinhardt, H.-W.** *Ökologische Bilanzierung von Baustoffen und Gebäuden - Wege zu einer ganzheitlichen Bilanzierung. (LCA of building materials and buildings - Routes to integrated LCA).* Basel : Birkhäuser Verlag, 2000.
5. **Gefahrstoffverordnung – GefStoffV (Hazardous substances regulation)** *Verordnung zum Schutz vor Gefahrstoffen (Regulation on protection against hazardous substances),* Berlin: BGBI. (Federal Gazette) I S. 3758, 2017.
6. **Chemikalien-Verbotsverordnung – ChemVerbotsV (Chemicals Prohibition Regulation)** *Verordnung über Verbote und Beschränkungen des Inverkehrbringens gefährlicher Stoffe, Zubereitungen und Erzeugnisse Chemikaliengesetz (Regulation on bans and restrictions of the placing on the market of hazardous substances, formulations and products covered by the Chemicals Law),* Berlin: BGBI. (Federal Gazette) I S. 1328, 2017.
7. **DIN EN ISO 14040 (2018-05)** *Environmental management - Life cycle assessment - Principles and framework.* Berlin: Beuth Verlag GmbH, 2018.
8. **DIN EN ISO 14044 (2006-10)** *Environmental management - Life cycle assessment - Requirements and guidelines.* Berlin: Beuth Verlag GmbH, 2006.
9. **EN ISO 14025:2011-10.** *Umweltkennzeichnungen und -deklarationen Typ III Umweltdeklarationen - Grundsätze und Verfahren.(Environmental labels and declarations - Type III environmental declarations - Principles and procedures)* Berlin: Beuth Verlag GmbH, 2011.
10. **OENORM S 5200:2009-04-01** *Radioactivity in construction materials.* Berlin: Beuth Verlag GmbH, 2009.
11. **PCR Part B – cable support systems for cables and lines.** *Product category rules for environmental product declarations as per EN ISO 14025 and EN 15804* Rosenheim: ift Rosenheim, 2016
12. **EN 15942:2012-01.** *Sustainability of construction works - Environmental product declarations - Communication format business-to-business.* Berlin: Beuth Verlag GmbH, 2012.
13. **EN 15804:2012+A1:2013.** *Sustainability of construction works - Environmental product declarations - Rules for the product categories.* Berlin: Beuth Verlag GmbH, 2013.
14. **RAL-Gütegemeinschaft Fenster und Haustüren e.V.; ift Institut für Fenstertechnik (Quality Assurance Association Windows and Doors)-.** *Leitfaden zur Planung und Ausführung der Montage von Fenstern und Haustüren (Guide on planning and implementing the installation of windows and external pedestrian doorsets).* Frankfurt: RAL-Gütegemeinschaft Fenster und Haustüren e.V. (Quality Assurance Association Windows and Doors), 2014
15. **Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety) Berlin,** *Leitfaden Nachhaltiges Bauen (Guidance on Sustainable Building)* Berlin: s.n., 2016.
16. **DIN EN 13501-1:2010-01.** *Fire classification of construction products and building elements - Part 1: Classification using test data from reaction to fire tests* Berlin: Beuth Verlag GmbH, 2010.
17. **DIN EN ISO 16000 Part 6, 9 11** *Indoor air: Determination of the emission of volatile organic compounds from building products and furnishing* Berlin: Beuth Verlag GmbH, 2006.
18. **ISO 21930:2017-07.** *Sustainability in building construction - Environmental declaration of building products* Berlin: Beuth Verlag, 2017.
19. **Bundesimmissionsschutzgesetz – BImSchG (Federal Immission Law)** *Gesetz zum Schutz vor schädlichen Umwelteinwirkungen durch Luftverunreinigungen, Geräusche, Erschütterungen und ähnlichen Vorgängen (Law on harmful environmental impacts by air contamination, noise, vibrations and similar processes.* Berlin: BGBI. (Federal Gazette) I S. 3830, 2017.
20. **Chemikaliengesetz – ChemG (Chemicals Act** *Chemikaliengesetz – ChemG (Chemicals Act) Gesetz zum Schutz vor gefährlichen Stoffen (Law on protection against hazardous substances Unterteilt sich in Chemikaliengesetzt und eine Reihe von Verordnungen; hier relevant (subdivided into Chemicals Law and a series of regulations; of relevance here: Gesetz zum Schutz vor gefährlichen Stoffen (Law on protection against hazardous substances)* Berlin: BGBI. (Federal Gazette) I S. 1146, 2017.
21. **IKP Universität Stuttgart and PE Europe GmbH** *GaBi 8: Software and database for LCA.* Leinfelden-Echterdingen: s.n, 2017
22. **DIN EN 16034:2014-12** *Pedestrian doorsets, industrial, commercial, garage doors and openable windows - Product standard, performance characteristics - Fire resistance and/or smoke control characteristics.* Berlin: Beuth Verlag GmbH, 2014.
23. **prEN 17213:2018-01.** *Windows and doors - Environmental product declarations - Product category rules for windows and doors.* Berlin: Beuth Verlag GmbH, 2018.
24. **DIN EN 14351-2:2019-01.** *Windows and doors - Product standard, performance characteristics - Part 2: Internal pedestrian doorsets without resistance to fire/or smoke leakage characteristics.* Berlin: Beuth Verlag GmbH, 2019.
25. **DIN EN 14351-1:2016-12.** *Windows and doors - Product standard, performance characteristics - Part 1: Windows and external pedestrian doors without resistance to fire and/or smoke leakage characteristics.* Berlin: Beuth Verlag GmbH, 2016.
26. **ETAG 010.** *ETAG 010 - Self supporting translucent roof kits.* Brussels: EOTA, 2004.
27. **DIN EN ISO 12457 Part 1-4** *Characterization of waste - Leaching; Compliance test for leaching of granular waste materials and sludges - Part 1-4:* Berlin: Beuth Verlag GmbH, 2003.
28. **ift-Guideline NA-01/3.** *Allgemeiner Leitfaden zur Erstellung von Typ III Umweltproduktdeklarationen (Guidance on preparing Type III Environmental Product Declarations)* Rosenheim ift Rosenheim GmbH, 2015
29. **PCR Part A.** *Product category rules for environmental product declarations as per EN ISO 14025 and EN 15804.* Rosenheim : ift Rosenheim, 2018.

9 Annex

Description of life cycle scenarios for the Cable tray system

Product stage			Con-struction stage		Use stage							End-of-life stage				Benefits and loads from beyond the system boundaries
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material supply	Transport	Manufacture	Transport	Construction/Installation	Use	Inspection, maintenance, clean-ing	Repair	Exchange / Replacement	Improvement / Modernisation	Operational energy use	Operational water use	Deconstruction	Transport	Waste management	Disposal	Re-use Recovery Recycling potential
✓	✓	✓	—	—	—	—	—	—	—	—	—	✓	✓	✓	✓	✓

The scenarios were based on information provided by the manufacturer. The scenarios were furthermore based on the research project “EPDs for transparent building components (1).

Note: The standard scenarios selected are presented in bold type. They were also used for calculating the indicators in the summary table.

- ✓ Included in the LCA
- — Not included in the LCA

C1 Deconstruction

No.	Scenario	Description
C1	Deconstruction	**Cable tray system 99 % deconstruction;** **Further deconstruction rates are possible, give adequate reasons depends on the building.**

The energy consumed for deconstruction is negligible. Any arising consumption is marginal.

Since only one scenario is used, the results are shown in the summary table.

In case of deviating consumption the removal of the products forms part of the site management and is covered at the building level.

C2 Transport

No.	Scenario	Description
C2	Transport	**Transport to collecting point using 32 t truck (Euro 6), 85 % capacity utilisation, 50 km distance**

Since only one scenario is used, the results are shown in the summary table.

C3 Waste management

No.	Scenario	Description
C3	Disposal	**Share for recirculation of materials:** • **97% steel in steel melt** • **Remainder to disposal site**

As Cable tray systems are placed on the European market, the disposal scenario is based on average European data sets.

The below table presents the disposal processes and their percentage by mass/weight. The calculation is based on the above mentioned shares in percent related to the declared unit of the product system.

C3 Disposal	Unit	C3
Collection process, collected separately	kg	13.0
Collection process, collected as mixed construction waste	kg	0.1
Recovery system, for re-use	kg	0.0
Recovery system, for recycling	kg	12.6
Recovery system, for energy recovery	kg	0.0
Disposal	kg	0.5

Since only one scenario is used, the results are shown in the summary table.

C4 Disposal		
No.	**Scenario**	**Description**
C4	**Disposal**	**The non-recordable amounts and losses within the re-use/recycling chain (C1 and C3) are modelled as “disposed”.**

The consumption of scenario C4 results from physical pre-treatment, waste recycling and management of the disposal site. The benefits obtained here from the substitution of primary material production are allocated to module D, e.g. electricity and heat from waste incineration.

Since only one scenario is used, the results are shown in the summary table.

D Benefits and loads from beyond the system boundaries		
No.	**Scenario**	**Description**
D	**Recycling potential**	**Steel scrap from C3 excluding the scrap used in A3 replaces 60 % of steel;**

The values in module D result from deconstruction at the end of service life.

Since only one scenario is used, the results are shown in the summary table.

Imprint

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