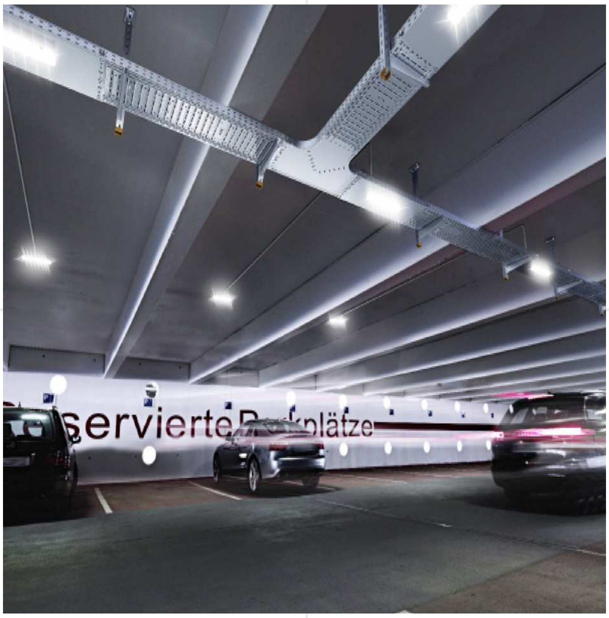
EPD Cable tray system

Long version
Environmental **P**roduct **D**eclaration
in accordance with DIN ISO 14025 and EN 15804

„Magic“ cable tray system, side height 60 mm, perforated, strip galvanised (Company-EPD)

OBO BETTERMANN GmbH & Co. KG



Declaration code
EPD-KTS-GB-17.0
April 2014

ift ROSENHEIM

Environmental Product Declaration in accordance with ISO 14025 and EN 15804

Cable tray systems for electrical installations

Detailed version

Programme operator	**ift Rosenheim GmbH** Theodor-Gietl-Strasse 7-9 D-83026 Rosenheim
Practitioner of the LCA	**Life Cycle Engineering Experts GmbH** Berliner Allee 58 64295 Darmstadt
Declaration holder	**OBO BETTERMANN GmbH & Co. KG** Hüinger Ring 52 D-58710 Menden
Declaration code	EPD-KTS-GB-17.0
Designation of declared product	"Magic" cable tray system, side height 60 mm, perforated, strip-galvanised
Scope	Cable tray systems are used for the safe routing of cables and lines in electrical installations
Basis	This EPD was prepared on the basis of EN ISO 14025:2011 and EN 15804:2012+A1:2013. The "Allgemeiner Leitfaden zur Erstellung von Typ III Umweltproduktdeklarationen" (Guidance on preparing Type III Environmental Product Declarations) also applies. This Declaration is based on the PCR document PCR-KTS-1.0 : 2014 (Cable management/Routing systems).
Validity	This verified Environmental Product Declaration applies solely to the specified products and is valid for a period of 5 years from the date of approval. Publication date: 01 April 2014 | Last revision: 18 December 2015 | Next revision: 01 April 2019
LCA basis	The LCA was prepared in accordance with DIN EN ISO 14040 and DIN EN ISO 14044. The data base includes the data gathered from the production site of OBO BETTERMANN GmbH & Co. KG as well as generic data derived from the "GaBi 6" data base. LCA calculations were based on the "cradle to gate" life cycle including all upstream processes (e.g. raw material extraction, etc.). In addition the modules "Disposal stage" and "Benefits and loads beyond the system boundaries" are included.
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	Diana Fischer, External Verifier

1 Product definition

Product definition

The EPD forms part of the product group Cable management/Routing systems and applies to:

"Magic" strip-galvanised cable tray system produced by the company OBO BETTERMANN GmbH & Co. KG

The LCA was prepared using the declared unit:

1 running metre (rm) of Magic cable tray system

The average mass per running metre of cable tray system is 3.82 kg.
The conversion factor for 1 kg is 0.26178 rm/kg.

Based on weight per rm, the results of the LCA can be applied linearly to other types of tray such as MKS-Magic, SKS-Magic, IKS-Magic and RKS-Magic.

Product description

Magic cable tray system, side height 60 mm, perforated with quick connection system, including all the relevant connection components for time-saving and economic installation, with beaded straight base perforation (7 x 20 mm, or 7 x 79 mm for MKS, SKS, IKS) for bracket mounting. From 200 mm width with cross beading (7 x 32 mm) for duct ventilation and easy installation. With 11 mm perforation for direct threaded rod suspension. Continuous side perforation (7 x 20 mm) as connector perforation. Strip-galvanised surface finish.

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 and the product descriptions at www.obo-bettermann.com.

Application

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

Management systems (optional)

The following management systems are in place:

- Quality management system to DIN EN ISO 9001
- Environmental management system to DIN EN ISO 14001
- Safety at work management system to OHSAS 18001

Additional information

Construction technology

Material thickness:	1 mm
Height of cable tray system:	60 mm
Width of cable tray system:	300 mm
Loadbearing capacity as a function of suspension spacing (1.5 m):	1.5 kN/m
Mass per m:	3.82 kg/m

2 Materials used

2.1 Primary materials

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

2.2 Declarable substances

Declarable substances The product contains no substances from the REACH candidate list (as of 16 December 2013).

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

3 Product stage

Product manufacture

Tray

The production of the Magic family is based on the new innovative and patented DUO-Plus manufacturing process and takes place at the company's site in Menden (Germany). This manufacturing process ensures a very high loadbearing capacity and structural resistance of the trays. During the DUO-Plus manufacturing process two sheets are joined by laser welding and the base structure is stamped and coined into the tray. The combination of laser weld and innovative bead structure allows high stability values to be achieved.

Standards-compliant durability and ageing tests with salt spray exposure have shown very clearly that the laser weld is much more resistant than the standard material.

As part of the VDE test in accordance with EN 61537, the laser weld was also subjected to an impact test, which it successfully passed. The laser weld contributes to the consolidation of the base structure. Standards-compliant, recorded tests conducted on the tensile testing machine showed that, if anywhere, cracks will occur in the base material – never in the laser weld.

Suspended support

The suspended support is manufactured at the company's production site in Hungary. It is composed of a perforated metal sheet (head plate) and a perforated U-profile. The U-profile is manufactured in Germany. The sheet metal is perforated and rolled into a U-profile. The head plate and the U-profile are welded together in Hungary and then hot-dip galvanised in the in-house hot-dip galvanising shop.

Wall and support bracket

The wall and support bracket is manufactured at the company's production site in Hungary. It is likewise composed of a head plate and a metal sheet that is folded and perforated on site. As with the suspended support, the metal sheet and the head plate are welded together and galvanised.

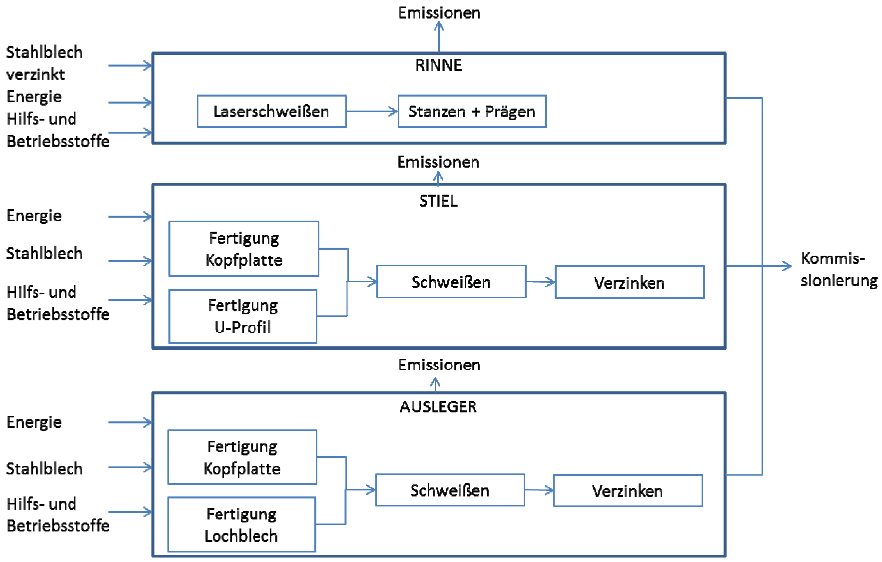


Figure 1: Production process

4 Construction process stage

Processing recommendations, installation

The cable tray is suitable for cable routing in all applications, from low-voltage cabling to power supply, data cables and telecommunications networks. A full, intelligent range of system components is offered, for a perfect solution for every situation.

Whether the system is used in dry inner areas or in aggressive atmospheres, the wide range of finishes and materials available means that reliable corrosion protection is always assured. Due to the large number of holes (30% or more by area), the perforated cable trays MKSM and SKSM are ideally suited for use beneath sprinkler systems. The IKSM cable tray also has large openings in the side rail, which can be used for cable entries or exits.

The complete system is supplemented by plug-in, screwless fittings with a Magic connection. The system also includes all types of connectors and additional accessories such as barrier strips, joint plates, mounting plates and covers. These small parts are not covered by this EPD.

Installation instructions are available for download from the OBO website (www.obo.de).

5 Use stage

Emissions to the environment

As part of an EU risk assessment, zinc and zinc compounds were assessed in terms of their impact on human health and the environment. The most important conclusions of the risk assessment were:

There are no health risks for the users) of zinc products or for those who produce or process zinc or zinc products. There are no restrictions on the use of zinc and zinc products. There is no obligation to mark the declared products.

The runoff rates of organic materials are negligible.
No further emissions to indoor air, water and soil are known.

Reference service life (RSL)

The RSL does not need to be documented for the EPD of the company OBO BETTERMANN GmbH & CO. KG. because the declaration does not cover the entire life cycle (Modules A1-A3, C1-C4 and D). If the product is used as instructed, a service life of >50 years can be assumed, because it is installed inside buildings and not exposed to weathering (cf. service life of building components for LCAs in accordance with the sustainable construction evaluation system [BNB] as of 11/2011, interior wall claddings [Code No.: 345.311]).

6 End-of-life stage

Possible end-of-life stages

The Magic cable tray system can be re-used / recycled. Process and new scrap resulting from the manufacturing and processing of the Magic product are fed back into the production process in their entirety. The waste and old scrap from demolition, conversion and renovation work on building sites is collected and fed back into steel production processes via the recycling industry.

Disposal routes

The LCA includes the average disposal routes.
The EWC code for steel is: 17 04 05.

All life cycle scenarios are detailed in the Annex.

7 Life Cycle Assessment (LCA)

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

As the basis for this, a Life Cycle Analysis (LCA) was prepared for the Magic cable tray system. The LCA was developed in accordance with EN 15804 and the requirements set out in 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.

7.1 Definition of goal and scope

Objective

The goal of the LCA is to demonstrate the environmental impacts of the Magic cable tray system. The environmental impacts are presented in accordance with EN 15804 on the basis of the following building life cycle stages: product stage (modules A1 – A3) and end-of-life stage (modules C1 – C4). In addition the "Benefits and loads beyond the system boundaries" (module D) are presented. Apart from these, no other environmental impacts have been specified / presented.

Data quality, data

The specific data used refer only to the fiscal year 2012 of the company OBO

availability, geographical and time-related system boundaries

BETTERMANN GmbH & Co. KG. They originate partly from company records and partly from direct measurements. The validity of the data was checked by the LCEE.

The generic data originate from the GaBi 6 (2013) software "Professional Datenbank und Baustoff Datenbank" (professional data base and building materials data base). The last update of both data bases was in 2013. The pro-rata energy sources for the HU energy mix originate also from these data bases. Furthermore, the energy used in Germany is supplied only from renewable sources (“Grünstrom”). No other generic data were used for the calculation.

Data gaps were filled with either 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 6 (2013)" for the development of Life Cycle Assessments.

The system boundaries refer to the entire manufacturing process of the product (cradle to gate) and/or the end-of-life stage and benefits and loads beyond the system boundary (information module D). The boundaries cover only the product-relevant data. All company data collected, i.e. all commodities/raw materials and electricity consumption, were taken into consideration. Due to the materials used, steel was used as recyclate for the end-of-life stage. The products are shipped to central collecting points. There they are usually sorted into their original pure components. Steel is recycled. Residual fractions are thermally recycled.
Raw materials are modelled as generic data and include average transport distance data.

Scope and system boundaries

The system boundaries refer to the supply of raw materials and purchased parts as well as the manufacture/production (cradle to gate) of the cable tray systems. Furthermore the end-of-life stage and benefits beyond the system boundaries are taken into account.

Cut-off criteria

All company data collected, i.e. all commodities/input and raw materials used, thermal energy, and electricity consumption, were taken into consideration.

The boundaries cover only the production-relevant data. Parts of buildings / facilities were excluded.

The transport distances of the primary products/pre-products for at least 95% of the mass of the Magic cable tray system were taken into consideration. The remaining transport distances of the primary products/pre-products to the Menden plant were not taken into consideration.

It can be assumed that the total of negligible processes per life cycle stage does not exceed 5 percent of the mass/primary energy. The life cycle calculation also includes material and energy flows that account for less than 1 percent.

7.2 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.

The models of the unit processes used for the LCA have been documented in a transparent manner.

Life cycle stages

Product stage (A1 – A3), end-of-life stage (C1 – C4), and 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 the Magic cable tray system did not produce any allocations.

Allocations for re-use, recovery and recycling

If the Magic cable tray system is re-used / recovered / recycled during the product stage (rejects), the units are shredded as necessary and then sorted into their original pure components. This is realised using various process plants e.g. magnetic separators. The system boundaries of the Magic cable tray system were set following disposal, with termination of their waste characteristics.

Allocations based on 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).

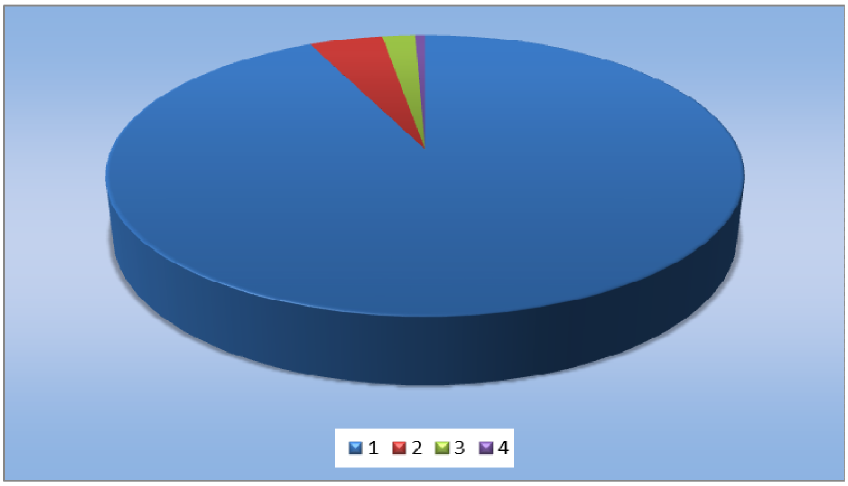
Inputs

The LCA includes the following production-relevant inputs:

Energy
For the production site in Hungary the Hungarian electricity mix was used as the basis for the energy used. The energy used by the production site in Germany is supplied only from renewable sources (“Grünstrom”).

Water
No water is consumed by the individual production steps in the manufacture of the Magic cable tray systems.
The consumption of fresh water specified in Section 7.3 originates from (among other things) the upstream processes of the primary products/pre-products.

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



No.	Material	Mass in %
1	Sheet steel	93.0
2	Sheet steel (head plate)	4.4
3	Zinc	2.0
4	Steel wire	< 1.0

Ancillary materials and consumables:

The ancillary materials and consumables used for the manufacture of one running metre of cable tray system are as follows:

Ancillary materials in kg	Cable tray system
Lubricants	0.000636
Lasgon	0.116
Inert gas	1.08
Carbon dioxide	0.00000137
Argon	0.00383
Nitrogen	0.00222
Helium	0.000344
Hydrochloric acid	0.0349
Sodium hydroxide (caustic soda) mix	0.0004
Calcium hydroxide	0.000253

Outputs

The LCA includes the following production-relevant outputs per m² of Magic cable tray system:

Waste
Secondary raw materials were included in the benefits.
See Section 7.3 - Impact assessment

Waste water
The manufacture of the Magic cable tray system produces a minor amount of waste water.

7.3 Impact assessment

Goal

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

Impact categories

The characterisation factors of the ELCD (European Reference Life Cycle Database) were used. The characterisation factors for the consumption of abiotic resources were taken from CML (Institute of Environmental Sciences, Faculty of Science, Leiden University, Netherlands).

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

Waste

The evaluation of the waste generated is shown separately for each of the three fractions, namely 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. The wastes presented are generated during the life cycle stages under consideration.

Results per m cable tray system

Environmental impacts	Unit	A1 – A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global warming potential (GWP)	kg CO_2 equiv.	11.2	-	-	-	-	-	-	-	-	-	-	0.01066	-	-	-5.02
Ozone depletion potential of stratospheric layer (ODP)	kg CFC 11 - equiv.	1.16E-9	-	-	-	-	-	-	-	-	-	-	5.11E-14	-	-	4.60E-10
Acidification potential of soil and water (AP)	kg SO_2 equiv.	0.04	-	-	-	-	-	-	-	-	-	-	4.88E-05	-	-	-0.02
Eutrophication potential (EP)	kg PO_4^{3-} equiv.	5.83E-3	-	-	-	-	-	-	-	-	-	-	1.12E-05	-	-	-1.96E-3
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg C_2H_4 equiv.	4.77E-3	-	-	-	-	-	-	-	-	-	-	-1.57E-05	-	-	-3.51E-3
Abiotic depletion potential - non-fossil resources (ADP - elements)	kg Sb-equiv.	6.30E-4	-	-	-	-	-	-	-	-	-	-	4.01E-10	-	-	-1.67E-7
Abiotic depletion potential - fossil fuels (ADP - fossil resources)	MJ	137.00	-	-	-	-	-	-	-	-	-	-	0.1471	-	-	-50.2

Use of resources	Unit	A1–A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Use of renewable primary energy - excluding renewable primary energy resources used as raw materials	MJ	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	0.94
Use of renewable primary energy resources used as raw materials (material use)	MJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total use of renewable primary energy resources (primary energy and renewable primary energy resources used as raw materials) (energy + material use)	MJ	7.7	-	-	-	-	-	-	-	-	-	-	5.80E-03	-	-	0.94
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	137.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-50.20
Use of non-renewable primary energy resources used as raw materials (material use)	MJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total use of non-renewable primary energy resources (primary energy and non-renewable primary energy resources used as raw materials) (energy + material use)	MJ	137.00	-	-	-	-	-	-	-	-	-	-	0.1476	-	-	-50.20
Use of secondary materials	kg	0.96	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Use of renewable secondary fuels	MJ	-	-	-	-	-	-	-	-	-	-	-	9.47E-07	-	-	-
Use of non-renewable secondary fuels	MJ	-	-	-	-	-	-	-	-	-	-	-	9.92E-06	-	-	-
Use of net fresh water	m³	4.175	-	-	-	-	-	-	-	-	-	-	5.52E-04	-	-	-2.35

Values that cannot be shown or are inexistent or marginal are expressed as [-]. Scenarios are described in the Annex.

Product group: Cable management/Routing systems
Declaration code: EPD-KTS-GB-17.0

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Waste categories	**Unit**	**A1 – A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	5.27E-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-3.37E-3
Non-hazardous waste disposed (municipal waste)	kg	0.135	-	-	-	-	-	-	-	-	-	-	5.20E-04	-	-	-0.08
Radioactive waste	kg	-	-	-	-	-	-	-	-	-	-	-	1.93E-07	-	-	1.45E-3
Output material flows	**Unit**	**A1–A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Materials for recycling	kg	-	-	-	-	-	-	-	-	-	-	-	-	3.67	-	-
Materials for energy recovery	kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Exported energy	MJ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Values that cannot be shown or are inexistent or marginal are expressed as [-]. Scenarios are described in the Annex.

7.4 Interpretation, LCA presentation and critical verification

Evaluation

The provision of pre-products in the form of sheet steel accounts for the largest share (approx. 94%) of the product's ozone depletion potential (GWP, 100 years). The balance (approx. 6%) results from steel processing. A total of approx. 53% of the overall GWP emissions are credited due to the end-of-life recycling of the steel.
Approx. 90% of the total use of primary energy resources is based on non-renewable energy sources, and approx. 10% on renewable energy sources.
The total use of renewable primary energy resources (PERT) is generated mainly by the upstream processes of the pre-product manufacture (Module A1). A major contributor is sheet steel production (approx. 90%). Module D does not provide any benefit, because a large amount of energy is consumed by the electric arc furnace required for the recycling process.
When evaluating the total use of non-renewable primary energy resources (PENRT), the upstream processes of the pre-product manufacture are the main contributors, with sheet steel production accounting for approx. 97%. A benefit of approx. 41% results from the recycling of the metallic pre-products.

The values shown are suitable for the certification of buildings.

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 verification

The LCA was critically verified by Mrs Diana Fischer, an independent **ift** verifier.

8 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 use the same boundary conditions for the various life cycle stages.
For the comparison of construction product EPDs, the rules set out in EN 15804 (Clause 5.3) apply.

Communication

The communications format of this EPD meets the requirements of EN 15942:2011 and is therefore also suitable as 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.

This Declaration is based on the **ift** PCR document PCR-KTS-1.0 : 2014 ("Führungssysteme für Kabel und Leitungen" – Cable management/Routing systems).

The European standard EN 15804 serves as the core PCR[a]
Independent verification of the declaration according to EN ISO 14025:2010 [b] ☐ internal ☒ external
Independent third party verifier: Diana Fischer
[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	Status note	Practitioner of the LCA	Verifier/s
1	25.03.2014	First verification and approval	T. Mielecke	P. Wortner
2	18.12.2015	External Verification	T. Mielecke	D. Fischer
3				
4				
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[24] Commission Directive 2009/2/EC
amending, for the purpose of its adaptation to technical progress, for the 31st time, Council Directive 67/548/EEC on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances
(15 January 2009)

[25] **ift** Guideline NA-01/1
Allgemeiner Leitfaden zur Erstellung von Typ III Umweltprodukt-

deklarationen (Guidance on preparing Type III Environmental Product Declarations)
ift Rosenheim, December 2012

[26] Arbeitsschutzgesetz – ArbSchG (Safety at Work Law)
Gesetz über die Durchführung von Maßnahmen des Arbeitsschutzes zur Verbesserung der Sicherheit und des Gesundheitsschutzes der Beschäftigten bei der Arbeit (Law on the implementation of occupational health and safety measures to improve the safety and health protection of employees at work), 5 February 2009 (BGBl. I p. 160, 270)

[27] 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), 26 September 2002 (BGBl. I p. 3830)

[28] 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]), 2 July 2008 (BGBl. I p.1146)

[29] Chemikalien-Verbotsverordnung – ChemVerbotsV (Chemicals Prohibition Regulation)
Verordnung über Verbote und Beschränkungen des Inverkehrbringens gefährlicher Stoffe, Zubereitungen und Erzeugnisse nach dem Chemikaliengesetz (Regulation on bans and restrictions of the placing on the market of hazardous substances, formulations and products covered by the Chemicals Law), 21 July 2008 (BGBl. I p. 1328)

[30] Gefahrstoffverordnung – GefStoffV (Hazardous substances regulation)
Verordnung zum Schutz vor Gefahrstoffen (Regulation on protection against hazardous substances), 23 December 2004 (BGBl. I p. 3758)

[31] "Cable management/Routing systems" – PCR-KTS-1.0 : 2014
ift Rosenheim, 2014

[32] Research project "EPDs für transparente Bauelemente" (EPDs for transparent building components)
ift Rosenheim, 2011

Annex: Description of life cycle scenarios for the Magic cable tray system

Product stage			Construction process stage		Use stage							End-of-life stage				Benefits and loads 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	Maintenance	Repair	Replacement	Modification/refurbishment	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” [35].

They were used for calculating the indicators in the overall table and the table in the summary.

C1 Deconstruction

No.	Scenario	Description
C1.1	**Deconstruction**	Cable tray system - 99% deconstruction; The energy consumed in deconstruction is negligible. Any arising consumption is marginal.

No relevant inputs or outputs apply to the scenario selected.
In case of deviating consumption the deconstruction of the products forms part of the site management and is covered at the building level.

C2 Transport

No.	Scenario	Description
C2.1	Transport	Transport to collecting point using 40 t truck, 80% capacity utilization, 50 km distance

C2 Transport Environmental impacts	Unit	C2.1
Global warming potential (GWP)	kg CO_2 equiv.	0.01066
Ozone depletion potential of stratospheric ozone layer (ODP)	kg R11-equiv.	5.11E-14
Acidification potential of soil and water (AP)	kg SO_2 equiv.	4.88E-05
Eutrophication potential (EP)	kg PO_4^{3-} equiv.	1.12E-05
Photochemical ozone creation potential (POCP)	kg C_2H_4 equiv.	-1.57E-05
Abiotic depletion potential - non-fossil resources (ADP - elements)	kg Sb-equiv.	4.01E-10
Abiotic depletion potential - fossil resources (ADP - fossil fuels)	MJ and Hz.	0.1471
Use of resources	**Unit**	**C2.1**
Use of renewable primary energy - excluding renewable primary energy resources used as raw materials	MJ	-
Use of renewable primary energy resources used as raw materials (material use)	MJ	-
Total use of renewable primary energy resources (primary energy and renewable primary energy resources used as raw materials) (energy + material use)	MJ	5.80E-03
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	-
Use of non-renewable primary energy resources used as raw materials (material use)	MJ	-
Total use of non-renewable primary energy resources (primary energy and non-renewable primary energy resources used as raw materials) (energy + material use)	MJ	0.1476
Use of secondary materials	kg	-
Use of renewable secondary fuels	MJ	9.47E-07
Use of non-renewable secondary fuels	MJ	9.92E-06
Use of net fresh water	m³	5.52E-04
Waste categories	**Unit**	**C2.1**
Hazardous waste disposed	kg	-
Non-hazardous waste disposed (municipal waste)	kg	5.20E-04
Radioactive waste	kg	1.93E-07
Output material flows	**Unit**	**C2.1**
Components for re-use	kg	-
Materials for recycling	kg	-
Materials for energy recovery	kg	-
Exported energy	MJ	-

Values that cannot be shown or are inexistent or marginal are expressed as [-].

C3 Waste management

No.	Scenario	Description
C3.1	Cable tray system	97% recycling of metals

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	C3.1
Collection process, collected separately	kg	**3.79**
Collection process, collected as mixed construction waste	kg	**0.03**
Recovery system, for re-use	kg	-
Recovery system, for recycling	kg	**3.67**
Recovery system, for energy recovery	kg	-
Disposal	kg	**0.12**
Assumptions for scenario development e.g. for transport	Appropriate units	-

Values that cannot be shown or are inexistent or marginal are expressed as [-].

C4 Disposal

No.	Scenario	Description
C4.1	Disposal	The non-recordable amounts and losses within the re-use/recycling chain (C1 and C3) are modelled as "disposed". The consumption is marginal and cannot be quantified.

D Benefits and loads beyond the system boundaries

No.	Scenario	Description
D	Recycling potential	Scrap metal from C3.1 excluding the scrap used in A3 replaces 100% of steel;

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

Imprint

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Notes

This EPD is mainly based on the work and findings of the Institut für Fenstertechnik e.V., Rosenheim (**ift** Rosenheim) and specifically on the **ift**-Richtlinie NA-01/1 Allgemeiner Leitfaden zur Erstellung von Typ III Umweltproduktdeklarationen (Guideline NA.01/1 – Guidance on preparing Type III Environmental Product Declarations).

Layout

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