

Background report - HVAC products and electrical installations

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Contents

General description.....	5
1 Air exchanger with heat recovery.....	6
1.1 Product name, title and standards.....	6
1.2 Market and description	6
1.3 Selected typical values	6
2 Cable trays and ladders	7
2.1 Product name, title and standards.....	7
2.2 Market and description	7
2.3 Selected typical values	7
3 Drinking water pipes, PEX.....	9
3.1 Product name, title and standards.....	9
3.2 Market and description	9
3.3 Selected typical values	9
4 Electric cable protecting pipe, PVC.....	11
4.1 Product name, title and standards.....	11
4.2 Market and description	11
4.3 Selected typical values	11
5 Electrical cable, medium voltage.....	13
5.1 Product name, title and standards.....	13
5.2 Market and description	13
5.3 Selected typical values	13
6 Electrical cable, low voltage	15
6.1 Product name, title and standards.....	15
6.2 Market and description	15
6.3 Selected typical values	15
7 Electrical group center.....	16
7.1 Product name, title and standards.....	16
7.2 Market and description	16
7.3 Selected typical values	16

8	Escalator.....	17
8.1	Market and description	17
8.2	Selected typical values	17
9	Exhaust air equipment.....	18
10	Exhaust ventilation system	19
10.1	Product name, title and standards	19
10.2	Market and description	19
10.3	Selected typical values.....	19
11	Faucets	20
11.1	Product name, title and standards	20
11.2	Market and description	20
11.3	Selected typical values.....	20
12	Heat distribution pipe, PE/PEX.....	22
12.1	Product name, title and standards	22
12.2	Market and description	22
12.3	Selected typical values.....	22
13	Heat pump, air to air	24
13.1	Product name, title and standards	24
13.2	Market and description	24
13.3	Selected typical values.....	24
14	In-house sewer pipes, PP	26
14.1	Product name, title and standards	26
14.2	Market and description	26
14.3	Selected typical values.....	26
15	Sinks and washbasins	28
15.1	Product name, title and standards	28
15.2	Market and description	28
15.3	Selected typical values.....	28
16	Luminaires	30
16.1	Product name, title and standards	30
16.2	Market and description	30
16.3	Selected typical values.....	30
17	Passenger elevator.....	33
17.1	Product name, title and standards	33
17.2	Market and description	33

17.3	Selected typical values.....	33
18	Radiator, water circuit	35
18.1	Product name, title and standards	35
18.2	Market and description	35
18.3	Selected typical values.....	35
19	Rainwater and drainage pipes	36
19.1	Product name, title and standards	36
19.2	Market and description	36
19.3	Selected typical values.....	36
20	Solar panel, monocrystalline.....	38
20.1	Product name, title and standards	38
20.2	Market and description	38
20.3	Selected typical values.....	38
21	Solar thermal collector.....	39
21.1	Product name, title and standards	39
21.2	Market and description	39
21.3	Selected typical values.....	39
22	Sprinkler system, pipes	40
22.1	Product name, title and standards	40
22.2	Market and description	40
22.3	Selected typical values.....	40
23	Toilet seat.....	41
23.1	Product name, title and standards	41
23.2	Market and description	41
23.3	Selected typical values.....	41
24	Ventilation duct, metal	42
24.1	Product name, title and standards	42
24.2	Market and description	42
24.3	Selected typical values.....	42
25	Water pump	43
25.1	Product name, title and standards	43
25.2	Market and description	43
25.3	Selected typical values.....	43
	Appendix 1 GWP values of materials	44
	Appendix 2 Electrical cables, medium voltage	46

General description

Several approaches have been applied to determine the value of HVAC products. In most of the cases the generic values are based on the product's components which are determined according to the LCA Manual on building system and existing machine data obtained by market research. These generic values were created mainly using the emission values of the materials contained in the database. For some products, the energy consumption of manufacturing the products has also been considered. In addition, EPDs and studies have also been used to determine emission values for some materials. Used GWP values of corresponding materials are presented in Appendix 1 with source.

In some cases, enough EPDs are found, and the typical value of the product has been determined on this basis. In such case the GWP (fossil) value, material content, recycling share and share of harmful substances are based on the EPDs.

Waste processing (C3) emissions and carbon handprints are declared as stand-alone items within other database sections. See those sections¹, including background reports, for more information.

¹ [Rakentamisen päästötietokanta](#) (see sections: waste process & carbon handprint)

1 Air exchanger with heat recovery

1.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
Ilmanvaihtokone lämmön talteenotolla	Luftväxlare med luftvärmväxlare	Air exchanger with heat recovery

Relevant harmonised standards

EN 13053 Ventilation for buildings

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
614.24	Lämmöntalteenottolaitteet	Ventilation vents

1.2 Market and description

Market

The domestic manufacturing market share is unknown. Imports are predominantly coming from Europe.

Description

Air exchanger with heat recovery is manufactured by assembling components of the appliance. When only considering the product stage of the system, the biggest embodied carbon contribution comes from the metal parts, predominantly steel and aluminum parts of the system. If also considering the use stage of the product, due to the energy usage (and energy saved) in the use phase, that would become the biggest contributor to the product's carbon emissions throughout the whole life cycle of the product.

1.3 Selected typical values

Components by mass: 78 % galvanized steel, 13 % aluminum, 6 % rock wool, 1 % steel, 1 % copper, 2 % others (fiberglass, cast steel, rubber). Energy usage of manufacturing is not included. The carbon handprint is caused by metal recycling, as the effect of other materials is non-existent.

The summary of the selected typical values are as follows:

Aspect	Result
Weight, kg/unit	477
GWP (fossil) (A1-A3), kg CO ₂ e/kg	3.50
Content of renewable raw materials, %	0
Content of nonrenewable materials, %	100
The content of secondary materials, %	13
Content of harmful substances (substances of very high concern), %	< 0.1

2 Cable trays and ladders

2.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
Kaapelitiet ja -tikkaat	Kabelrännor och kabelstegar	Cable trays and ladders

Relevant harmonised standards

BS EN 61537:2007 Cable management. Cable tray systems and cable ladder systems.

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
622.1	Kaapelihyllyt	Cable supports

2.2 Market and description

Market

Cable trays and ladders used in Finland are manufactured both in Finland and in Europe. The share of import is not known, nor is the amount of the consumption. Based on the market review, one of the most significant importers is OBO Bettermann, whose main production facility is in Germany.

Description

Manufacturing galvanized steel causes the most significant part of the GWP emissions from the production of cable trays and ladders. As is known from steel production, recycling saves 60...90% of energy compared to primary steel production, so the share of recycled material significantly affects the GWP value of the final products².

2.3 Selected typical values

Since manufacturing of cable trays and ladders commonly used in Finland is concentrated in central and northern Europe, it can be assumed that the steel used in the production of cable trays and ladders corresponds to the production of steel in the region in general. Steel sheets manufactured in Northern and Middle Europe are mainly manufactured from BOF-based steel. The differences in GWP values of steel sheet-based products are thus rather small (see the EPD's from the background report of steel profile and grill, lightweight, galvanized). The density can be assumed to be the same as that of a galvanized steel profile – 7850 kg/m³.

A limited number of EPDs can be found for cable trays and ladders. Therefore, the selected typical value for cable trays and ladders is formed from the average of the products presented in the following table (bolded values included in the average). The EPD value that differ significantly from the others are not used for calculating the average, since it would increase the overall value relatively excessively.

Relevant EPD's:

² Steel reuse and recycling. Ruukki. J. Kesti.

Source	GWP (fossil) (A1-A3), kg CO ₂ e/kg
Cable support systems, cable tray system EPD-KTS-GB-17.1 https://www.obo.de/fileadmin/DMS/Produktzertifikate/04_KTS/04-200_Kabelrinnen-Systeme/04-200 EPD OBO Cable Trays.PDF	2.76
Cable support systems, mesh cable tray system EPD-GRS-GB-17.0 https://www.obo.global/fileadmin/DMS/Produktzertifikate/04_KTS/04-250_Gitterrinnen-Systeme/04-250 EPD OBO Mesh Cable Trays.PDF	2.65
Cable tray systems, underfloor duct systems, photovoltaic construction systems ITB No. 270/2021 https://www.elpuk.com.pl/images/Download/cert_6_ITB-EPD_elpuk_v7.pdf	2.57
Cable management systems - Pre galvanised steel (Sendzimir) EPD Norge: NEPD-2942-1632-EN https://www.epd-norge.no/getfile.php/1319678-1695829357/EPDer/Byggevarer/NEPD-2942-1632_Cable-management-systems---Pre-galvanised-steel--Sendzimir-.pdf	5.04

The summary of the selected typical values are as follows:

Aspect	Result
Density kg/m ³	7850
GWP (fossil) (A1-A3), kg CO ₂ e/kg	2.66
Content of renewable raw materials, %	0
Content of nonrenewable materials, %	100
The content of secondary materials, %	20
Content of harmful substances (substances of very high concern), %	< 0.1

3 Drinking water pipes, PEX

Updated: 15.10.2024 (version 01.00.008)

3.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
Juomavesiputki, PEX	Dricksvattenrör, PEX	Drinking water pipe, PEX

Relevant harmonised standards

EN 15875-3:2003 Plastics piping systems for hot and cold-water installations

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
143	Käyttövesiputket	Fresh water pipes

3.2 Market and description

Market

The domestic manufacturing market share is unknown. Imports are predominantly coming from Europe. The Finnish market for plastic pipe manufacturing is dominated by Uponor Finland and Pipelife Finland. In terms of the overall market volume, plastic pipes are estimated to be the leading solution on the market. In addition of plastic pipes, drinking water pipes in the market are also made from composite materials as well as copper. In terms of import, composite is mainly imported from Germany, whereas cross-linked polyethylene (PEX) pipes are mainly imported from Sweden.

Description

In terms of the PEX pipe, the biggest emission impacts come from the raw materials. The manufacturing energy use does have an impact on the GWP of the product, although it is generally a smaller one when compared to PEX related raw material emissions.

3.3 Selected typical values

Following table presents the sources considered for selection of typical values.

Declaration number	Source	Name	Manufacturing	Market	Valid	GWP - fossil (A1-A3) [co2e kg/kg]
RTS_146_21	RTS EPD	AQUASYSTEM PP-R & PP-RCT PIPES AND FITTINGS	Turkey	-	16.8.2026	2.27
RTS_164_22	RTS EPD	UPONOR UNI PIPE PLUS DIAMETER RANGE 16-32 MM	Germany	-	1.20.2027	5.53
RTS_173_22	RTS EPD	UPONOR COMBI PIPE DIAMETER RANGE 12-50 MM	Sweden	-	2.25.2027	3.18

Declaration number	Source	Name	Manufacturing	Market	Valid	GWP - fossil (A1-A3) [co2e kg/kg]
RTS_163_22	RTS EPD	UPONOR AQUAPEX DIAMETER RANGE 1/4" – 3"	USA	-	20.1.2027	2.82
HUB-0066	EPD HUB	Uponor Aqua Pipe	Sweden	Sweden	17.1.2027	3.23

An average of two EPDs of PEX drinking water pipes manufactured in Sweden are selected (values bolded) as a base for the typical indicator values. Weight is declared for a pipe of 15 mm diameter.

The summary of the selected typical values are as follows:

Aspect	Result
Density, kg/m ³	938
Weight, kg/unit	0.35
GWP (fossil) (A1-A3), kg CO ₂ e/kg	3.21
Content of renewable raw materials, %	0
Content of nonrenewable materials, %	100
The content of secondary materials, %	0
Content of harmful substances (substances of very high concern), %	< 0.1

4 Electric cable protecting pipe, PVC

Updated: 15.10.2024 (version 01.00.008)

4.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
Sähkökaapelin suojaputki, PVC	Kabelskyddsrör, PVC	Electric cable protecting pipe, PVC

Relevant harmonised standards

EN 13501 Fire classification of construction products and building elements

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
623	Sähköasennustuotteet	Electrical installation products

4.2 Market and description

Market

The import share of protection pipes for electrical cables is relatively low and almost a 100 % is domestically manufactured.

Description

The purpose of the product is to slow down and prevent electrical fires caused by damaged cabling.

The most contributing material in the plastic pipe's GWP is the PVC used. The GWP value can however vary, depending on the raw material and the share of recycled material used (if any). The outline of products, key issues affecting embodied carbon and the current market were obtained by market research and interview with Uponor Finland and Talteka.

4.3 Selected typical values

Following table presents the sources considered for selection of typical values.

Declaration number	Source	Name	Manufacturing	Market	Valid	GWP - fossil (A1-A3) [co2e kg/kg]
-	epd-norge	Smooth PVC installation pipe 750N with low friction	Sweden	Sweden, Europe	20.3.2028	2.16
-	epd-norge	Smooth PVC installation pipe 750N	Sweden	Sweden, Europe	2.5.2028	2.55

An average of both EPDs of PVC cable protection / installation pipes manufactured in Sweden are selected (values bolded) as a base for the typical indicator values. Weight is declared for a pipe of 20 mm diameter.

The summary of the selected typical values are as follows:

Aspect	Result
Weight, kg/m	0.081
GWP (fossil) (A1-A3), kg CO ₂ e/kg	2.36
Content of renewable raw materials, %	0
Content of nonrenewable materials, %	100
The content of secondary materials, %	1
Content of harmful substances (substances of very high concern), %	< 0.1

5 Electrical cable, medium voltage

5.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
Sähkökaapeli, keskijännite	El kabel, mellanspänning	Electrical cable, medium voltage

Relevant harmonised standards

SFS-EN 61936-1:en Power installations exceeding 1 kV a.c. - Part 1: Common rules

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
621	Johtimet ja johdot	Cables and wiring

5.2 Market and description

Market

The domestic market share and the share of import are not known. However, Reka Kaapeli Oy is a significant domestic manufacturer.

Description

Power cables are commonly made of protective polyamide layers and copper or aluminum wires running inside the polyamide. Power cables are typically single-core or three-core components. As these are high emission materials, A1 phase can be considered as the main drivers of the product's GWP. Since there are so few copper cables to be found from market overview and EPDs' the given GWP value only applies to cables with aluminum core.

5.3 Selected typical values

The voltage range of medium voltage cables is 1-36 kv. The product's GWP value is assessed by the available EPD's, since material composition of medium voltage cables varies between product types.

According to the collected data, the material proportions are on average 47 % metals (mostly aluminium and in some cases little amount of copper) and 53 % plastics. In addition, it was evaluated whether the number of cores has a significant effect on the material proportion or emissions - the share of metals in single-core cables was on average higher than in multi-core cables, but the emission of multicore was slightly greater. However, it cannot be shown that the number of cores solely affects the material proportions or emission of the product, as the difference can also be explained by product-specific differences. All gathered EPDs and their additional information are presented in the Appendix 2 Electrical cables, medium voltage.

Selected typical value is average of all products that has an EPD in the Nordic region (Norway, Finland and Sweden). A few EPD's were also given for other than countries, but the emission data deviates from the Nordic data. These are not included into the GWP fossil value given in the following table.

Benefits from the end-of-life stage and GWP (C3) emission values are defined in the following publication: LCA database for building products, services, and systems Description of the content

and working methods³. These have been applied directly to determine the C3 phase and carbon handprint of cables based on material proportions.

The summary of the selected typical values are as follows:

Aspect	Result
Conversion factor (kg/m)	3.98
GWP (fossil) (A1-A3), kg CO ₂ e/kg	5.42
Content of renewable raw materials, %	0
Content of nonrenewable materials, %	100
The content of secondary materials, %	-
Content of harmful substances (substances of very high concern), %	< 0.1

³ LCA database for building products, services, and systems Description of the content and working methods, Häkkinen, 2022. [LCA database for building products, services, and systems – Description of the content and working methods \(helsinki.fi\)](https://lca.helsinki.fi/)

6 Electrical cable, low voltage

6.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
Sähkökaapeli, matalajännite	El kabel, låg spanning	Electrical cable, low voltage

Relevant harmonised standards

EN 50525 Electric cables. Low voltage energy cables of rated voltages up to and including 450/750V

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
621	Johtimet ja johdot	Cables and wiring

6.2 Market and description

Market

The domestic market share and the share of import are not known. However, Reka Kaapeli Oy is a significant domestic manufacturer.

Description

Electrical cables are mainly made from polyamide and copper wires. As high emission materials, they can be considered as the main drivers of the product's GWP.

6.3 Selected typical values

The selected generic value on the 9 mm diameter electric cable is based on the bill of material of commonly used products. Mass wise the product contains Polyamide 6.6 (49 %) and copper wires (51 %). This generic value was created using the emission values of the materials contained in the database and in addition data of emission factor of the polyamide is provided by PlasticsEurope. Wires containing a lot of metal and copper can be recycled with the metals, which is the chosen end-of-life treatment for the product. Since plastics around the cables are often separated during the waste treatment, the benefits of energy recovery of plastics are also considered in the carbon handprint.

The summary of the selected typical values are as follows:

Aspect	Result
Weight, kg/m	0.13
GWP (fossil) (A1-A3), kg CO ₂ e/kg	5.29
Content of renewable raw materials, %	0
Content of nonrenewable materials, %	100
The content of secondary materials, %	0
Content of harmful substances (substances of very high concern), %	< 0.1

7 Electrical group center

7.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
Sähkökeskus	Elcentral	Electrical group center

Relevant harmonised standards

EN 61439 Low-voltage switchgear and controlgear assemblies

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
631	Keskukset ja keskustuotteet	Distribution boards, electric

7.2 Market and description

Market

The share of domestic manufacturing and imports is not known. Two large domestic manufacturers are ABB and Ensto.

Description

One of the most impacting components of the product is galvanized steel due to its high share in terms of the mass of the product. In terms of the components of the product, the share of scrap material in galvanized steel could have an impact on the GWP value of the product.

7.3 Selected typical values

Mass wise the product contains galvanized steel (85 %), powder fired painting (9 %), PVC (4 %) and copper (2 %). The chosen end-of-life treatment is metal recycling, whereas other materials are treated as impurities. End-of-life scenario is metal recycling and other materials are treated as impurities. Therefore, it can be assumed that only metal recycling affects the carbon handprint, other effects are negligible. Product's dimensions for one unit are 530 mm x 290 mm x 120 mm (WxHxD).

The summary of the selected typical values are as follows:

Aspect	Result
Weight, kg/unit	12
GWP (fossil) (A1-A3), kg CO ₂ e/kg	2.32
Content of renewable raw materials, %	0
Content of nonrenewable materials, %	100
The content of secondary materials, %	17
Content of harmful substances (substances of very high concern), %	< 0.1

8 Escalator

Updated 1.7.2025

8.1 Market and description

Market

Escalators used in Finland are produced by KONE, Otis and Schindler. Share of domestic manufacturing is not known.

Description

Escalators are primarily made of ferrous metals, such as galvanized steel and stainless steel. Other materials include other metals, inorganic materials, polymers, electronics, and others.

8.2 Selected typical values

Kone and Otis have published EPDs for escalators. It is estimated that KONE TravelMaster™ 110 Escalator represents typical product used in Finnish building construction. The typical values are based on its published EPD (S-P-06533).

The summary of the selected typical values are as follows:

Aspect	Result
GWP (fossil) (A1-A3), kg CO ₂ e/kg	5.4
Content of renewable raw materials, %	0
Content of nonrenewable materials, %	100
The content of secondary materials, %	53
Content of harmful substances (substances of very high concern), %	< 0.1

9 Exhaust air equipment

Updated: 17.4.2026

Exhaust air equipment consists of different exhaust ventilation pipes and vents, pass-throughs, roof hoods and cowls installed mainly in roofs to enable air exhaustion of building's ventilation system in a controlled way. These products are made both steel and plastic-based materials.

Major manufacturers in exhaust air equipment market in Finland are Vilpe, Etsnord, Climecon and Fläktwood. Some imports are also coming from Estonia, Sweden, UK and others. Some reference data (EPDs) were found for Vilpe's and Climecon's products. Also, some data were found for Swedish products which are imported to Finland. However, collected data is expected to represent less than half of Finnish exhaust air equipment market, so therefore, as a somewhat conservative choice, the 80th upper percentile of the reference data GWP values is chosen as the typical GWP (A1-A3) fossil value for exhaust air equipment.

Considered reference data is shown in following table:

Declaration number	Name	Manufacturer	Place of production	GWP - fossil (A1-A3) [co2e kg/kg]
HUB-2733	Ventilation Pipes	VILPE Oy	Finland	2,45
HUB-2393	P- and C-series Exhaust Ventilation Pipes	VILPE Oy	Finland	3,17
HUB-4233	Pass-throughs	VILPE Oy	Finland	3,50
HUB-2295	S-Series Exhaust Vents	VILPE Oy	Finland	3,04
HUB-1013	Roof Hoods	Climecon Oy	Finland	3,51
HUB-2896	Roof hoods in metal and colour-coated steel	Swegon Group AB	Sweden	4,00
HUB-1310	Roof Cowls- Metal coated steel	Bevent Rasch AB	Sweden	3,51
HUB-0839	Roof hoods – metal coated 75% recycled steel	Ekovent AB	Sweden	1,21
HUB-0838	Roof hoods – Metal Coated Steel	Ekovent AB	Sweden	3,65

10 Exhaust ventilation system

10.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
Koneellinen poistoilmanvaihto	Avgasventilationssystem	Exhaust ventilation system

Relevant harmonised standards

EN 16798-1:2019 Energy performance of buildings – Ventilation for buildings

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
614	Ilmastointituotteet	Air conditioning products

10.2 Market and description

Market

Domestic manufacturing market share is not known. However, imports are predominantly coming from Europe. In domestic market one major manufacturer in exhaust ventilation systems is Vilpe.

Description

The product's dominant source of carbon emissions is zincing coated steel due to its high mass share. Also, regardless of its low mass share in the product, aluminum contributes substantially to the product's GWP. The outline of products, key issues affecting embodied carbon and the current market were obtained by market research, previous studies⁴ and interview with Talteka.

10.3 Selected typical values

The selected generic value of the product is obtained from the bill of material of commonly used products. Components by mass: 85 % zinc coated steel, 8 % aluminum, 7 % copper. The end-of-life scenario of the product is based on the end-of-life scenarios of separate constituents. Steel, aluminum, and copper are expected to be fully recycled. Values represents Finnish production. Product's dimensions for one unit are 627 mm x 602 mm x 627 mm (WxHxD).

The summary of the selected typical values are as follows:

Aspect	Result
Weight, kg/unit	42
GWP (fossil) (A1-A3), kg CO ₂ e/kg	3.06
Content of renewable raw materials, %	0
Content of nonrenewable materials, %	100
The content of secondary materials, %	7
Content of harmful substances (substances of very high concern), %	< 0.1

⁴ Talotekniikan LCA-laskentaohjelman käsikirja. (2013)

11 Faucets

11.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
Keittiön hana	Kökskran	Kitchen faucet with dishwasher valve
Kylpyhuoneen hana	Badrumskran	Bathroom faucet
Suihkun hana letkulla	Duschkran	Shower faucet with shower set

Relevant harmonised standards

EN 200:2008 Sanitary tapware – Single taps and combination taps for water supply systems of type 1 and type 2

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
613.31	Sekoittimet, hanat	Mixers, taps
613.32	Suihkut	Showers

11.2 Market and description

Market

The Finnish market for faucets and showers is dominated by Oras, whose market share (of mainly domestically manufactured products) is estimated to be approximately 70%. Competitors import products manufactured in Europe, and they include Hansgrohe, Mora, FM Mattson and others.

Description

The carbon intensity of brass contributes significantly to the product's GWP value. However, by using scrap materials in brass production, it is possible to achieve lower carbon footprint values compared to the selected value. The GWP is mainly dominated by the use of electricity in the manufacturing process. As the usage of recycled materials differs in the market, the GWP values can be greatly increased when no scrap materials are used.

11.3 Selected typical values

Faucets and showers are available both cast in brass and in plastic, having thus significantly different embodied carbon. The database only presents the values of brass faucets, because they are more common in Finland. As the energy use and packaging have a considerably impact on the product's GWP, they have been included in the calculation of the selected generic value with the assumed energy consumption of 8 kWh/kg for all faucets. The energy consumption of the manufacturing has been estimated with the help of the existing EPD's. The carbon handprint is formed by metal recycling, as the effect of other materials is small.

Kitchen faucet with a dishwasher valve: The material content of faucets is diverse, but the main materials are brass, zinc, plastic and steel.

The summary of the selected typical values are as follows:

Aspect	Result
Weight, kg/unit	2
GWP (fossil) (A1-A3), kg CO ₂ e/kg	5.52
Content of renewable raw materials, %	0 %
Content of nonrenewable materials, %	100 %
The content of secondary materials, %	3 %
Content of harmful substances (substances of very high concern), %	< 0.1 %

Bathroom faucet: The material content of faucets is diverse, but the main materials are brass, plastic and steel. Product's dimensions for one unit are 33 mm x 146 mm x 144 mm (WxHxD).

The summary of the selected typical values are as follows:

Aspect	Result
Weight, kg/unit	1.3
GWP (fossil) (A1-A3), kg CO ₂ e/kg	5.26
Content of renewable raw materials, %	0 %
Content of nonrenewable materials, %	100 %
The content of secondary materials, %	0 %
Content of harmful substances (substances of very high concern), %	< 0.1 %

Shower faucet with a shower set: The material content of faucets is diverse, but the main materials are brass, plastic and steel. Product's dimensions for one unit are 150 mm x 131 mm x 150 mm (WxHxD) (faucet only).

The summary of the selected typical values are as follows:

Aspect	Result
Weight, kg/unit	2.8
GWP (fossil) (A1-A3), kg CO ₂ e/kg	4.75
Content of renewable raw materials, %	0 %
Content of nonrenewable materials, %	100 %
The content of secondary materials, %	3 %
Content of harmful substances (substances of very high concern), %	< 0.1 %

12 Heat distribution pipe, PE/PEX

Updated: 15.10.2024 (version 01.00.008)

12.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
Lämmönjakoputki, PEX	Värmefördelningsrör, PEX	Heat distribution pipe, PEX

Relevant harmonised standards

EN 1264 Water based surface embedded heating and cooling systems

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
146	Lämpöputket ja -kanavat	Heating ducts

12.2 Market and description

Market

The pipes are manufactured by Uponor and Pipelife Finland. Share of domestic manufacturing is not known. Imported PEX pipes come predominantly from European countries. PE pipes on the other hand are almost exclusively domestically manufactured. Heating pipes used in Finland are mainly manufactured with PEX.

Description

The diameter of the pipe is dependent on the building and flooring type, but ranges predominantly from 17 to 20 mm. In normal residential apartment buildings, the 17 mm diameter PEX pipe is often the most common one. The heating pipe is often installed inside a PE protecting pipe, which also contributes to the pipe's GWP.

Manufacturing of PEX is the most carbon intensive contributor to the GWP of heat distribution pipes. The outline of products, key issues affecting embodied carbon and the current market were obtained by market research, previous studies and interviews arranged with industry experts, including Uponor.

12.3 Selected typical values

Following table presents the sources considered for selection of typical values.

Declaration number	Source	Name	Manufacturing	Market	Valid	GWP - fossil (A1-A3) [co2e kg/kg]
RTS_146_21	RTS EPD	AQUASYSTEM PP-R & PP-RCT PIPES AND FITTINGS	Turkey	-	16.8.2026	2.27
RTS_164_22	RTS EPD	UPONOR UNI PIPE PLUS DIAMETER RANGE 16-32 MM	Germany	-	1.20.2027	5.53
RTS_173_22	RTS EPD	UPONOR COMBI PIPE DIAMETER RANGE 12-50 MM	Sweden	-	2.25.2027	3.18

Declaration number	Source	Name	Manufacturing	Market	Valid	GWP - fossil (A1-A3) [co2e kg/kg]
RTS_163_22	RTS EPD	UPONOR AQUAPEX DIAMETER RANGE 1/4" – 3"	USA	-	20.1.2027	2.82
RTS_178_22	RTS EPD	UPONOR COMFORT PIPE PLUS BLUE DIAMETER RANGE 16-20 MM	Sweden	-	3.24.2027	2.54
RTS_174_22	RTS EPD	UPONOR COMFORT PIPE PLUS DIAMETER RANGE 14-25 MM	Sweden	-	1.25.2027	2.62

An average of two EPDs one of PEX and other of PE based heat distribution pipes manufactured in Sweden are selected (values bolded) as a base for the typical indicator values. Weight is declared for a pipe of 17 mm diameter.

The summary of the selected typical values are as follows:

Aspect	Result
GWP (fossil) (A1-A3), kg CO ₂ e/kg	2.9
Content of renewable raw materials, %	0
Content of nonrenewable materials, %	100
The content of secondary materials, %	0
Content of harmful substances (substances of very high concern), %	< 0.1

13 Heat pump, air to air

13.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
Ilmalämpöpumppu	Värmepump	Heat pump, air to air

Relevant harmonised standards

EN 14825 Air conditioners, liquid chilling packages and heat pumps, with electrically driven compressors, for space heating and cooling

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
612.2	Lämpöpumput	Heat pumps

13.2 Market and description

Market of heat pump

Domestic manufacturing market share and locations of imports are not known.

Factors affecting the carbon footprint of heat pump

The biggest contribution from heat pumps comes predominantly from the use of refrigerant fluids in the system. Other contributing materials steel, copper, aluminium and plastic due to their carbon intensity or mass share in the product. The outline of products, key issues affecting embodied carbon and the current are based on building services industry experts and research.

13.3 Selected typical values

The selected generic value was modeled according to commonly used products and their bill of materials. Exceptionally, for this product the GWP value also contains the refrigerant fluid which is installed into the product in connection with installation phase (A5). However, the product is entirely useless without the refrigerant fluid and as such cannot be considered functional nor representative of its actual impacts without this. The refrigerant leakages in the different phases of installation, use, refills and decommissioning constitute a very significant portion of the life cycle impacts of the product.

Conversion factors:

- Components by mass: 16 % plastics, 49 % steel, 24 % copper, 5 % aluminum, 2 % R410a, others (brass, fiberglass) 4 %
- Product mass: 50.2 kg/unit
- Representativeness: Europe

R410A cooling refrigerant was expected to be used. Its GWP per kg of refrigerant is set to 2 088 kg CO₂e/kg⁵. The filling was expected to be 1.15 kg of refrigerant in the installation phase. In the

⁵ GOV.UK. (2014). Calculate the carbon dioxide equivalent quantity of an F gas. <https://www.gov.uk/guidance/calculate-the-carbon-dioxide-equivalent-quantity-of-an-f-gas>

calculation for the selected value the impacts were expected to come from the leakage of the refrigerant. Actual rate of leakage can vary significantly, impacting greatly the GWP of the product. The carbon handprint consists mainly of the benefits of metal recycling, but since the share of plastics is notable (16 %) it also has small affect.

The summary of the selected typical values are as follows:

Aspect	Result
GWP (fossil) (A1-A3), kg CO ₂ e/kg	13.84
Content of renewable raw materials, %	0
Content of nonrenewable materials, %	100
The content of secondary materials, %	0
Content of harmful substances (substances of very high concern), %	< 0.1

14 In-house sewer pipes, PP

Updated: 15.10.2024 (version 01.00.008)

14.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
Kiinteistöviemäriputket, PP	Fastighets avloppsrörs, PP	In-house sewer pipes, PP

Relevant harmonised standards

EN 1451 PP soil and waste systems for buildings

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
142	Viemäriputket	Drainage pipes

14.2 Market and description

Market

The pipes are manufactured in Finland by Uponor, Pipelife Finland and Meltex. Share of domestic manufacturing or imports is not known. In-house sewer pipes used in Finland are mainly manufactured with polypropylene (PP).

Description

In-house sewer pipes are used as part of soil and waste systems in buildings. In-house sewer pipes have resistance for mechanical and chemical loads including raised temperatures and corrosiveness. The pipes are mostly manufactured from polypropylene (PP), but mineral reinforced polypropylene is also used when low decibel requirements are given for sewer pipe systems. The pipes can be used in rainwater systems as well.

Manufacturing of PP is the most carbon intensive contributor to the GWP of in-house sewer pipes.

14.3 Selected typical values

Following table presents the sources considered for selection of typical values.

Declaration number	Source	Name	Manufacturing	Market	Valid	GWP - fossil (A1-A3) [co2e kg/kg]
HUB-0939	EPD HUB	Geberit Silent-Pro pipe	Italy	Switzerland	24.1.2029	1.21
HUB-0938	EPD HUB	Geberit Silent-PP pipe	Italy	Switzerland	24.1.2029	1.86
RTS_145_21	RTS EPD	SILENTA PREMIUM, SILENTA EXTREME, SILENTA 3A	Turkey	-	16.8.2026	1.86
HUB-1458	EPD HUB	Polypropylene sewer pipes for	Finland	Finland	24.5.2029	1.66

Declaration number	Source	Name	Manufacturing	Market	Valid	GWP - fossil (A1-A3) [co2e kg/kg]
		building and underground use				
HUB-0107	EPD HUB	HT PP Nordic Pipes	Sweden	Finland	19.8.2027	2.31
HUB-0062	EPD HUB	Master 3 Plus	Sweden	Finland	19.6.2027	2.12
	epd-norge	PP Nordic Pipe	Sweden	Europe, Sweden	19.3.2028	2.23
	epd-norge	PP Stilla Pipes	Sweden	Europe, Sweden	24.3.2028	1.98
HUB-1065	EPD HUB	HTP In-house drainage pipes	Finland	Finland	5.2.2029	1.64
NEPD-3475-2069-EN	epd-norge	SiTech+ PP Pipe STEM	Germany	Nordic, Europe	27.5.2027	1.28
NEPD-3587-2251-EN	epd-norge	Wafix PP	Sweden	Nordic, Europe	16.8.2027	2.26
NEPD-3474-2069-EN	epd-norge	AS+ Pipe LGY	Germany	Nordic, Europe	27.5.2027	1.46

An average of EPDs of in-house sewer pipes with Finnish market representativeness are selected (values bolded) as a base for the typical indicator values.

The summary of the selected typical values are as follows:

Aspect	Result
GWP (fossil) (A1-A3), kg CO ₂ e/kg	1.93
Content of renewable raw materials, %	0
Content of nonrenewable materials, %	100
The content of secondary materials, %	0
Content of harmful substances (substances of very high concern), %	< 0.1

15 Sinks and washbasins

15.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
Keittiön pesuallas	Diskbänk	Kitchen sink
Kylpyhuoneen pesuallas	Handfat	Bathroom washbasin

Relevant harmonised standards

EN 13310:2015 Kitchen sinks

EN 14688:2015 + A1:2018 Sanitary appliances – Wash basins

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
522.5	Keittiöaltaat ja pesupöytälevyt	Kitchen sinks and washtable panels
523.31	Pesualtaat	Wash basins

15.2 Market and description

Market of kitchen sink and washbasin

Residential kitchen sinks are manufactured mainly from stainless steel, but also from composite. Market is contested by a number of companies, including domestic manufacturers. In the professional kitchens, Metos is the market leader

Bathroom washbasins are manufactured predominantly from sanitary porcelain, whose only major domestic manufacturer today in Finland is IDO. IDO's market share is estimated at 55 %. The rest of the sanitary porcelain comes from around Europe. Other material types and their manufacturers include for example Finnish Durat, who manufactures washbasins from massive composite material using recycled raw material.

Factors affecting the carbon footprint of kitchen sink and washbasin

The main factor impacting embodied carbon in stainless steel sink is the production of stainless steel itself. Depending on the manufacturer, the stainless steel can be manufactured from scrap materials decreasing the use of virgin materials.

The main impactor in the washbasin's GWP is the ceramics used due to its high mass share and carbon intensity. The energy usage in the sanitary ceramics production, especially the firing process it entails, is very carbon intensive.

15.3 Selected typical values

Kitchen sink: The selected generic value for the product is based on commonly used products and its constituents.

Conversion factors:

- Constituents by mass: 97 % Stainless steel, 3 % PP. The packaging of the product was calculated in the selected value.

- Representativeness: Finland
- Conversion value: 5 kg/unit
- Seat height: 500 mm x 550 mm

End-of-life scenario: placed in metal recycling, other materials are treated as impurities. The carbon footprint is formed by metal recycling, as the effect of other materials is non-existent.

The summary of the selected typical values are as follows:

Aspect	Result
GWP (fossil) (A1-A3), kg CO ₂ e/kg	3.34
Content of renewable raw materials, %	0
Content of nonrenewable materials, %	100
The content of secondary materials, %	60
Content of harmful substances (substances of very high concern), %	< 0.1

Bathroom washbasin: The selected generic value for the product is based on commonly used products and its constituents, and energy used in manufacturing. Carbon handprint consists of the benefits of recycling copper.

- Constituents by mass: 97 % Sanitary ceramics, 3 % copper. The packaging was included in the calculation of the selected generic value.
- Representativeness: Europe
- Conversion value: 11 kg/unit
- Seat height: 460 mm x 280 mm

The carbon handprint is formed only by metal recycling. Since the share of metal is only 3 %, carbon handprint is almost non-existing.

The summary of the selected typical values are as follows:

Aspect	Result
GWP (fossil) (A1-A3), kg CO ₂ e/kg	3.65
Content of renewable raw materials, %	0
Content of nonrenewable materials, %	100
The content of secondary materials, %	0
Content of harmful substances (substances of very high concern), %	< 0.1

16 Luminaires

16.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
Yleisvalaisin	Allmän belysning	General luminaire
Moduulivalaisin	Modulär belysning	Modular luminaire
Ripustusvalaisin	Pendelbelysning	Pendant luminaire
Teollisuusvalaisin	Industrial lampa	Industrial luminaire
Katu- tai pylväsvalaisin	Gatulampa	Street or column luminaire

Relevant harmonised standards

EN 60598-1:2015 Luminaires — Part 1: General requirements and tests

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
633	Valaistustuotteet	Lighting products

16.2 Market and description

Market

Domestic manufacturing market share is not known. Domestic luminaire manufacturing assembly and manufacturing includes Ensto, Valtavalo, GreenLED and others. Not all manufacturers manufacture whole range of luminaires. As luminaires are relatively lightweight, imports are also coming in from outside Europe.

Description

The GWP value of luminaires is significantly influenced by the lamp's electronic components. In addition of the semiconductors and other circuit board components, also the polycarbonate casing and metal parts (where present) play a role. Assembly level impacts are relatively minor.

16.3 Selected typical values

General luminaire

The general luminaire value is given for use when there is no information about the type of luminaire or there is no corresponding type of luminaires in the database. The General luminaire value is created from the average of all compiled EPD values, excluding industrial luminaires and street or column luminaires. The General luminaire value describes lamps intended for indoor use in general. All relevant EPD's of general luminaires are presented in Appendix 3 Luminaires. Since it is not possible to point out where the general luminaires used in Finland are mainly manufactured, representativeness is assumed Europe.

The summary of the selected typical values are as follows:

Aspect	Result
GWP (fossil) (A1-A3), kg CO ₂ e/kg	11.45
Content of renewable raw materials, %	0 %
Content of nonrenewable materials, %	100 %
The content of secondary materials, %	0 %

Aspect	Result
Content of harmful substances (substances of very high concern), %	< 0.1

Modular luminaire

Relevant EPD's of modular luminaires are presented in Appendix 3 Luminaires – types included: modular luminaires, modular luminaires/pendant luminaires. The typical value is given based on the average of 25 products. There are great number of EPDs for modular luminaires and therefore GWP values variates. Considering the number of all collected EPDs, the range of GWP values can be considered moderate. Since it is not possible to point out where the modular luminaires used in Finland are mainly manufactured, representativeness is assumed Europe.

The summary of the selected typical values are as follows:

Aspect	Result
GWP (fossil) (A1-A3), kg CO ₂ e/kg	11.31
Content of renewable raw materials, %	0 %
Content of nonrenewable materials, %	100 %
The content of secondary materials, %	0 %
Content of harmful substances (substances of very high concern), %	< 0.1

Pendant luminaire

Relevant EPD's of pendant luminaires are presented in Appendix 3 Luminaires – types included: pendant luminaires, modular luminaires/pendant luminaires. The typical value is given based on the average of 25 products. There are great number of EPDs for pendant luminaires and therefore GWP values variates. Considering the number of all collected EPDs, the range of GWP values can be considered moderate. Since it is not possible to point out where the pendant luminaires used in Finland are mainly manufactured, representativeness is assumed Europe.

The summary of the selected typical values are as follows:

Aspect	Result
GWP (fossil) (A1-A3), kg CO ₂ e/kg	9.30
Content of renewable raw materials, %	0 %
Content of nonrenewable materials, %	100 %
The content of secondary materials, %	0 %
Content of harmful substances (substances of very high concern), %	< 0.1

Industrial luminaire

Relevant EPD's of industrial luminaires are presented in Appendix 3 Luminaires – type included: industrial luminaire. The typical value is given based on the average of five products. Open source EPDs for industrial luminaires are limited. The average GWP value of industrial lighting is clearly higher than other luminaire types and the range is moderate. Since it is not possible to point out where the industrial luminaires used in Finland are mainly manufactured, representativeness is assumed Europe.

The summary of the selected typical values are as follows:

Aspect	Result
GWP (fossil) (A1-A3), kg CO ₂ e/kg	25.50
Content of renewable raw materials, %	0 %
Content of nonrenewable materials, %	100 %
The content of secondary materials, %	0 %
Content of harmful substances (substances of very high concern), %	< 0.1

Street or column luminaire

Relevant EPD's of street or column luminaires are presented in Appendix 3 Luminaires – Type included: Street or column luminaires. The typical value is given based on the average of eight products. As far as street and column luminaires is concerned, the market's supply is very versatile, both in terms of countries of manufacture and products. Also, the GWP fossil values from the EPD's vary at the range of 48.91 CO₂eq/kg to 4.37 CO₂eq/kg. Since the range is so significant and one result is clearly greater than the majority, the correctness of the average value was also examined for the median. Median value is 13.97 CO₂eq/kg. It has been decided to use the average value to represent a more conservative result, as solar cells and motion detectors appear in an increasing number of street and column luminaires. Since it is not possible to point out where the street or column luminaires used in Finland are mainly manufactured, representativeness is assumed Europe.

The summary of the selected typical values are as follows:

Aspect	Result
GWP (fossil) (A1-A3), kg CO ₂ e/kg	17.22
Content of renewable raw materials, %	0 %
Content of nonrenewable materials, %	100 %
The content of secondary materials, %	0 %
Content of harmful substances (substances of very high concern), %	< 0.1

17 Passenger elevator

17.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
Henkilöhissi	Hiss	Passenger elevator

Relevant harmonised standards

EN 81-20 Safety rules for the construction and installation of lifts. Part 20: Passenger and goods passenger lifts EN 50525

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
661	Hissit	Lifts

17.2 Market and description

Market

Passenger elevators used in Finland are mainly produced by KONE. Other manufactures include Schindler and Otis. Share of domestic manufacturing is not known.

Description

The elevator consists mainly of ferrous metals, such as zinc-coated steel, stainless steel, cold rolled steel, etc. that contribute significantly to the embodied carbon of the product. However, most ferrous metal products can be recycled after the end of life of the elevator. Elevators contain a significant variety of materials.

The information herein is based on market research and discussion with a KONE representative.

17.3 Selected typical values

Since the material-based calculation of elevator production would produce somewhat inaccurate results and there are available several relevant EPD's, the GWP (A1-A3) values are based on an average of those. As the table below presents, the range of variations between product is moderate. It is selected that the typical value is an average of market leader's elevators presented in the table.

Relevant EPD's:

Source	Product mass kg	GWP (fossil) (A1-A3), kg CO ₂ e/kg	GWP (C3), kg CO ₂ e/kg	Carbon handprint (D), kg CO ₂ e
KONE N MonoSpace® RTS_65_20 rts 65 20-kone n monospace epd 22-03.pdf	4961	3.38	0.07	0.58
KONE MonoSpace® 300 DX RTS_69_20 rts 69 20-kone monospace 300 dx epd 22-03.pdf	2803	3.02	0.06	0.61
KONE Monospace 500 DX	2872	2.97	0.06	0.59

Source	Product mass kg	GWP (fossil) (A1-A3), kg CO ₂ e/kg	GWP (C3), kg CO ₂ e/kg	Carbon handprint (D), kg CO ₂ e
RTS_66_20 KONE MonoSpace 500 DX EPD 22012714 tcm17-96160.pdf				
KONE MonoSpace[®] 700 RTS_32_19 KONE MonoSpace 700 EPD 2019-brochure A4 V8.pdf (rts.fi)	6953	2.60	0.06	0.55
KONE 3000S MonoSpace[®] RTS_82_20 rts 82 20-kone monospace 3000s epd 22-03.pdf	8710	2.67	0.05	0.61
KONE MiniSpace[™] RTS_45_19 *KONE MiniSpace EPD 2020.pdf (rts.fi)	10031	3.95	0.08	0.82
KONE N MiniSpace[™] RTS_64_20 rts 64 20-kone n minispace epd 22-03.pdf	7980	2.92	0.09	0.64
KONE TranSys[™] RTS_43_19 rts 43 19-kone transys epd 22-03.pdf	8093	3.03	0.06	0.41
KONE TranSys[™] DX RTS_107_21 rts 107 21-kone transys soc epd 22-03.pdf	8476	3.10	0.06	0.79

Conversion factors (based on KONE Monospace 500 DX):

- Product mass: 2872 kg/unit
- Dimensions: 1.1 m x 1.4 m x 2.1 m (internal)
- Composition: ferrous metals (66.99 %), inorganic materials (27.12 %), electronics and electrical equipment (1.93 %), plastics and rubbers (1.19 %), non-ferrous metals (1.04 %), organic materials (0.44 %), others (0.28 %).

The summary of the selected typical values are as follows:

Aspect	Result
GWP (fossil) (A1-A3), kg CO ₂ e/kg	3.07
Content of renewable raw materials, %	0
Content of nonrenewable materials, %	100
The content of secondary materials, %	22
Content of harmful substances (substances of very high concern), %	< 0.1

18 Radiator, water circuit

18.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
Vesikiertoinen patteri	Vattenburet element	Radiator, water circuit

Relevant harmonised standards

EN 442-1:2014 Radiators and convectors

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
612.41	Patterilämmitys	Radiator heating

18.2 Market and description

Market

The radiators market in Finland leader is Rettig Lämpö. However, there is no significant domestic manufacturing, and the predominant source of imports is Eastern Europe.

Description

In terms of the A1-A3 emissions, the impacts of radiators are mostly based on steel and its GWP, as stainless steel is the main component of the product. As with any steel-based product, whether the steel used is from scrap materials or plain virgin materials has a significant impact on the GWP value of the product.

18.3 Selected typical values

The water circuit radiator is expected to be purely from cold-rolled stainless steel 100 %.

Conversion factors:

- Representativeness: Finland
- Conversion value: 33 kg/unit
- Products dimension: 60 cm x 100 cm x 10.2 cm

The summary of the selected typical values are as follows:

Aspect	Result
GWP (fossil) (A1-A3), kg CO ₂ e/kg	3.4
Content of renewable raw materials, %	0
Content of nonrenewable materials, %	100
The content of secondary materials, %	65
Content of harmful substances (substances of very high concern), %	< 0.1

19 Rainwater and drainage pipes

Updated: 15.10.2024 (version 01.00.008)

19.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
Sadevesi- ja salaojaputket	Regnvatten- och avloppsrör	Rainwater and drainage pipes

Relevant harmonised standards

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
141	Salaojaputket ja -kaivot	Drainage pipes and wells

19.2 Market and description

Market

The pipes are manufactured in Finland by Uponor, Pipelife Finland and Meltex. Share of domestic manufacturing or imports is not known. Rainwater and drainage pipes used in Finland are manufactured with either polypropylene (PP), polyethylene (PE) or polyvinylchloride (PVC).

Description

Rainwater and drainage pipes are typically small diameter drum pipes which are installed underground around the foundation of the building. The pipes are then used to direct rainwater off property to drain wells and then to the basic water well. The pipes are also used for technical drainage around the building to direct capillary water to drainage wells and then to the basic water well as well.

Manufacturing of the base material (PP, PE, PVC) is the most carbon intensive contributor to the GWP of rainwater and drainage pipes.

19.3 Selected typical values

Following table presents the sources considered for selection of typical values.

Declaration number	Source	Name	Manufacturing	Market	Valid	GWP - fossil (A1-A3) [co2e kg/kg]
HUB-1575	EPD HUB	Uponor PVC Storm water pipes	Finland	Finland	13.6.2029	2.67
HUB-0074	EPD HUB	iQ storm water pipe Blue, range ID (inner diameter) 150 - 1200mm	Finland, Sweden	Finland	8.7.2027	2.21
HUB-0075	EPD HUB	iQ storm water pipe, range ID (inner diameter) 150 - 1200mm	Finland, Sweden	Finland	8.7.2027	2.18

HUB-1061	EPD HUB	Double wall polyethylene rainwater and drainage pipes	Finland	Finland	1.2.2029	2.4
-	epd- norge	INFRA Sewage pipes	Sweden	Europe, Sweden	13.4.2028	2.01
-	epd- norge	Road pipes	Sweden	Europe, Sweden	12.6.2028	1.32
HUB-0029	EPD HUB	Double wall pipes for rain water (PE)	Finland	Europe, Sweden	29.4.2027	2.1
NEPD-3588-2251-EN	epd- norge	X-Stream	Sweden	Europe, Nordic	16.8.2027	2.38
HUB-0168	EPD HUB	Pipes for non- pressure underground drainage and sewage	Estonia	-	3.11.2027	2.67

An average of all EPDs of rainwater and drainage pipes is selected (values bolded) as a base for the typical indicator values.

The summary of the selected typical values are as follows:

Aspect	Result
GWP (fossil) (A1-A3), kg CO ₂ e/kg	2.22
Content of renewable raw materials, %	6
Content of nonrenewable materials, %	94
The content of secondary materials, %	15
Content of harmful substances (substances of very high concern), %	< 0.1

20 Solar panel, monocrystalline

20.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
Aurinkopaneeli	Solpanel	Solar panel, monocrystalline

Relevant harmonised standards

EN 62446-1:2016/A1:2018 - Photovoltaic (PV) systems

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
642	Aurinkoenergiatuotteet	Solar energy products

20.2 Market and description

Market

Solar panels are fully imported, and predominantly from China, but to lesser extent from other countries. The solar panels are often sold to the projects by domestic installation and wholesaler firms.

Description

Solar panels are manufactured with different technologies. The solar panels embodied carbon constitutes from the advanced materials and manufacturing processes used in the manufacturing and assembly of the photovoltaic cells. They contribute greatly to the GWP value of the product, even though their share from the mass is low.

20.3 Selected typical values

The selected generic value of the product is modeled by each constituent. The bill of material of the product was obtained from existing EPD studies. The electricity usage of the manufacturing process was also modeled into the selected generic value according to existing EPDs.

The end-of-life phase is determined as follows: The recycling process of silicon-based solar panels begins with separating the aluminum and glass parts. All glass and external metal parts are recycled. The rest of the materials are incinerated.

Conversion factors:

- Representativeness: Europe
- Conversion value: 19.5 kg/unit, with dimension: 1.6 m²/panel.
- Constituents by mass: Glass (69 %), aluminum (13.5 %), ethylene-vinyl-acetate (EVA) (9 %), photovoltaic cells (3.5 %), PP (3 %), copper (1.3 %) and silicone (0.7 %).

The summary of the selected typical values are as follows:

Aspect	Result
GWP (fossil) (A1-A3), kg CO ₂ e/kg	9.00
Content of renewable raw materials, %	0
Content of nonrenewable materials, %	100
The content of secondary materials, %	5
Content of harmful substances (substances of very high concern), %	< 0.1

21 Solar thermal collector

21.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
Aurinkolämpökeräin	Solvärmefångare	Solar thermal collector, flat plate

Relevant harmonised standards

EN 12975 Thermal solar systems and components – Solar collectors

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
612.16	Aurinkolämmityslaitteet	Solar energy heaters

21.2 Market and description

Market

Small scale solar thermal systems are manufactured and imported by a wide variety of companies. Share of domestic manufacturing is unknown. However, in the larger scale systems Savosolar is a significant domestic manufacturer.

Description

There are two predominant solar thermal collector system types on the market: flat plate collectors and vacuum tube collectors. The flat plate collectors comprise of an absorption surface, insulation, frame and pipes with heat transmission fluid to transfer the heat into the heat exchanger.

21.3 Selected typical values

The selected generic value for the product is created as an average of typical products. Dataset is created as the average dataset of existing product datasets on the market. Thermal fluid is not considered in the calculation. Carbon handprint is formed by metal recycling.

Conversion factors:

- Representativeness: Europe
- Conversion value: 17.5 kg/m², with product's dimension: 100 cm x 100 cm x 8 cm.
- Composition: Float glass 34 %, copper 14 %, aluminum 46 %, glass wool 7 %.

The summary of the selected typical values are as follows:

Aspect	Result
GWP (fossil) (A1-A3), kg CO ₂ e/kg	5.17
Content of renewable raw materials, %	0
Content of nonrenewable materials, %	100
The content of secondary materials, %	0
Content of harmful substances (substances of very high concern), %	< 0.1

22 Sprinkler system, pipes

22.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
Sprinkler-järjestelmän johdot	Sprinklersystemrör	Sprinkler system, pipes

Relevant harmonised standards

EN 12259 Fixed firefighting systems components for sprinkler and waterspray systems - Part 1: Sprinklers

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
617.11	Sprinklerilaitteistot	Sprinkler system

22.2 Market and description

Market

Sprinkler system pipes manufacturing domestic market share is not known. Sprinkler system domestic manufacturers include Marioff corporation.

Description

Sprinkler system pipes can be made from coated or treated steel. The steel parts impact predominantly the product's GWP.

22.3 Selected typical values

The system is dependent on the size and type of the building the system is installed in. Sprinkler system pipes can be categorized separately into for example trunk mains and range pipes, where their diameters vary. However, this does not impact their GWP values, as all the sprinkler system pipes are made from the same material.

The selected generic value is based on generally used products and their constituents. The sprinkler system pipes constitute of galvanized steel (98 % of mass) and epoxy paint (2 % of mass). The carbon handprint is caused by metal recycling, as the effect of other materials is non-existent.

Conversion factors:

- Representativeness: Finland
- Conversion value: 8 kg/m – 18 kg/m
- Product's dimension: 25 mm – 65 mm - Diameter

The summary of the selected typical values are as follows:

Aspect	Result
GWP (fossil) (A1-A3), kg CO ₂ e/kg	3.40
Content of renewable raw materials, %	0
Content of nonrenewable materials, %	100
The content of secondary materials, %	20
Content of harmful substances (substances of very high concern), %	< 0.1

23 Toilet seat

23.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
WC-istuin	Toalettsits	Toilet seat

Relevant harmonised standards

EN 997:2018 WC pans and WC suites with integral trap

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
523.36	WC-istuimet	WC seats

23.2 Market and description

Market of toilet seat

The main manufacturer manufacturing toilet seats in Finland is IDO, which is a part of the German Geberit group. The domestic manufacturing market share is over one half of the total market share. The imports are predominantly from Europe.

Descriptiontoilet seat

Toilet seats are manufactured mainly from sanitary ceramic, which dominates the embodied carbon emissions of the product due to its high mass share and carbon intensity. The energy usage in the sanitary ceramics production, such as the firing process it entails, is often carbon intensive. Only plastic components contributes carbon handprint and since the share of plastics is rather low, so is the carbon hadprint.

23.3 Selected typical values

The product is composed of ceramic (95%) and polypropylene (5%).

Conversion factors:

- Representativeness: Finland
- Conversion value: 29 kg/unit
- Seat height: 420 mm
- Toilet height: 860 mm

The summary of the selected typical values are as follows:

Aspect	Result
GWP (fossil) (A1-A3), kg CO ₂ e/kg	3.64
Content of renewable raw materials, %	0
Content of nonrenewable materials, %	100
The content of secondary materials, %	0
Content of harmful substances (substances of very high concern), %	< 0.1

24 Ventilation duct, metal

24.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
Ilmanvaihtokanava, metalli	Ventilationskanal	Ventilation duct, metal

Relevant harmonised standards

EN 12237, EN 1506 Ventilation for buildings. Ductwork hangers and supports. Requirements for strength, Ventilation for buildings. Sheet metal air ducts and fittings with circular cross-section. Dimensions

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
614.4	Ilmanvaihtokanavistot	Combustion and dilution air intakes

24.2 Market and description

Market of water pump

Ventilation ducts used in Finland are predominantly made out of either galvanized steel or polypropylene. However, the polypropylene ventilation ducts are mainly used in single family houses. The metal ventilation ducts are used in all other building types. Approximately 90 % of the metal ventilation ducts are imported.

Descriptionwater pump

The product's emissions are predominantly caused by the raw material. Metal ventilation ducts are made of galvanized steel, which is practically solely responsible for the raw material's contribution to the GWP value of the ventilation duct. The resulting GWP is dependent on the amount of scrap materials in the steel used.

24.3 Selected typical values

The proposed generic value of the product is obtained from the bill of material of commonly used products.

Conversion factor:

- The product constituents by mass: 100 % zinc coated steel
- Representativeness: Europa

The summary of the selected typical values are as follows:

Aspect	Result
GWP (fossil) (A1-A3), kg CO ₂ e/kg	2.6
Content of renewable raw materials, %	0
Content of nonrenewable materials, %	100
The content of secondary materials, %	20

Content of harmful substances (substances of very high concern), %	< 0.1
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25 Water pump

25.1 Product name, title and standards

Product names in Finnish, Swedish and English

Product names in Finnish	Product names in Swedish	Product names in English
Vesipumppu	Vattenpump	Water pump

Relevant harmonised standards

EN 16480 Pumps – Minimum required efficiency of rotodynamic water pumps

Relevant classes according to TALO 2000 classification system

Class number	Name in Finnish	Name in English
613.15	Vesipumput ja -pumppaamot	Water pumps

25.2 Market and description

Market of water pump

The domestic market for water pumps is led by Grundfos, Wilo and Xylem. However, the domestic manufacturing market share is not known. The import of water pumps comes predominantly from Europe.

Descriptionwater pump

The main constituents by mass of the water pump are cast iron, plastics, and steel. Together with the manufacturing energy use, these constituents contribute the most to the product's GWP. If also considering the use phase of the product, this could have significant impact to the product's carbon emissions.

25.3 Selected typical values

The selected generic value for water pump is based on a commonly used product and its constituents. The selected generic value also considers the electricity usage in the manufacturing of the product according to the Finnish Tilastokeskus carbon emission data. Carbon handprint is formed of metal recycling and energy recovery of plastic.

Conversion factor:

- The product constituents by mass: Cast iron (44 %), plastics (19 %), steel (16%), aluminium (7 %), copper (4%) and others.
- Representativeness: Europe
- Conversion value: 6.5 kg/unit, with product's dimension: 99 cm x 209 cm 17 cm.

The summary of the selected typical values are as follows:

Aspect	Result
GWP (fossil) (A1-A3), kg CO ₂ e/kg	5.96
Content of renewable raw materials, %	0

Aspect	Result
Content of nonrenewable materials, %	100
The content of secondary materials, %	50
Content of harmful substances (substances of very high concern), %	< 0.1

Appendix 1 GWP values of materials

CO2Data: version 1.00.008, 2022-12-06

Material	kg CO2e/kg	Source
ABS plastic	2,75	PlasticsEurope ABS EPD
Aluminium sheet for walls and ceilings, scrap 0%	10	CO2data
Brass	1,46	EPD-AUR-20160216-CBA1-EN
Brass (used)	4,51	EPD-VAS-20150047-CIA1-EN
Cardboard		Ecoinvent
Cast iron	1,64	-
Ceramics	3,74	http://www.roca.com/roca-web-static/resources/environmental+product+declaration+0718.6ffc9a4e-bcc6-4358-9e62-cde6b70b0564.pdf
Chipboard	0,39	CO2data
Chipboard, melamine coated	0,55	CO2data
Copper tube	0,65	CO2data
Copper wire	4,2	CO2data
District heat	0,147	CO2data
Electricity	0,153	CO2data
Epoxy primer	3,4	1.1.00115.2020
EPS insulation	2,9	CO2data
Ethylene-vinyl acetate EVA	1,62	PlasticsEurope
Fibreboard, hard	0,21	CO2data
Fibreboard, medium density, mdf	0,5	CO2data
Fibreglass	1,5	GlassFibreEurope 2016
Float glass	1,2	CO2data
Glass wool insulation, density 20 kg/m3	1	CO2data
GLT, Glued laminated timber	0,11	CO2data
Heat treated timber for indoor use	0,75	CO2data
High-density polyethylene HDPE	1,87	PlasticsEurope (2014) [4]
Insulating glass unit	1,7	CO2data
Laminated glass	1,7	CO2data
Mirror glass	1,7	CO2data
Paint, acrylic, water-borne for exterior use	2,5	CO2data
Paper mass	0,77	Ecoinvent
PEX	1,8	PlasticsEurope
PEX-a	3,05	PlasticsEurope
Polyamide PA6.6	6,4	PlasticsEurope PA6.6 EPD
Polystyrene PS	3,26	PlasticsEurope (2016) [1]

Material	kg CO2e/kg	Source
Polyurethane insulation board	2,9	PU Europe (2014) [2]
Polyvinyl chloride PVC	1,99	PlasticsEurope
Powder firing	0,15	-
PP Polypropylene polymer	1,63	PlasticsEurope (2014) [3]
Precast concrete, solid slab element 220 mm	0,16	CO2data
Refrigerant R410A	2088	https://www.gov.uk/guidance/calculate-the-carbon-dioxide-equivalent-quantity-of-an-f-gas
Rubber	1,31368	Carbon footprint reduction: a critical study of rubber production in small and medium scale enterprises in Sri Lanka
Sawn timber	0,069	CO2data
Sealant	7,08	EPD-FEI-20150323-IBG1-EN
Solid wood	0,15	RTS_27_19
Stainless steel sheet	3,4	CO2data
Steel sheet for roofing and cladding, hot-dip galvanized, painted or not-painted, or with COR-TEN surface	2,6	CO2data
Stone wool insulation for facades, density 61 kg/m3	1,2	CO2data
Thermally toughened glass	1,6	CO2data

Appendix 2 Electrical cables, medium voltage

Information area	Content
Source	Medium Voltage Three Core Underground Cable AXLJ-F-TT 6/10 (12) kV 3x240 S-P-06944 https://api.environdec.com/api/v1/EPDLibrary/Files/cb539e43-465d-4ce1-72d0-08da954a8add/Data
Description	Type: Three core Manufacturing: Greece
GWP fossil (A1 – A3), kg/kg	11.09
Carbon handprint, kg/kg	-0.95
Content of renewable raw materials, %	0 %
Content of secondary materials, %	7 %

Information area	Content
Source	Medium Voltage Three Core Underground Cable AXLJ-F-TT 12/20 (24) kV 3x240 S-P-06943 https://api.environdec.com/api/v1/EPDLibrary/Files/ebc7cfbb-4014-4f8d-72d2-08da954a8add/Data
Description	Type: Three core Manufacturing: Greece
GWP fossil (A1 – A3), kg/kg	11.52
Carbon handprint, kg/kg	-1.16
Content of renewable raw materials, %	0 %
Content of secondary materials, %	7 %

Information area	Content
Source	AXLJ-TT 1x150/25 36kV S-P-05140 https://api.environdec.com/api/v1/EPDLibrary/Files/a3c541df-2862-4cb5-5669-08d9a98a0c6e/Data
Description	Type: Single core Manufacturing: Sweden
GWP fossil (A1 – A3), kg/kg	4.08
Carbon handprint, kg/kg	-3.69
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0 %

Information area	Content
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Information area	Content
Source	AXLJ-TT 1x240/35 36kV S-P-05140 https://api.environdec.com/api/v1/EPDLibrary/Files/a3c541df-2862-4cb5-5669-08d9a98a0c6e/Data
Description	Type: Single core Manufacturing: Sweden
GWP fossil (A1 – A3), kg/kg	4.26
Carbon handprint, kg/kg	-4.03
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0 %

Information area	Content
Source	AXLJ-TT 1x630/35 36kV S-P-05140 https://api.environdec.com/api/v1/EPDLibrary/Files/a3c541df-2862-4cb5-5669-08d9a98a0c6e/Data
Description	Type: Single core Manufacturing: Sweden
GWP fossil (A1 – A3), kg/kg	4.59
Carbon handprint, kg/kg	-4.82
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0 %

Information area	Content
Source	AXALJ-TT 3x50/25 AL 36kV S-P-05141 https://api.environdec.com/api/v1/EPDLibrary/Files/fdd664d9-53dd-4bda-5668-08d9a98a0c6e/Data
Description	Type: Three core Manufacturing: Sweden
GWP fossil (A1 – A3), kg/kg	3.44
Carbon handprint, kg/kg	-2.84
Content of renewable raw materials, %	0 %
Content of secondary materials, %	6 %

Information area	Content
Source	AXALJ-TT 3x95/35 AL 36kV S-P-05141 https://api.environdec.com/api/v1/EPDLibrary/Files/fdd664d9-53dd-4bda-5668-08d9a98a0c6e/Data
Description	Type: Three core Manufacturing: Sweden

Information area	Content
GWP fossil (A1 – A3), kg/kg	3.69
Carbon handprint, kg/kg	-3.28
Content of renewable raw materials, %	0 %
Content of secondary materials, %	4 %

Information area	Content
Source	AXALJ-TT 3x150/35 AL 36kV S-P-05141 https://api.environdec.com/api/v1/EPDLibrary/Files/fdd664d9-53dd-4bda-5668-08d9a98a0c6e/Data
Description	Type: Three core Manufacturing: Sweden
GWP fossil (A1 – A3), kg/kg	3.85
Carbon handprint, kg/kg	3.62
Content of renewable raw materials, %	0 %
Content of secondary materials, %	5 %

Information area	Content
Source	AXALJ-TT 3x240/50 AL 36kV S-P-05141 https://api.environdec.com/api/v1/EPDLibrary/Files/fdd664d9-53dd-4bda-5668-08d9a98a0c6e/Data
Description	Type: Three core Manufacturing: Sweden
GWP fossil (A1 – A3), kg/kg	4.04
Carbon handprint, kg/kg	-3.92
Content of renewable raw materials, %	0 %
Content of secondary materials, %	5 %

Information area	Content
Source	AXALJ-TT 3x300/50 AL 36kV S-P-05141 https://api.environdec.com/api/v1/EPDLibrary/Files/fdd664d9-53dd-4bda-5668-08d9a98a0c6e/Data
Description	Type: Three core Manufacturing: Sweden
GWP fossil (A1 – A3), kg/kg	4.14
Carbon handprint, kg/kg	-4.09
Content of renewable raw materials, %	0 %

Information area	Content
Content of secondary materials, %	6 %

Information area	Content
Source	AXQJ / AXCMK-HF / IFSI-Al 4x240/72 0,6/1 (1,2) kV EPDHUB-0106 EPD Reka Cables Ltd AXQJ AXCMK HF IFSI Al 4x240 72 0,6 1 (1,2) kV HUB-0106 2023-12-19 (2).pdf
Description	Type: Four core Manufacturing: Finland
GWP fossil (A1 – A3), kg/kg	6.08
Carbon handprint, kg/kg	-4.15
Content of renewable raw materials, %	0 %
Content of secondary materials, %	3 %

Information area	Content
Source	3X300+35 PEX-S-AL 12KV PE-SHEATH NEPD-5255-4586-EN https://www.epd-norge.no/getfile.php/1347091-1698310724/EPDer/Byggevarer/NEPD-5255-4586_3X300-35-PEX-S-AL-12KV-PE-SHEATH.pdf
Description	Type: Three core Manufacturing: Norway
GWP fossil (A1 – A3), kg/kg	9.12
Carbon handprint, kg/kg	-2.73
Content of renewable raw materials, %	0 %
Content of secondary materials, %	10 %

Information area	Content
Source	3X300+35 PEX-S-AL 12KV PE-SHEATH NEPD-5254-4581-EN https://nkt.widen.net/content/fro0xkywtm/pdf/NEPD-5254-4581_3X300-35-PEX-S-AL-17-5-kV.pdf?u=gj0n1y
Description	Type: Three core Manufacturing: Norway
GWP fossil (A1 – A3), kg/kg	8.76
Carbon handprint, kg/kg	-2.51
Content of renewable raw materials, %	0 %
Content of secondary materials, %	9 %

Information area	Content
Information area	Content
Source	1X1000RE+140 PEX-M-AL-LRT 72 kV NEPD-5253-4582-EN https://nkt.widen.net/content/txwxwcnw5x/pdf/NEPD-5253-4582_1X1000RE-140-PEX-M-AL-LRT-72-kV.pdf?u=gj0n1y
Description	Type: Single core Manufacturing: Norway
GWP fossil (A1 – A3), kg/kg	9.21
Carbon handprint, kg/kg	-2.84
Content of renewable raw materials, %	0 %
Content of secondary materials, %	10 %

Information area	Content
Source	AXAL-F-TT 18/30(36)kV 3x240/50AL PRO 3.0 NEPD-4758-4013-EN https://nkt.widen.net/content/us0mmaqzvc/pdf/NEPD-4758-4013_AXAL-F-TT-18-30-36-kV-3x240-50AL-PRO-30.pdf?u=gj0n1y
Description	Type: Three core Manufacturing: Norway
GWP fossil (A1 – A3), kg/kg	7.49
Carbon handprint, kg/kg	-2.08
Content of renewable raw materials, %	0 %
Content of secondary materials, %	7 %

Information area	Content
Source	TSLF 12/20(24) kV 1x240AFR/35 NEPD-3605-2549-EN https://nkt.widen.net/content/txwxwcnw5x/pdf/NEPD-5253-4582_1X1000RE-140-PEX-M-AL-LRT-72-kV.pdf?u=gj0n1y
Description	Type: Single core Manufacturing: Sweden
GWP fossil (A1 – A3), kg/kg	4.36
Carbon handprint, kg/kg	-3.55
Content of renewable raw materials, %	0 %
Content of secondary materials, %	4 %

Information area	Content
Source	TSLF 24kV 1x240/35 AFR NEPD-2944-1638-EN https://www.epd-norge.no/getfile.php/1319334-1624978686/EPDer/Byggevarer/NEPD-2944-1638_TSLF-24kV-1x240-35-AFR.pdf

Information area	Content
Description	Type: Single core Manufacturing: Sweden
GWP fossil (A1 – A3), kg/kg	4.20
Carbon handprint, kg/kg	-3.74
Content of renewable raw materials, %	0 %
Content of secondary materials, %	4 %

Appendix 3 Luminaires

Information area	Content
Source	LED office luminaire 38085 https://oekobaudat.de/OEKOBAU.DAT/datasetdetail/process.xhtml?uuid=b6dd564d-22e0-47b7-898c-802644931ba4&version=20.23.050
Description	Manufacturing: Germany Type: Unknown (indoor luminaire)
GWP fossil (A1 – A3), kg/kg	5,39
Carbon handprint, kg/kg	-1,88
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,10

Information area	Content
Source	Multilume Slim S-P-03105 https://api.environdec.com/api/v1/EPDLibrary/Files/1b911de9-d4eb-41f6-68e3-08d9b3ca1199/Data
Description	Manufacturing: Sweden Type: Modular luminaire
GWP fossil (A1 – A3), kg/kg	8,03
Carbon handprint, kg/kg	-5,08
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	NOTOR 65 S-P-02588 https://api.environdec.com/api/v1/EPDLibrary/Files/b68e84ff-ee9d-4893-3d3c-08d91ff9d553/Data
Description	Manufacturing: Sweden Type: Pendant luminaire
GWP fossil (A1 – A3), kg/kg	14,47
Carbon handprint, kg/kg	-10,70
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	Multilume Re:Think S-P-03128 https://www.fagerhult.at/globalassets/inriverresources/epd/epd_multilume_rethink.pdf
Description	Manufacturing: Sweden Type: Modular luminaire
GWP fossil (A1 – A3), kg/kg	9,56
Carbon handprint, kg/kg	-3,77
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,35

Information area	Content
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Information area	Content
Source	Streamer S-P-04726 https://api.environdec.com/api/v1/EPDLibrary/Files/b4efb49c-4c12-4591-2f3f-08db028f20a5/Data
Description	Manufacturing: China Type: Spotlight
GWP fossil (A1 – A3), kg/kg	16,03
Carbon handprint, kg/kg	-4,56
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,81

Information area	Content
Source	FIL35, FIL45, FIL50, FIL70 and FIL120 Modular Linear Technical Luminaires S-P-05607 https://api.environdec.com/api/v1/EPDLibrary/Files/2733ec8c-34a3-4bdd-567d-08da12da9675/Data
Description	Manufacturing: Spain Type: Pendant luminaire
GWP fossil (A1 – A3), kg/kg	12,91
Carbon handprint, kg/kg	-0,56
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	Strombell 80 + cork bell S-P-09828 https://api.environdec.com/api/v1/EPDLibrary/Files/6a1a1ecd-00f4-47a2-5769-08db8f4b80b8/Data
Description	Manufacturing: Spain Type: Pendant luminaire
GWP fossil (A1 – A3), kg/kg	13,23
Carbon handprint, kg/kg	-4,44
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,25

Information area	Content
Source	Stormbell 80 + PET bell S-P-09828 https://api.environdec.com/api/v1/EPDLibrary/Files/6a1a1ecd-00f4-47a2-5769-08db8f4b80b8/Data
Description	Manufacturing: Spain Type: Pendant luminaire
GWP fossil (A1 – A3), kg/kg	15,25
Carbon handprint, kg/kg	-5,11
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,11

Information area	Content
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Information area	Content
Source	Strombell 80 + aluminium bell S-P-09828 https://api.environdec.com/api/v1/EPDLibrary/Files/6a1a1ecd-00f4-47a2-5769-08db8f4b80b8/Data
Description	Manufacturing: Spain Type: Pendant luminaire
GWP fossil (A1 – A3), kg/kg	17,31
Carbon handprint, kg/kg	-4,46
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,06

Information area	Content
Source	Strombell 173 + polycarbonate bell S-P-09828 https://api.environdec.com/api/v1/EPDLibrary/Files/6a1a1ecd-00f4-47a2-5769-08db8f4b80b8/Data
Description	Manufacturing: Spain Type: Pendant luminaire
GWP fossil (A1 – A3), kg/kg	9,18
Carbon handprint, kg/kg	-7,77
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,01

Information area	Content
Source	Planar LED Downlight S-P-07792 https://api.environdec.com/api/v1/EPDLibrary/Files/7b97194e-a999-4d2a-48dd-08db1f315c5e/Data
Description	Manufacturing: China Type: Downlight
GWP fossil (A1 – A3), kg/kg	13,24
Carbon handprint, kg/kg	-1,48
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	KOMBIC100, KOMBIC150 and KOMBIC200 Luminaires S-P-03873 https://api.environdec.com/api/v1/EPDLibrary/Files/f3991ad6-c53f-4a14-567f-08da12da9675/Data
Description	Manufacturing: Spain Type: Downlight/Surface luminaire
GWP fossil (A1 – A3), kg/kg	13,51
Carbon handprint, kg/kg	-0,83
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	Office lighting 1 MD-20037-EN https://www.fischer-lighting.com/wp-

Information area	Content
	content/uploads/2021/01/EPDDanmark_Fischer-Lighting.pdf
Description	Manufacturing: Denmark Type: Pendant luminaire
GWP fossil (A1 – A3), kg/kg	22,17
Carbon handprint, kg/kg	-4,19
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,50

Information area	Content
Source	Office lighting 2 MD-20037-EN https://www.fischer-lighting.com/wp-content/uploads/2021/01/EPDDanmark_Fischer-Lighting.pdf
Description	Manufacturing: Denmark Type: Pendant luminaire
GWP fossil (A1 – A3), kg/kg	4,39
Carbon handprint, kg/kg	-0,83
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,10

Information area	Content
Source	Office lighting 3 MD-20037-EN https://www.fischer-lighting.com/wp-content/uploads/2021/01/EPDDanmark_Fischer-Lighting.pdf
Description	Manufacturing: Denmark Type: Pendant luminaire
GWP fossil (A1 – A3), kg/kg	4,12
Carbon handprint, kg/kg	-0,78
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,09

Information area	Content
Source	Office lighting 4 MD-20037-EN https://www.fischer-lighting.com/wp-content/uploads/2021/01/EPDDanmark_Fischer-Lighting.pdf
Description	Manufacturing: Denmark Type: Pendant luminaire
GWP fossil (A1 – A3), kg/kg	5,91
Carbon handprint, kg/kg	-1,12
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,13

Information area	Content
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Information area	Content
Source	Phi Linear 1160 RTS EPD_210_23 https://cer.rts.fi/wp-content/uploads/rts_210_23-epd_phi_greenled-22-3-1.pdf
Description	Manufacturing: Finland Type: Modular luminaire/Pendant luminaire
GWP fossil (A1 – A3), kg/kg	7,23
Carbon handprint, kg/kg	-4,46
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	Phi Linear 1720 RTS EPD_210_23 https://cer.rts.fi/wp-content/uploads/rts_210_23-epd_phi_greenled-22-3-1.pdf
Description	Manufacturing: Finland Type: Modular luminaire/Pendant luminaire
GWP fossil (A1 – A3), kg/kg	7,26
Carbon handprint, kg/kg	-0,40
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	Phi Linear 2312 RTS EPD_210_23 https://cer.rts.fi/wp-content/uploads/rts_210_23-epd_phi_greenled-22-3-1.pdf
Description	Manufacturing: Finland Type: Modular luminaire/Pendant luminaire
GWP fossil (A1 – A3), kg/kg	7,16
Carbon handprint, kg/kg	-4,43
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	Phi Vision 1160 RTS EPD_210_23 https://cer.rts.fi/wp-content/uploads/rts_210_23-epd_phi_greenled-22-3-1.pdf
Description	Manufacturing: Finland Type: Modular luminaire/Pendant luminaire
GWP fossil (A1 – A3), kg/kg	7,51
Carbon handprint, kg/kg	-4,46
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	Phi Vision 1720 RTS EPD_210_23 https://cer.rts.fi/wp-content/uploads/rts_210_23-epd_phi_greenled-22-3-1.pdf

Information area	Content
Description	Manufacturing: Finland Type: Modular luminaire/Pendant luminaire
GWP fossil (A1 – A3), kg/kg	7,98
Carbon handprint, kg/kg	-4,83
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	Phi Vision 2312 RTS EPD_210_23 https://cer.rts.fi/wp-content/uploads/rts_210_23-epd_phi_greenled-22-3-1.pdf
Description	Manufacturing: Finland Type: Modular luminaire/Pendant luminaire
GWP fossil (A1 – A3), kg/kg	7,06
Carbon handprint, kg/kg	-4,11
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	Phi Vision Direct/indirect 1160 RTS EPD_210_23 https://cer.rts.fi/wp-content/uploads/rts_210_23-epd_phi_greenled-22-3-1.pdf
Description	Manufacturing: Finland Type: Modular luminaire/Pendant luminaire
GWP fossil (A1 – A3), kg/kg	9,46
Carbon handprint, kg/kg	-5,85
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	Phi Vision Direct/indirect 1720 RTS EPD_210_23 https://cer.rts.fi/wp-content/uploads/rts_210_23-epd_phi_greenled-22-3-1.pdf
Description	Manufacturing: Finland Type: Modular luminaire/Pendant luminaire
GWP fossil (A1 – A3), kg/kg	9,78
Carbon handprint, kg/kg	-6,44
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	Phi Modul 1340 RTS EPD_210_23 https://cer.rts.fi/wp-content/uploads/rts_210_23-epd_phi_greenled-22-3-1.pdf
Description	Manufacturing: Finland Type: Modular luminaire/Pendant luminaire
GWP fossil (A1 – A3), kg/kg	7,29

Information area	Content
Carbon handprint, kg/kg	-4,29
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	Phi Modul 1400 RTS EPD_210_23 https://cer.rts.fi/wp-content/uploads/rts_210_23-epd_phi_greenled-22-3-1.pdf
Description	Manufacturing: Finland Type: Modular luminaire/Pendant luminaire
GWP fossil (A1 – A3), kg/kg	7,12
Carbon handprint, kg/kg	-4,19
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	Phi Modul 1640 RTS EPD_210_23 https://cer.rts.fi/wp-content/uploads/rts_210_23-epd_phi_greenled-22-3-1.pdf
Description	Manufacturing: Finland Type: Modular luminaire/Pendant luminaire
GWP fossil (A1 – A3), kg/kg	6,91
Carbon handprint, kg/kg	-3,96
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	Phi Modul 1700 RTS EPD_210_23 https://cer.rts.fi/wp-content/uploads/rts_210_23-epd_phi_greenled-22-3-1.pdf
Description	Manufacturing: Finland Type: Modular luminaire/Pendant luminaire
GWP fossil (A1 – A3), kg/kg	6,98
Carbon handprint, kg/kg	-3,88
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	Phi Modul 1840 RTS EPD_210_23 https://cer.rts.fi/wp-content/uploads/rts_210_23-epd_phi_greenled-22-3-1.pdf
Description	Manufacturing: Finland Type: Modular luminaire/Pendant luminaire
GWP fossil (A1 – A3), kg/kg	6,89
Carbon handprint, kg/kg	-4,15
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Information area	Content
Source	Phi Modul 1900 RTS EPD_210_23 https://cer.rts.fi/wp-content/uploads/rts_210_23-epd_phi_greenled-22-3-1.pdf
Description	Manufacturing: Finland Type: Modular luminaire/Pendant luminaire
GWP fossil (A1 – A3), kg/kg	6,95
Carbon handprint, kg/kg	-4,07
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00
Information area	Content
Source	Arena 1200 NEPD-4002-3042-EN https://www.sg-as.com/storage/data/130073_Arena/54/5703821174473_NEPD-4002-3042_Arena-1200.pdf
Description	Manufacturing: Denmark Type: Modular luminaire
GWP fossil (A1 – A3), kg/kg	16,03
Carbon handprint, kg/kg	-0,41
Content of renewable raw materials, %	0 %
Content of secondary materials, %	1,03
Information area	Content
Source	i60-1200 LED 4600 HF OP NEPD-4286-3520-EN https://www.epd-norge.no/getfile.php/1331420-1679481995/EPDer/Byggevarer/NEPD-4286-3520_i60-1200-LED-4600-HF-OP.pdf
Description	Manufacturing: Norway Type: Modular luminaire
GWP fossil (A1 – A3), kg/kg	12,29
Carbon handprint, kg/kg	-0,46
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,52
Information area	Content
Source	A51-R600/C430 LED 2100 DALI LI NEPD-4334-3571-EN https://www.glamox.com/globalassets/pbs/epds/nepd-4334-3571_a51-r600-c430-led-2100-dali-li.pdf
Description	Manufacturing: Norway Type: Modular luminaire
GWP fossil (A1 – A3), kg/kg	17,56
Carbon handprint, kg/kg	-0,33
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,87

Information area	Content
Information area	Content
Source	C77-R600x600 WH 3000 DALI 840 LI SM NEPD-4233-3474-EN https://www.glamox.com/globalassets/pbs/epds/nepd-4233-3474_c77-r600x600-wh-3000-dali-840-li-sm.pdf
Description	Manufacturing: Norway Type: Modular luminaire
GWP fossil (A1 – A3), kg/kg	20,73
Carbon handprint, kg/kg	-0,44
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,75

Information area	Content
Source	C90-R600x600 LED 4000 DALI 840 LI MP NEPD-4146-3379-EN https://www.glamox.com/globalassets/pbs/epds/nepd-4146-3379_c90-r600x600-led-4000-dali-840-li-mp.pdf
Description	Manufacturing: Norway Type: Modular luminaire
GWP fossil (A1 – A3), kg/kg	24,90
Carbon handprint, kg/kg	-0,45
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,64

Information area	Content
Source	C90-R600x600 LED 5000 DALI 830 LI MP NEPD-4212-3436-EN https://www.glamox.com/globalassets/pbs/epds/nepd-4212-3436_c90-r600x600-led-5000-dali-830-li-mp.pdf
Description	Manufacturing: Norway Type: Modular luminaire
GWP fossil (A1 – A3), kg/kg	24,83
Carbon handprint, kg/kg	-0,45
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	A40-W600 LED 1000 HF A40-W600 LED 1000 HF https://epdnorway.lca-data.com/resource/datastocks/91413340-7bf0-4f88-a952-0f91cba685df/processes/5e0330a5-555e-42aa-8855-1df37c093350/epd?version=00.03.000

Information area	Content
Description	Manufacturing: Estonia Type: Modular luminaire
GWP fossil (A1 – A3), kg/kg	19,25
Carbon handprint, kg/kg	-1,88
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,19

Information area	Content
Source	Arena Sport 1200 NEPD-4746-3992-EN https://www.epd-norge.no/getfile.php/1342465-1691593508/EPDer/Byggevarer/NEPD-4746-3992_Arena-Sport-1200.pdf
Description	Manufacturing: Denmark Type: Modular luminaire
GWP fossil (A1 – A3), kg/kg	9,73
Carbon handprint, kg/kg	-0,41
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	Pendant luminaire ECO-ZGR-42186823-Office-EU-2020-01-31 https://resources.z.lighting/object/EPD/EPDGen.aspx?Number=357360&CompanyID=1&Language=EN&CC=COM
Description	Manufacturing: Serbia Type: Pendant luminaire
GWP fossil (A1 – A3), kg/kg	8,04
Carbon handprint, kg/kg	-4,33
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	Discovery Discovery, Fagerhults Belysning AB https://www.fagerhult.com/globalassets/inriverresources/epd/epd_discovery.pdf
Description	Manufacturing: Sweden Type: Modular luminaire
GWP fossil (A1 – A3), kg/kg	14,29
Carbon handprint, kg/kg	-1,19
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,01

Information area	Content
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Source	FLIGHT VITALITY FVWQ9Y34KEP WHITECROFT LIGHTING LTD RTS_136_21 https://cer.rts.fi/wp-content/uploads/epd-fvwq9y34kep_whitecroat-lighting-rts_136_21.pdf
Description	Manufacturing: United Kingdom Type: Industrial luminaire
GWP fossil (A1 – A3), kg/kg	30,68
Carbon handprint, kg/kg	-4,88
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,20

Information area	Content
Source	FLIGHT VITALITY FVWQ9Y54KEP WHITECROFT LIGHTING LTD RTS_137_21 https://cer.rts.fi/wp-content/uploads/epd-fvwq9y54kep_whitecroat-lighting.pdf
Description	Manufacturing: United Kingdom Type: Industrial luminaire
GWP fossil (A1 – A3), kg/kg	31,43
Carbon handprint, kg/kg	-4,80
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,21

Information area	Content
Source	FLIGHT VITALITY FVWQ9Y64KEP WHITECROFT LIGHTING LTD RTS_138_21 https://cer.rts.fi/wp-content/uploads/epd-fvwq9y64kep_whitecroat-lighting.pdf
Description	Manufacturing: United Kingdom Type: Industrial luminaire
GWP fossil (A1 – A3), kg/kg	32,02
Carbon handprint, kg/kg	-4,76
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,21

Information area	Content
Source	i10-1500 LED 16000 HF 840 MB NEPD-3958-2994-EN https://www.epd-norge.no/getfile.php/1327311-1671099460/EPDer/Byggevarer/NEPD-3958-2994_i10-1500-LED-16000-HF-840-MB.pdf
Description	Manufacturing: Norway Type: Industrial luminaire
GWP fossil (A1 – A3), kg/kg	14,57
Carbon handprint, kg/kg	-0,45
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,68

Information area	Content
Source	Pleiad G4 Pleiad G4, Fagerhults Belysning AB https://www.fagerhult.at/globalassets/inriverresources/epd/epd_pleiad_g4_125_165_205.pdf
Description	Manufacturing: Sweden Type: Industrial luminaire
GWP fossil (A1 – A3), kg/kg	18,81
Carbon handprint, kg/kg	-1,70
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,25

Information area	Content
Source	Evolume 1 S-P-03810 https://api.environdec.com/api/v1/EPDLibrary/Files/26b67451-103d-4258-f121-08daa04473b0/Data
Description	Manufacturing: Sweden Type: Street or column luminaire
GWP fossil (A1 – A3), kg/kg	7,40
Carbon handprint, kg/kg	-0,33
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	Colibri S-P-05887 https://api.environdec.com/api/v1/EPDLibrary/Files/e9988c33-e427-484c-7a28-08da491c4cdf/Data
Description	Manufacturing: Latvia Type: Street or column luminaire
GWP fossil (A1 – A3), kg/kg	4,37
Carbon handprint, kg/kg	-5,56
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	CENTURY with fixation CATENARIA, fixation LIRA, fixation LATERAL and fixation VERTICAL, Street luminaire. S-P-08966 https://api.environdec.com/api/v1/EPDLibrary/Files/5837510e-04db-475a-8766-08db523a4d9e/Data
Description	Manufacturing: Spain Type: Street or column luminaire
GWP fossil (A1 – A3), kg/kg	48,97
Carbon handprint, kg/kg	-18,21
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,14

Information area	Content
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Information area	Content
Source	Place NEPD-4447-3710-EN https://www.epd-norge.no/getfile.php/1332609-1683566929/EPDer/Byggevarer/NEPD-4447-3710_Place.pdf
Description	Manufacturing: Denmark Type: Street or column luminaire
GWP fossil (A1 – A3), kg/kg	21,12
Carbon handprint, kg/kg	-1,34
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,31

Information area	Content
Source	Street lighting luminaire EPD-WEF-2013111-E https://api.weef.com/files/document/print_media/download/epd-weef-vfl540-s70-2013111.pdf
Description	Manufacturing: Global Type: Street or column luminaire
GWP fossil (A1 – A3), kg/kg	15,06
Carbon handprint, kg/kg	-7,35
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	Functional street luminaire CIES 24 LED 601602 GlobalEPD EN50693-005 https://www.aenor.com/Producto_DAP_pdf/GlobalEPD%20EN50693-005%20CIES4%2024LED%20601602_EN.pdf
Description	Manufacturing: Spain Type: Street or column luminaire
GWP fossil (A1 – A3), kg/kg	14,34
Carbon handprint, kg/kg	0,00
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00

Information area	Content
Source	Functional street luminaire CIES 24 LED 601600 GlobalEPD EN50693-004 https://www.en.aenor.com/Producto_DAP_pdf/GlobalePD%20EN50693-004%20CIES%2024LED%20601600_EN.pdf
Description	Manufacturing: Type: Street or column luminaire
GWP fossil (A1 – A3), kg/kg	12,87
Carbon handprint, kg/kg	0,00
Content of renewable raw materials, %	0 %

Information area	Content
Content of secondary materials, %	0,00

Information area	Content
Source	Functional street luminaire CIES 12 LED 600600 GlobalEPD EN50693-003 https://www.en.aenor.com/Producto_DAP_pdf/GlobalEPD%20EN50693-003%20CIES%2012LED%20600600_EN.pdf
Description	Manufacturing: Type: Street or column luminaire
GWP fossil (A1 – A3), kg/kg	13,61
Carbon handprint, kg/kg	0,00
Content of renewable raw materials, %	0 %
Content of secondary materials, %	0,00