Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2:2019/AC:2021 for:
Single product

LK Cap ½"

From

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
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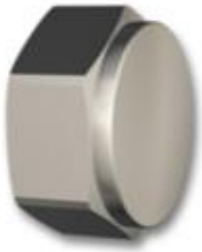
An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

Product no.	Product	Weight (kg)
1870667	LK Cap ½"	0,026



General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
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Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): *Product category rules (PCR): 2019:14, Construction products (EN 15804:A2) (1.3.4)*
PCR review was conducted by: The *Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review Chair: Claudia A. Peña, University of Conceptción, Chile The review panel may be contacted via the Secretariat www.environdec.com/contact.*
Life Cycle Assessment (LCA)
LCA accountability: *Tyréns Sverige AB*
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification through a pre-verified LCA/EPD tool Third-party verifier: Marcus Wendin, Miljögiraff AB, verifier of the Pre-verified and integrated EPD tool: Tyréns EPD-Generator 3.0.0 – LK Systems Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but registered in different EPD programs, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterization factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD:
LK Systems AB, Johannesfredsvägen 7, 168 69 Bromma, Sweden

Contact:
info@lksystems.se
https://www.lksystems.se/

Description of the organisation:
LK Systems is the leading manufacturer of easy-to-install systems for heating and tap water distribution in the Nordics. Through our prefabrication factory, we also provide tailor-made solutions that simplify the installation process even further. From idea to final solution, you can be sure of the smartest answers for your everyday challenges, today and tomorrow.

Name and location of production site(s):
Production: Europe. See product description.
Construction site: Sweden

Product information

Product name: LK Cap ½"
Product identification: 1870667
Product description: Supplied complete with seal for plugging unused connections on LK Manifold UNI. Production takes place in Borgomanero, Italy, and consists of brass machining and milling. The product is then assembled with a gasket and packed for delivery in plastic bags and cardboard boxes. Climate impact from the energy mix in production is 0,618 kg CO2 eq. per kWh (GWP-GHG).

UN CPC code: 41516

Geographical scope:
Module A1 and A2 Material suppliers are Global
Module A3 production is located in Europe
Module A5, C and D scenarios are for Sweden

LCA information

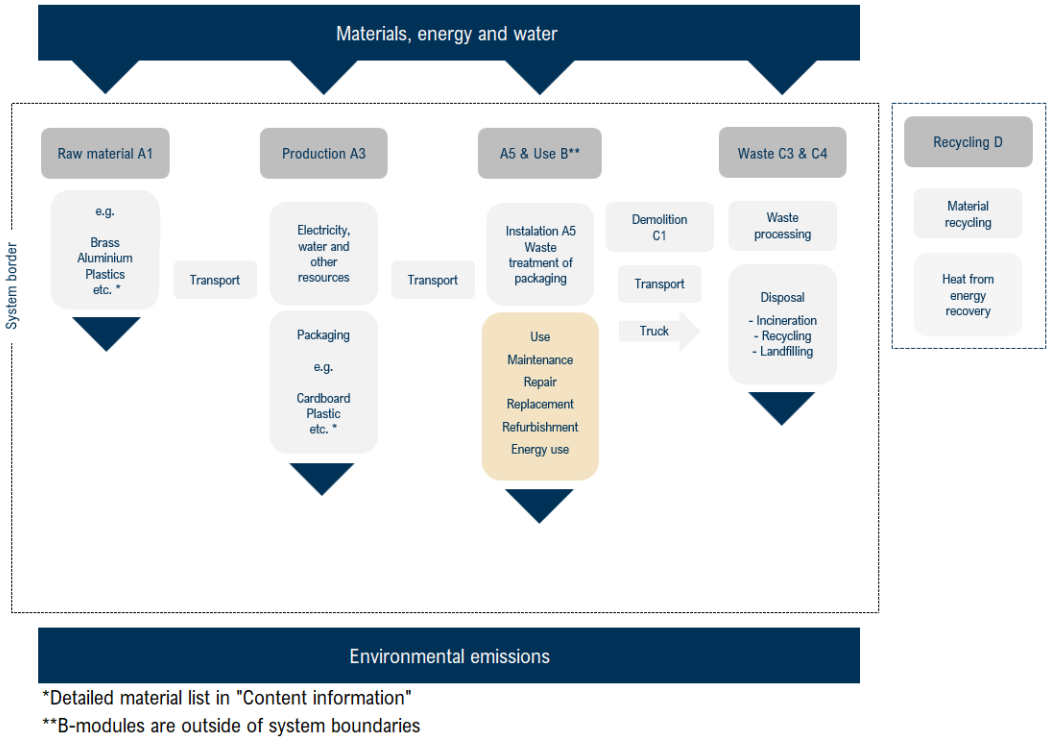
Functional unit / declared unit: 1 kg

Time representativeness: The LCA is based on production data from 2022/2023 but is deemed to be representative of an average year of production.

Database(s) and LCA software used: The LCA software is SimaPro Flow version 2.47 and the database is Ecoinvent 3.9.1. When modelling in Simapro, Ecoinvent data (updated November 2022) has been used for generic data.

Description of system boundaries:
This is a Cradle to Grave with modules A+C+D
Pre-verified and integrated EPD tool: This EPD is generated by Tyréns EPD-generator 3.0.0 – LK Systems. The tool is verified by Marcus Wendin, Miljögiraff AB

System diagram:



*Detailed material list in "Content information"
**B-modules are outside of system boundaries

Production
The manufacturing process includes the manufacturing of the raw materials used for the final product. After the manufacturing of the product is completed, it is packed in product specific packaging, which is then stacked on a pallet and then transported to the warehouse. The production process flow contains the same or similar steps in all manufacturing locations for each material.
See product information for detailed production process.

More information:
This EPD is generated with a pre-verified EPD tool. All processes are fixed and variable input data for each material/component is governed by a menu. The results of the EPD are checked for plausibility. The review of the EPD-generator and its constituent processes and the fixed content of the EPD is accepted based on the verification of the tool and the first EPD generated by the tool. Identification name and version number of the EPD-generator: LK Systems EPD-generator 3.0.0.

Results for the additional impact categories particulate matter, ionising radiation, ecotoxicity (freshwater), human toxicity (cancer), human toxicity (non-cancer) and land use is not declared.

EN 15804 reference package based on EF 3.1 has been used.

Electricity data

The electricity used is residual mix/market* for the production country.
*Applies to Austria.

Estimates and assumptions
The declared unit values for 1 kg of the product used in this study are calculated based on the total weight of the product produced during the year under study. Data is allocated for the energy use of the declared unit based on regular production rate. The raw materials necessary for manufacturing and the amount of packaging allocated to the product are based on the amount of material used to manufacture the declared unit, including waste.
The used product is assumed to be transported 50 km to the nearest waste disposal facility. The waste treatment assumption has led to the product being either incinerated for energy recovery, recycled for material use, or disposed of in a landfill. The waste treatment assumes that the product is installed in the building and deconstructed when the building is demolished. Processes for waste management in Switzerland are comparable to those in Sweden.

The following assumptions has been made:
- Cardboard is material recycled at 78% and the rest is incinerated for energy recovery.
- Plastics are material recycled at 13% and the rest are incinerated for energy recovery.
- Metals are material recycled at 95% and the rest are disposed of in a landfill.
- Other materials are either incinerated for energy recovery or disposed of in a landfill at 100%.
- Energy efficiency in municipal incinerator is 61%.
- No environmental impact during installation and demolition due to only hand tools being used.
- A wooden pallet is used 25 times.

For calculations in Module D following assumptions have been made:
The recycled materials are replacing production of primary materials.
Module D also contains benefits from exported energy from waste incineration declared in module C. Exported energy assumed to be 77 % heat and 23 % electricity from incineration.

<u>Allocation for recycled materials</u>
Recycled brass contain recycled copper (preconsumer scrap from copper anode). This copper is allocated as a by-product. Recycled bronze is post-consumer and all activities treating the products is included as well as transport to the treating facility or losses. Recycled PE contain recycled granulate. All activities treating the products is included as well as transport to the treating facility or losses are also accounted. Used Ecoinvent processes 3.9.1, Cut off: " Metal part of electronics scrap, in copper, anode, market for metal part of electronics scrap, in copper, anode, Global" , "Bronze scrap, post-consumer, market for bronze scrap, post-consumer, Global and "market for polyethylene, high density, granulate, recycled, India"

Background data
The data quality of the background data is considered good. The assessment considers all available data from the production process, including all raw materials and auxiliary materials used as well as the energy consumption in relation to available Ecoinvent 3.9.1 datasets and EPD's.

The infrastructure or capital goods used in the product system for underlying processes are included for upstream and downstream processes, as infrastructure or capital goods can NOT be excluded in SimaPro FLOW. Therefore results of the impact categories abiotic depletion of minerals and metals, land use, human toxicity (cancer), human toxicity, noncancer and ecotoxicity (freshwater) may be

highly uncertain in LCAs that include capital goods/infrastructure in generic datasets, in case infrastructure/capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used to quantify these indicators in currently available generic datasets sometimes lack temporal, technological and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes. For core module infrastructure or capital goods are excluded.

Data quality
When modeling in Simapro, Ecoinvent data (updated November 2023) has been used for generic data. The database is considered to be of high quality.

Specific data are related to amount of energy, transportation and direct emission used throughout module A1-A3.

Other Indata gathered from the actual manufacturing plant with product-specific processes, specific amounts, specific waste, and spillage %, specific energy mix, specific transportation distances and transportation type and EPD's from some of the suppliers are primary data.
Primary data are collected directly from supplier and production site.

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	GLO	EU	SE	SE	ND	ND	ND	ND	ND	ND	ND	SE	SE	SE	SE	SE
Specific data used	9% *			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	not relevant			-	-	-	-	-	-	-	-	-	-	-		-	-
Variation – sites	not relevant			-	-	-	-	-	-	-	-	-	-	-		-	-

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight % and kg C/declared unit
Brass	0.96	0.00 %	0.00 %
Cellulose fibre	0.02	0.00 %	100.00 % and 0.01
Plastic	0.02	0.00 %	0.00 %
TOTAL	1.00	0.00 %	2.00 % and 0.01

Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/declared unit
Plastic	0.02	2.00 %	0.00
Pallet	0.01	1.00 %	<0.01
Cardboard box	0.01	1.00 %	<0.01
TOTAL	0.04	4.00 %	0.01

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per functional or declared unit
-	-	-	0.00

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804

Results per 1 kg									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	3.70E+00	4.08E-01	4.33E-02	0.00E+00	7.43E-03	8.44E-02	2.92E-04	-3.43E-01
GWP-biogenic	kg CO_2 eq.	1.91E-01	3.74E-04	1.63E-01	0.00E+00	6.23E-06	4.39E-02	1.67E-07	0.00E+00
GWP-luluc	kg CO_2 eq.	8.13E-03	2.02E-04	1.43E-06	0.00E+00	3.63E-06	1.42E-05	1.76E-07	-8.74E-04
GWP-total	kg CO_2 eq.	3.90E+00	4.09E-01	2.06E-01	0.00E+00	7.44E-03	1.28E-01	2.92E-04	-3.44E-01
ODP	kg CFC 11 eq.	5.07E-08	8.89E-09	2.54E-10	0.00E+00	1.63E-10	5.74E-10	8.45E-12	-4.43E-09
AP	mol H^+ eq.	5.22E-02	8.98E-04	1.39E-05	0.00E+00	3.47E-05	1.27E-04	2.20E-06	-2.14E-02
EP-freshwater	kg P eq.	4.43E-03	2.90E-05	4.21E-07	0.00E+00	5.36E-07	6.27E-06	2.43E-08	-1.71E-03
EP-marine	kg N eq.	6.59E-03	2.27E-04	6.66E-06	0.00E+00	1.38E-05	4.06E-05	8.44E-07	-1.20E-03
EP-terrestrial	mol N eq.	7.34E-02	2.30E-03	6.10E-05	0.00E+00	1.47E-04	4.29E-04	9.04E-06	-1.60E-02
POCP	kg NMVOC eq.	2.17E-02	1.39E-03	1.69E-05	0.00E+00	5.15E-05	1.27E-04	3.15E-06	-4.52E-03
ADP-minerals&metals*	kg Sb eq.	1.27E-03	1.33E-06	8.21E-09	0.00E+00	2.31E-08	4.01E-07	4.05E-10	-3.06E-04
ADP-fossil*	MJ	4.51E+01	5.80E+00	1.89E-02	0.00E+00	1.07E-01	2.34E-01	7.27E-03	-4.59E+00
WDP*	m^3	2.69E+00	3.41E-02	1.08E-03	0.00E+00	6.60E-04	1.40E-02	3.30E-04	-3.98E-01
Acronyms		GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption							

Disclaimer: The results of modules A1-A3 should not be used without considering the results of module C. The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

**Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Potential environmental impact – additional mandatory and voluntary indicators

Results per 1 kg									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	3.79E+00	4.09E-01	4.33E-02	0.00E+00	7.44E-03	8.48E-02	2.92E-04	-3.46E-01

Disclaimer: The results of modules A1-A3 should not be used without considering the results of module C. The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Use of resources

Results per 1 kg									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	5.86E+00	9.11E-02	1.62E-03	0.00E+00	1.70E-03	7.97E-02	6.15E-05	-1.05E+00
PERM*	MJ	6.07E-01	0.00E+00	-1.45E-01	0.00E+00	0.00E+00	-2.90E-01	0.00E+00	0.00E+00
PERT	MJ	6.47E+00	9.11E-02	-1.43E-01	0.00E+00	1.70E-03	-2.10E-01	6.15E-05	-1.05E+00
PENRE	MJ	4.81E+01	6.16E+00	2.02E-02	0.00E+00	1.14E-01	2.46E-01	7.73E-03	-4.89E+00
PENRM*	MJ.	1.65E+00	0.00E+00	-8.00E-01	0.00E+00	0.00E+00	-8.00E-01	0.00E+00	0.00E+00
PENRT	MJ	4.97E+01	6.16E+00	-7.80E-01	0.00E+00	1.14E-01	-5.54E-01	7.73E-03	-4.89E+00
SM	kg	1.28E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	1.80E+02	1.34E-03	4.69E-05	0.00E+00	2.55E-05	5.31E-04	8.43E-06	-1.58E-02
Acronyms		PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water							

Disclaimer: The results of modules A1-A3 should not be used without considering the results of module C.

**For the PERM and PENRM the new "GUIDANCE TO CALCULATING THE PRIMARY ENERGY USE INDICATORS" in Annex 3 of the PCR is followed and calculated according to option A.*

[1] The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Waste production and output flows

Waste production

Results per 1 kg									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste disposed	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Radioactive waste disposed	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Disclaimer: The results of modules A1-A3 should not be used without considering the results of module C

Output flows

Results per 1 kg									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00	1.04E-02	0.00E+00	0.00E+00	9.15E-01	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	0.00E+00	0.00E+00	1.07E-01	0.00E+00	0.00E+00	1.38E-01	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	3.58E-01	0.00E+00	0.00E+00	4.63E-01	0.00E+00	0.00E+00

Disclaimer: The results of modules A1-A3 should not be used without considering the results of module C

Additional information

ID: EPD Calculation LK Systems v3 04-04-2025 14:56

References

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