Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2:2019

LK PressPex ECO T-piece/Straight & Angle fittings

LK Systems AB

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

Company information

Owner of the EPD:	LK Systems AB Johannesfredsvägen 7 168 69 Bromma Sweden
Contact:	info@lksystems.se https://www.lksystems.se/
Name and location of production site:	Rifeng Enterprise Group Co.,Ltd China
Product-related or management system-related certifications:	Safe Water Installation

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, 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 characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)	
Product category rules (PCR): 2019:14, Construction products (EN 15804:A2) (1.2)	
PCR review was conducted by: Claudia A. Peña, The Technical Committee of the International EPD® System.	
Contact: info@environdec.com	
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☒ EPD verification	
Third party verifier: Daniel Böckin, PhD, Miljögiraff AB, daniel@miljogiraff.se. Approved by: The International EPD® System.	

Company information

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.
For the simpler, smarter everyday
Simpler. Smarter. More sustainable. At LK, we believe there's a better way to do everything. That's why – from water, heating and hydronic solutions to pipe extrusion – we push for innovation over status quo and simplicity over complexity. It's a belief all of us at LK apply to every product and solution we create

Product information

Press fittings for connection of LK PAL and LK PE-X Universal Pipe. LK PressPex fittings is primarily intended for heating, potable water and cooling water systems and may not be used for the distribution of gas. LK PressPex fittings comes in different types and dimensions. All parts of the LK PressPex fittings that are in contact with water is made of DZR (dezincification-resistant brass).

See additional information for product included.

Further information can be found at https://www.lksystems.se/

The EPD represents several product versions, that comes in different sizes and shapes. The EPD is an average EPD and the declared unit is based on LK Eco T-piece (1882425). The result presented in the EPD has the average result of all products declared and the variations between the products stays within 10% (GWP-GHG). See appendix for total weight of the products included in the EPD.

LCA information

Functional unit / declared unit	In accordance with EN 15804 + A2 the declared unit is mass 1 kg.
Time representativeness:	2022
Database:	Ecoinvent 3.8. - “allocation cut off by classification” is used throughout the study.
LCA software used:	SimaPro 9.4.0.2
Geographical scope	Production: China Construction site: Sweden
LCA Report	LK Systems AB, Report no. 21

Description of system boundaries:

The scope of the EPD is a cradle to gate with options, including A4, A5, C and D. See Table 1 for the modules declared. The system boundary mean that all processes needed for raw material extraction, transport, manufacturing and disposal are included in the study. Figure 1. gives an overview of the included processes.

Table 1, Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation

	Product stage			Construc-tion 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
Geog-raphy	CN	CN	CN	GLO	SE								SE	SE	SE	SE	SE
Specific data used	Specific data 21% Partly specific 73%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	<10%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%					-	-	-	-	-	-	-	-	-	-	-	-

X = Modules included in the analysis ND = Module not declared O= Optional modules

Content information

Table 2, shows the weight for the raw material of the declared product.

Product components	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Brass	0,733	51	0
Stainless steel	0,241	0	0
Plastic	0,020	0	0
Rubber	0,005	0	0
Nickel	0,001	0	0
TOTAL	1	51	0
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	
Cardboard box	0,032	3,2	
Plastic	0,006	0,6	
Pallet	0,001	0,1	
TOTAL	0,039	3,9	

Declared product contains no dangerous substances from the candidate list of SVHC for Authorisation.

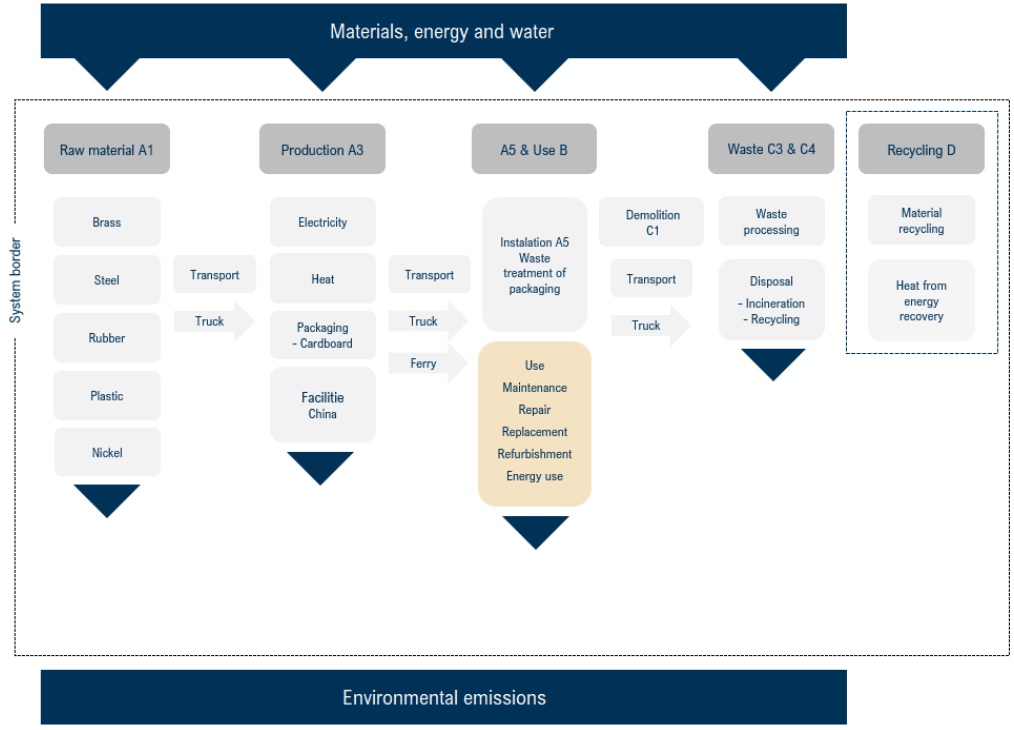


Figure 1, overview of the included processes. Light gray represents modules included, yellow represent models not declared.

Product life-cycle

Raw material supply, transport, manufacturing and packaging (A1-A3)

The raw materials that are included and calculated in the EPD are the material content for the product and the packaging.

LK PressPex fittings consist mostly of brass and smaller parts of steel, rubber and plastic. The brass deliverers in bars that are cut in a machine and then hot forging to the right shape. After the correct shape is made, the product is sandblasted to smooth the surface. Then the fittings that comes with nickel get plated. When the shape of the product is completed, it is machining and then polished. When the polishing of the brass is completed, the other components are assembled to the final product. After the manufacturing of the product is completed and pressure tested, it is packed in cardboard box, which is then stacked on a pallet.

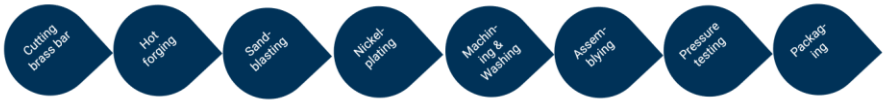


Figure 2 shows the process flow for LK PressPex fittings.

Transport & installation (A4-A5)

Transportation impacts represent the transport from the final product´s delivery to the construction site. The transport distance is based on average distance. The transportation is performed by truck with fuel and ferry. It is assumed that there are no environmental aspects during installation of the product, except the waste management of packaging after installation.

Product end of life (C1-C4, D)

The product end of life (C1) is assumed that there are no environmental aspects during demolition of the product. Brass and steel are fully recyclable materials and has a strong market position, therefore assumptions have taken that the product will end up in material recycling at 95% when the building, where the product is installed, is demolished and that the plastic parts end up in combustible waste afterwards. The metal that does not end up in recycling go to combustible waste.

The cardboard box is assumed to be material recycling. The finished products are packed on a wooden pallet with packaging film. It has been assumed that the wooden pallet is reused and that the plastic ends up in combustible waste. The product assumed to be sent to the nearest waste facility. The benefits in the resource recovery stage will be mostly material recycling and a smaller part energy recovery.

Cut-off rules

Life cycle inventory data shall according to EN 15804 include a minimum of 95% of total inflows (mass and energy) per module. In addition, if less than 100% of the inflows are accounted for, proxy data or extrapolation should be used to achieve 100% completeness.

Background data

The data quality of the background data is considered good. All specific data that includes processes, volume of different materials, energy & water usage and transport distance has been collected by questionnaire and personal contact with the manufacturer. Ecoinvent database has been used. Ecoinvent is the world's biggest LCI data library and contains data for the specific geographical regions relevant for this study, which have been analysed to be the most suitable for the various steps in the process. Information on biogenic carbon content is calculated with the formula from EN 350-2 and information from IVL.
Collected data represent average yearly data for 2022 and assumed to be representative for the EPDs period of validity of 5 years.

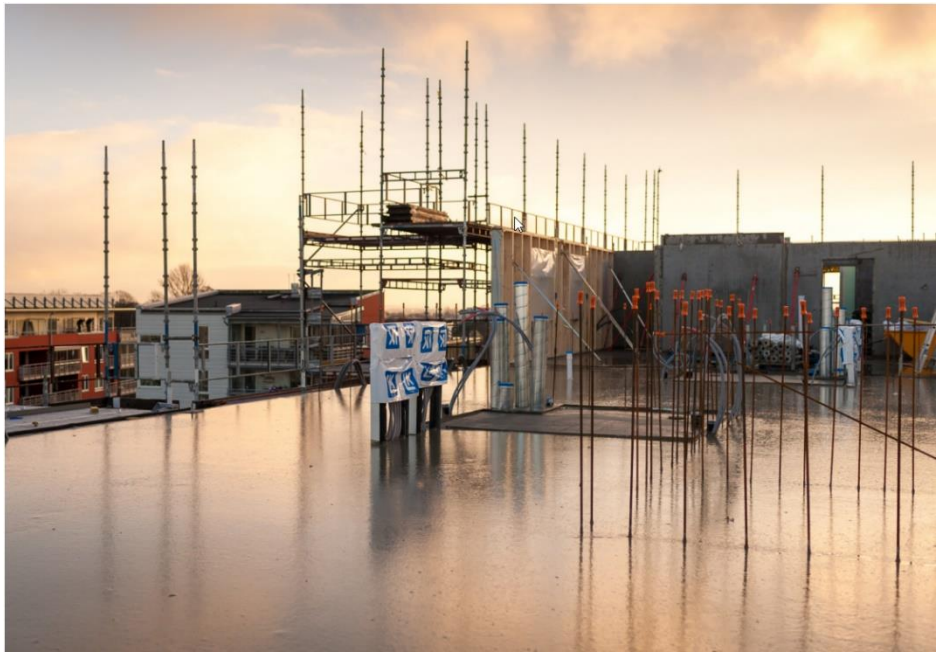
Electricity data

The electricity consumption in the A3 module accounts for less than 30% of the total energy use in module A1-A3. The electricity used is an electricity mix, low voltage, market for China, from Ecoinvent 3.8.

Allocation and assumptions

The declare unit values for 1 kg of product that is used in this study and is calculated, based on the total product weight produced during the year studied. The content of raw material can vary slightly between the different dimensions of the product and are examined with high accuracy that they variation of GWP-GHG stays within 10%. Data is allocated for the energy use of the declared unit. The allocation is based on production rate with complexity and high accuracy. The raw material necessary for the manufacturing and the amount of packaging is allocated to product, based on the amount of material used to manufacture the declare unit, including waste. Allocation is made with complexity and high accuracy. The declared unit is based on LK Eco T-piece (1882425). The variance of the declared products is less than 10%, that is based according to data quality requirements outlined in PCR 2019:14.

The used product is assumed to be transported 50 km to the nearest waste disposal facility. The waste treatment assumption has resulted in that the product will get material recycle as metal. The waste treatment builds and presupposes that the product is installed in the building and that it is de-construct when the building demolished. The product is assumed to be material recycled at 95% and the cardboard box is assumed to be material recycled at 78%. The plastic part in the product and in the packaging are assumed to be incinerated with energy recovery efficiency at 61%.



Recycling of packaging and product

Within the framework of producer responsibility, LK are affiliated with FTI, the Packaging and Newspaper Collection, which is the business community's collection system for recycling packaging. Packaging shall recycle as carton and plastic. None of the packaging material are classified as hazardous waste. The product shall be material recycled as metal.

Environmental information

Potential environmental impact – mandatory indicators according to EN 15804.
Results of declared unit of the study.

Results per declared unit

Indicator	Unit	Tot.A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-fossil	kg CO2 eq.	3,27E+00	2,76E-01	1,46E-02	0	6,56E-03	5,87E-02	5,75E-04	-2,28E+00
GWP-biogenic	kg CO2 eq.	7,01E-03	5,46E-05	1,11E-02	0	6,41E-06	7,85E-06	7,63E-04	-2,15E-02
GWP-luluc	kg CO2 eq.	4,43E-03	1,73E-04	4,33E-07	0	2,67E-06	1,15E-06	2,30E-07	-3,90E-03
GWP-total	kg CO2 eq.	3,28E+00	2,77E-01	2,57E-02	0	6,57E-03	5,87E-02	1,34E-03	-2,30E+00
ODP	kg CFC 11 eq.	1,69E-07	5,75E-08	1,90E-10	0	1,54E-09	3,93E-10	1,32E-10	-1,19E-07
AP	mol H+ eq.	9,49E-02	6,58E-03	7,71E-06	0	3,72E-05	1,49E-05	4,09E-06	-8,24E-02
EP-freshwater	kg PO_4^{3-} eq.	2,18E-02	3,64E-05	3,73E-07	0	1,36E-06	1,03E-06	1,96E-06	-1,98E-02
EP-freshwater	kg P eq.	7,10E-03	1,19E-05	1,22E-07	0	4,43E-07	3,36E-07	6,40E-07	-6,44E-03
EP-marine	kg N eq.	6,50E-03	1,64E-03	3,69E-06	0	1,35E-05	7,61E-06	1,54E-06	-5,20E-03
EP-terrestrial	mol N eq.	8,16E-02	1,82E-02	3,45E-05	0	1,47E-04	6,79E-05	1,66E-05	-6,70E-02
POCP	kg NMVOC eq.	2,32E-02	4,76E-03	8,97E-06	0	4,21E-05	1,73E-05	4,91E-06	-1,88E-02
ADP-minerals&metals[2]	kg Sb eq.	2,08E-03	5,56E-07	3,67E-09	0	2,20E-08	9,49E-09	1,93E-09	-1,93E-03
ADP-fossil[2]	MJ	3,89E+01	3,73E+00	8,98E-03	0	1,01E-01	1,13E-02	1,05E-02	-2,69E+01
WDP[2]	m3	2,14E+00	8,13E-03	2,26E-04	0	3,32E-04	6,89E-04	9,47E-05	-1,76E+00

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

Potential environmental impact – additional mandatory indicators according to EN 15804.

Results per declared unit

Indicator	Unit	Tot.A1-A3	A4	A5	C1	C2	C3	C4	D
Particulate matter	disease inc.	3,49E-07	1,33E-08	2,75E-10	0	7,26E-10	1,02E-10	1,36E-10	-2,68E-07
Ionnising radiation[1]	kBq U-235 eq	2,70E-01	1,75E-02	5,31E-05	0	5,21E-04	9,29E-05	4,88E-05	-2,23E-01
Ecotoxicity, freshwater[2]	CTUe	7,41E+02	2,52E+00	5,62E-02	0	8,00E-02	1,58E-01	2,49E-02	-6,71E+02
Human toxicity, cancer[2]	CTUh	4,38E-08	1,48E-10	3,41E-12	0	3,19E-12	1,17E-11	1,72E-12	-4,06E-08
Human toxicity, non-cancer[2]	CTUh	1,14E-06	2,02E-09	5,02E-11	0	9,23E-11	1,10E-10	1,48E-11	-1,05E-06
Land use[2]	Pt	3,78E+01	1,20E+00	4,64E-03	0	8,62E-02	3,36E-03	1,44E-02	-3,35E+01

Disclaimer 1 – This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

Climate impact IPCC 2013 GWP 100

Results per declared unit

Indicator	Unit	Tot.A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG	kg CO2 eq.	3,21E+00	2,75E-01	1,46E-02	0	6,51E-03	5,86E-02	5,63E-04	-2,24E+00

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.

Use of resources

Results per declared unit

Indicator	Unit	Tot.A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	8,00E+00	3,41E-02	3,85E-04	0	1,45E-03	1,05E-03	2,81E-04	-6,95E+00
PERM	MJ	4,64E-01	0	0	0	0	0	0	0
PERT	MJ	8,46E+00	3,41E-02	3,85E-04	0	1,45E-03	1,05E-03	2,81E-04	-6,95E+00
PENRE	MJ	4,14E+01	3,96E+00	9,58E-03	0	1,07E-01	1,21E-02	1,11E-02	-2,86E+01
PENRM	MJ	0	0	0	0	0	0	0	0
PENRT	MJ	4,14E+01	3,96E+00	9,58E-03	0	1,07E-01	1,21E-02	1,11E-02	-2,86E+01
SM	kg	5,10E-01	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m3	5,99E-02	4,44E-04	2,03E-05	0	1,87E-05	3,20E-05	9,25E-06	-5,27E-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

Waste production and output flows

Waste production

Results per declared unit

Indicator	Unit	Tot.A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	kg	0	0	0	0	0	0	0	0
Non-hazardous waste disposed	kg	0	0	0	0	0	0	0	0
Radioactive waste disposed	kg	0	0	0	0	0	0	0	0

Note: Ecoinvent database include all waste treatment processes within the system boundaries, i.e. there are no waste flows exiting the system boundaries and the waste indicators to be declared are therefore zero.

Output flows

Results declared unit

Indicator	Unit	Tot.A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	0	0	0	0	0	0	0	0
Material for recycling	kg	0	0	0	0	0	0	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0
Exported energy, electricity	MJ	0	0	0	0	0	0	0	0
Exported energy, thermal	MJ	0	0	0	0	0	0	0	0

Information on biogenic carbon content

Results per functional or declared unit

BIOGENIC CARBON CONTENT	Unit	QUANTITY
Biogenic carbon content in product	kg C	0
Biogenic carbon content in packaging	kg C	9,41E-03

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO2.

Additional information

Product name	Product number	Weight (kg)
Eco Angle fitting 90°	1882370	0,087
	1882371	0,129
	1882372	0,183
Eco Straight fitting	1882385	0,199
	1882386	0,392
	1882391	0,160
	1882392	0,168
	1882393	0,281
	1882394	0,307
Eco T-piece	1882424	0,122
	1882425	0,182
	1882426	0,257
	1882430	0,099
	1882432	0,113
	1882433	0,143
	1882434	0,120
	1882435	0,127
	1882436	0,145
	1882437	0,143
	1882438	0,158
	1882439	0,189
	1882440	0,204
	1882441	0,231

References

General Programme Instructions of the International EPD® System. Version 4.0.

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Material recycling https://www.sgu.se (2022-08-22) https://www.sgu.se
(SGU – Stål- och metallindustriavfall & SGU – Metall- och mineralåtervinning)

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