ENVIRONMENTAL PRODUCT DECLARATION

as per /ISO 14025/ and /EN 15804/

Owner of the Declaration	Kaimann GmbH
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-KAI-20190093-IBC1-EN
Issue date	19.08.2019
Valid to	18.08.2024

Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus

Kaimann GmbH

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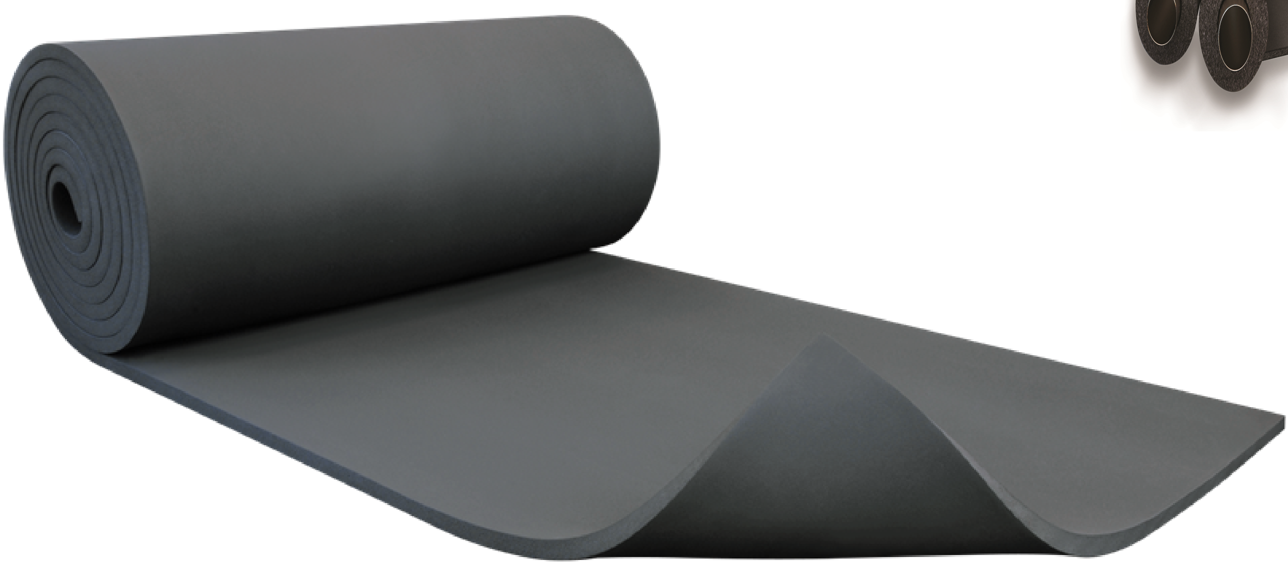


1. General Information

Kaimann GmbH	Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus
Programme holder IBU - Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany	**Owner of the declaration** Kaimann GmbH Hansastraße 2-5 33161 Hövelhof
Declaration number EPD-KAI-20190093-IBC1-EN	**Declared product / declared unit** 1 m³ insulation material Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus
This declaration is based on the product category rules: Insulating materials made of foam plastics, 06.2017 (PCR checked and approved by the SVR)	**Scope:** Product line Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus Thermal insulation material made of flexible elastomeric foam for technical building equipment and industrial installations. The EPD is performed in agreement with the demands of PCR Part A with reference to EN 15804+A1:2013 and PCR Part B: Requirements on the EPD for insulating materials made of foam plastics. The EPD is based on the average Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus production from six different variations produced in Germany. The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.
Issue date 19.08.2019	
Valid to 18.08.2024	
	Verification The standard /EN 15804/ serves as the core PCR Independent verification of the declaration and data according to /ISO 14025:2010/ ☐ internally ☒ externally
Dipl. Ing. Hans Peters (President of Institut Bauen und Umwelt e.V.)	
Dr. Alexander Röder (Managing Director IBU)	Matthias Klingler (Independent verifier appointed by SVR)

2. Product

2.1 Product description / Product definition

Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus is a flexible closed cell rubber insulation made of flexible elastomeric foam (FEF) that prevents condensation and reduces energy loss. By incorporating a water vapour barrier into the insulation cell structure Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus can effectively eliminate water vapour migration and retain outstanding performance over the entire system life. This EPD covers the Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus product family including Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus tubes, coils, and sheets.

For the placing on the market of the product in the EU/EFTA (with the exception of Switzerland) Regulation (EU) No. 305/2011 (CPR) applies. The product needs a declaration of performance taking into consideration /EN 14304:2009/ and the CE-marking. For the application and use the respective national provisions apply.

2.2 Application

Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus is used for air-conditioning, refrigeration, chilled water, heating and hot water pipes and air distribution ductwork. In addition to preventing condensation and saving energy, Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus also performs an acoustic function, absorbing sound and dampening duct wall vibration. With inherent anti-microbial resistance as standard, and a Class B fire rated, closed cell rubber that is completely dust and fibre free, Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus can be used in any kind of public, commercial or industrial building without impacting on health or the quality of air. Outdoor application requires protection against UV-radiation.

2.3 Technical Data

Constructional data

Name	Value	Unit
Gross density	48.35	kg/m³
Water vapour diffusion resistance factor acc. to EN 12088	μ ≥ 10000	-
Thermal conductivity	$\lambda_{\vartheta}\ 0.034 + 7.2 \cdot 10^{-5}\ \vartheta + 1.2 \cdot 10^{-6}\ \vartheta^2$	W/(mK)
Thermal conductivity at -10 °C	0.033	W/(mK)
Thermal conductivity at 0 °C	0.034	W/(mK)
Thermal conductivity at 10 °C	0.035	W/(mK)

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to /EN 14304:2009/.

2.4 Delivery status

Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus is supplied in the shape of tubes and sheets:

- Tube dN = 6 - 50 mm
- Tube – Self-adhesive dN = 6 - 50 mm
- Tube continuous dN = 6 - 50 mm
- Sheet continuous – roll Ø 400 mm
- Sheet continuous – roll Ø 530 mm
- Flat sheet (2.0 x 1.0 m) dN = 3 - 50 mm

The EPD is based on the average of these six different versions. Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus is typically packaged in containerboard boxes or polypropylene bags and delivered on EURO pallets. Some product varieties are wrapped in polyethylene film before packaging.

2.5 Base materials / Ancillary materials

Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus is based on synthetic rubber and consists of several components. The following table shows the components clustered into substance groups:

- Rubber and polymers: 27.6%
- Fillers and pigments: 21%
- Blowing agent: 13%
- Vulcanisation system, additives, plasticizer: 3.5%
- Flame retardant: 34.5%
- Stabilizer: 0.4%

Rubber and polymer are the base material. Fillers and pigments are for firmness and colour. The blowing agent causes the volume increase and expansion process during the manufacture of the product. The vulcanisation system, additives, and plasticizer sure flexibility and workability. The flame retardants ensure the fire resistance of the end-product, and the adhesives and stabilizers are for processing and process control.

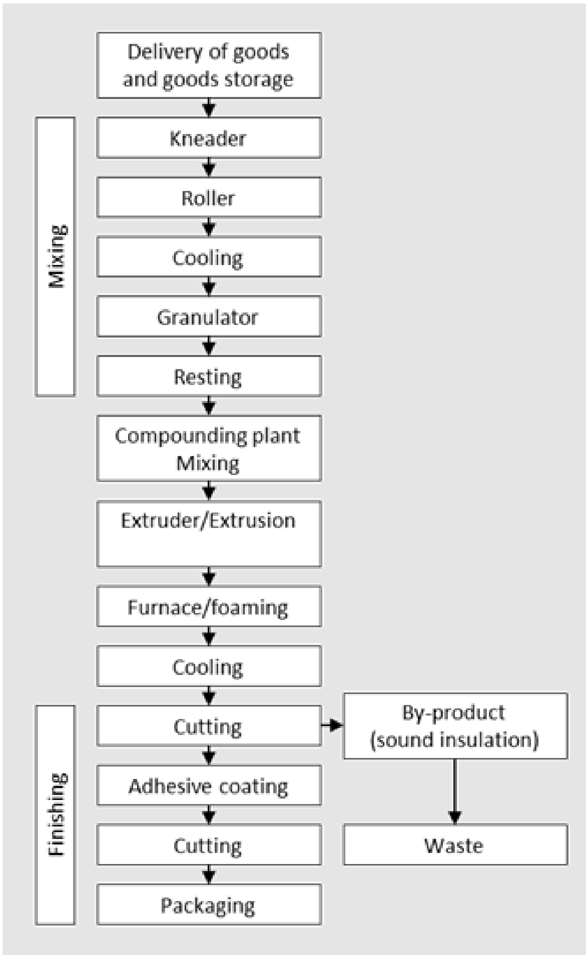
This product least one partial article contains substances listed in the candidate list (date: 10.04.2019) exceeding 0.1 percentage by mass: no.

This product least one partial article contains other CMR substances in categories 1A or 1B which are not on the candidate list, exceeding 0.1 percentage by mass: no.

Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) Ordinance on Biocide Products No. 528/2012): no.

2.6 Manufacture

Upon delivery, the raw materials are stored in a warehouse and used in the production shortly after. The first step in the production of Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus is to mix the raw materials in a kneader and to roll-out the resulting mixture which is then cut into sheets. The flat sheets are passed through an industrial cooler and cooled-off. The cooled-off sheets are granulated and the granulates are temporarily stored at room temperature before entering the compounding plant.
In a next step, the different types of granulates enter the compounding plant for mixing. The resulting elastomer compound is pushed through extruders and carried on a conveyer belt through an industrial furnace for foaming. After foaming, the endless sheets are passed through an industrial cooler upon which a continuous longitudinal cut is applied to cut sheets into the right width. If applicable, adhesive coating is applied on one side of the sheets. Finally, a traverse cut trims the continuous sheet into sheets of various sizes. For the packaging, cardboard, polyethylene film, polypropylene film, and wooden pallets are used.



2.7 Environment and health during manufacturing
The manufacturer of Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus complies with national manufacturing guidelines and regulations such as the German Energy Saving Regulation (EnEV) and the German Renewable Energy Act (EEG). In addition, KAIMANN's environmental management is certified in accordance with /DIN ISO 9001/ISO 14001/ISO 50001/.

2.8 Product processing/Installation
The installation of Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus requires basic tools such as cutters and scissors. No additional specific protection, beyond normal protective clothes, is required.

2.9 Packaging
Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus is packaged in cardboard boxes with polypropylene and polyethylene films in varying sizes. The boxes are placed on wooden EURO pallets.

2.10 Condition of use
Changes in materials composition of Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus during the use phase only occur in case of extraordinary effects.

2.11 Environment and health during use
An odour should be considered normal. The odour will dissipate during use (about 4 weeks) because the cells are exchanged with the air.

2.12 Reference service life

Since the use stage (B1-B7) is not fully declared, the declaration of the reference service life is only voluntary.

2.13 Extraordinary effects

Fire
Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus is designed to meet European fire regulations and is a self-extinguishing foam that will not drip or support flame spread. It can be safely used with confidence in public, commercial and industrial buildings.

Fire protection

Name	Value
Building material class	B (sheets) / BL (tubes)
Burning droplets	d0
Smoke gas development	s3

Water

Mechanical destruction

2.14 Re-use phase
At the end-of-life, Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus can be used for energy recovery in a waste incineration plat, as well the plastic from packaging. The cardboard and wooden pallets from packaging can be re-used.

2.15 Disposal
Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus is disposed in accordance with local regulations governed by the European Waste Catalogue (waste code: *07 wastes from organic chemical processes - 07 02 13 waste plastic*).

2.16 Further information
Additional information about Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus are available on https://kaimann.com/.

3. LCA: Calculation rules

3.1 Declared Unit
The declared unit is 1 m³ of the thermal insulation material for technical building equipment and industrial installations Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus including packaging materials. The declared unit refers to the product as it leaves the factory gate. The gross density is the average density of al declared products, weighted by production volume.

Declared unit

Name	Value	Unit
Gross density	48.35	kg/m³
Conversion factor to 1 kg	0.20683	-
Declared unit	1	m³

3.2 System boundary
The system boundaries of the EPD follow the modular structure of EN 15804 (according to /EN 15804/, section 6.2.1). Only the declaration of the product stage modules A1 to A3 is mandatory for compliance with EN15804. The declaration of the modules of other life cycle stages is optional. Resources from the ecosphere and Technosphere enter the system on stage A1 and leave the system on stage C4. The following life cycle stages are considered:

Module A1: The system boundaries comprise raw material extraction and supply from cradle to factory gate and is represented through generic background data sets.

Module A2: The transport of the raw materials from the factory gate to the point of manufacturing is represented through generic background data sets. The transportation distances have been provided by the manufacturer.

Module A3: The manufacturing includes manufacturer specific material and energy data which are represented through generic data sets. Machinery as well as buildings to manufacture the declared unit are neglected. On average, 0.49 kWh electricity and 2.65 kWh natural gas are required for the manufacturing of 1m³ Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus. This data was provided by Kaimann GmbH. This module also includes packaging with plastics and carboard and wooden pallets. The biogenic carbon stored is declared in the result section.

Module A4: The transport of Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus from the factory gate to the site of assembly is represented through generic background data. The transportation distances are based on average transportation data provided by the manufacturer.

Module A5: The assembly can be done manually without use of any electrical equipment. Only glue (Kaiflex Spezialkleber) is required for the assembly of Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus. Packaging material from module A3 is disposed here: Plastic packaging is incinerated, and cardboard and the wooden pallet are re-used.

Module C2: The products to be disposed are transported to the waste treatment facility.

Module C4: The waste is treated according to the waste framework directive of the European Union.

Module D: Potential impacts and benefits from energy recovery and recycling are described.

3.3 Estimates and assumptions

The type of EPD is cradle to gate.

Module A2: Raw materials are transported to the manufacturer by road transport and shipping. Information on the transportation distances were provided by the manufacturer. For the calculation, the distances were weighted by the mass of the respective raw materials.

Module A3: No production waste is assumed during the production of Kaiflex. For further information, see chapter the Allocation. The packaging materials are declared in this module. For the included biogenic carbon, see the results chapter.

Module A4: Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus is distributed worldwide. The average transportation distance per declared unit was calculated based on the sales volume and average transportation distance per country where Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus is distributed. Whenever the distance to the target country was higher than 2,000 km, it was assumed that only 750 km of the transportation distance were covered by road (from the manufacturer to the harbour and from the harbour to the point of use) whereas the rest of the distance was covered by shipping. Distances shorter than 2,000 km are assumed to be covered fully by road. Based on the sum product of sales volume multiplied with the road and ship transportation, the total transportation distances were calculated and divided by the total sales volume to calculate the average transportation distance per declared unit. As a result, the average road transportation distance per declared unit is 1021 kilometres by road and 968 kilometres by ship. No loss during transportation is assumed.

Module A5: Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus is assembled by manual labour under use of adhesive. It is assumed that no further energy or materials are required in this module, and that consumers of Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus order correct product sizes and thus avoid waste production during the assembly. The packaging materials are disposed of by re-using (cardboard and wooden pallet) and by incineration (polyethylene and polypropylene).

Module C2: The average distance of disassembled Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus to the point of disposal is assumed to be 75 kilometres covered by road.

Module C4: Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus is incinerated.

3.4 Cut-off criteria

All material flows in module A1 are covered and almost all material and energy flows in module A3 are covered. Neglected material or energy flows have a mass or energy contribution of less than one percent per process and contribute to less than 5% of mass and energy flows of a module. Infrastructure such as office buildings and the manufacturing hall as well as the machinery required to produce Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus have not been considered.

3.5 Background data

The LCA model underlying this EPD was created in openLCA 1.8 developed by GreenDelta GmbH. As a background database /GaBi database/ professional database (version from July 2016) by thinkstep AG was used and has been complemented by data sets from /GaBi databease/ extension databases as well as data sets from the /EuGeos database/ 15804-IA database version 2.1 by EuGeos Ltd.

3.6 Data quality

The life cycle inventory for the assessed product is based on an internal assessment of manufacturing and environmental data, assessment of LCA-relevant data for the supply chain and energy measurement within the factors. The required product flows for creation of the product system were handed over to GreenDelta GmbH.
All data was scrutinised and found to be plausible and consistent and were therefore found to be representative.
Some of the background data sets are more than 10 years old but were used when no recent dataset was available. Datasets from the GaBi database are assumed to have a high quality.
There are no materials or processes that are left out because they are under the cut-off threshold.

3.7 Period under review

The production data refers to the average of the year 2018.

3.8 Allocation

During production, material cut-offs from Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus are collected, shredded, and pressed. The pressed material is sold as a soundproofing material. Because it is composed of the exact same material as the main product, no allocation is considered. The soundproofing material is assumed to undergo the same life cycle as Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus.

3.9 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to /EN 15804/ and the building context, respectively the product-specific characteristics of performance, are taken into account.

As a background database /GaBi database/ professional database (version from July 2016) by thinkstep AG was used and has been complemented by data sets from /GaBi/ extension databases as well as data sets from the /EuGeos database/ 15804-IA database version 2.1 by EuGeos Ltd..

4. LCA: Scenarios and additional technical information

The following technical scenario information serves as a basis for the declared modules. All values refer to the declared unit of 1 m³.

Transport to the building site (A4)

Name	Value	Unit
Transport distance (road)	1021	km
transport distance (ship)	968	km

Installation into the building (A5)

Name	Value	Unit
Auxiliary	1.6	kg
Water consumption	0	m^3
Other resources	0	kg
Electricity consumption	0	kWh
Other energy carriers	0	MJ
Material loss	0	kg
Output substances following waste treatment on site	16.5	kg
Dust in the air	0	kg
VOC in the air	0	kg

The 16.5 kg are the sum of all packaging materials per declared unit.

End of life (C1-C4)

Name	Value	Unit
Collected separately	49.95	kg
Collected as mixed construction waste	0	kg
Reuse	0	kg
Recycling	0	kg
Energy recovery	49.95	kg
Landfilling	0	kg

48.35 kg Kaiflex and 1.6 Kaiflex Spezialkleber are incinerated for energy recovery.

Reuse, recovery and/or recycling potentials (D), relevant scenario information

Module D includes the credits from the material re-use in module A5 and the credits of the incineration processes from A5 (packaging waste) and C4 at a waste incineration plant with an assumed efficiency of R1<0.6.

5. LCA: Results

The life cycle impact assessment method is based on EN15804. Energy indicators for resource use utilise the lower calorific value.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
X	X	X	X	X	MND	MND	MNR	MNR	MNR	MND	MND	MND	X	MND	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 m³

Parameter	Unit	A1-A3	A4	A5	C2	C4	D
Global warming potential	[kg CO_2-Eq.]	2.78E+2	8.23E+0	1.09E+1	6.04E-1	1.14E+2	-3.92E+0
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	5.00E-5	1.50E-6	1.09E-14	1.10E-7	0.00E+0	-2.23E-7
Acidification potential of land and water	[kg SO_2-Eq.]	1.49E+0	3.27E-2	3.33E-3	2.40E-3	1.78E-2	-1.66E-2
Eutrophication potential	[kg $(PO_4)^{3-}$-Eq.]	1.46E+0	7.49E-3	4.89E-4	5.50E-4	4.28E-3	-7.47E-3
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	6.34E-2	1.38E-3	3.48E-4	1.02E-4	9.98E-4	-1.29E-3
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	1.22E-2	2.46E-5	1.53E-6	1.80E-6	0.00E+0	-1.55E-5
Abiotic depletion potential for fossil resources	[MJ]	4.79E+3	1.26E+2	4.26E+1	9.23E+0	2.43E+1	-4.68E+1

RESULTS OF THE LCA - RESOURCE USE: 1 m³

Parameter	Unit	A1-A3	A4	A5	C2	C4	D
Renewable primary energy as energy carrier	[MJ]	5.47E+2	1.61E+0	5.02E+0	1.10E-1	0.00E+0	-1.94E+2
Renewable primary energy resources as material utilization	[MJ]	5.35E+1	0.00E+0	4.45E-5	7.66E-3	2.43E-3	-4.02E+1
Total use of renewable primary energy resources	[MJ]	6.01E+2	1.61E+0	5.02E+0	1.18E-1	2.43E-3	-2.34E+2
Non-renewable primary energy as energy carrier	[MJ]	1.13E+3	1.27E+2	4.41E+1	9.35E+0	2.88E+1	-4.99E+1
Non-renewable primary energy as material utilization	[MJ]	3.91E+3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Total use of non-renewable primary energy resources	[MJ]	5.04E+3	1.27E+2	4.41E+1	9.35E+0	2.88E+1	-4.99E+1
Use of secondary material	[kg]	1.88E+0	3.02E-2	0.00E+0	2.22E-3	0.00E+0	-5.86E-2
Use of renewable secondary fuels	[MJ]	5.20E-6	0.00E+0	4.19E-22	0.00E+0	0.00E+0	0.00E+0
Use of non-renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	1.23E-1	0.00E+0	0.00E+0	0.00E+0
Use of net fresh water	[m³]	5.89E+0	2.00E-2	3.86E-2	1.47E-3	2.74E-1	-2.32E-2

RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: 1 m³

Parameter	Unit	A1-A3	A4	A5	C2	C4	D
Hazardous waste disposed	[kg]	6.22E-2	3.30E-3	8.16E-8	2.42E-4	0.00E+0	-1.70E-3
Non-hazardous waste disposed	[kg]	1.17E+2	5.84E+0	2.87E+0	4.29E-1	4.21E+0	-7.72E-1
Radioactive waste disposed	[kg]	2.66E-2	8.48E-4	5.97E-4	6.23E-5	1.60E-3	-2.32E-4
Components for re-use	[kg]	0.00E+0	0.00E+0	1.37E+1	0.00E+0	0.00E+0	0.00E+0
Materials for recycling	[kg]	4.13E-4	6.99E-5	0.00E+0	5.14E-6	0.00E+0	0.00E+0
Materials for energy recovery	[kg]	1.76E-11	2.98E-12	2.71E+0	2.19E-13	5.00E+1	0.00E+0
Exported electrical energy	[MJ]	0.00E+0	0.00E+0	1.43E+1	0.00E+0	1.81E+2	0.00E+0
Exported thermal energy	[MJ]	0.00E+0	0.00E+0	4.70E+1	0.00E+0	5.85E+2	0.00E+0

Additional Technical scenario:
In module A3, a wooden EURO-pallet is used. 42.44kg CO2 are absorbed per one pallet as biogenic carbon. In module A5, the pallet is re-used and thus counted as an avoided product. This means that the same amount of CO2 is “released” in this module.

6. LCA: Interpretation

Environmental Impacts
All seven environmental impact categories are dominated by module A1 raw material supply. For global warming potential, ozone layer depletion, acidification potential, photochemical ozone creation potential, and abiotic depletion potential (fossil), the production of the blowing agent is the largest contributor. For the eutrophication potential, the largest contributor is the production of the vulcanisation agent. For the abiotic depletion potential for non-fossil resources it is the production of the flame retardant.

Renewable primary energy as energy carrier (PERE)
This impact category is dominated by the module A3 manufacturing.
Most of the renewable energy is used in the production process of the EURO pallet and the carboard.

Renewable primary energy resources as material utilization (PERM)
The dominant modules are A3 manufacturing and the avoided burdens in module D.

Most of the renewable energy is stored in the wood of the EURO pallet and is ‘released’ in module D because of re-using.

Non-renewable primary energy as energy carrier (PENRE)
The dominant module is A2 because of the long transport distances and A3 assembly.
Fuel is the main contributor for the transport.

Non-renewable primary energy as material utilization (PENRM)
The dominant module is A1 raw material supply, where energy is stored in the product itself.

Use of secondary material (SM)
The largest contributors is the module A1 raw material supply.
The most secondary materials are used to produce the blowing agent.

Use of net fresh water (FW)
This impact category is dominated by module A1 raw material supply.
The production of the blowing agent uses the most fresh water.

Hazardous waste disposed (HWD)
This impact category is dominated by modules A1 raw material supply and A2 transport.
Most of the hazardous waste comes from the production of the blowing agent for A1 and the fuel for A2.

Non-hazardous waste disposed (NHWD)
This impact category is dominated by module A1 raw material supply.
The main contributors are the production of the base material and the flame-retardant.

Radioactive waste disposed (RWD)
This impact category is dominated by module A1 raw material supply.
Most radioactive waste stems from the production of the base material, the blowing agent, and the base material.

Materials for recycling (MFR)
The lorry transport process includes recycling materials, mainly to produce trucks and roads. So, the transport modules show the highest impacts in this category.

Conclusion
The production of the blowing agent is the largest contributor to the environmental impacts of Kaiflex ST, Kaiflex ST s2, Kaiflex Ductplus.

7. Requisite evidence

7.1 VOC emissions

The Volatile Organic Compound (VOC) emissions have been tested by /Eurofins/ Product Testing A/S by using the Committee for health-related evaluation of building products/Deutsches Institut für Bautechnik (/AgBB/DIBt/) test method in 09.2013.

AgBB overview of results (28 days [µg/m³])

Name	Value	Unit
TVOC (C6 - C16)	<5	µg/m^3
Sum SVOC (C16 - C22)	<5	µg/m^3
R (dimensionless)	<1	-
VOC without NIK	<5	µg/m^3
Carcinogenic Substances	<1	µg/m^3

AgBB overview of results (3 days [µg/m³])

Name	Value	Unit
TVOC (C6 - C16)	<5	µg/m^3
Sum SVOC (C16 - C22)	<5	µg/m^3
R (dimensionless)	<1	-
VOC without NIK	<5	µg/m^3
Carcinogenic Substances	<1	µg/m^3

7.2 Leaching performance

The concentration of water-soluble chloride ions is 300 mg/kg according to /EN 13468:2001/.

8. References

/IBU 2016/
IBU (2016): General Programme Instructions for the Preparation of EPDs at the Institut Bauen und Umwelt e.V., Version 1.1 Institut Bauen und Umwelt e.V., Berlin.
www.ibu-epd.de

/ISO 14025/
DIN EN /ISO 14025:2011-10/, Environmental labels and declarations — Type III environmental declarations — Principles and procedures

/EN 15804/
/EN 15804:2012-04+A1 2013/, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

/AGBB/DIBt/
Deusches Institut für Bautechnik 2018: Anforderungen an die Innenraumluftqualität in Gebäuden: Gesundheitliche Bewertung der Emissionen von flüchtigen organischen Verbindungen (VVOC, VOC und SVOC) aus Bauprodukten

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