Environmental Product Declaration (EPD)

In accordance with UNI EN ISO 14025:2010 - EN 15804:2012+A2:2019/AC:2021

K-FLEX®ST and ST PLUS (tube) thermal insulation products

From K-FLEX®

EPD of multiple products, based on a representative product

The EPD covers the production range related to K-FLEX®ST (tube) and ST PLUS (tube) :

- **Thickness:** from **6 mm** to **60 mm**
- **Inner diameter:** from **6 mm** to **170 mm**
- **Length: 2 meters**

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CPC 3623 - Tubes, pipes and hoses of vulcanized rubber other than hard rubber
PCR 2019:14: “Construction products” version 2.0.1 valid until 2030-04-07
C-PCR 005 “Thermal Insulation Products” version 1.0.0 valid until 2030-04-07

COMPANY INFORMATION

THE COMPANY

K-FLEX® is an Italian manufacturing company specialised in the production of thermal and acoustic flexible elastomeric insulation materials. K-FLEX® has production facilities and subsidiary networks around the globe in order to supply their products to a world-wide customer base. Its diversified products range provides solutions for various market sectors, including building, transportation, petrochemical and renewable energy. K-FLEX® is a worldwide market leader thanks to its focus on technological innovation and the quality of its products that play an essential role in energy consumption control and reduction of the greenhouse gas emission.

K-FLEX® is an example of a successful Italian company that has established itself worldwide. The company is present in 63 countries, with production facilities in all continents and more than 6500 employees. In addition, the company has commercial distribution branches, located all over the world, for the efficient and effective global distribution process of its products. The original manufacturing plant, located in Roncello (north of Milan), was founded in 1989 and today it is the largest in the world for the production of elastomeric insulation.

K-FLEX HISTORY

K-FLEX® was founded in 1989 in Roncello, located north of Milan, Italy, with the first production plant of elastomeric materials for thermal insulation. K-FLEX® quickly developed its presence in the market and grew rapidly. In 1993, K-FLEX® had already established a significant market share in Italy. It subsequently expanded into other European markets such as France and Spain, opening in Barcelona in 1995 and in Madrid in 1998. Almost ten years after its foundation, K-FLEX® began its expansion outside Europe starting up K-FLEX® China. Based in Guangzhou was the first of two manufacturing plants with a second plant built in Suzhou, which opened in 2009.The Company built further production facilities in the US, in Russia in 2005, in Malaysia, Poland, India and Dubai. In order to expand its commercial footprint, the Company opened distribution branches and various other distribution / sales companies in Germany (2000), Scandinavia (2005), United Kingdom (2006), Romania (2008), Japan (2008), Ukraine (2009), South Korea (2009).

In the 2008 another strategic activity was the 100% share acquisition of BevEx Ltd. BevEx offers an important diversification opportunity for K-FLEX® through its presence in the Food & Beverage sector. At the end of 2009, K-FLEX® opened its headquarter in Roncello, housing a 50,000 sq. meter

production facility. In the last few years K-FLEX® has been expanding the production facilities in Russia, Poland, India and USA in order to better answer to the local market request. In June 2014, the company changed its legal form from limited liability company (S.r.l.) to joint stock company (S.p.A.). In 2017, the plant in the USA was extended towards the biggest and most modern plant worldwide. Also the Polish plant was extended in 2017 and represents the biggest and most modern plant in Europe.

In 2018, a new production site in Egypt was opened. In 2018, the new K-FLEX® logistics centre "K-FLEX®Logistikzentrum Leipzig-Halle" in Germany was opened. It is now the biggest distribution centre for elastomeric foams in whole Europe. In 2019, a new production site in Vietnam has been opened in support of the Asian region market request. In the same year K-FLEX® implemented his Polish factory with a new polyethylene production plant. In 2020, a new production site in Mexico was opened to support the growing of South American market. Based in Apodaca, N.L., Mexico, its 600,000 sf (56,000 m2), 2-building campus, it represents the third bigger production site of the Company and one of the largest in the world. It is dedicated to the manufacture of the full range of K-FLEX® thermal insulation products based on Flexible Elastomeric Foam (FEF) and Polyethylene Foam (PEF).

In late 2020, the foundation stone of a new production and warehouse complex was laid in Moscow region, Istra urban district, Denkovo village. The production site-aimed at increasing productivity and bringing new thermal insulation materials to the market-came into operation in the third quarter of 2021. The third building at the Polish site, which will be used as a new warehouse, was also opened during the same period. While in the first quarter of 2022 work began on the fourth building, which will be dedicated that will be devoted to the production of underfloor heating/cooling systems.

This declaration refers to products made in the Polish plant in Uniejów.

PRODUCT INFORMATION

The insulation product is a material that, thanks to particular characteristics, prevents the transmission or diffusion of thermal, acoustic, electrical or other energy, depending on the application for which it is intended. The present EPD refers to:

- **K-FLEX®ST and ST PLUS** (tube) (CPC 3622) is a highly flexible closed cell elastomeric foam (FEF) suitable for hot and cold thermal insulation, featuring a combination of low theraml conductivity, good water vapour diffusion resistance and low flame spread. K-FLEX ST is ideal for thermal insulation for pipes, applied for air conidtioning, heating and plumbing, pipe fittings.

The representative product analyzed in this EPD is a **K-FLEX®ST and ST PLUS (tube)** with the following dimensions:

- **Thickness:** 25 mm
- **Inner diameter:** 22 mm
- **Length:** 2 meters

This product was chosen as representative because it is the most commonly sold configuration in the product range during year 2024.

This EPD covers the following dimensional range for the **K-FLEX®ST and ST PLUS (tube)**:

- **Thickness:** from **6 mm** to **60 mm**
- **Inner diameter:** from **6 mm** to **170 mm**
- **Length: 2 meters**

The following tables show the technical characteristics of the type of product.

Characteristics of thermal insulation product K-FLEX® ST and ST PLUS (tube):

Property	Value	Standard
Temperature range	-165°C +110°C	EN 14706 EN 14707
Thermal resistance / Thermal conductivity	λ°C ≤ 0,033 W/(m*K) λ40°C ≤ 0,037 W/(m*K) λ(ϑm) = (33 + 0,087*ϑm + 0,00098*ϑm^2)/1000 W/(m*K)	EN 13787 EN ISO 8497
Reaction to Fire	Euroclasse BL-s2,d0	EN 13501-1

LCA INFORMATION

DECLARED UNIT

This life cycle analysis, defined as "from-cradle-to-gate with modules C1-C4 and module D", takes into consideration the production phases of raw materials, their transportation to the production site, the manufacture and the end of life of the product, excluding the distribution and use phase. As regards the flows of matter and energy, declared unit is defined as:

1 m^3 of thermal insulation product, including packaging

The density considered for the products derives from an average of the production of the reference year (2024) and it is shown in the following table.

Density of thermal insulation product

Product	Density
K-FLEX ST and ST PLUS (tube)	50 kg/m^3

SYSTEM BOUNDARIES

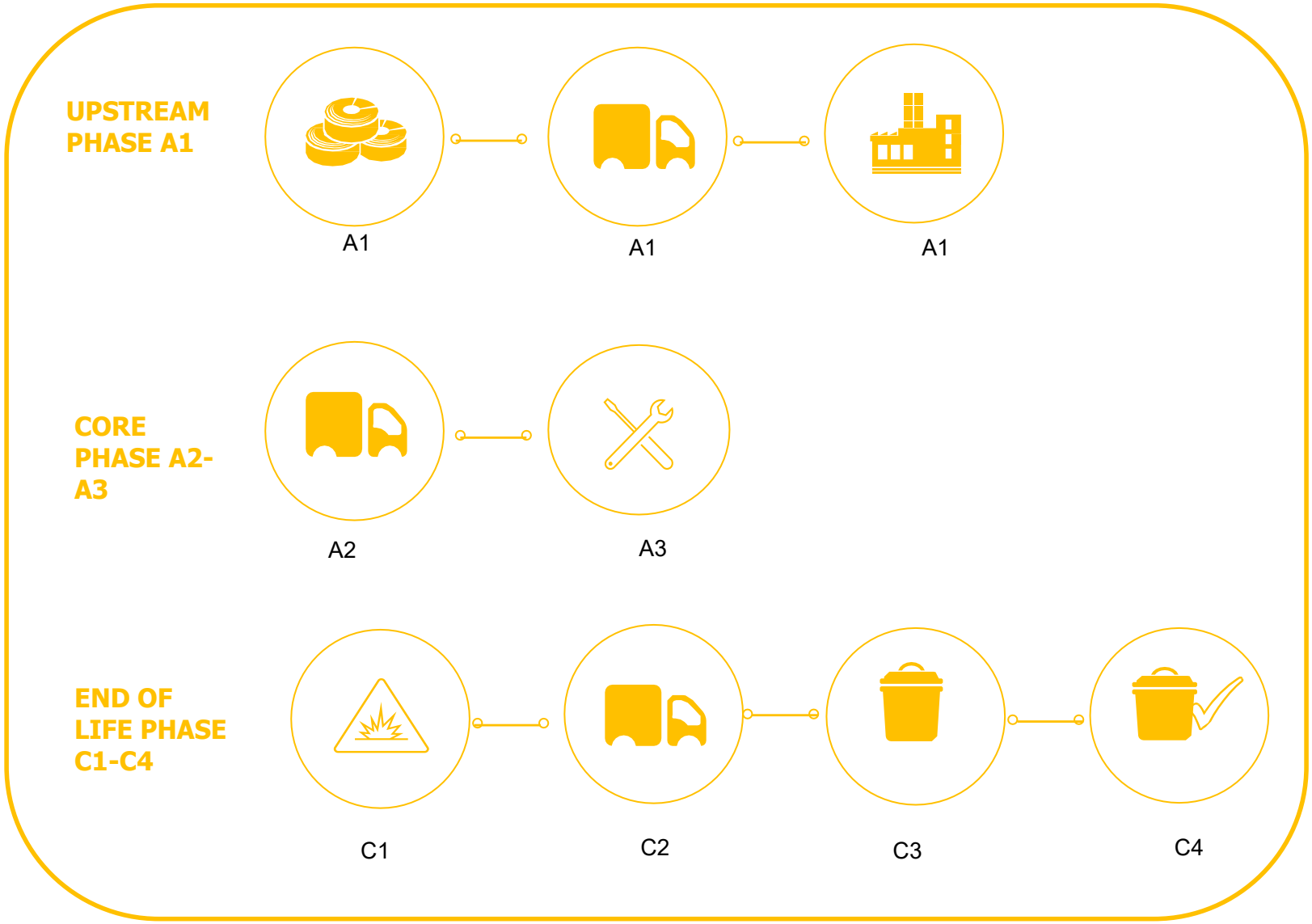
The system boundaries determine the process units to be included in the LCA study and which type of data "input" and / or "output" to the system can be omitted. In accordance with the PCR 2019:14 version 2.0.1 document and EN 15804, the life cycle of the acoustic insulation products made by K-Flex includes the extraction of raw materials and production cycle, transport and manufacturing, divided in the Upstream (A1), Core (A2 and A3) and End of Life (C) and Benefits and loads beyond the system boundary (D) phases. The construction process stage and the use stage (phases from A4 to B7 of PCR 2019:14) are not taken into account in this life cycle analysis.

	LIFE CYCLE INFORMATION															Supplementary information
	Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundary
	A1 – A3			A4 – A5		B1 – B5					B6 – B7		C1 – C4				D
	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
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Module declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	PL WORLD	EU WORLD	PL										PL	PL	PL	PL	PL
Specific data	28%*																
Variation – products	<0,1%																
Variation – sites	Not relevant																

ND: modules/processes/life-cycle stages not declared

*See data quality

The following picture rappresents the system boundaries infographic.



The **Upstream (A1)** phase includes raw material extraction and processing, and in particular:

- ✓ Extraction and processing of raw materials (e.g. mining processes);
- ✓ Generation of electricity, steam and heat from primary resources, also including their extraction, refining and transport.

The **Core (A2-A3)** phase includes following processes:

- ✓ Transportation up to the factory gate and internal transport (A2);
- ✓ Production of ancillary materials or pre-products (A3);
- ✓ Manufacturing of products and co-products (A3);
- ✓ Manufacturing of packaging (A3);
- ✓ Processing up to the end-of-waste state or disposal of final residues (A3).

The **End of life (C1-C4)** stage includes following processes:

- ✓ De-construction, demolition (C1);
- ✓ Transport to waste processing (C2);
- ✓ Waste processing for reuse, recovery and/or recycling (C3);
- ✓ Disposal (C4).

At the end of life, 100% of the K-Flex thermal/acoustic insulation product is assumed to be sent to landfill. The following scenario is modeled in line with PCR 2019:14 v2.0.1, Section 4.8.4:

- **C1 – Deconstruction**: The insulation product is typically installed inside walls, embedded in building systems such as ducts or pipe fittings. As such, it is not removed separately and is disposed of together with other components during building demolition. No specific deconstruction activity is modeled, and the impacts of C1 are considered negligible (0 MJ).
- **C2 – Transport:** The product is assumed to be transported 100 km by 16–32 ton EURO 5 truck to a landfill facility.
- **C3 – Waste processing:** Not applicable. The product is not separated or treated for reuse, recycling, or energy recovery.
- **C4 – Disposal:** 100% of the product mass is disposed of in inert landfill.

Module D includes reuse, recovery and/or recycling potentials, expressed as net impacts and benefits.

PRODUCTION PROCESS

Weighting out raw materials from the warehouse according to the recipe for the actual production. Mixing weighted out all components in a mixer, and after in a roll mill to complete the mixing of the "Masterbatch".

All raw materials are dosed into the mixer and mixed together with "Masterbatch", and after in the ROLLMILL. Small samples are prepared for quality controls. After the cooling down, the Final batch is transported to the extruders area, where the material is extruded according to the shape and size needed. The extruded rubber passes directly into the oven for vulcanization and foaming process. Water bath is used to cool down the expanded rubber that is successively dried in a dedicated tunnel. The last step before packaging is the ink printing and cutting to required lengths. Small samples of finished products are constantly picked up during the whole production.

ELECTRICITY INFORMATION

In the Polish plant, the energy consumed to produce insulation materials comes both from the national power grid, through medium voltage lines, and from the production of electricity from the photovoltaic plant. Specifically, Plant W1, which is dedicated to rubber products (both thermal and acoustic insulation), uses electricity exclusively from the grid. In contrast, Plants W2 and W3, which are involved in the production of PE and Solid products, use electricity from both the grid (97%) and the photovoltaic panels (3%). The products covered by this EPD were produced at plant W1.

The inventory of electricity production and distribution from the grid was obtained from the Ecoinvent 3.10 cut-off EN15804 database, based on the national energy mix process. The GWP-GHG of the electricity mix is 1,088 kg CO_2 eq/kWh.

CUT-OFF AND ALLOCATION

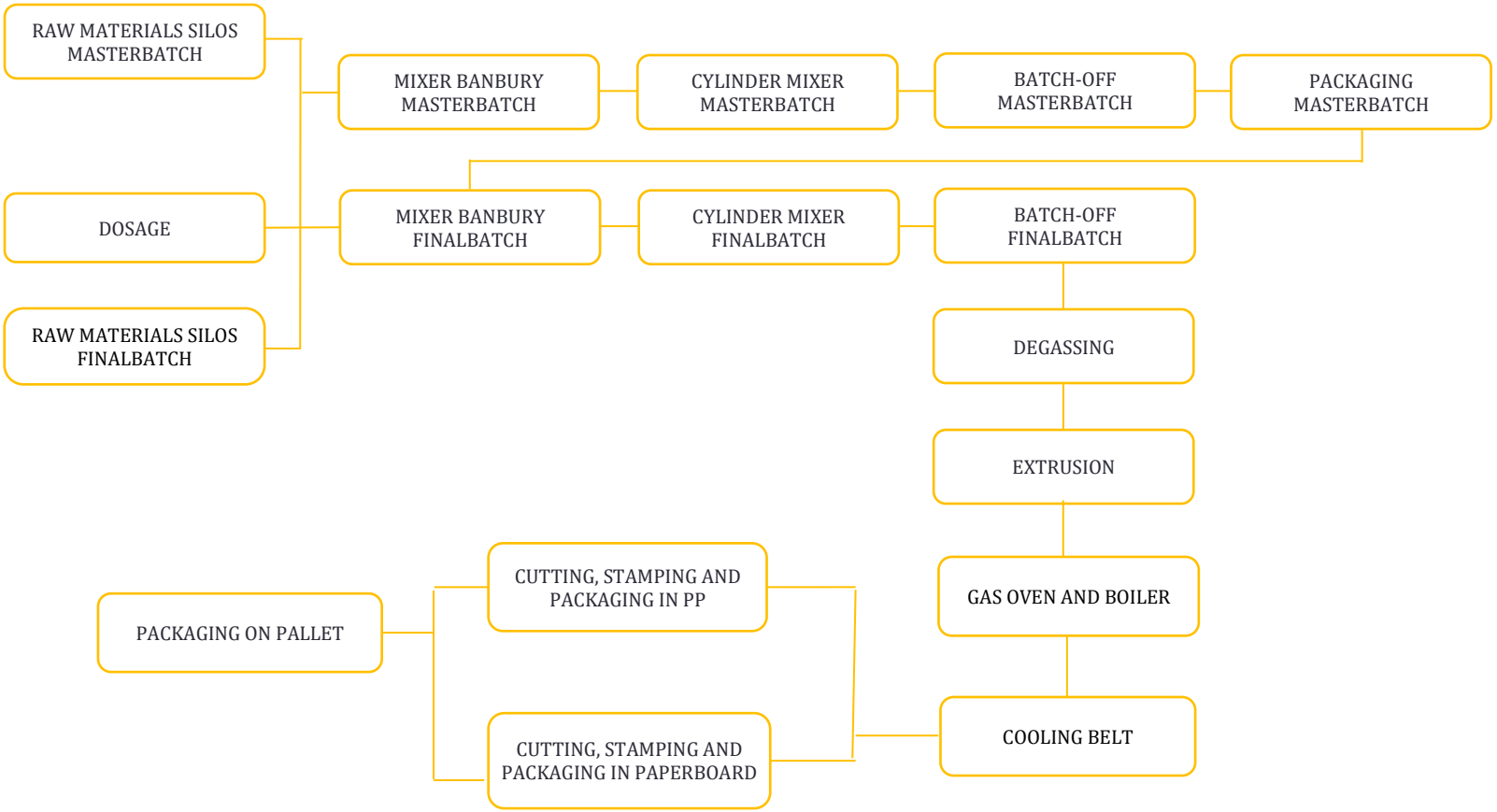
In accordance with the cut-off rule defined by PCR 2019:04 version 2.0.1, the following were excluded from the assessment:

- the packaging of raw materials and auxiliaries.
- the construction of factories (4.3.6 of the PCR 2019:14 version 2.0.1);
- the maintenance of machinery used for production (4.3.6 of the PCR 2019:14 version 2.0.1);
- business travel of personnel (4.3.5 of the PCR 2019:14 version 2.0.1).

In accordance with PCR 2019:14, the allocation rule for calculating the inputs and outputs of some specific data was calculated on an annual basis and with respect to the quantity produced (or processed) of insulation products, specifically:

- electricity, methane and water consumption were allocated to the quantity of product processed.
- the use of packaging materials was allocated to the quantity of packaged product for the reference year in kg.
- waste was allocated to the annual production of insulation products.
- For selected generic data (from databases), allocations present in the processes used were maintained.

SYSTEM DIAGRAM



GENERAL SERVICES:

- pneumatic transport
- fume extraction
- air treatment
- compressed air
- chiller
- internal transport
- waste management

DATA QUALITY

The inventory analysis was based on a combination of specific and generic data. Site-specific primary data were collected by K-Flex for the year 2024 and refer to the production site located in Uniejów, Poland. These data cover the consumption of raw materials and electricity, the manufacturing of thermal/acoustic insulation products, and the associated production waste. This information reflects the actual operations and is considered to be of high quality and representative of current production conditions.

Database (Ecoinvent 3.10, cut-off, EN15804) were used for the upstream production of raw materials and auxiliary materials, energy generation and distribution, transport processes, production phase and waste treatment activities linked to the production phase. Land transportation distances were calculated using Google Maps, and maritime distances were estimated using the Searates online tool.

A full data quality assessment was performed in accordance with EN 15804:2012+A2:2019 Annex E and EN 15941. Each dataset was evaluated based on representativeness in terms of technology, geography, and time, as well as completeness and consistency. The raw material datasets from Ecoinvent were found to have good technological and geographical representativeness, and very good temporal representativeness. The manufacturing phase was modeled using high-quality, site-specific data, fully aligned with the processes taking place at the Uniejów facility. The relevant data assessed included no other poor or very poor data.

Data quality assessment and declaration

Proceses	Source type	Source	Refrence year	Data Category	Share of primary data of GWP-GHG results for A1- A3
Manufacturing of product, inclusive generation of electricity used in manufacturing of product	Collected data	EPD Owner, Ecoinvent 3.10	2024	Primary data	25%
Transport of raw materials	Database	Ecoinvent 3.10	2024	Primary data	3%
Total share of primary data, of GWP-GHG results for A1-A3					**28%**

CONTENT INFORMATION

Content declaration of 1 m³ of thermal insulation products K-FLEX ST and ST PLUS (tube)

Product	Product components	Weight, kg	Weight, %	Post-consumer material, weight-%	Biogenic material, mass-% of product	Biogenic material, kg C/product
K-FLEX ST and ST PLUS (tube)	Polymers	10,0	21,6%	0%	0%	0,00
	Fillers	17,6	37,8%	0%	0%	0,00
	Plasticizer	9,3	20,1%	0%	0%	0,00
	Chemical additive (vulcanization agents)	5,3	11,3%	0%	0%	0,00
	Others	4,3	9,2%	0%	0%	0,00
	TOTAL	**46,5**	**100%**	**0%**	**0%**	**0,00**
	Packaging components	**Weight, kg**		**Weight-% (versus the product)**	**Biogenic material, kg C/product**	
	Paperboard	0,125		0,27%	2,80E-02	
	Pallet	0,149		0,32%	1,43E-01	
	LDPE foil	0,00246		0,01%	0,00E+00	
	TOTAL	**0,1835**		**0,39%**	**1,71E-01**	

K-FLEX products not contain substances that are listed in the “Candidate List of Substances of Very High Concern for authorisation” in concentrations greater than 0,1%.

ENVIRONMENTAL INFORMATION

In order to reach the results reported below, one of the most widespread application software was used for the evaluation of the product life cycle, namely SimaPro 10.2.0.2. Furthermore, the most recent databases on the production of materials, the production cycles in the metallurgical and chemical sector, transports and energy systems were used (Ecoinvent 3.10, cut-off, EN15804).

ASSESSMENT METHOD

The assessment methods adopted for the LCA study reported in this EPD are described in EN 15804 annex C "Impact categories and related indicators, methodologies and characterization factors". The impact assessment was performed using the EN 15804 reference package based on the Environmental Footprint (EF) 3.1 method.

RESULTS OF ENVIRONMENTAL IMPACTS OF 1 m^3 OF K-FLEX ST AND ST PLUS (TUBE)

Potential environmental impacts	Unit	A1-A3	C1	C2	C3	C4	D
GWP-fossil	kg CO_2 eq	1,89E+02	0,00E+00	7,77E-01	0,00E+00	4,54E+00	0,00E+00
GWP-biogenic	kg CO_2 eq	3,00E-01	0,00E+00	2,92E-05	0,00E+00	1,63E-04	0,00E+00
GWP-luluc	kg CO_2 eq	3,16E-01	0,00E+00	1,91E-05	0,00E+00	3,81E-05	0,00E+00
GWP total	**kg CO_2 eq**	**1,90E+02**	**0,00E+00**	**7,77E-01**	**0,00E+00**	**4,54E+00**	**0,00E+00**
ODP	kg CFC-11 eq	2,30E-06	0,00E+00	1,58E-08	0,00E+00	1,59E-08	0,00E+00
AP	mol H^+ eq	1,12E+00	0,00E+00	1,93E-03	0,00E+00	3,13E-03	0,00E+00
EP-freshwater	kg P eq	5,16E-02	0,00E+00	5,60E-06	0,00E+00	1,42E-05	0,00E+00
EP-marine	kg N eq	3,07E-01	0,00E+00	7,42E-04	0,00E+00	1,05E-01	0,00E+00
EP-terrestrial	mol N eq	2,81E+00	0,00E+00	8,11E-03	0,00E+00	1,45E-02	0,00E+00
POCP	kg NMVOC eq	7,67E-01	0,00E+00	3,37E-03	0,00E+00	6,60E-03	0,00E+00
ADP-min&met*	kg Sb eq	1,18E+00	0,00E+00	2,56E-08	0,00E+00	2,10E-07	0,00E+00
ADP-fossil*	MJ	2,99E+03	0,00E+00	1,02E+01	0,00E+00	1,10E+01	0,00E+00
WDP*	m^3 eq	1,25E+02	0,00E+00	1,08E-02	0,00E+00	4,28E+00	0,00E+00

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

Potential environmental impacts – additional indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP-GHG**	kg CO_2 eq	1,90E+02	0,00E+00	7,77E-01	0,00E+00	4,54E+00	0,00E+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 equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.*

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).

RESULTS OF USE OF RESOURCES, WASTE PRODUCTION, OUTPUT FLOWS OF 1 m^3 OF K-FLEX ST AND ST PLUS (TUBE)

Use of resources	Unit	A1-A3	C1	C2	C3	C4	D
PERE	MJ	5,70E+01	0,00E+00	3,56E-02	0,00E+00	2,98E-01	0,00E+00
PERM	MJ	7,81E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	**MJ**	**1,35E+02**	0,00E+00	**3,56E-02**	0,00E+00	**2,98E-01**	0,00E+00
PENRE	MJ	2,72E+03	0,00E+00	1,02E+01	0,00E+00	1,10E+01	0,00E+00
PENRM	MJ	2,66E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	**MJ**	**2,99E+03**	0,00E+00	**1,02E+01**	0,00E+00	**1,10E+01**	0,00E+00
SM	kg	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
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m^3	3,95E+00	0,00E+00	2,63E-04	0,00E+00	1,00E+01	0,00E+00

Waste production	Unit	A1-A3	C1	C2	C3	C4	D
HW	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NHW	kg	1,34E+01	0,00E+00	2,50E-07	0,00E+00	2,40E-04	0,00E+00
RW	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Hazardous and non-hazardous waste is only declared if the treatment takes place outside the system boundaries. The amount of radioactive waste comes from the use of nuclear energy in the national electricity production mix of the different countries along the life cycle.

Output flows	Unit	A1-A3	C1	C2	C3	C4	D
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	7,62E-01	0,00E+00	2,50E-07	0,00E+00	2,40E-04	0,00E+00
MER	kg	1,58E-04	0,00E+00	2,51E-09	0,00E+00	1,03E-07	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EET	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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; HP = Hazardous waste disposed; NHW = Non-hazardous waste disposed; RW = Radioactive waste disposed; CRU = Components for reuse; MFR = Materials for recycling; MER = Materials for energy recovery; EEE= Exported energy, electricity; EET = Exported energy, thermal.

Disclaimer: The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3).

ADDITIONAL ENVIRONMENTAL INFORMATION

UNI EN ISO 9001:2015 and ISO 14001 certified, the company offers a wide range of products that ensure quality, reliability and compliance with market standards. K-FLEX® products also play a very important role in conserving the environment by improving the relationship between energy consumption and pollutant emissions, controlling energy consumption and reducing the release of greenhouse gas in the atmosphere.

VERSION HISORY

This is the first version of the EPD.

ABBREVIATIONSN

Abbreviation	Definition
General Abbreviations	
EN	European Norm (European Standard)
EPD	Environmental Product Declaration
EF	Environmental Footprint
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
PCR	Product Category Rules
c-PCR	Complementary Product Category Rule
CEN	European Committee for Standardization
CPC	Central product classification
Environmental Impact Indicators (EN 15804)	
GHG	Greenhouse gas
GWP	Global Warming Potential (kg CO_2 eq.)
GWP-fossil	Global Warming Potential from fossil sources (kg CO_2 eq.)
GWP-biogenic	Global Warming Potential from biogenic sources (kg CO_2 eq.)
GWP-luluc	Global Warming Potential from land use and land use change (kg CO_2 eq.)
GWP-total	Total Global Warming Potential (kg CO_2 eq.)
GWP-GHG	Global Warming Potential for greenhouse gases (kg CO_2 eq.
ODP	Ozone Depletion Potential (kg CFC-11 eq.)
AP	Acidification Potential (mol H^+ eq.)
EP-freshwater	Freshwater eutrophication potential (kg P eq.)
EP-marine	Marine eutrophication potential (kg N eq.)
EP-terrestrial	Terrestrial eutrophication potential (mol N eq.)
POCP	Photochemical Ozone Creation Potential (kg NMVOC eq.)
ADP	Abiotic Depletion Potential
ADP-minerals&metals	Abiotic depletion potential for non-fossil resources (kg Sb eq.
ADP-fossil	Abiotic depletion potential for fossil resources (MJ)
WDP	Water Deprivation Potential (m^3)
Resource Use Indicators	
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials (MJ)
PERM	Use of renewable primary energy resources used as raw materials (MJ)
PERT	Total use of renewable primary energy resources (MJ)
PENRE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (MJ)
PENRM	Use of non-renewable primary energy resources used as raw materials (MJ)
PENRT	Total use of non-renewable primary energy resources (MJ)
Waste Indicators	
HW	Hazardous Waste (disposed) (kg)
NHW	Non-Hazardous Waste (disposed) (kg)
RW	Radioactive Waste (disposed) (kg)
Output Flow Indicators	
CFR	Components for Reuse (kg)
MR	Material for Recycling (kg)
MER	Materials for Energy Recovery (kg)
EEE	Exported Energy, Electricity (MJ)
EET	Exported Energy, Thermal (MJ)

Abbreviation	Definition
Other Relevant Terms	
CFC-11 eq.	Chlorofluorocarbon-11 Equivalents
CO_2 eq.	Carbon Dioxide Equivalents
EU	European Union
FEF	Flexible Elastomeric Foam
PEF	Polyethylene Foam
K	Kelvin
kg	Kilogram
kg C	kilograms of Carbon
kg CO_2 eq.	Kilograms of Carbon Dioxide Equivalent
kWh	Kilowatt-hour
LDPE	Low-Density Polyethylene
m^3	Cubic Meter
MJ	Megajoule
mm	millimetre
N eq.	Nitrogen Equivalents
NMVOC	Non-Methane Volatile Organic Compounds
ND	Not Declared
P eq.	Phosphorus Equivalents
PL	Poland
Sb eq.	Antimony Equivalents
UNI	Italian standardization body (Ente Nazionale Italiano di Unificazione)
W	Watt
λ	Thermal conductivity
ϑ_m	Mean temperature, in °C

REFERENCES

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4. PCR 2019:14 Construction products; version 2.0.1 valid until 2030-04-07
5. C-PCR 005 “Thermal Insulation Products” version 1.0.0 valid until 2030-04-07
6. EN 15804:2012+A2:2019/AC:2021 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
7. EN 16783:2017 Thermal insulation products – Product category rules (PCR) for factory made and in –situ formed products for preparing environmental product declarations
8. LCA report insulation products, revisione 00 - 2025

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PROGRAMME INFORMATION

Programme:	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm Sweden www.environdec.com info@environdec.com
Product Category Rules (PCR)	
CEN standard EN 15804 serves as the core Product Category Rules (PCR)	
Product category rules (PCR): 2019:14 Construction products, version 2.0.1 and UN CPC 3622; PCR 2019:14 -C-PCR 005 "Thermal Insulation Products" version 1.0.0 valid until 2030-04-07	
PCR review was conducted by: The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Rob Rouwette (chair), Noa Meron (co-chair). The review panel may be contacted via the Secretariat www.environdec.com/contact.	
Life Cycle Assessment (LCA)	
Study conducted by Ambiente Italia s.r.l.	

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 may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same version number up to the first two digits20) 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.

Verification
External and independent (third-party') verification of the declaration and data, according to ISO 14025:2006, via EPD verification through: ☐ individual EPD verification without a pre-verified LCA/EPD tool ☐ individual EPD verification with a pre-verified LCA/EPD tool ☒ EPD process certification* without a pre-verified LCA/EPD tool ☐ EPD process certification* with a pre-verified LCA/EPD tool ☐ Fully pre-verified EPD tool *EPD process certification involves an accredited certification body certifying and periodically auditing the EPD process and conducting external and independent verification of EPDs that are regularly published. More information can be found in the General Programme Instructions on www.envrondec.com.
Third party verifier: Bureau Veritas Italia, Accredited certification body and responsible for third-party verification Accredited by: Accredia, accreditation number 00031
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No