

# ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

HYMAX<sup>®</sup>2 Wide-Range Coupling Family Solution.

Krausz Industries Ltd.



**EPD HUB, HUB-2854**

Published on 15.02.2025, last updated on 15.02.2025, valid until 14.02.2030.

## GENERAL INFORMATION

### MANUFACTURER

Manufacturer	Krausz Industries Ltd.
Address	HaRav Shalom Mantsura Str. 1, Rosh HaAyin, Zip Code: 4850001, Israel
Contact details	infokrausz@muellerwp.com
Website	www.krausz.com

### EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR Version 1.1, 5 Dec 2023
Sector	Manufactured product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4, D
EPD author	yaron katzav
EPD verification	Independent verification of this EPD and data, according to ISO 14025: <input type="checkbox"/> Internal verification <input checked="" type="checkbox"/> External verification
EPD verifier	Lucas Pedro Berman, as an authorized verifier acting for EPD Hub Limited

The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

### PRODUCT

Product name	HYMAX®2 Wide-Range Coupling Family Solution.
Additional labels	HYMAX®2 Coupling, HYMAX®2 Flange Adaptor, HYMAX®2 Reducer, HYMAX®2 Long, KRAUSZ Dismantling Joint.
Product reference	
Place of production	Rosh HaAyin, Israel
Period for data	2023
Averaging in EPD	Multiple products
Variation in GWP-fossil for A1-A3	50/-50 %

### ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg of pipe coupling grip
Declared unit mass	1 kg
GWP-fossil, A1-A3 (kgCO <sub>2</sub> e)	9,51E+00
GWP-total, A1-A3 (kgCO <sub>2</sub> e)	5,47E+00
Secondary material, inputs (%)	25.7
Secondary material, outputs (%)	75.2
Total energy use, A1-A3 (kWh)	47.2
Net freshwater use, A1-A3 (m <sup>3</sup> )	0.09

## PRODUCT AND MANUFACTURER

### ABOUT THE MANUFACTURER

Krausz Industries develops, designs, and manufactures market-leading state of the art solutions for repairing and connecting different types of pipes for water and wastewater applications worldwide.

During more than 100 years of industry leadership, Krausz has earned a solid reputation for innovative, high-quality products that are exceptionally easy to use and are extremely durable; products that save significant time and cost in installation, inventory and maintenance.

With millions of installations worldwide, Krausz products expertly meet immediate connection and repair needs and prevent future pipe damage, delivering long-lasting value.

At Krausz, we are first and foremost committed to providing you with product excellence. We achieve this by investing in our in-house R&D, whose long list of patents have innovated the industry, while maintaining manufacturing excellence using the highest quality materials and the latest work processes. Starting with every nut and bolt and through to the special finishes we use, our attention to detail has a primary objective: providing solutions you can rely on.

In 2018, Krausz was acquired by Mueller Water Products.

Mueller Water Products, Inc. (NYSE: MWA) is a leading manufacturer and marketer of products and services used in the transmission, distribution and measurement of water in North America. Mueller's broad product and service portfolio includes engineered valves, fire hydrants, pipe connection and repair products, metering products, leak detection, and pipe condition assessment.

At our core, Mueller is committed to incorporating the fundamental principles of sustainability by lowering our environmental impact on the world around us and operating our business in a safe, inclusive and ethical manner.

Mueller is committed to reducing the environmental impact of our

operations, and the products and solutions we offer. We manage our environmental footprint across four key areas: emissions, energy, water and waste.

### PRODUCT DESCRIPTION

HYMAX®2 Wide-Range Coupling Family Solution DN40 to DN300.

KRAUSZ Dismantling Joint DN40 to DN600.

### Product features and application

Krausz HYMAX® coupling solutions feature advanced engineering and innovative design, enabling fast installation, outstanding flexibility, and extreme durability in varied conditions. These benefits make the Krausz HYMAX® the high-performance, cost-effective choice for a broad variety of applications from couplings to flange adaptors and reducers. A revolutionary product line that has set a new industry standard, the HYMAX® products have been field-proven in millions of installations worldwide.

HYMAX® Extensive portfolio of products from DN40 to DN1600 pipe size, uses superior quality raw materials that allows nominal diameter range of up to 54mm. Suitable for both metal and plastic pipes. It Ready-to-use, stab-on design, eliminates the need for product disassembly before use.

HYMAX® equipped with a top-facing two-bolt or four-bolt design, eliminates the need for extensive under-pipe digging and work and enables quick and easy installation.

Its patented gasket transforms the pipe joint into a flexible connection, allowing continuous dynamic deflection of the pipe after installation of 4° per side, reducing future pipe cracks and breaks.

HYMAX® uses an innovative patent for its sealing element; hydraulically assisted gasket features two-stage sealing: mechanical sealing that is effective under vacuum or non-pressure; and self-inflated gasket using water pressure. In addition, HYMAX®2's (DN40-DN300) uses advanced no-tear gasket technology - a patented flip gasket that can be easily flipped in or out to accommodate different pipe diameters for maximum installation

efficiency.

### Technical specifications

#### Center ring:

DN40 - DN300: Grade P235 Steel, EN 10217-1

DN350 - DN600: Grade S235JR Steel, EN 10025-2 (DIN 17100)

#### End Rings:

DN40 - DN300: Grade S235JR Steel, EN 10025-2 (DIN 17100).

DN350 - DN600: Grade S235JR Steel, EN 10025-2 (DIN 17100).

#### Bolts, nuts, washers and gasket bridge:

Bolts, nuts and washers are made of AISI SS316 Stainless Steel. Rolled thread and unique dry Molecular Anti-galling (MAG) treatment process on nuts and bolts; based on embedded zinc, prevents galling and enables repeated bolt tightening; it also eliminates the need for grease, preventing dust and dirt build-up.

#### Flange:

Compatible with EN 1092-1 PN10/16.

ANSI 125 and 150, BSTD bolt patterns.

#### Gasket:

EPDM compounded for water and sewerage, meets international standards for contact with drinking water: NSF-61, KTW, W270, XP P 41-250, and BS 6920. Meets DIN EN 681-1 for water and drainage applications.

#### Coating:

100% fusion-bonded epoxy coating enables an insulated product for enhance corrosion protection. Average thickness 250 microns. Meets NSF-61, BS 6920, W270, ONORM B 5014-1, XP P 41-250, AS/NZS 4020, and UBA-Coatings Guideline. GSK Certified.

### Product performance

#### Working temperature:

EPDM GASKET

CONTINUOUS OPERATION | -30°C UP TO +85°C

SHORT TIME OPERATION | -30°C UP TO +100°C

EPOXY COATING

ABOVE GROUND APPLICATIONS | UP TO +50°C

BELOW GROUND APPLICATIONS | UP TO +65°C

#### Dynamic deflection:

DN40-DN600: Up to 4° per side

#### Maximum offset for misaligned pipe:

DN40-DN80: 10mm | DN100-DN600: 13mm

#### Maximum out of roundness:

Up to 13mm Depending on DN size and/or pipe material

DN40

2mm

DN50-DN80

5mm

DN100-DN300

8mm

DN350-DN600

13mm

#### PFA - Allowable Operating Pressure:

16 Bar

#### PEA - Allowable Test Pressure:

24 Bar

#### Vacuum test:

0.8 Bar

#### Product standards:

All products meet or exceed international standards for contact with drinking water.

Quality assurance:  
ISO9001:2015

Certification:  
NSF-61 and NSF-372.  
Products DN40-300 were approved by 3rd party ILAC lab according to EN14525.  
KTW, W270, XP P 41-250, and BS 6920. Meets DIN EN 681-1 for water and drainage applications.

Further information can be found at [www.krausz.com](http://www.krausz.com).

### PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	88	China
Minerals		
Fossil materials	12	Italy, Germany
Bio-based materials		

### BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	
Biogenic carbon content in packaging, kg C	0.0979

### FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 kg of pipe coupling grip
Mass per declared unit	1 kg
Functional unit	
Reference service life	

### SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

# PRODUCT LIFE-CYCLE

## SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR

## MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

The HYMAX is made of steel, stainless steel and EPDM gasket parts. The manufacturing process requires electricity and fuels for powering the production equipment. Lubricating oil is used for the maintenance of manufacturing machines and to ensure a smooth factory process. Wastewater treatment is also considered. A

wooden pallet, cardboard, and packaging film are used as packaging materials for transporting to the manufacturing site.

The Hymax coupling solution wide-range product family is assembled from several components such as steel, stainless steel fasteners, EPDM gasket and plastic. All the components are assembled in Israel.

The steel body parts are manufactured in Israel. In the manufacturing process, the parts are cold rolled. The waste in the process is sent to recycle.

The gasket EPDM material was considered in the LCA.

The stainless-steel fasteners are manufactured using forging and rolling processes. Material losses incurred during production are minimal and can be considered negligible.

Upon receiving all components from suppliers at the fabrication site in Israel, the components undergo a quality inspection, are temporarily stored, and are then assembled to order and packed for shipment. Each product is packed in a cardboard box and stacked on a Euro-pallet before shipping. Excluded from A3 are the infrastructure at the production site and the administrative activities of the employees.

## TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

Average distance of transportation from production plant to retailer's site is assumed as 1000 km and the transportation method is assumed to be lorry/freight. Vehicle capacity utilization volume factor is assumed to be 1 which means full load. In reality, it may vary but as role of transportation emissions in total results is small, the variety in load is assumed to be negligible. To be conservative, empty returns are included in this study as implemented through an average load factor in the Ecoinvent transport datapoints. Transportation does not cause losses as product is packaged properly. Environmental impacts from installation into the infrastructure include generation of waste packaging materials (A5) and release of biogenic carbon dioxide from wood pallets/cardboard boxes. The impacts of material production, its processing and its

disposal as installation waste are also included. Electricity consumption for installation of the HYMAX coupling is considered, too.

### **PRODUCT USE AND MAINTENANCE (B1-B7)**

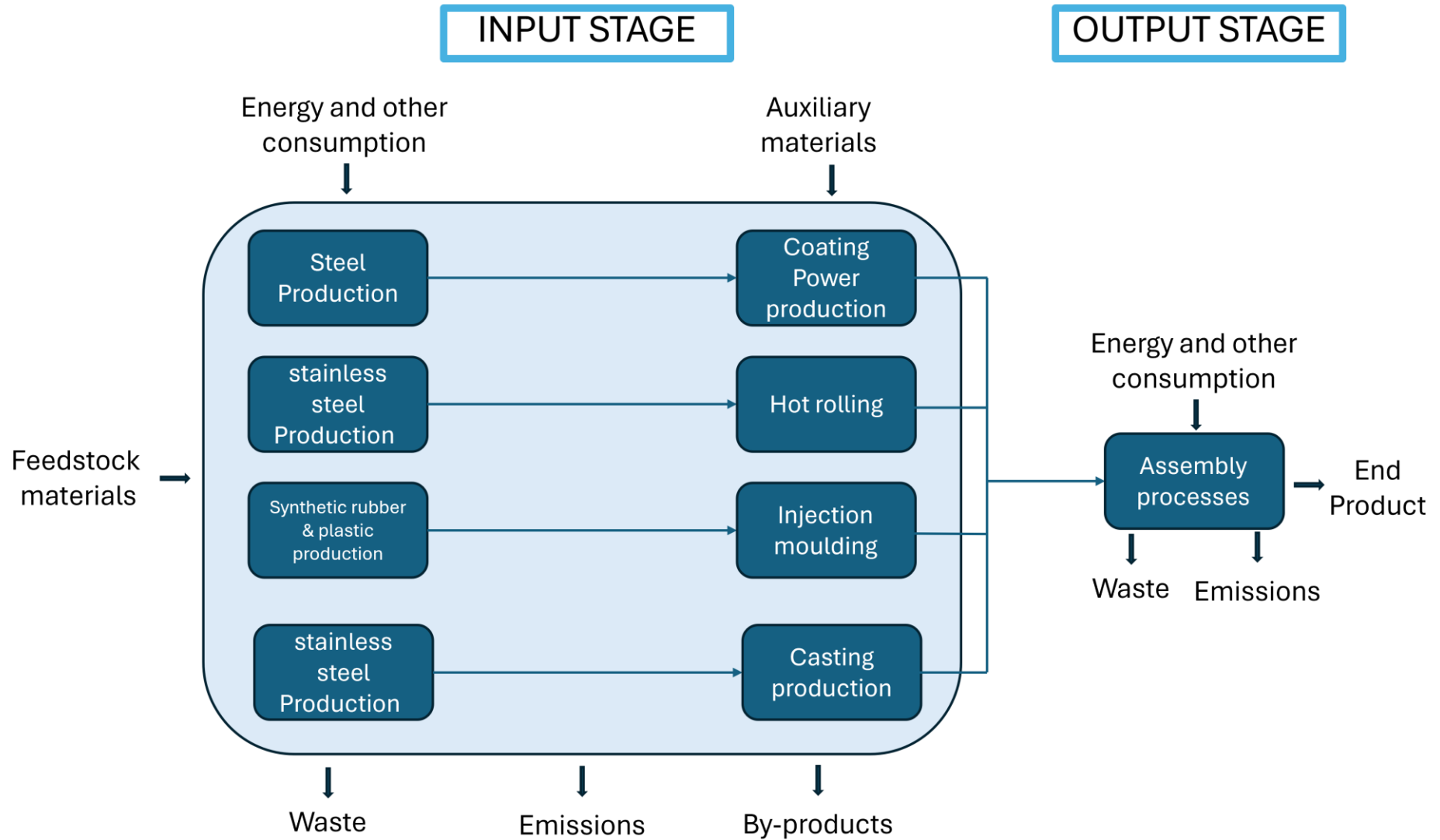
The HYMAX coupling product family service life expectancy is at least as the pipe service life. The product's function does not involve the consumption of resources, the release of effluents or emissions, or the generation of waste. No maintenance, repair, replacement, or refurbishment is needed throughout its service life. Furthermore, the product does not require energy or water during its usage phase. For these reasons The use phase is not relevant to the life cycle emissions of this product and is therefore not accounted for in the assessment.

Air, soil, and water impacts during the use phase have not been studied.

### **PRODUCT END OF LIFE (C1-C4, D)**

The product is considered to be dismantled manually, so no energy use is included. It is assumed that the waste is collected separately and transported to the waste treatment facility. Transportation distance to waste treatment plant is assumed to be 100km and the transportation method is assumed to be lorry (C2). Module C3 accounts for energy and resource inputs for sorting and treating of steel and plastic materials for recycling and incineration with energy recovery with efficiency greater than 60%. Additionally, waste that is incinerated without energy recovery or landfilled is included in Module C4. Due to the material and energy recovery potential of parts in the product and in packaging, recycled raw materials lead to avoided virgin material production and the energy recovered from incineration replaces electricity and heat from primary sources. Benefits and loads from incineration and recycling are included in Module D.

# MANUFACTURING PROCESS





## LIFE-CYCLE ASSESSMENT

### CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

### ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	No allocation
Packaging material	Not applicable
Ancillary materials	Not applicable
Manufacturing energy and waste	Allocated by mass or volume

### AVERAGES AND VARIABILITY

Type of average	Multiple products
Averaging method	Representative product
Variation in GWP-fossil for A1-A3	50/-50 %

The product studied in this EPD represent the average for the HYMAX2 products range in the diameter from DN40 up to DN300 and HYMAX DISMANTLING JOINT DN88 up to DN600 . The variation of weight is in the range 2 kg – 173kg.

### LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.8, Plastics Europe, Federal LCA Commons and One Click LCA databases as sources of environmental data.

# ENVIRONMENTAL IMPACT DATA

## CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total <sup>1)</sup>	kg CO <sub>2</sub> e	4,08E+00	1,69E-01	1,22E+00	5,47E+00	0,00E+00	4,17E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,86E-02	1,59E-01	4,38E-02	-5,19E+00
GWP – fossil	kg CO <sub>2</sub> e	4,08E+00	1,69E-01	5,26E+00	9,51E+00	0,00E+00	9,99E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,86E-02	1,59E-01	4,38E-02	-1,09E+00
GWP – biogenic	kg CO <sub>2</sub> e	0,00E+00	0,00E+00	-4,06E+00	-4,06E+00	0,00E+00	4,07E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-4,09E+00
GWP – LULUC	kg CO <sub>2</sub> e	3,39E-03	1,03E-04	1,13E-02	1,48E-02	0,00E+00	8,63E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,57E-05	2,60E-05	1,57E-06	-1,32E-03
Ozone depletion pot.	kg CFC-11e	2,94E-07	3,52E-08	2,43E-07	5,72E-07	0,00E+00	6,84E-09	MND	MND	MND	MND	MND	MND	MND	0,00E+00	8,51E-09	2,37E-09	5,16E-10	-1,06E-07
Acidification potential	mol H <sup>+</sup> e	2,01E-02	3,92E-03	2,78E-02	5,18E-02	0,00E+00	3,26E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,60E-04	2,40E-04	1,92E-05	-1,35E-02
EP-freshwater <sup>2)</sup>	kg Pe	1,77E-04	8,57E-07	2,64E-04	4,42E-04	0,00E+00	2,30E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,26E-07	9,63E-07	4,79E-08	-1,86E-05
EP-marine	kg Ne	3,51E-03	9,76E-04	5,42E-03	9,91E-03	0,00E+00	7,16E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,66E-05	5,97E-05	1,39E-05	-4,81E-03
EP-terrestrial	mol Ne	3,88E-02	1,08E-02	5,96E-02	1,09E-01	0,00E+00	7,90E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	5,14E-04	6,68E-04	7,96E-05	-6,06E-02
POCP (“smog”) <sup>3)</sup>	kg NMVOCe	1,55E-02	2,85E-03	1,71E-02	3,54E-02	0,00E+00	2,25E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,57E-04	1,80E-04	2,26E-05	-1,68E-02
ADP-minerals & metals <sup>4)</sup>	kg Sbe	5,67E-05	2,89E-07	1,28E-05	6,98E-05	0,00E+00	1,64E-07	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,34E-07	2,14E-06	6,90E-09	-2,06E-05
ADP-fossil resources	MJ	5,57E+01	2,25E+00	7,02E+01	1,28E+02	0,00E+00	8,95E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	5,59E-01	2,57E-01	3,80E-02	-1,24E+01
Water use <sup>5)</sup>	m <sup>3</sup> e depr.	1,78E+00	7,93E-03	1,76E+00	3,55E+00	0,00E+00	1,26E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,45E-03	1,04E-02	1,47E-03	6,29E-02

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO<sub>4</sub>e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

### ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	2,80E-07	9,82E-09	2,99E-07	5,89E-07	0,00E+00	4,33E-09	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,29E-09	3,06E-09	2,78E-10	-5,26E-07
Ionizing radiation <sup>6)</sup>	kBq 11235e	3,65E-01	1,05E-02	6,92E-01	1,07E+00	0,00E+00	6,02E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,60E-03	2,66E-03	1,69E-04	-1,16E-02
Ecotoxicity (freshwater)	CTUe	1,49E+02	1,65E+00	1,05E+02	2,56E+02	0,00E+00	1,40E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	5,15E-01	1,30E+00	1,10E-01	-1,12E+02
Human toxicity, cancer	CTUh	2,88E-08	8,65E-11	7,62E-09	3,66E-08	0,00E+00	3,06E-11	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,45E-11	5,13E-11	4,05E-12	5,10E-09
Human tox. non-cancer	CTUh	8,18E-08	1,31E-09	5,83E-08	1,41E-07	0,00E+00	8,04E-10	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,79E-10	1,84E-09	1,34E-10	-8,57E-09
SQP <sup>7)</sup>	-	1,63E+01	1,13E+00	5,24E+02	5,41E+02	0,00E+00	3,40E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,87E-01	4,74E-01	7,28E-02	-6,34E+02

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. 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; 7) SQP = Land use related impacts/soil quality.

### USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy <sup>8)</sup>	MJ	5,79E+00	1,91E-02	4,19E+01	4,77E+01	0,00E+00	6,14E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,55E-03	4,08E-02	6,93E-04	-2,25E+01
Renew. PER as material	MJ	0,00E+00	0,00E+00	3,57E+01	3,57E+01	0,00E+00	-3,57E+01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	5,79E+00	1,91E-02	7,76E+01	8,34E+01	0,00E+00	-3,56E+01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,55E-03	4,08E-02	6,93E-04	-2,25E+01
Non-re. PER as energy	MJ	5,15E+01	2,25E+00	6,74E+01	1,21E+02	0,00E+00	8,95E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	5,59E-01	2,57E-01	3,80E-02	-1,05E+01
Non-re. PER as material	MJ	4,19E+00	0,00E+00	2,55E+00	6,75E+00	0,00E+00	-2,75E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	-1,18E+00	-2,81E+00	3,93E+01
Total use of non-re. PER	MJ	5,57E+01	2,25E+00	7,00E+01	1,28E+02	0,00E+00	-1,86E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	5,59E-01	-9,23E-01	-2,77E+00	2,88E+01
Secondary materials	kg	2,57E-01	8,83E-04	1,51E-01	4,09E-01	0,00E+00	3,28E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,84E-04	4,04E-04	1,52E-05	4,80E-01
Renew. secondary fuels	MJ	4,76E-03	4,12E-06	9,32E-01	9,37E-01	0,00E+00	1,99E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,38E-06	1,41E-05	4,74E-07	6,17E-04
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m <sup>3</sup>	4,57E-02	1,98E-04	4,57E-02	9,16E-02	0,00E+00	3,03E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,60E-05	3,48E-04	8,27E-05	-2,34E-02

8) PER = Primary energy resources.

### END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	1,62E+00	3,05E-03	4,35E-01	2,06E+00	0,00E+00	4,66E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	8,04E-04	1,91E-03	1,77E-03	-3,99E-01
Non-hazardous waste	kg	8,28E+00	3,39E-02	1,07E+01	1,90E+01	0,00E+00	1,06E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,29E-02	1,10E-01	1,92E-01	1,16E+00
Radioactive waste	kg	1,56E-04	1,56E-05	2,14E-04	3,85E-04	0,00E+00	3,63E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,69E-06	1,33E-06	0,00E+00	-2,40E-05

### END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	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	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	4,16E-02	4,16E-02	0,00E+00	3,93E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	7,52E-01	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,81E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,10E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	1,08E+00	0,00E+00	0,00E+00

### ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO <sub>2</sub> e	3,99E+00	1,67E-01	5,15E+00	9,31E+00	0,00E+00	9,95E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,82E-02	1,58E-01	4,26E-02	-1,03E+00
Ozone depletion Pot.	kg CFC <sub>11</sub> e	2,63E-07	2,79E-08	2,02E-07	4,93E-07	0,00E+00	5,47E-09	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,74E-09	1,95E-09	4,17E-10	-1,11E-07
Acidification	kg SO <sub>2</sub> e	1,67E-02	3,13E-03	2,29E-02	4,27E-02	0,00E+00	2,65E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,25E-04	1,91E-04	1,42E-05	-9,73E-03
Eutrophication	kg PO <sub>4</sub> <sup>3</sup> e	7,69E-03	3,70E-04	9,99E-03	1,81E-02	0,00E+00	1,03E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,86E-05	9,37E-05	3,55E-04	-3,13E-03
POCP (“smog”)	kg C <sub>2</sub> H <sub>4</sub> e	1,43E-03	8,29E-05	1,17E-03	2,68E-03	0,00E+00	1,13E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	5,06E-06	7,26E-06	1,27E-06	-1,03E-03
ADP-elements	kg Sbe	5,62E-05	2,82E-07	1,26E-05	6,91E-05	0,00E+00	1,61E-07	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,31E-07	2,14E-06	6,05E-09	-2,05E-05
ADP-fossil	MJ	5,56E+01	2,25E+00	7,01E+01	1,28E+02	0,00E+00	8,95E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	5,59E-01	2,57E-01	3,80E-02	-1,24E+01

## VERIFICATION STATEMENT

### VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with reference standard, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The digital background data for this EPD

Why does verification transparency matter? Read more online

This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

### THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the EPD, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14025:2010 and reference standard.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

Lucas Pedro Berman, as an authorized verifier acting for EPD Hub Limited  
15.02.2025

