



Issuance date: 14.11.2024
Validation: 18.03.2025
Validity date: 14.11.2029



Water supply, sewage, industrial, gas and fire protection fittings



Owner of the EPD:

Fabryka Armatur JAFAR S.A.
Address: ul. Kadyiego 12
38-200 Jasło, Poland
Tel.: +48 13 44 290 41
Website: <https://www.jafar.com.pl/>
Contact: jafar@jafar.com.pl

EPD Program Operator:

Instytut Techniki Budowlanej (ITB)
Address: Filtrowa 1,
00-611 Warsaw, Poland
Website: www.itb.pl
Contact: energia@itb.pl

ITB is the verified member of The European Platform for EPD program operators and LCA practitioner www.eco-platform.org

Basic information

This declaration is the Type III Environmental Product Declaration (EPD) based on EN 15804+A2 and verified according to ISO 14025 by an external auditor. It contains the information on the impacts of the declared construction materials on the environment and their aspects verified by the independent body according to ISO 14025. Basically, comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804+A2.

Life cycle analysis (LCA): A1-A3, C1-C4 and D modules in accordance with EN 15804+A2
(Cradle-to-Gate with options)

Product standards: PN-EN 1074-1 to PN-EN 1074-5, PN-EN 1171:2015-12

The year of preparing the EPD: 2025

Service Life: 50 years for standard product

PCR: ITB-PCR A

Declared unit: 1 kg

Reasons for performing LCA: B2B

Representativeness: Poland, European, 2023

MANUFACTURER



Figure 1 Street view of Fabryka Armatur JAFAR S.A.

Fabryka Armatur JAFAR S.A. is located in south east region of Poland. It was set up in 1953 as a local metallic plant. Jafar has been modernising its facilities for over a decade, continuing to invest in state-of-the-art equipment for iron machining iron, water cutting and welding. Currently, most of the production takes place in two plants located in Skołyszyn and Przysieki. The company has come a long way from the pre-war metal workshop, through state-owned mass production plant, to the modern enterprise of today, based on employee share ownership, coupled with the courage, knowledge, shared passion and ambition of the owners and employees. At the moment, Jafar is one of few companies in this industry to design and, most of all, manufacture its main products in its own foundries and production plants located in Poland. Jafar today has one of the most modern medium-sized iron foundries in Europe, as well as being an undisputed leader in the production and sales of iron fittings for clean water, foul water and gas in Poland.

Jafar manufactures and sells over 400,000 products per year. The most recognizable Jafar products are gate valves, valves, hydrants and butterfly valves. The most important export markets are: Germany, France, Italy, Egypt and Romania. According to the feedback provided by our customers, some of these products are re-exported to countries in the Persian Gulf and Central Asia.

As far as export markets are concerned, Jafar operates both via a network of distributors and through its subsidiaries in Romania, Slovakia, Ukraine, Germany and Hungary. One of the assumptions in the company's development policy is its further expansion in Europe and in the MENA region.

Jafar is a company with a strong sense of attachment to its region and its social responsibility.

PRODUCTS DESCRIPTION AND APPLICATION

Most products undergo a full production cycle, which allows us to ensure good quality starting from design and implementation (design and construction studio and model shop), through production (foundry of grey and ductile iron, mechanical department and powder coating shop), inspection (control laboratory), to delivery of products, as well as their servicing in the future. Jafar's activities have been certified as follows:

ISO 9001 : 2015, ISO 14001 : 2015, ISO 45001:2018, ISO 50001: 2018, CE certificates, hydrant acceptance certificates from CNBOP, hygiene certificates from PZH, quality and test certificates 3.1, as well as GSK, MARK NF, ACS, GOST and WRAS certificates.

The manufactured water, sewage, industrial and gas fittings are divided into 8 product groups, which are described in Table 1.

Type III Environmental Product Declaration No. 687/2024

Table 1. Descriptions of product groups manufactured by Fabryka Armatur JAFAR S.A.

Opis	Wymiar	Coating
GROUP 1000	-	Coating based on epoxy resin 80%/
		Material 20%
1300/1350 Anti-pollution valve	DN50- DN100	Coating based on epoxy resin
1800/1850 Water meter well KAJMA	DN400	Material
GROUP 2000	DN32-DN1200	Coating based on epoxy resin 99,7%
		Polyvinyl coating 0,3%
2002/2111/2112/2302/2311/2902/2911/2003/2112/2316/2502/2511/2531/2532/2700 Soft-sealed flanged gate valve	DN32-DN1000	Coating based on epoxy resin
2120/2121/2312/2123 –gate valve with PE nozzle	DN50-DN300	Coating based on epoxy resin
2005/2006/2905/2907 Knife gate valve	DN50-DN1000	Coating based on epoxy resin
2110/2910 Ring gate valve	DN40-DN300	Polyvinyl coating
GROUP 3000	DN20-DN50	Coating based on epoxy resin 98%
		Stainless steel 2%
3050/3100/3150/3160 - connetcors	DN50/DZ-63DZ738	Coating based on epoxy resin
3116/3126/3216/3217/3218/3136/3500/3510 Connection valves	DN20-DN50	Coating based on epoxy resin
3250 Drill-valve valve	DZ63-DZ225	Coating based on epoxy resin
3300 Mounting band	DN80-DN800	Stainless steel
GROUP 4000		Coating based on epoxy resin 90%
		Polyvinyl coating 10%
4493/4496/4497/4499 Butterfly valve	DN200-DN1200	Coating based on epoxy resin 90%
		Polyvinyl coating 10%
GROUP 6000		Coating based on epoxy resin 100%
6516/6526/6616/6626 ball valve	DN50-DN500	Coating based on epoxy resin
GROUP 7000		Coating based on epoxy resin 93%
		Stainless steel 7 %
7010/7040/7050 valve for air venting - cast iron	DN50-DN200	Coating based on epoxy resin
7020/7025/7080/7090 valve for air venting steel	DN50-DN200	Coating based on epoxy resin 70 %
7091 flushing and cleaning set	515mmx2000mm	Stainless steel 30%
		Coating based on epoxy resin 50 %
		Stainless steel 50%
7110/7310/7320 Strainer	DN50-DN300	Coating based on epoxy resin
GROUP 8000		Coating based on epoxy resin 92%
		Stainless steel 8 %
8001- street hydrant	DN50	Coating based on epoxy resin 20%
		Stainless steel 80%
8003/8004/8005/8007/8855/8856 – above-ground hydrant	DN80-DN150	Coating based on epoxy resin 91%
		Stainless steel 9%
8050 – high-capacity collector	DN300	Coating based on epoxy resin
8700/8705/8780/8785– above-ground hydrant	DN80-DN150	Coating based on epoxy resin
8850/8851/8852/8853/ – underground hydrant	DN80	Coating based on epoxy resin 95%

Type III Environmental Product Declaration No. 687/2024

		Stainless steel 5%
8890 – inspection connector	DN50-DN600	Coating based on epoxy resin
8895 – pipeline flushing fittings	DN50-DN80	Coating based on epoxy resin 40%
		Stainless steel 60%
GROUP 9000		Coating based on epoxy resin 76%
		Polyvinyl coating 7%
		Stainless steel 0,2%
		Material 16,8%
9102/9103/9104/9122//9123/9144/9151/9152/9163/9232/9311 -Connectors	DN50-DN800	Coating based on epoxy resin
9201/9202/9203/9204/9205/9206/9207/9208/9209/9210/9212/9216/9217/9218/9221	DN50-DN600	Coating based on epoxy resin
9113/9114 – Stand	935 mm/ 685mm	Stainless steel
9501/9502/9503/ 9504/ 9505/ 9506/ 9507/ 9508/ 9509/ 9514/ – street box	DFi270xH270/Dfi420xH310/ Dfi200xH250	Polyvinyl coating 29%
		Material 71%
9610/9611/9612 – supports	DFi200xH250mm	Stainless steel 40%
		Material 60%

All additional technical information about the product is available on the [manufacturer's website](#).

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Unit

The declared unit is 1 kg of product (groups as in Table 1). The conversion from kilogram to a specific product can be done by multiplying the result by the weight of the product.

System boundary

The life cycle analysis (LCA) of the declared products covers: product stage – modules A1-A4, end of life – modules C1-C4 and benefits and loads beyond the system boundary – module D (cradle-to-gate with options) in accordance with EN 15804+A2 and ITB PCRA. Energy and water consumption, emissions as well as information on generated wastes were inventoried and were included in the calculations. It can be assumed that the total sum of omitted processes does not exceed 5% of all impact categories. In accordance with EN 15804+A2, machines and facilities (capital goods) required for the production as well as transportation of employees were not included in LCA.

Allocation

The allocation rules used for this EPD are based on general ITB PCRA. Production of the Water supply, sewage, industrial and gas fittings is a line process conducted in two factories of JAFAR S.A. located in Skołyszyn and Przysieki in Poland. Allocation was done on product mass basis. All impacts associated with the extraction and processing of raw materials used for the production of the declared product are allocated in module A1 of the LCA. Impacts from the global line production of JAFAR S.A. were inventoried and 5% were allocated to Water supply, sewage, industrial and gas fittings production. Water and energy consumption (electrical grid, natural gas, fuel oil and LPG), associated emissions and generated wastes are allocated to module A3. Packaging materials were taken into consideration.

System limits

Minimum 99.0% input materials and 100% energy consumption (electricity, gas, LPG, other) were inventoried in a processing plant and were included in the calculation. In the assessment, all available data from production have been considered, i.e. all raw materials/elements used as per formulation process, utilized thermal energy for heating, and electric power consumption. Thus, material and energy flows contributing less than 1 % of mass or energy have been considered. It can be assumed that the total sum of neglected processes does not exceed 1 % of energy usage and mass per modules A or D. Machines and facilities required during production are neglected. The packaging products (pallets, foil, spacers, plastic tapes etc.) are included.

Modules A1 and A2: Raw materials supply and transport

Modules A1 and A2 present the extraction and processing of raw materials (mainly cast iron and brax) and transportation to the production site. Brax, steel, polymers, powder coatings, and others are commonly used raw materials for the production of water, sewage, industrial and gas fittings. The raw materials used come from both local and foreign suppliers. Module A2 (transport) covers truck transport and uses Polish and European averages for fuel data.

Module A3: Production

The production of the Water supply, sewage, industrial and gas fittings is carried out in Polish factories of JAFAR S.A. in Skołyszyn and Przysieki. The block diagram of the production process is shown in Figure 2.

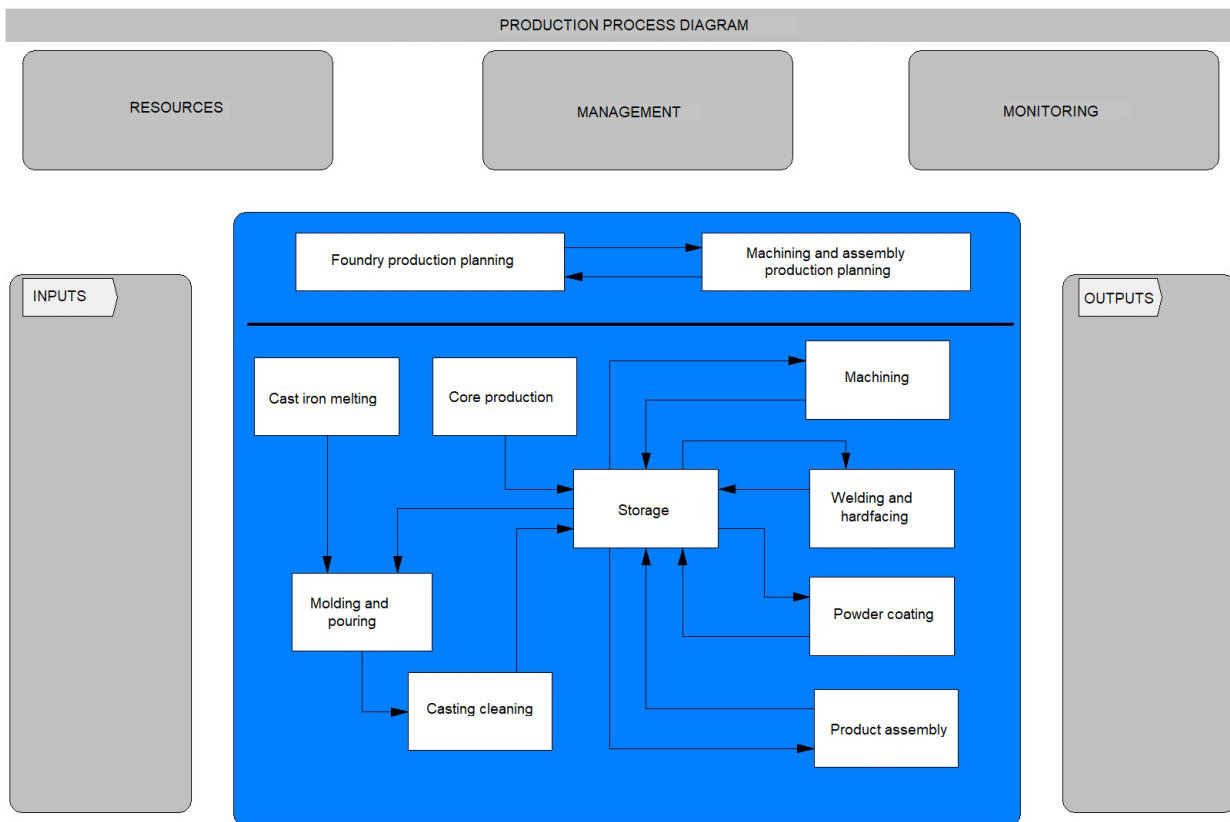


Figure 2. Diagram of the manufacturing process of Water supply, sewage, industrial and gas fittings

Module A4: Transport to consumer

Transport of the Water supply, sewage, industrial and gas fittings from plant to the construction site is carried out using trucks. Vehicle transport at distance 100 km is considered (emission standard: Euro 5) with 100% load capacity.

Modules C and D: End-of-life (EoL)

In the adapted end-of-life scenario, the fittings are disposed of using appropriate tools, the environmental impact of which can be considered as low (<1%), and then transported to a steel mill 100 km away on a >16 kg EURO 5 truck, where they are used as cast iron scrap for the production of new cast iron. The external plastic and epoxy resin coatings are separated using electrical tools (module C3) and disposed of in landfills. The recycling potential of cast iron and alloys elements in module C3 is 80% and it is assumed that 20% of the products will end up in landfill – module C4 (table 2). Module D shows the credits resulting from the recycling of cast iron scrap (used for the production of cast iron), calculated according to the approach developed by the World Steel Association.

Table 2. End-of-life scenario for a Water supply, sewage, industrial and gas fittings

Material	Material recovery	Recycling	Landfilling
Cast iron and metal scrap	100%	80%	20%
polymers	100%	0%	100%

Data collection period

The data for manufacture of the declared products refer to period between 01.01.2023 – 31.12.2023 (1 year). The life cycle assessments were prepared for Poland and Europe as reference area.

Data quality

The data selected for LCA originate from ITB-LCI questionnaires completed by JAFAR S.A. and verified during data audit. No data collected is older than five years and no generic datasets used are older than ten years. The representativeness, completeness, reliability, and consistency is judged as good. The background data for the processes come from the following resources database Ecoinvent v.3.10 and specific suppliers (EPDs). Specific (LCI) data quality analysis was a part of the input data verification.

Assumptions and estimates

The impacts of the representative products were aggregated using weighted average.

Calculation rules

LCA was performed using ITB-LCA tool developed in accordance with EN15804+A2. Emission of greenhouse gases was calculated using the IPCC 2013 GWP method with a 100-year horizon. Emission of acidifying substances, Emission of substances to water contributing to oxygen depletion, Emission of gases that contribute to the creation of ground-level ozone, Abiotic depletion, and ozone depletion emissions where all calculated with the CML-IA baseline method.

Additional information

Polish electricity (Ecoinvent v 3.10 supplemented by actual national KOBIZE data) emission factor used is 0.685 kg CO₂/kWh (National for 2023). As a general rule, no particular environmental or health protection measures other than those specified by law are necessary.

LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The declaration refers to declared unit (DU) – 1 kg of Water supply, sewage, industrial and gas fittings produced in Poland. The following life cycle modules (Table 3) were included in the analysis. The following tables 4-35 show the environmental impacts of the life cycle of selected modules (A1-A3+C1-C4+D).

Table 3 System boundaries for the environmental characteristic of the product.

Environmental assessment information (MD – Module Declared, MND – Module Not Declared, INA – Indicator Not Assessed)																
Product stage			Construction process		Use stage							End of life				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport to construction site	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction 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
MD	MD	MD	MD	MND	MND	MND	MND	MND	MND	MND	MND	MD	MD	MD	MD	MD

Type III Environmental Product Declaration No. 687/2024

Table 4 Life cycle assessment (LCA) results of a product from group 1000 – environmental impacts (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO ₂	2.48E+00	1.31E-01	1.01E+00	3.62E+00	8.34E-02	6.85E-03	2.21E-02	6.39E-02	1.06E-03	-3.09E-01
Greenhouse potential - fossil	eq. kg CO ₂	2.48E+00	1.31E-01	1.01E+00	3.62E+00	8.31E-02	6.85E-03	2.20E-02	6.38E-02	1.05E-03	-3.15E-01
Greenhouse potential - biogenic	eq. kg CO ₂	-9.42E-03	8.53E-05	3.11E-03	-6.23E-03	2.84E-04	1.85E-05	7.52E-05	1.33E-05	2.68E-06	-5.90E-03
Global warming potential - land use and land use change	eq. kg CO ₂	9.68E-03	4.29E-05	1.39E-04	9.86E-03	3.26E-05	1.07E-06	8.64E-06	1.01E-05	9.94E-07	-2.49E-04
Stratospheric ozone depletion potential	eq. kg CFC 11	1.68E-08	2.60E-09	1.55E-08	3.49E-08	1.92E-08	3.77E-11	5.09E-09	7.80E-01	4.26E-10	-3.14E-08
Soil and water acidification potential	eq. mol H ⁺	5.95E-02	4.10E-04	1.01E-02	7.00E-02	3.37E-04	7.25E-05	8.93E-05	5.32E-04	9.90E-06	-1.60E-04
Eutrophication potential - freshwater	eq. kg P	4.70E-03	8.74E-06	1.60E-03	6.31E-03	5.59E-06	1.18E-05	1.48E-06	4.32E-07	9.81E-08	-2.39E-04
Eutrophication potential - seawater	eq. kg N	4.39E-03	1.38E-04	1.45E-03	5.98E-03	1.02E-04	1.03E-05	2.70E-05	1.81E-03	3.45E-06	-1.56E-04
Eutrophication potential - terrestrial	eq. mol N	4.06E-02	1.50E-03	1.28E-02	5.49E-02	1.11E-03	8.95E-05	2.94E-04	3.42E-03	3.77E-05	-2.52E-03
Potential for photochemical ozone synthesis	eq. kg NMVOC	1.64E-02	6.42E-04	3.70E-03	2.07E-02	3.40E-04	2.57E-05	9.01E-05	7.46E-04	1.10E-05	-2.92E-03
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	7.26E-04	4.28E-07	6.26E-07	7.27E-04	2.95E-07	2.58E-09	7.80E-08	1.45E-08	2.42E-09	-5.04E-06
Abiotic depletion potential - fossil fuels	MJ	2.85E+01	1.84E+00	1.78E+01	4.81E+01	1.23E+00	1.08E-01	3.27E-01	6.05E-02	2.89E-02	-4.11E+00
Water deprivation potential	eq. m ³	9.74E-01	8.89E-03	2.88E-01	1.27E+00	5.70E-03	2.07E-03	1.51E-03	1.42E-03	9.16E-05	-7.64E-01

Table 5 Life cycle assessment (LCA) results of a product from group 1000 – additional impacts indicators (DU: 1 kg)

Indicator	Unit	A1-A4	C1-C4	D
Particulate matter	disease incidence	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA

Type III Environmental Product Declaration No. 687/2024

Table 6 Life cycle assessment (LCA) results of the a product from group 1000 - the resource use (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	3.33E+00	3.12E-02	2.81E+00	6.17E+00	1.77E-02	8.90E-03	4.69E-03	1.11E-03	2.51E-04	-1.29E+00
Consumption of renewable primary energy resources used as raw materials	MJ	5.62E-02	0.00E+00	0.00E+00	5.62E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of renewable primary energy resources	MJ	3.39E+00	3.12E-02	2.81E+00	6.23E+00	1.77E-02	8.90E-03	4.69E-03	1.11E-03	2.51E-04	-1.29E+00
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	2.84E+01	1.84E+00	1.54E+01	4.56E+01	1.23E+00	1.08E-01	3.27E-01	-2.95E+00	2.89E-02	-4.12E+00
Consumption of non-renewable primary energy resources used as raw materials	MJ	5.68E+00	0.00E+00	2.40E+00	8.07E+00	0.00E+00	0.00E+00	0.00E+00	3.01E+00	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	3.41E+01	1.84E+00	1.78E+01	5.37E+01	1.23E+00	1.08E-01	3.27E-01	6.06E-02	2.89E-02	-4.12E+00
Consumption of secondary materials	kg	3.60E-01	8.42E-04	2.05E-03	3.63E-01	4.14E-04	9.40E-06	1.10E-04	2.74E-05	6.07E-06	-7.77E-01
Consumption of renew. secondary fuels	MJ	3.59E-04	1.06E-05	9.09E-06	3.79E-04	4.56E-06	4.75E-08	1.21E-06	3.72E-07	1.59E-07	-1.22E-04
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater	m ³	2.99E-02	2.44E-04	4.26E-02	7.28E-02	1.55E-04	3.11E-04	4.11E-05	5.36E-05	3.16E-05	-4.14E-03

Table 7 Life cycle assessment (LCA) results of a product from group 1000 – waste categories (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	5.51E-01	2.65E-03	1.71E-01	7.25E-01	1.38E-03	8.38E-04	3.67E-04	4.35E-09	3.07E-05	7.47E-02
Non-hazardous waste	kg	1.92E+01	5.60E-02	7.81E+00	2.70E+01	2.46E-02	5.65E-02	6.51E-03	1.14E-02	4.32E-04	-1.59E-01
Radioactive waste	kg	3.68E-05	5.86E-07	2.34E-06	3.97E-05	9.21E-08	1.62E-08	2.44E-08	3.23E-07	1.92E-07	-3.49E-05
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	1.91E-03	1.38E-05	2.41E-04	2.17E-03	3.82E-06	7.26E-07	1.01E-06	4.04E-07	5.78E-08	-1.98E-01
Materials for energy recovery	kg	5.92E-06	1.17E-07	2.01E-07	6.24E-06	3.09E-08	1.17E-09	8.18E-09	5.04E-09	6.85E-10	-5.38E-02
Exported Energy	MJ	3.31E-02	7.67E-04	1.15E-02	4.54E-02	0.00E+00	3.46E-04	0.00E+00	6.17E-02	0.00E+00	2.77E-03

Type III Environmental Product Declaration No. 687/2024

Table 8 Life cycle assessment (LCA) results of a product from group 2000 – environmental impacts (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO ₂	2.85E+00	1.31E-01	1.01E+00	3.99E+00	8.34E-02	6.85E-03	2.21E-02	6.39E-02	1.06E-03	-3.09E-01
Greenhouse potential - fossil	eq. kg CO ₂	2.85E+00	1.31E-01	1.01E+00	3.99E+00	8.31E-02	6.85E-03	2.20E-02	6.38E-02	1.05E-03	-3.15E-01
Greenhouse potential - biogenic	eq. kg CO ₂	-1.21E-02	8.53E-05	3.11E-03	-8.95E-03	2.84E-04	1.85E-05	7.52E-05	1.33E-05	2.68E-06	-5.90E-03
Global warming potential - land use and land use change	eq. kg CO ₂	1.67E-02	4.29E-05	1.39E-04	1.68E-02	3.26E-05	1.07E-06	8.64E-06	1.01E-05	9.94E-07	-2.49E-04
Stratospheric ozone depletion potential	eq. kg CFC 11	2.01E-08	2.60E-09	1.55E-08	3.82E-08	1.92E-08	3.77E-11	5.09E-09	7.80E-01	4.26E-10	-3.14E-08
Soil and water acidification potential	eq. mol H ⁺	7.20E-02	4.10E-04	1.01E-02	8.25E-02	3.37E-04	7.25E-05	8.93E-05	5.32E-04	9.90E-06	-1.60E-04
Eutrophication potential - freshwater	eq. kg P	5.68E-03	8.74E-06	1.60E-03	7.29E-03	5.59E-06	1.18E-05	1.48E-06	4.32E-07	9.81E-08	-2.39E-04
Eutrophication potential - seawater	eq. kg N	5.20E-03	1.38E-04	1.45E-03	6.80E-03	1.02E-04	1.03E-05	2.70E-05	1.81E-03	3.45E-06	-1.56E-04
Eutrophication potential - terrestrial	eq. mol N	4.96E-02	1.50E-03	1.28E-02	6.39E-02	1.11E-03	8.95E-05	2.94E-04	3.42E-03	3.77E-05	-2.52E-03
Potential for photochemical ozone synthesis	eq. kg NMVOC	1.95E-02	6.42E-04	3.70E-03	2.38E-02	3.40E-04	2.57E-05	9.01E-05	7.46E-04	1.10E-05	-2.92E-03
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	8.86E-04	4.28E-07	6.26E-07	8.87E-04	2.95E-07	2.58E-09	7.80E-08	1.45E-08	2.42E-09	-5.04E-06
Abiotic depletion potential - fossil fuels	MJ	3.32E+01	1.84E+00	1.78E+01	5.28E+01	1.23E+00	1.08E-01	3.27E-01	6.05E-02	2.89E-02	-4.11E+00
Water deprivation potential	eq. m ³	1.17E+00	8.89E-03	2.88E-01	1.46E+00	5.70E-03	2.07E-03	1.51E-03	1.42E-03	9.16E-05	-7.64E-01

Table 9 Life cycle assessment (LCA) results of a product from group 2000 – additional impacts indicators (DU: 1 kg)

Indicator	Unit	A1-A3	C1-C4	D
Particulate matter	disease incidence	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA

Type III Environmental Product Declaration No. 687/2024

Table 10 Life cycle assessment (LCA) results of the a product from group 2000 - the resource use (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	4.00E+00	3.12E-02	2.81E+00	6.84E+00	1.77E-02	8.90E-03	4.69E-03	1.11E-03	2.51E-04	-1.29E+00
Consumption of renewable primary energy resources used as raw materials	MJ	7.56E-02	0.00E+00	0.00E+00	7.56E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of renewable primary energy resources	MJ	4.07E+00	3.12E-02	2.81E+00	6.92E+00	1.77E-02	8.90E-03	4.69E-03	1.11E-03	2.51E-04	-1.29E+00
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	3.29E+01	1.84E+00	1.54E+01	5.01E+01	1.23E+00	1.08E-01	3.27E-01	-2.95E+00	2.89E-02	-4.12E+00
Consumption of non-renewable primary energy resources used as raw materials	MJ	7.08E+00	0.00E+00	2.40E+00	9.48E+00	0.00E+00	0.00E+00	0.00E+00	3.01E+00	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	3.99E+01	1.84E+00	1.78E+01	5.95E+01	1.23E+00	1.08E-01	3.27E-01	6.06E-02	2.89E-02	-4.12E+00
Consumption of secondary materials	kg	3.99E-01	8.42E-04	2.05E-03	4.02E-01	4.14E-04	9.40E-06	1.10E-04	2.74E-05	6.07E-06	-7.77E-01
Consumption of renew. secondary fuels	MJ	4.71E-04	1.06E-05	9.09E-06	4.91E-04	4.56E-06	4.75E-08	1.21E-06	3.72E-07	1.59E-07	-1.22E-04
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater	m ³	3.60E-02	2.44E-04	4.26E-02	7.88E-02	1.55E-04	3.11E-04	4.11E-05	5.36E-05	3.16E-05	-4.14E-03

Table 11 Life cycle assessment (LCA) results of a product from group 2000 – waste categories (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	6.39E-01	2.65E-03	1.71E-01	8.13E-01	1.38E-03	8.38E-04	3.67E-04	4.35E-09	3.07E-05	7.47E-02
Non-hazardous waste	kg	2.31E+01	5.60E-02	7.81E+00	3.10E+01	2.46E-02	5.65E-02	6.51E-03	1.14E-02	4.32E-04	-1.59E-01
Radioactive waste	kg	4.37E-05	5.86E-07	2.34E-06	4.67E-05	9.21E-08	1.62E-08	2.44E-08	3.23E-07	1.92E-07	-3.49E-05
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	2.30E-03	1.38E-05	2.41E-04	2.56E-03	3.82E-06	7.26E-07	1.01E-06	4.04E-07	5.78E-08	-1.98E-01
Materials for energy recovery	kg	7.14E-06	1.17E-07	2.01E-07	7.46E-06	3.09E-08	1.17E-09	8.18E-09	5.04E-09	6.85E-10	-5.38E-02
Exported Energy	MJ	4.13E-02	7.67E-04	1.15E-02	5.36E-02	0.00E+00	3.46E-04	0.00E+00	6.17E-02	0.00E+00	2.77E-03

Type III Environmental Product Declaration No. 687/2024

Table 12 Life cycle assessment (LCA) results of a product from group 3000 – environmental impacts (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO ₂	2.38E+00	1.31E-01	1.01E+00	3.52E+00	8.34E-02	6.85E-03	2.21E-02	6.39E-02	1.06E-03	-3.09E-01
Greenhouse potential - fossil	eq. kg CO ₂	2.38E+00	1.31E-01	1.01E+00	3.52E+00	8.31E-02	6.85E-03	2.20E-02	6.38E-02	1.05E-03	-3.15E-01
Greenhouse potential - biogenic	eq. kg CO ₂	-1.43E-02	8.53E-05	3.11E-03	-1.11E-02	2.84E-04	1.85E-05	7.52E-05	1.33E-05	2.68E-06	-5.90E-03
Global warming potential - land use and land use change	eq. kg CO ₂	2.22E-02	4.29E-05	1.39E-04	2.24E-02	3.26E-05	1.07E-06	8.64E-06	1.01E-05	9.94E-07	-2.49E-04
Stratospheric ozone depletion potential	eq. kg CFC 11	1.61E-08	2.60E-09	1.55E-08	3.42E-08	1.92E-08	3.77E-11	5.09E-09	7.80E-01	4.26E-10	-3.14E-08
Soil and water acidification potential	eq. mol H ⁺	5.37E-02	4.10E-04	1.01E-02	6.42E-02	3.37E-04	7.25E-05	8.93E-05	5.32E-04	9.90E-06	-1.60E-04
Eutrophication potential - freshwater	eq. kg P	4.23E-03	8.74E-06	1.60E-03	5.84E-03	5.59E-06	1.18E-05	1.48E-06	4.32E-07	9.81E-08	-2.39E-04
Eutrophication potential - seawater	eq. kg N	4.09E-03	1.38E-04	1.45E-03	5.68E-03	1.02E-04	1.03E-05	2.70E-05	1.81E-03	3.45E-06	-1.56E-04
Eutrophication potential - terrestrial	eq. mol N	3.74E-02	1.50E-03	1.28E-02	5.16E-02	1.11E-03	8.95E-05	2.94E-04	3.42E-03	3.77E-05	-2.52E-03
Potential for photochemical ozone synthesis	eq. kg NMVOC	1.51E-02	6.42E-04	3.70E-03	1.95E-02	3.40E-04	2.57E-05	9.01E-05	7.46E-04	1.10E-05	-2.92E-03
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	6.44E-04	4.28E-07	6.26E-07	6.45E-04	2.95E-07	2.58E-09	7.80E-08	1.45E-08	2.42E-09	-5.04E-06
Abiotic depletion potential - fossil fuels	MJ	2.73E+01	1.84E+00	1.78E+01	4.69E+01	1.23E+00	1.08E-01	3.27E-01	6.05E-02	2.89E-02	-4.11E+00
Water deprivation potential	eq. m ³	8.95E-01	8.89E-03	2.88E-01	1.19E+00	5.70E-03	2.07E-03	1.51E-03	1.42E-03	9.16E-05	7.64E-01

Table 13 Life cycle assessment (LCA) results of a product from group 3000 – additional impacts indicators (DU: 1 kg)

Indicator	Unit	A1-A4	C1-C4	D
Particulate matter	disease incidence	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA

Type III Environmental Product Declaration No. 687/2024

Table 14 Life cycle assessment (LCA) results of the a product from group 3000 - the resource use (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	3.04E+00	3.12E-02	2.81E+00	5.88E+00	1.77E-02	8.90E-03	4.69E-03	1.11E-03	2.51E-04	-1.29E+00
Consumption of renewable primary energy resources used as raw materials	MJ	8.71E-02	0.00E+00	0.00E+00	8.71E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of renewable primary energy resources	MJ	3.13E+00	3.12E-02	2.81E+00	5.97E+00	1.77E-02	8.90E-03	4.69E-03	1.11E-03	2.51E-04	-1.29E+00
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	2.71E+01	1.84E+00	1.54E+01	4.43E+01	1.23E+00	1.08E-01	3.27E-01	-2.95E+00	2.89E-02	-4.12E+00
Consumption of non-renewable primary energy resources used as raw materials	MJ	5.08E+00	0.00E+00	2.40E+00	7.47E+00	0.00E+00	0.00E+00	0.00E+00	3.01E+00	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	3.22E+01	1.84E+00	1.78E+01	5.18E+01	1.23E+00	1.08E-01	3.27E-01	6.06E-02	2.89E-02	-4.12E+00
Consumption of secondary materials	kg	3.27E-01	8.42E-04	2.05E-03	3.30E-01	4.14E-04	9.40E-06	1.10E-04	2.74E-05	6.07E-06	-7.77E-01
Consumption of renew. secondary fuels	MJ	2.82E-04	1.06E-05	9.09E-06	3.02E-04	4.56E-06	4.75E-08	1.21E-06	3.72E-07	1.59E-07	-1.22E-04
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater	m ³	2.73E-02	2.44E-04	4.26E-02	7.02E-02	1.55E-04	3.11E-04	4.11E-05	5.36E-05	3.16E-05	-4.14E-03

Table 15 Life cycle assessment (LCA) results of a product from group 3000 – waste categories (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	5.12E-01	2.65E-03	1.71E-01	6.86E-01	1.38E-03	8.38E-04	3.67E-04	4.35E-09	3.07E-05	7.47E-02
Non-hazardous waste	kg	1.76E+01	5.60E-02	7.81E+00	2.54E+01	2.46E-02	5.65E-02	6.51E-03	1.14E-02	4.32E-04	-1.59E-01
Radioactive waste	kg	3.36E-05	5.86E-07	2.34E-06	3.65E-05	9.21E-08	1.62E-08	2.44E-08	3.23E-07	1.92E-07	-3.49E-05
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	1.72E-03	1.38E-05	2.41E-04	1.97E-03	3.82E-06	7.26E-07	1.01E-06	4.04E-07	5.78E-08	-1.98E-01
Materials for energy recovery	kg	5.34E-06	1.17E-07	2.01E-07	5.65E-06	3.09E-08	1.17E-09	8.18E-09	5.04E-09	6.85E-10	-5.38E-02
Exported Energy	MJ	3.78E-02	7.67E-04	1.15E-02	5.01E-02	0.00E+00	3.46E-04	0.00E+00	6.17E-02	0.00E+00	-2.77E-03

Type III Environmental Product Declaration No. 687/2024

Table 16 Life cycle assessment (LCA) results of a product from group 4000 – environmental impacts (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO ₂	2.00E+00	1.31E-01	1.01E+00	3.14E+00	8.34E-02	6.85E-03	2.21E-02	6.39E-02	1.06E-03	-3.09E-01
Greenhouse potential - fossil	eq. kg CO ₂	2.00E+00	1.31E-01	1.01E+00	3.14E+00	8.31E-02	6.85E-03	2.20E-02	6.38E-02	1.05E-03	-3.15E-01
Greenhouse potential - biogenic	eq. kg CO ₂	-1.83E-02	8.53E-05	3.11E-03	-1.51E-02	2.84E-04	1.85E-05	7.52E-05	1.33E-05	2.68E-06	-5.90E-03
Global warming potential - land use and land use change	eq. kg CO ₂	1.24E-02	4.29E-05	1.39E-04	1.26E-02	3.26E-05	1.07E-06	8.64E-06	1.01E-05	9.94E-07	-2.49E-04
Stratospheric ozone depletion potential	eq. kg CFC 11	1.12E-08	2.60E-09	1.55E-08	2.93E-08	1.92E-08	3.77E-11	5.09E-09	7.80E-01	4.26E-10	-3.14E-08
Soil and water acidification potential	eq. mol H ⁺	9.76E-03	4.10E-04	1.01E-02	2.03E-02	3.37E-04	7.25E-05	8.93E-05	5.32E-04	9.90E-06	-1.60E-04
Eutrophication potential - freshwater	eq. kg P	7.31E-04	8.74E-06	1.60E-03	2.34E-03	5.59E-06	1.18E-05	1.48E-06	4.32E-07	9.81E-08	-2.39E-04
Eutrophication potential - seawater	eq. kg N	1.94E-03	1.38E-04	1.45E-03	3.54E-03	1.02E-04	1.03E-05	2.70E-05	1.81E-03	3.45E-06	-1.56E-04
Eutrophication potential - terrestrial	eq. mol N	4.83E-03	1.50E-03	1.28E-02	1.91E-02	1.11E-03	8.95E-05	2.94E-04	3.42E-03	3.77E-05	-2.52E-03
Potential for photochemical ozone synthesis	eq. kg NMVOC	6.82E-03	6.42E-04	3.70E-03	1.12E-02	3.40E-04	2.57E-05	9.01E-05	7.46E-04	1.10E-05	-2.92E-03
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	2.18E-05	4.28E-07	6.26E-07	2.29E-05	2.95E-07	2.58E-09	7.80E-08	1.45E-08	2.42E-09	-5.04E-06
Abiotic depletion potential - fossil fuels	MJ	2.19E+01	1.84E+00	1.78E+01	4.15E+01	1.23E+00	1.08E-01	3.27E-01	6.05E-02	2.89E-02	-4.11E+00
Water deprivation potential	eq. m ³	3.78E-01	8.89E-03	2.88E-01	6.76E-01	5.70E-03	2.07E-03	1.51E-03	1.42E-03	9.16E-05	-7.64E-01

Table 17 Life cycle assessment (LCA) results of a product from group 4000 – additional impacts indicators (DU: 1 kg)

Indicator	Unit	A1-A4	C1-C4	D
Particulate matter	disease incidence	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA

Type III Environmental Product Declaration No. 687/2024

Table 18 Life cycle assessment (LCA) results of the a product from group 4000 - the resource use (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1,06E+00	3,12E-02	2,81E+00	3,90E+00	1,77E-02	8,90E-03	4,69E-03	1,11E-03	2,51E-04	-1,29E+00
Consumption of renewable primary energy resources used as raw materials	MJ	8,71E-02	0,00E+00	0,00E+00	8,71E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total consumption of renewable primary energy resources	MJ	1,14E+00	3,12E-02	2,81E+00	3,99E+00	1,77E-02	8,90E-03	4,69E-03	1,11E-03	2,51E-04	-1,29E+00
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	2,18E+01	1,84E+00	1,54E+01	3,90E+01	1,23E+00	1,08E-01	3,27E-01	-2,95E+00	2,89E-02	-4,12E+00
Consumption of non-renewable primary energy resources used as raw materials	MJ	2,68E-01	0,00E+00	2,40E+00	2,66E+00	0,00E+00	0,00E+00	0,00E+00	3,01E+00	0,00E+00	0,00E+00
Total consumption of non-renewable primary energy resources	MJ	2,21E+01	1,84E+00	1,78E+01	4,17E+01	1,23E+00	1,08E-01	3,27E-01	6,06E-02	2,89E-02	-4,12E+00
Consumption of secondary materials	kg	3,57E-01	8,42E-04	2,05E-03	3,60E-01	4,14E-04	9,40E-06	1,10E-04	2,74E-05	6,07E-06	-7,77E-01
Consumption of renew. secondary fuels	MJ	1,61E-04	1,06E-05	9,09E-06	1,81E-04	4,56E-06	4,75E-08	1,21E-06	3,72E-07	1,59E-07	-1,22E-04
Consumption of non-renewable secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net consumption of freshwater	m ³	9,67E-03	2,44E-04	4,26E-02	5,25E-02	1,55E-04	3,11E-04	4,11E-05	5,36E-05	3,16E-05	-4,14E-03

Table 19 Life cycle assessment (LCA) results of a product from group 4000 – waste categories (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	3,48E-01	2,65E-03	1,71E-01	5,22E-01	1,38E-03	8,38E-04	3,67E-04	4,35E-09	3,07E-05	-7,47E-02
Non-hazardous waste	kg	4,43E+00	5,60E-02	7,81E+00	1,23E+01	2,46E-02	5,65E-02	6,51E-03	1,14E-02	4,32E-04	-1,59E-01
Radioactive waste	kg	1,57E-05	5,86E-07	2,34E-06	1,87E-05	9,21E-08	1,62E-08	2,44E-08	3,23E-07	1,92E-07	-3,49E-05
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	3,91E-04	1,38E-05	2,41E-04	6,46E-04	3,82E-06	7,26E-07	1,01E-06	4,04E-07	5,78E-08	-1,98E-01
Materials for energy recovery	kg	1,37E-06	1,17E-07	2,01E-07	1,68E-06	3,09E-08	1,17E-09	8,18E-09	5,04E-09	6,85E-10	-5,38E-02
Exported Energy	MJ	2,86E-02	7,67E-04	1,15E-02	4,09E-02	0,00E+00	3,46E-04	0,00E+00	6,17E-02	0,00E+00	-2,77E-03

Type III Environmental Product Declaration No. 687/2024

Table 20 Life cycle assessment (LCA) results of a product from group 6000 – environmental impacts (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO ₂	1.97E+00	1.31E-01	1.01E+00	3.10E+00	8.34E-02	6.85E-03	2.21E-02	6.39E-02	1.06E-03	-3.09E-01
Greenhouse potential - fossil	eq. kg CO ₂	1.97E+00	1.31E-01	1.01E+00	3.11E+00	8.31E-02	6.85E-03	2.20E-02	6.38E-02	1.05E-03	-3.15E-01
Greenhouse potential - biogenic	eq. kg CO ₂	-1.09E-02	8.53E-05	3.11E-03	-7.67E-03	2.84E-04	1.85E-05	7.52E-05	1.33E-05	2.68E-06	-5.90E-03
Global warming potential - land use and land use change	eq. kg CO ₂	1.70E-02	4.29E-05	1.39E-04	1.72E-02	3.26E-05	1.07E-06	8.64E-06	1.01E-05	9.94E-07	-2.49E-04
Stratospheric ozone depletion potential	eq. kg CFC 11	6.00E-03	2.60E-09	1.55E-08	6.00E-03	1.92E-08	3.77E-11	5.09E-09	7.80E-01	4.26E-10	-3.14E-08
Soil and water acidification potential	eq. mol H ⁺	1.43E-02	4.10E-04	1.01E-02	2.48E-02	3.37E-04	7.25E-05	8.93E-05	5.32E-04	9.90E-06	-1.60E-04
Eutrophication potential - freshwater	eq. kg P	6.60E-03	8.74E-06	1.60E-03	8.21E-03	5.59E-06	1.18E-05	1.48E-06	4.32E-07	9.81E-08	-2.39E-04
Eutrophication potential - seawater	eq. kg N	7.85E-03	1.38E-04	1.45E-03	9.44E-03	1.02E-04	1.03E-05	2.70E-05	1.81E-03	3.45E-06	-1.56E-04
Eutrophication potential - terrestrial	eq. mol N	8.63E-03	1.50E-03	1.28E-02	2.29E-02	1.11E-03	8.95E-05	2.94E-04	3.42E-03	3.77E-05	-2.52E-03
Potential for photochemical ozone synthesis	eq. kg NMVOC	1.26E-02	6.42E-04	3.70E-03	1.69E-02	3.40E-04	2.57E-05	9.01E-05	7.46E-04	1.10E-05	-2.92E-03
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	6.00E-03	4.28E-07	6.26E-07	6.00E-03	2.95E-07	2.58E-09	7.80E-08	1.45E-08	2.42E-09	-5.04E-06
Abiotic depletion potential - fossil fuels	MJ	2.21E+01	1.84E+00	1.78E+01	4.17E+01	1.23E+00	1.08E-01	3.27E-01	6.05E-02	2.89E-02	-4.11E+00
Water deprivation potential	eq. m ³	3.92E-01	8.89E-03	2.88E-01	6.89E-01	5.70E-03	2.07E-03	1.51E-03	1.42E-03	9.16E-05	7.64E-01

Table 21 Life cycle assessment (LCA) results of a product from group 6000 – additional impacts indicators (DU: 1 kg)

Indicator	Unit	A1-A4	C1-C4	D
Particulate matter	disease incidence	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA

Type III Environmental Product Declaration No. 687/2024

Table 22 Life cycle assessment (LCA) results of the a product from group 6000 - the resource use (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.05E+00	3.12E-02	2.81E+00	3.89E+00	1.77E-02	8.90E-03	4.69E-03	1.11E-03	2.51E-04	-1.29E+00
Consumption of renewable primary energy resources used as raw materials	MJ	8.22E-02	0.00E+00	0.00E+00	8.22E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of renewable primary energy resources	MJ	1.12E+00	3.12E-02	2.81E+00	3.97E+00	1.77E-02	8.90E-03	4.69E-03	1.11E-03	2.51E-04	-1.29E+00
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	2.17E+01	1.84E+00	1.54E+01	3.89E+01	1.23E+00	1.08E-01	3.27E-01	-2.95E+00	2.89E-02	-4.12E+00
Consumption of non-renewable primary energy resources used as raw materials	MJ	4.37E-01	0.00E+00	2.40E+00	2.83E+00	0.00E+00	0.00E+00	0.00E+00	3.01E+00	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	2.21E+01	1.84E+00	1.78E+01	4.17E+01	1.23E+00	1.08E-01	3.27E-01	6.06E-02	2.89E-02	-4.12E+00
Consumption of secondary materials	kg	3.86E-01	8.42E-04	2.05E-03	3.89E-01	4.14E-04	9.40E-06	1.10E-04	2.74E-05	6.07E-06	-7.77E-01
Consumption of renew. secondary fuels	MJ	6.31E-03	1.06E-05	9.09E-06	6.33E-03	4.56E-06	4.75E-08	1.21E-06	3.72E-07	1.59E-07	1.22E-04
Consumption of non-renewable secondary fuels	MJ	6.00E-03	0.00E+00	0.00E+00	6.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater	m ³	1.56E-02	2.44E-04	4.26E-02	5.85E-02	1.55E-04	3.11E-04	4.11E-05	5.36E-05	3.16E-05	-4.14E-03

Table 23 Life cycle assessment (LCA) results of a product from group 6000 – waste categories (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	3,54E-01	2,65E-03	1,71E-01	5,28E-01	1,38E-03	8,38E-04	3,67E-04	4,35E-09	3,07E-05	7,47E-02
Non-hazardous waste	kg	3,90E+00	5,60E-02	7,81E+00	1,18E+01	2,46E-02	5,65E-02	6,51E-03	1,14E-02	4,32E-04	-1,59E-01
Radioactive waste	kg	6,02E-03	5,86E-07	2,34E-06	6,02E-03	9,21E-08	1,62E-08	2,44E-08	3,23E-07	1,92E-07	-3,49E-05
Components for re-use	kg	6,00E-03	0,00E+00	0,00E+00	6,00E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	6,36E-03	1,38E-05	2,41E-04	6,61E-03	3,82E-06	7,26E-07	1,01E-06	4,04E-07	5,78E-08	-1,98E-01
Materials for energy recovery	kg	6,00E-03	1,17E-07	2,01E-07	6,00E-03	3,09E-08	1,17E-09	8,18E-09	5,04E-09	6,85E-10	-5,38E-02
Exported Energy	MJ	3,28E-02	7,67E-04	1,15E-02	4,51E-02	0,00E+00	3,46E-04	0,00E+00	6,17E-02	0,00E+00	-2,77E-03

Type III Environmental Product Declaration No. 687/2024

Table 24 Life cycle assessment (LCA) results of a product from group 7000 – environmental impacts (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO ₂	1.87E+00	1.31E-01	1.01E+00	3.01E+00	8.34E-02	6.85E-03	2.21E-02	6.39E-02	1.06E-03	-3.09E-01
Greenhouse potential - fossil	eq. kg CO ₂	1.88E+00	1.31E-01	1.01E+00	3.01E+00	8.31E-02	6.85E-03	2.20E-02	6.38E-02	1.05E-03	-3.15E-01
Greenhouse potential - biogenic	eq. kg CO ₂	-2.53E-02	8.53E-05	3.11E-03	-2.21E-02	2.84E-04	1.85E-05	7.52E-05	1.33E-05	2.68E-06	-5.90E-03
Global warming potential - land use and land use change	eq. kg CO ₂	5.52E-02	4.29E-05	1.39E-04	5.54E-02	3.26E-05	1.07E-06	8.64E-06	1.01E-05	9.94E-07	-2.49E-04
Stratospheric ozone depletion potential	eq. kg CFC 11	1.19E-08	2.60E-09	1.55E-08	3.00E-08	1.92E-08	3.77E-11	5.09E-09	7.80E-01	4.26E-10	-3.14E-08
Soil and water acidification potential	eq. mol H ⁺	1.32E-02	4.10E-04	1.01E-02	2.37E-02	3.37E-04	7.25E-05	8.93E-05	5.32E-04	9.90E-06	-1.60E-04
Eutrophication potential - freshwater	eq. kg P	9.92E-04	8.74E-06	1.60E-03	2.60E-03	5.59E-06	1.18E-05	1.48E-06	4.32E-07	9.81E-08	-2.39E-04
Eutrophication potential - seawater	eq. kg N	2.01E-03	1.38E-04	1.45E-03	3.60E-03	1.02E-04	1.03E-05	2.70E-05	1.81E-03	3.45E-06	-1.56E-04
Eutrophication potential - terrestrial	eq. mol N	9.80E-03	1.50E-03	1.28E-02	2.41E-02	1.11E-03	8.95E-05	2.94E-04	3.42E-03	3.77E-05	-2.52E-03
Potential for photochemical ozone synthesis	eq. kg NMVOC	7.07E-03	6.42E-04	3.70E-03	1.14E-02	3.40E-04	2.57E-05	9.01E-05	7.46E-04	1.10E-05	-2.92E-03
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	7.43E-05	4.28E-07	6.26E-07	7.54E-05	2.95E-07	2.58E-09	7.80E-08	1.45E-08	2.42E-09	-5.04E-06
Abiotic depletion potential - fossil fuels	MJ	2.11E+01	1.84E+00	1.78E+01	4.07E+01	1.23E+00	1.08E-01	3.27E-01	6.05E-02	2.89E-02	-4.11E+00
Water deprivation potential	eq. m ³	3.94E-01	8.89E-03	2.88E-01	6.91E-01	5.70E-03	2.07E-03	1.51E-03	1.42E-03	9.16E-05	-7.64E-01

Table 25 Life cycle assessment (LCA) results of a product from group 7000 – additional impacts indicators (DU: 1 kg)

Indicator	Unit	A1-A3	C1-C4	D
Particulate matter	disease incidence	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTU _e	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTU _h	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTU _h	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA

Type III Environmental Product Declaration No. 687/2024

Table 26 Life cycle assessment (LCA) results of the a product from group 7000 - the resource use (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.15E+00	3.12E-02	2.81E+00	3.99E+00	1.77E-02	8.90E-03	4.69E-03	1.11E-03	2.51E-04	-1.29E+00
Consumption of renewable primary energy resources used as raw materials	MJ	1.39E-01	0.00E+00	0.00E+00	1.39E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of renewable primary energy resources	MJ	1.28E+00	3.12E-02	2.81E+00	4.13E+00	1.77E-02	8.90E-03	4.69E-03	1.11E-03	2.51E-04	-1.29E+00
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	2.06E+01	1.84E+00	1.54E+01	3.78E+01	1.23E+00	1.08E-01	3.27E-01	-2.95E+00	2.89E-02	-4.12E+00
Consumption of non-renewable primary energy resources used as raw materials	MJ	1.14E+00	0.00E+00	2.40E+00	3.53E+00	0.00E+00	0.00E+00	0.00E+00	3.01E+00	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	2.17E+01	1.84E+00	1.78E+01	4.13E+01	1.23E+00	1.08E-01	3.27E-01	6.06E-02	2.89E-02	-4.12E+00
Consumption of secondary materials	kg	2.64E-01	8.42E-04	2.05E-03	2.67E-01	4.14E-04	9.40E-06	1.10E-04	2.74E-05	6.07E-06	-7.77E-01
Consumption of renew. secondary fuels	MJ	1.30E-04	1.06E-05	9.09E-06	1.49E-04	4.56E-06	4.75E-08	1.21E-06	3.72E-07	1.59E-07	-1.22E-04
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater	m ³	1.05E-02	2.44E-04	4.26E-02	5.34E-02	1.55E-04	3.11E-04	4.11E-05	5.36E-05	3.16E-05	-4.14E-03

Table 27 Life cycle assessment (LCA) results of a product from group 7000 – waste categories (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	3.11E-01	2.65E-03	1.71E-01	4.85E-01	1.38E-03	8.38E-04	3.67E-04	4.35E-09	3.07E-05	7.47E-02
Non-hazardous waste	kg	5.68E+00	5.60E-02	7.81E+00	1.35E+01	2.46E-02	5.65E-02	6.51E-03	1.14E-02	4.32E-04	-1.59E-01
Radioactive waste	kg	1.54E-05	5.86E-07	2.34E-06	1.83E-05	9.21E-08	1.62E-08	2.44E-08	3.23E-07	1.92E-07	-3.49E-05
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	4.64E-04	1.38E-05	2.41E-04	7.19E-04	3.82E-06	7.26E-07	1.01E-06	4.04E-07	5.78E-08	-1.98E-01
Materials for energy recovery	kg	1.58E-06	1.17E-07	2.01E-07	1.90E-06	3.09E-08	1.17E-09	8.18E-09	5.04E-09	6.85E-10	-5.38E-02
Exported Energy	MJ	3.93E-02	7.67E-04	1.15E-02	5.16E-02	0.00E+00	3.46E-04	0.00E+00	6.17E-02	0.00E+00	-2.77E-03

Type III Environmental Product Declaration No. 687/2024

Table 28 Life cycle assessment (LCA) results of a product from group 8000 – environmental impacts (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO ₂	1.91E+00	1.31E-01	1.01E+00	3.05E+00	8.34E-02	6.85E-03	2.21E-02	6.39E-02	1.06E-03	-3.09E-01
Greenhouse potential - fossil	eq. kg CO ₂	1.91E+00	1.31E-01	1.01E+00	3.05E+00	8.31E-02	6.85E-03	2.20E-02	6.38E-02	1.05E-03	-3.15E-01
Greenhouse potential - biogenic	eq. kg CO ₂	-2.39E-02	8.53E-05	3.11E-03	-2.07E-02	2.84E-04	1.85E-05	7.52E-05	1.33E-05	2.68E-06	5.90E-03
Global warming potential - land use and land use change	eq. kg CO ₂	1.80E-02	4.29E-05	1.39E-04	1.81E-02	3.26E-05	1.07E-06	8.64E-06	1.01E-05	9.94E-07	-2.49E-04
Stratospheric ozone depletion potential	eq. kg CFC 11	1.12E-08	2.60E-09	1.55E-08	2.94E-08	1.92E-08	3.77E-11	5.09E-09	7.80E-01	4.26E-10	-3.14E-08
Soil and water acidification potential	eq. mol H ⁺	1.07E-02	4.10E-04	1.01E-02	2.12E-02	3.37E-04	7.25E-05	8.93E-05	5.32E-04	9.90E-06	-1.60E-04
Eutrophication potential - freshwater	eq. kg P	7.80E-04	8.74E-06	1.60E-03	2.39E-03	5.59E-06	1.18E-05	1.48E-06	4.32E-07	9.81E-08	-2.39E-04
Eutrophication potential - seawater	eq. kg N	1.94E-03	1.38E-04	1.45E-03	3.53E-03	1.02E-04	1.03E-05	2.70E-05	1.81E-03	3.45E-06	-1.56E-04
Eutrophication potential - terrestrial	eq. mol N	6.00E-03	1.50E-03	1.28E-02	2.03E-02	1.11E-03	8.95E-05	2.94E-04	3.42E-03	3.77E-05	-2.52E-03
Potential for photochemical ozone synthesis	eq. kg NMVOC	6.73E-03	6.42E-04	3.70E-03	1.11E-02	3.40E-04	2.57E-05	9.01E-05	7.46E-04	1.10E-05	-2.92E-03
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	3.53E-05	4.28E-07	6.26E-07	3.63E-05	2.95E-07	2.58E-09	7.80E-08	1.45E-08	2.42E-09	-5.04E-06
Abiotic depletion potential - fossil fuels	MJ	2.11E+01	1.84E+00	1.78E+01	4.07E+01	1.23E+00	1.08E-01	3.27E-01	6.05E-02	2.89E-02	-4.11E+00
Water deprivation potential	eq. m ³	3.88E-01	8.89E-03	2.88E-01	6.85E-01	5.70E-03	2.07E-03	1.51E-03	1.42E-03	9.16E-05	-7.64E-01

Table 29 Life cycle assessment (LCA) results of a product from group 8000 – additional impacts indicators (DU: 1 kg)

Indicator	Unit	A1-A4	C1-C4	D
Particulate matter	disease incidence	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA

Type III Environmental Product Declaration No. 687/2024

Table 30 Life cycle assessment (LCA) results of the a product from group 8000 - the resource use (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.09E+00	3.12E-02	2.81E+00	3.93E+00	1.77E-02	8.90E-03	4.69E-03	1.11E-03	2.51E-04	-1.29E+00
Consumption of renewable primary energy resources used as raw materials	MJ	1.27E-01	0.00E+00	0.00E+00	1.27E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of renewable primary energy resources	MJ	1.22E+00	3.12E-02	2.81E+00	4.06E+00	1.77E-02	8.90E-03	4.69E-03	1.11E-03	2.51E-04	-1.29E+00
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	2.10E+01	1.84E+00	1.54E+01	3.82E+01	1.23E+00	1.08E-01	3.27E-01	-2.95E+00	2.89E-02	-4.12E+00
Consumption of non-renewable primary energy resources used as raw materials	MJ	4.08E-01	0.00E+00	2.40E+00	2.80E+00	0.00E+00	0.00E+00	0.00E+00	3.01E+00	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	2.14E+01	1.84E+00	1.78E+01	4.10E+01	1.23E+00	1.08E-01	3.27E-01	6.06E-02	2.89E-02	-4.12E+00
Consumption of secondary materials	kg	3.24E-01	8.42E-04	2.05E-03	3.27E-01	4.14E-04	9.40E-06	1.10E-04	2.74E-05	6.07E-06	-7.77E-01
Consumption of renew. secondary fuels	MJ	1.63E-04	1.06E-05	9.09E-06	1.83E-04	4.56E-06	4.75E-08	1.21E-06	3.72E-07	1.59E-07	1.22E-04
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater	m ³	1.00E-02	2.44E-04	4.26E-02	5.29E-02	1.55E-04	3.11E-04	4.11E-05	5.36E-05	3.16E-05	-4.14E-03

Table 31 Life cycle assessment (LCA) results of a product from group 8000 – waste categories (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	3.32E-01	2.65E-03	1.71E-01	5.06E-01	1.38E-03	8.38E-04	3.67E-04	4.35E-09	3.07E-05	7.47E-02
Non-hazardous waste	kg	4.77E+00	5.60E-02	7.81E+00	1.26E+01	2.46E-02	5.65E-02	6.51E-03	1.14E-02	4.32E-04	-1.59E-01
Radioactive waste	kg	1.56E-05	5.86E-07	2.34E-06	1.85E-05	9.21E-08	1.62E-08	2.44E-08	3.23E-07	1.92E-07	-3.49E-05
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	4.03E-04	1.38E-05	2.41E-04	6.58E-04	3.82E-06	7.26E-07	1.01E-06	4.04E-07	5.78E-08	-1.98E-01
Materials for energy recovery	kg	1.41E-06	1.17E-07	2.01E-07	1.72E-06	3.09E-08	1.17E-09	8.18E-09	5.04E-09	6.85E-10	-5.38E-02
Exported Energy	MJ	3.66E-02	7.67E-04	1.15E-02	4.89E-02	0.00E+00	3.46E-04	0.00E+00	6.17E-02	0.00E+00	-2.77E-03

Type III Environmental Product Declaration No. 687/2024

Table 32 Life cycle assessment (LCA) results of a product from group 9000 – environmental impacts (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO ₂	2.00E+00	1.31E-01	1.01E+00	3.14E+00	8.34E-02	6.85E-03	2.21E-02	6.39E-02	1.06E-03	-3.09E-01
Greenhouse potential - fossil	eq. kg CO ₂	2.00E+00	1.31E-01	1.01E+00	3.14E+00	8.31E-02	6.85E-03	2.20E-02	6.38E-02	1.05E-03	-3.15E-01
Greenhouse potential - biogenic	eq. kg CO ₂	-7.80E-03	8.53E-05	3.11E-03	-4.60E-03	2.84E-04	1.85E-05	7.52E-05	1.33E-05	2.68E-06	-5.90E-03
Global warming potential - land use and land use change	eq. kg CO ₂	1.78E-03	4.29E-05	1.39E-04	1.96E-03	3.26E-05	1.07E-06	8.64E-06	1.01E-05	9.94E-07	-2.49E-04
Stratospheric ozone depletion potential	eq. kg CFC 11	1.41E-08	2.60E-09	1.55E-08	3.22E-08	1.92E-08	3.77E-11	5.09E-09	7.80E-01	4.26E-10	-3.14E-08
Soil and water acidification potential	eq. mol H ⁺	7.81E-03	4.10E-04	1.01E-02	1.83E-02	3.37E-04	7.25E-05	8.93E-05	5.32E-04	9.90E-06	-1.60E-04
Eutrophication potential - freshwater	eq. kg P	6.20E-04	8.74E-06	1.60E-03	2.23E-03	5.59E-06	1.18E-05	1.48E-06	4.32E-07	9.81E-08	-2.39E-04
Eutrophication potential - seawater	eq. kg N	1.79E-03	1.38E-04	1.45E-03	3.38E-03	1.02E-04	1.03E-05	2.70E-05	1.81E-03	3.45E-06	--1.56E-04
Eutrophication potential - terrestrial	eq. mol N	5.04E-03	1.50E-03	1.28E-02	1.93E-02	1.11E-03	8.95E-05	2.94E-04	3.42E-03	3.77E-05	-2.52E-03
Potential for photochemical ozone synthesis	eq. kg NMVOC	6.87E-03	6.42E-04	3.70E-03	1.12E-02	3.40E-04	2.57E-05	9.01E-05	7.46E-04	1.10E-05	-2.92E-03
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	3.99E-06	4.28E-07	6.26E-07	5.04E-06	2.95E-07	2.58E-09	7.80E-08	1.45E-08	2.42E-09	-5.04E-06
Abiotic depletion potential - fossil fuels	MJ	2.41E+01	1.84E+00	1.78E+01	4.37E+01	1.23E+00	1.08E-01	3.27E-01	6.05E-02	2.89E-02	-4.11E+00
Water deprivation potential	eq. m ³	3.83E-01	8.89E-03	2.88E-01	6.80E-01	5.70E-03	2.07E-03	1.51E-03	1.42E-03	9.16E-05	-7.64E-01

Table 33 Life cycle assessment (LCA) results of a product from group 9000 – additional impacts indicators (DU: 1 kg)

Indicator	Unit	A1-A4	C1-C4	D
Particulate matter	disease incidence	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA

Type III Environmental Product Declaration No. 687/2024

Table 34 Life cycle assessment (LCA) results of the a product from group 9000 - the resource use (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.01E+00	3.12E-02	2.81E+00	3.85E+00	1.77E-02	8.90E-03	4.69E-03	1.11E-03	2.51E-04	-1.29E+00
Consumption of renewable primary energy resources used as raw materials	MJ	6.05E-03	0.00E+00	0.00E+00	6.05E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of renewable primary energy resources	MJ	1.01E+00	3.12E-02	2.81E+00	3.86E+00	1.77E-02	8.90E-03	4.69E-03	1.11E-03	2.51E-04	-1.29E+00
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	2.27E+01	1.84E+00	1.54E+01	3.99E+01	1.23E+00	1.08E-01	3.27E-01	-2.95E+00	2.89E-02	-4.12E+00
Consumption of non-renewable primary energy resources used as raw materials	MJ	1.40E+00	0.00E+00	2.40E+00	3.80E+00	0.00E+00	0.00E+00	0.00E+00	3.01E+00	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	2.41E+01	1.84E+00	1.78E+01	4.37E+01	1.23E+00	1.08E-01	3.27E-01	6.06E-02	2.89E-02	-4.12E+00
Consumption of secondary materials	kg	3.25E-01	8.42E-04	2.05E-03	3.28E-01	4.14E-04	9.40E-06	1.10E-04	2.74E-05	6.07E-06	-7.77E-01
Consumption of renew. secondary fuels	MJ	7.56E-04	1.06E-05	9.09E-06	7.76E-04	4.56E-06	4.75E-08	1.21E-06	3.72E-07	1.59E-07	1.22E-04
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater	m ³	9.64E-03	2.44E-04	4.26E-02	5.25E-02	1.55E-04	3.11E-04	4.11E-05	5.36E-05	3.16E-05	-4.14E-03

Table 35 Life cycle assessment (LCA) results of a product from group 9000 – waste categories (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	3.18E-01	2.65E-03	1.71E-01	4.92E-01	1.38E-03	8.38E-04	3.67E-04	4.35E-09	3.07E-05	7.47E-02
Non-hazardous waste	kg	3.69E+00	5.60E-02	7.81E+00	1.16E+01	2.46E-02	5.65E-02	6.51E-03	1.14E-02	4.32E-04	-1.59E-01
Radioactive waste	kg	1.62E-05	5.86E-07	2.34E-06	1.91E-05	9.21E-08	1.62E-08	2.44E-08	3.23E-07	1.92E-07	-3.49E-05
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	3.61E-04	1.38E-05	2.41E-04	6.16E-04	3.82E-06	7.26E-07	1.01E-06	4.04E-07	5.78E-08	-1.98E-01
Materials for energy recovery	kg	1.40E-06	1.17E-07	2.01E-07	1.72E-06	3.09E-08	1.17E-09	8.18E-09	5.04E-09	6.85E-10	-5.38E-02
Exported Energy	MJ	1.53E-02	7.67E-04	1.15E-02	2.76E-02	0.00E+00	3.46E-04	0.00E+00	6.17E-02	0.00E+00	-2.77E-03

Type III Environmental Product Declaration No. 687/2024

Verification

The process of verification of this EPD is in accordance with ISO 14025 and ISO 21930. After verification, this EPD is valid for a 5-year-period. EPD does not have to be recalculated after 5 years, if the underlying data have not changed significantly.

The basis for LCA analysis was EN 15804+A2 and ITB PCR A	
Independent verification corresponding to ISO 14025 (subclause 8.1.3.)	
☒ external	☐ internal
External verification of EPD: PhD. Eng. Halina Prejzner	
LCI audit and verification: Filip Poznański, M.Sc. Eng.	
LCA, LCI audit and input data verification: Michał Piasecki, PhD., D.Sc., Eng.	

Note 1: The declaration owner has the sole ownership, liability, and responsibility for the the information provided and contained in EPD. Declarations of construction products may not be comparable if they do not comply with EN 15804+A2. For further information about comparability, see EN 15804+A2 and ISO 14025.

Note 2: ITB is a public Research Organization and Notified Body (EC Reg. no 1488) to the European Commission and to other Member States of the European Union designated for the tasks concerning the assessment of building products' performance. ITB acts as the independent, third-party verification organization (ISO 17025/17065/17029). ITB-EPD program is recognized and registered member of The European Platform - Association of EPD program operators and ITB-EPD declarations are registered and stored in the international ECO-PORTAL.

Normative references

- ITB PCR A General Product Category Rules for Construction Products
- PN-EN 1074-1 Armatura wodociągowa – Wymagania użytkowe i badania sprawdzające -- Część 1: Wymagania ogólne.
- PN-EN 1074-2+PN-EN 1074-2/A1 Armatura wodociągowa – Wymagania użytkowe i badania sprawdzające -- Część 2: Armatura zaporowa
- PN-EN 1074-3 Armatura wodociągowa – Wymagania użytkowe i badania sprawdzające -- Część 3: Armatura zwrotna
- PN-EN 1074-4 Armatura wodociągowa – Wymagania użytkowe i badania sprawdzające -- Część 4: Zawory napowietrzająco-odpowietrzające
- PN-EN 1074-5 Armatura wodociągowa – Wymagania użytkowe i badania sprawdzające -- Część 5: Armatura regulująca
- PN-EN 1171:2015-12 Armatura przemysłowa. Zasuwy żeliwne
- PN-EN 12266-1:2012 Armatura przemysłowa -- Badania armatury metalowej -- Część 1: Próby ciśnieniowe, procedury badawcze i kryteria odbioru -- Wymagania obowiązkowe.
- PN-EN 13774:2013-07 Zawory dla systemów dystrybucji gazu na maksymalne ciśnienie robocze mniejsze lub równe 16 bar -- Wymagania eksploatacyjne
- PN-EN 1983:2014-02 Armatura przemysłowa -- Kurki kulowe stalowe
- PN-EN 88-1:2023-03 Urządzenia zabezpieczające i sterujące do palników gazowych i urządzeń spalających gaz -- Część 1: Regulatory ciśnienia dla ciśnień wlotowych do 50 kPa włącznie
- ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures
- ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services
- ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines
- ISO 15686-1:2011 Buildings and constructed assets – Service life planning – Part 1: General principles and framework
- ISO 15686-8:2008 Buildings and constructed assets – Service life planning – Part 8: Reference service life and service-life estimation
- EN 15804:2012+A2:2019 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
- ISO 14067:2018 Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification
- PN-EN 15942:2012 Sustainability of construction works – Environmental product declarations – Communication format business-to-business
- ISO 20915:2018 Life cycle inventory calculation methodology for steel products
- KOBIZE Wskaźniki emisyjności CO₂, SO₂, NO_x, CO i pyłu całkowitego dla energii elektrycznej. December 2023
- World Steel Association 2017 Life Cycle inventory methodology report for steel products
- <https://ecoinvent.org/>

LCA, LCI, input data verification
Michał Piasecki, PhD. D.Sc.

Qualified electronic signature

Head of Thermal Physic, Acoustic and Environment Department
Agnieszka Winkler-Skalna, PhD.

Qualified electronic signature



Instytut Techniki Budowlanej

00-611 Warsaw, Filitrowa 1

Thermal Physics, Acoustics and Environment Department

02-656 Warsaw, Ksawerów 21

CERTIFICATE No 687/2025 of TYPE III ENVIRONMENTAL DECLARATION

Products:

**Water supply, sewage, industrial,
gas and fire protection fittings**

Manufacturer:

Fabryka Armatur JAFAR S.A.

ul. Kadyiego 12, 38-200 Jasło, Poland

confirms the correctness of the data included in the development of
Type III Environmental Declaration and accordance with the requirements of the standard

EN 15804+A2

Sustainability of construction works.

Environmental product declarations.

Core rules for the product category of construction products.

This certificate, issued on 6th March 2025 is valid for 5 years
or until amendment of mentioned Environmental Declaration

Head of the Thermal Physics, Acoustics
and Environment Department

Agnieszka Winkler-Skalna
Agnieszka Winkler-Skalna, PhD



Deputy Director
for Research and Innovation

Krzysztof Kuczyński
Krzysztof Kuczyński, PhD

Warsaw, March 2025