Environmental Product Declaration Type III ITB No. 145 /2021

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thermPIR® insulation panels

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Basic information

This declaration is the type III Environmental Product Declaration (EPD) based on EN 15804 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. Their aspects were verified by the independent body according to ISO 14025. Basically. a comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804 (point 5.3 of the standard).

Life cycle analysis (LCA): A1-A3. C1-C4 and D in accordance with EN 15804 (Cradle to Gate with options)
The year of preparing the EPD: 2020
Product standard: EN 13165:2012+A2:2016
Service Life: 50 years
PCR: ITB-PCR A (PCR based on EN 15804)
Declared unit: 1 kg (for 1m^2 impact data is also provided)
Reasons for performing LCA: B2B
Representativeness: Polish product

[1] *ITB is an accredited and notified body for certification of products (ID number 1488) - conducts certification activities within the scope of certification of products and construction services and the factory production control by acting in accordance with the requirements of the Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products, the PN-EN ISO/IEC 17065 standard and having an accredited research laboratory in accordance with PN-EN ISO/IEC 17025 (accreditation number AB 023).*

MANUFACTURER

Gór-Stal has been on the market for producers of building materials for over 18 years. providing solutions for industrial. Residential and agricultural construction. Offering a wide range of wall, roof and cooling sandwich panels. One of the important activity is the production of termPIR® insulation boards. Gór-Stal specializes in the production of PIR panels which are one of the component parts during thermal insulation works. Company offer insulation panels made of raw materials from PIR panels are insulation of buildings and rooms in single-family houses.

Figure 1. A view of the Gór-Stal production plant in Gorlice (Poland).

They can be used when insulating pitched roofs, attics, flat roofs, terraces, as well as ceilings, basements, foundations and floors. PIR panels for the wall can be used to insulate both external two-layer and three-layer walls as well as partition walls and other internal walls. ISO 9001 and 14001 certificates confirm the company's compliance with international standards regarding quality management and environmental protection. TermPIR® boards in addition to the CE mark have the Keymark mark. This certificate confirms the manufacturer's compliance with high requirements regarding among others the way production is carried out testing and declaration of parameters (in particular thermal). All parameters contained in the declarations of performance are periodically and randomly verified by Keymark laboratories. The quality and safety of products is also confirmed in the Netherlands (EPDB), the Czech Republic (SVT) and Sweden (BVB Sundahus). Gór-Stal is in the process of implementing further quality certificates: ATG for Belgium, KOMO for the Netherlands and Zulassung for Germany. Having the above certificates is associated with constant supervision over the products. On average monthly Gór-Stal factories are audited and its products tested in recognized institutes in Germany, Belgium, the Netherlands, Sweden, Finland, Hungary and Slovakia and checked by national research units having EU notifications: Certbud, IciMB, IMBiGS, PCBC and ITB. The Gór-Stal company - as a manufacturer of termPIR® insulation boards and sandwich panels - is constantly expanding its product range and offers solutions tailored to the needs of customers.

List all product covered by this EPD manufactured by Gór-Stal is provided in a Table 1. The core of the panel is made of rigid polyisocyanurate foam (PIR) with good insulating and fire-resistance properties. The double-sided panel lining is made of: KRAFT paper covered with aluminium (AL) or gas-permeable lining from glass reticular fibre (WS) or glass reticular fibre impregnated with bitumen (BT) or polyethylene laminate (Agro P) or glass fleece (ETX). Edges are milled for ease of installation and improvement in thermal insulation. Milling can be performed as follows: FIT – Straight edges. LAP– Overlap edges, TAG – Tongue and Groove.

Table 1. Description of PIR products covered by EPD

Product	Description
termPIR AL	The **termPIR® AL** insulation boards comprise of a PIR rigid foam thermal insulation core. The boards are protected on both sides with a gas tight lining layer composed of aluminium (AL), paper and polyethylene.
termPIR AGRO AL	The **termPIR® AGRO AL** insulation boards comprise of a PIR rigid foam thermal insulation core. The boards are protected on both sides with a washable gas tight aluminium foil lining thickness 50 μ m (Agro AL)
termPIR GK	**termPIR® GK** composite insulation boards are composed of a termPIR® boards with a PIR foam core covered on both sides by gas-resistant paper- and aluminium-based facings. and gypsum board with thickness of 12.5 mm. An adhesive layer bonds the paper- and aluminium-based facing and the gypsum board.
termPIR WS	The **termPIR® WS** insulation boards comprise of a PIR rigid foam thermal insulation core. The boards are protected with gas-permeable lining from glass reticular fibre (WS).
termPIR BT	The **termPIR® BT** insulation boards comprise of a PIR rigid foam thermal insulation core. The boards are protected on both sides with gas-permeable lining from glass reticular fibre impregnated with bitumen (BT).
termPIR BWS	**termPIR® BWS** insulation boards comprise a rigid polyisocyanurate foam thermal insulation core. The core is protected on both sides by gas permeable facings; one of the facings is made of glass fleece (WS) and the other facing is made of bitumen impregnated glass fleece (BT).
termPIR AGRO P REV	The **termPIR® Agro P REV** insulation boards comprise a rigid polyisocyanurate foam thermal insulation core. The core is protected on both sides by gas resistant multilayer aluminium and polyethylene laminate (Agro P) with the aluminium layer facing the PIR core. **termPIR® Agro P REV** insulation boards are intended for use with materials that would enter into a reaction with aluminium.
termPIR AGRO P	The **termPIR® AGRO P** insulation boards comprise of a PIR rigid foam thermal insulation core. The boards are protected on both sides with a washable gas tight aluminium and polyethylene layer laminate lining.
termPIR PK	The **termPIR® PK** insulation boards comprise of a PIR rigid foam thermal insulation core. The boards are protected on both sides with gas-permeable lining from Kraft paper (PK).
termPIR PK REM	The **termPIR® PK REM** insulation boards comprise of a PIR rigid foam thermal insulation core. The boards are protected on both sides with gas-permeable lining from Kraft paper (PK) which should be torn off before assembly.
termPIR ETX	**termPIR® ETX** insulation boards comprise a rigid polyisocyanurate foam thermal insulation core. The core is protected on both sides by gas permeable facings made of glass fleece (ETX)
termPIR MAX 19	**termPIR® MAX19 AL** insulation boards comprise a rigid polyisocyanurate foam thermal insulation core. featuring a thermal conductivity coefficient of 0.019 [W/m·K]. The core is protected on both sides by gas resistant multilayer aluminium (AL), paper and polyethylene facings.

Flowchart at Figure 2 presents a basic thermPIR production process scheme.

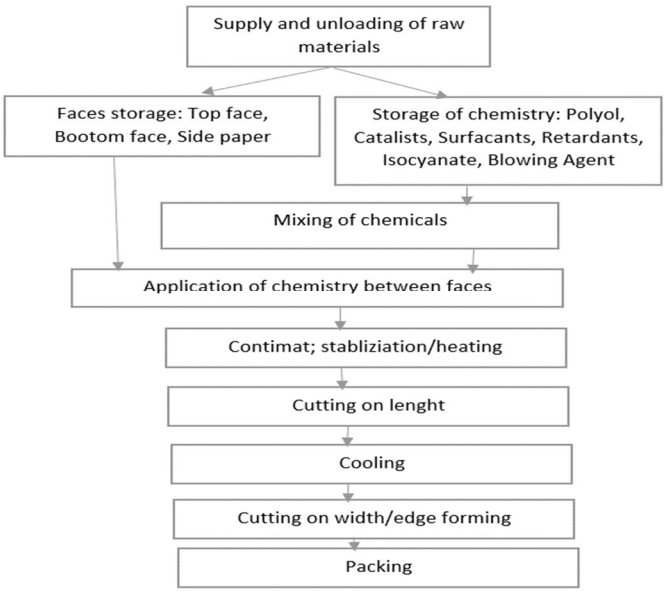

Figure 2. A production process of PIR panels

PRODUCT DESCRIPTION

TECHNICAL PROPERTIES and CERTIFICATES

All technical properties of PIR panels in the field of: fire reaction, fire resistance, flame propagation, thermal physics, acoustic insulation, corrosion resistance, statics are detailed in the technical catalogs which can be downloaded at https://termpir.eu/do-pobrania. Panels are manufactured in accordance with EN 13165:2012+A2:2016. CE marked and the Declaration of Performance is issued. The basic technical characteristics of panels are;

- Type of core - Rigid polyisocyanurate foam (PIR)
- Apparent density of core [kg/m^3] - 30
- Declared heat conductivity coefficient λD [W/m·K] - λD = 0.022
- Board facing – see Table 1
- Board dimensions[2] [mm] - 600 x 1200; 1200 x 2400
- Joint types - FIT - Straight edges, (LAP – Overlap, TAG - Tongue and Groove - on request)
- Thickness [mm] - from 20 to 250

Table 2. The basic technical characteristics of PIR panels

Product	Declared heat conductivity coefficient	Fire reaction classification	Compressive strength
termPIR AL	0.022	F (for20-50 mm)	120 kPa (for 20 mm)
		E (for 50-250 mm)	150 kPa (for 30 – 250 mm)
termPIR AGRO AL	0.022	D-s2, d0	120 kPa (for 20 mm)
			150 kPa (for 30 – 250 mm)
termPIR AGRO P	0.022	F	120 kPa (for 20 mm)
			150 kPa (for 30 – 250 mm)
termPIR P REV	0.022	F	120 kPa
termPIR PK REM 20≤ dn<80	0.027	F	120 kPa
termPIR PK REM 80≤ dn <120	0.026		
termPIR PK REM 120≤ dn ≤250	0.025		
termPIR MAX 19	0.019	E	100 kPa
termPIR GK	0.022	F	nd
termPIR WS 20≤ dn<80	0.027	F (for 20-50 mm)	120 kPa (for 20 mm)
termPIR WS 80≤ dn <120	0.026	E (for50-250 mm)	150 kPa (for 30 – 250 mm)
termPIR WS 120≤ dn ≤250	0.025		
termPIR ETX 20≤ dn<80	0.027	F (for 20-50 mm)	120 kPa (for 20 mm)
termPIR ETX 80≤ dn <120	0.026	E (for 50-250 mm)	150 kPa (for 30 – 250 mm)
termPIR ETX 120≤ dn ≤250	0.025		
termPIR BT 20≤ dn<80	0.027	F	120 kPa (for 20 mm)
termPIR BT 80≤ dn <120	0.026		150 kPa (for 30 – 250 mm)
termPIR BT 120≤ dn ≤250	0.025		
termPIR BWS 20≤ dn<80	0.027	F (for 20-50 mm)	120 kPa (for 20 mm)
termPIR BWS 80≤ dn <120	0.026	E/F WS/BT (for 50-250 mm)	150 kPa (for30 – 250 mm)
termPIR BWS 120≤ dn ≤250	0.025		
termPIR PK 20≤ dn<80	0.027	F	120 kPa (for 20 mm)
termPIR PK 80≤ dn <120	0.026		150 kPa (for 30 – 250 mm)
termPIR PK 120≤ dn ≤250	0.025		

APPLICATIONS

PIR panels are used as a component of thermal insulation systems. They are used to insulate foundations, walls, exterior walls, ceilings, terraces and balconies, flat roofs and pitched roofs. They

[2] *Depending on the customer's needs, Gór-Stal is able to produce any length of the board.*

provide thermal insulation as compared to other construction materials such as mineral wool or foamed polystyrene.

HEALTH ASPECTS

Polyurethane is formed by a chemical reaction between the polyol and the diisocyanate. As a result of this process a completely inert and safe for humans polyurethane foam is created (no dusting). In accordance to literature the foams are safe for humans The product has the National Hygienic Certificate and VOC emission assessment by Eurofins at “Indoor Air Comfort GOLD” level (2020).

CERTIFICATES

- Keymark – nr 021-IMBIgs-0001 z dn. 14.09.2020 r., Sieć Badawcza Łukasiewicz – Instytut Mechanizacji Budownictwa i Górnictwa Skalnego. Zakład Certyfikacji w Katowicach.
- KOMO CTG-724/1. KOMO CTG-7251/. SGS INTRON Certificatie B.V. Venusstraat 2. Postbus 267. 4100 AG Culemborg.
- ATG H966. ATG 3188. Rue du Lombard 42. 1000 Bruxelles.
- VOC emission test report 77/13.03.2020. Eurofins Product Testing A/S. Smededkovvej 38. 8464 Gal
- ISO 9001 : 2015. PCC-CERT Sp. z o.o. Sp. K., ul. Sportowa 9. 55-040 Kobierzyce
- ISO 14001 : 2015. PCC-CERT Sp. z o.o. Sp. K., ul. Sportowa 9. 55-040 Kobierzyce

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Allocation

The allocation rules used for this EPD are based on general ITB PCR A. Production of the panels is a line process. Allocation for production A1-A3 (PIR) is done on a production mass basis. All impacts from raw materials extraction and production (including: steel profil faces (aluminium, glass fleet etc.), polyol, MDI, catalyst KX, n-pentane, paper gaskets, packaking, energy carriers and water) are allocated in A1 module. 100% of impacts from line production were inventoried and 100% were allocated to the PIR panels production. Utilization of packaging material (PE, PP, styrofoam) was taken into consideration. Module A2 includes transport of raw materials such as faces, chemicals. additives and ancillary materials from their suppliers to manufacturing plant. Municipal wastes of factory were allocated to module A3. Energy supply was inventoried for whole factory and 100% was allocated to the PIR based sandwich panels production. Emissions in the factory were estimated by using national conversion factors (KOBiZE- 2019) and were allocated to module A3.

System limits

The life cycle analysis of the declared products covers “Product Stage”, A1-A3, C1-C4 and D modules (Cradle to Gate with options) in accordance with EN 15804+A1 and ITB PCR A. The input materials and energy consumption inventoried in factories were included in calculation. In the assessment all significant parameters from gathered production data are considered i.e. all material used per formulation, utilized thermal energy, internal fuel and electric power consumption. It is assumed that the total sum of omitted processes does not exceed 2% of all impact categories. In accordance with EN 15804 machines and facilities (capital goods) required for and during production are excluded, as is transportation of employees.

A1 and A2 Modules: Raw materials supply and transport

In the case of PIR panels family a core material is a rigid PIR foam obtained in a controlled chemical reaction during production process. A vast majority of liquid components necessary for chemical

reactions are sourced from inventoried foreign suppliers (Bayer located at Leverkusen). The transport to the factory has been fully inventorized (LCI questionnaire) taking into account the number of deliveries: type of vehicles, the size of the delivery and the distance from the manufacturer to the factory for all input sources and raw materials.

A3: Production

Production process itself (PIR) can be divided into stages (Figure 2). PIR insulation core material is being formed as a product of chemical reactions. Main components are polymeric isocyanate and polyols. To control reaction speed catalysts are being used. Pentane is used as a physical blowing agent (due to its very low thermal conductivity is also responsible for superior heat insulation properties). All components according to formulation are being dosed and mixed at high pressure in a liquid form. Such a reactive mixture is being evenly distributed across internal side of profiled facing. Foaming process starts and two facings where expanding chemical mixture fills volume with very fine cells structure foam. The belt laminator ensure dimension (thickness and width of sandwich panel) as well as necessary conditions for foam to harden. A component adhesive is being applied between facings. Later panels are being cut to length by flying saw synchronised with production line speed. Next panels are being transported into a cooling buffer. where need to spend relevant time to reach temperature stability. In the end of the process panels are stacked to form a parcel which is subsequently wrapped with foil. Next ready parcels need to stabilise for 48 hours. Finally products are being load on trucks and deliver to customer.

C1 – C4: End of life

The end of life scenario for a sandwich panel with PIR core is provided in Table 3. The product is disassembled using a mechanical jacks and hand electric tools.

Table 3. End-of-life scenario (C modules) for a sandwich panel with PIR core

Parameter	Contribution
Collection rate	100%
Reuse	20%
Incineration of PIR	40% of PIR core
Landfilling PIR	40% of PIR core

D: Re-use, recovery, recycling potential

20% of “reuse benefit” is calculated for A1-A3 values of panel production.

Data collection period

The data for manufacture of the declared products refer to year 2019. The life cycle assessments were prepared for Poland as reference area.

Data input quality

The values determined to calculate the LCA originate from LCI verified inventory data provided by Gór-Stal.

Assumptions and estimates

The impacts of the panels were aggregated using mass of production. Impacts were inventoried and calculated for all products. The impact on the panel's environmental performance from different type of facings was averaged for a product using the weighted average method. Due to the lack of good LCI data for triethyl phosphate production (<2%) relevant data for ammonium phosphate was used which may perform the same function (fire retardant) in the final product.

Calculation rules

LCA was done in accordance with ITB PCR A document.

Databases

The data for the processes come from the following databases: Ecoinvent v.3.7 (polyol, MDI, catalyst KX, n-pentane, paper gaskets, packaging, water, facings), foils (Plastic Europe), styrofoam (specific EPD), KOBiZE/Tauron (energy carriers: electricity, ON, natural gas and LPG). Specific data quality analysis was a part of external ISO 14001 based audit. Characterization factors are CML ver. 4.2 based on EN 15804:2012+A1:2013 version (PN-EN 15804+A1:2014-04).

LIFE CYCLE ASSESSMENT (LCA) – Results

Declared/functional unit

The declaration refers to declared unit (DU) – 1 kg of the panels manufactured by Gór-Stal (Table 5). The following tables 6-17 present the environmental impact in relation to 1 m^2 for all offered product thicknesses.

Table 4. System boundaries (life's modules included) for the environmental characteristic of the PIR panels.

Environmental assessment information (MNA – Module not assessed. MD – Module 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	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MD	MD	MD	MD	MD

Table 5. Environmental product characteristic – 1 kg of thermPIR

Environmental impacts: (DU) 1 kg									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential	kg CO_2 eq.	2.09E+00	8.28E-02	2.35E-02	1.57E-01	3.80E-03	9.80E-01	1.68E-03	-4.19E-01
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.	5.49E-06	0.00E+00	1.20E-09	1.73E-09	0.00E+00	1.44E-08	5.76E-10	-1.10E-06
Acidification potential of soil and water	kg SO_2 eq.	5.29E-02	6.09E-04	2.52E-05	1.38E-04	2.77E-05	5.60E-04	1.24E-05	-1.06E-02
Formation potential of tropospheric ozone	kg Ethene eq.	1.00E-02	4.33E-05	8.23E-06	7.17E-04	2.02E-06	0.00E+00	4.24E-07	-2.01E-03
Eutrophication potential	kg $(PO_4)^{3-}$ eq.	4.07E-03	1.07E-04	7.75E-05	5.77E-06	4.89E-06	2.80E-03	1.94E-05	-8.15E-04
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb eq.	5.31E-03	0.00E+00	2.91E-07	1.17E-03	0.00E+00	1.60E-04	0.00E+00	-1.06E-03
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	5.12E+01	7.58E-01	9.80E-01	1.80E+00	1.26E-01	2.96E-01	5.60E-02	-1.02E+01
Environmental aspects: (DU) 1 kg									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	1.36E+00	1.52E-02	9.80E-03	2.70E-01	#ARG!	4.00E-02	2.80E-03	-2.73E-01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	5.85E+01	7.96E-01	1.05E+00	1.98E+00	1.33E-01	3.11E-01	5.80E-02	-1.17E+01
Use of secondary material	kg	6.22E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.24E-07
Use of renewable secondary fuels	MJ	1.16E-05	3.98E-02	0.00E+00	0.00E+00	6.63E-03	0.00E+00	0.00E+00	-2.32E-06
Use of non-renewable secondary fuels	MJ	1.06E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.12E-07
Net use of fresh water	m^3	7.68E-02	1.00E-06	1.80E-04	5.69E-04	1.20E-03	4.00E-05	1.60E-04	-1.54E-02
Other environmental information describing waste categories: (DU) 1 kg									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	1.63E-03	4.60E-06	0.00E+00	2.40E-06	2.53E-08	8.40E-07	4.00E-03	-3.26E-04
Non-hazardous waste disposed	kg	3.50E-02	4.27E-03	2.85E-03	2.17E-02	2.35E-05	8.00E-03	3.92E-01	-7.00E-03
Radioactive waste disposed	kg	5.52E-05	0.00E+00	0.00E+00	2.40E-06	0.00E+00	0.00E+00	0.00E+00	-1.10E-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
Materials for recycling	kg	0.00E+00	0.00E+00	8.16E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recover	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
Exported energy	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

Table 5. Environmental product characteristic – 1 m^2 of thermPIR panel (20 mm)

Environmental impacts: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential	kg CO_2 eq.	1.26E+00	4.97E-02	1.41E-02	9.44E-02	2.28E-03	5.88E-01	1.01E-03	-2.51E-01
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.	3.29E-06	0.00E+00	7.20E-10	1.04E-09	0.00E+00	8.64E-09	3.46E-10	-6.59E-07
Acidification potential of soil and water	kg SO_2 eq.	3.17E-02	3.65E-04	1.51E-05	8.30E-05	1.66E-05	3.36E-04	7.44E-06	-6.34E-03
Formation potential of tropospheric ozone	kg Ethene eq.	6.03E-03	2.60E-05	4.94E-06	4.30E-04	1.21E-06	0.00E+00	2.54E-07	-1.21E-03
Eutrophication potential	kg $(PO_4)^{3-}$ eq.	2.44E-03	6.45E-05	4.65E-05	3.46E-06	2.94E-06	1.68E-03	1.17E-05	-4.89E-04
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb eq.	3.19E-03	0.00E+00	1.75E-07	7.00E-04	0.00E+00	9.60E-05	0.00E+00	-6.37E-04
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	3.07E+01	4.55E-01	5.88E-01	1.08E+00	7.58E-02	1.78E-01	3.36E-02	-6.15E+00
Environmental aspects: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	8.18E-01	9.10E-03	5.88E-03	1.62E-01	7.98E-02	2.40E-02	1.68E-03	-1.64E-01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	3.51E+01	4.78E-01	6.29E-01	1.19E+00	7.96E-02	1.87E-01	3.48E-02	-7.02E+00
Use of secondary material	kg	3.73E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-7.46E-08
Use of renewable secondary fuels	MJ	6.96E-06	2.39E-02	0.00E+00	0.00E+00	3.98E-03	0.00E+00	0.00E+00	-1.39E-06
Use of non-renewable secondary fuels	MJ	6.37E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.27E-07
Net use of fresh water	m^3	4.61E-02	6.00E-07	1.08E-04	3.41E-04	7.20E-04	2.40E-05	9.60E-05	-9.22E-03
Other environmental information describing waste categories: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	9.79E-04	2.76E-06	0.00E+00	1.44E-06	1.52E-08	5.04E-07	2.40E-03	-1.96E-04
Non-hazardous waste disposed	kg	2.10E-02	2.56E-03	1.71E-03	1.30E-02	1.41E-05	4.80E-03	2.35E-01	-4.20E-03
Radioactive waste disposed	kg	3.31E-05	0.00E+00	0.00E+00	1.44E-06	0.00E+00	0.00E+00	0.00E+00	-6.62E-06
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
Materials for recycling	kg	0.00E+00	0.00E+00	4.90E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recover	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
Exported energy	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

Table 6. Environmental product characteristic – 1 m^2 of thermPIR (40 mm)

Environmental impacts: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential	kg CO_2 eq.	2.51E+00	9.94E-02	2.82E-02	1.89E-01	4.56E-03	1.18E+00	2.02E-03	-5.03E-01
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.	6.59E-06	0.00E+00	1.44E-09	2.08E-09	0.00E+00	1.73E-08	6.91E-10	-1.32E-06
Acidification potential of soil and water	kg SO_2 eq.	6.34E-02	7.31E-04	3.02E-05	1.66E-04	3.33E-05	6.72E-04	1.49E-05	-1.27E-02
Formation potential of tropospheric ozone	kg Ethene eq.	1.21E-02	5.20E-05	9.88E-06	8.60E-04	2.43E-06	0.00E+00	5.09E-07	-2.41E-03
Eutrophication potential	kg $(PO_4)^{3-}$ eq.	4.89E-03	1.29E-04	9.31E-05	6.92E-06	5.87E-06	3.36E-03	2.33E-05	-9.78E-04
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb eq.	6.37E-03	0.00E+00	3.49E-07	1.40E-03	0.00E+00	1.92E-04	0.00E+00	-1.27E-03
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	6.15E+01	9.10E-01	1.18E+00	2.16E+00	1.52E-01	3.55E-01	6.72E-02	-1.23E+01
Environmental aspects: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	1.64E+00	1.82E-02	1.18E-02	3.24E-01	1.60E-01	4.80E-02	3.36E-03	-3.27E-01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	7.02E+01	9.55E-01	1.26E+00	2.38E+00	1.59E-01	3.73E-01	6.96E-02	-1.40E+01
Use of secondary material	kg	7.46E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.49E-07
Use of renewable secondary fuels	MJ	1.39E-05	4.78E-02	0.00E+00	0.00E+00	7.96E-03	0.00E+00	0.00E+00	-2.78E-06
Use of non-renewable secondary fuels	MJ	1.27E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.55E-07
Net use of fresh water	m^3	9.22E-02	1.20E-06	2.16E-04	6.83E-04	1.44E-03	4.80E-05	1.92E-04	-1.84E-02
Other environmental information describing waste categories: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	1.96E-03	5.52E-06	0.00E+00	2.88E-06	3.04E-08	1.01E-06	4.80E-03	-3.92E-04
Non-hazardous waste disposed	kg	4.20E-02	5.12E-03	3.42E-03	2.60E-02	2.82E-05	9.60E-03	4.70E-01	-8.41E-03
Radioactive waste disposed	kg	6.62E-05	0.00E+00	0.00E+00	2.88E-06	0.00E+00	0.00E+00	0.00E+00	-1.32E-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
Materials for recycling	kg	0.00E+00	0.00E+00	9.79E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recover	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
Exported energy	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

Table 7. Environmental product characteristic – 1 m^2 of thermPIR (50 mm)

Environmental impacts: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential	kg CO_2 eq.	3.14E+00	1.24E-01	3.52E-02	2.36E-01	5.70E-03	1.47E+00	2.52E-03	-6.28E-01
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.	8.23E-06	0.00E+00	1.80E-09	2.60E-09	0.00E+00	2.16E-08	8.64E-10	-1.65E-06
Acidification potential of soil and water	kg SO_2 eq.	7.93E-02	9.13E-04	3.78E-05	2.08E-04	4.16E-05	8.40E-04	1.86E-05	-1.59E-02
Formation potential of tropospheric ozone	kg Ethene eq.	1.51E-02	6.50E-05	1.23E-05	1.08E-03	3.03E-06	0.00E+00	6.36E-07	-3.01E-03
Eutrophication potential	kg $(PO_4)^{3-}$ eq.	6.11E-03	1.61E-04	1.16E-04	8.65E-06	7.34E-06	4.20E-03	2.92E-05	-1.22E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb eq.	7.97E-03	0.00E+00	4.37E-07	1.75E-03	0.00E+00	2.40E-04	0.00E+00	-1.59E-03
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	7.68E+01	1.14E+00	1.47E+00	2.70E+00	1.90E-01	4.44E-01	8.40E-02	-1.54E+01
Environmental aspects: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	2.04E+00	2.27E-02	1.47E-02	4.05E-01	2.00E-01	6.00E-02	4.20E-03	-4.09E-01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	8.78E+01	1.19E+00	1.57E+00	2.97E+00	1.99E-01	4.67E-01	8.70E-02	-1.76E+01
Use of secondary material	kg	9.32E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.86E-07
Use of renewable secondary fuels	MJ	1.74E-05	5.97E-02	0.00E+00	0.00E+00	9.95E-03	0.00E+00	0.00E+00	-3.48E-06
Use of non-renewable secondary fuels	MJ	1.59E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.19E-07
Net use of fresh water	m^3	1.15E-01	1.50E-06	2.70E-04	8.53E-04	1.80E-03	6.00E-05	2.40E-04	-2.30E-02
Other environmental information describing waste categories: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	2.45E-03	6.89E-06	0.00E+00	3.60E-06	3.80E-08	1.26E-06	6.00E-03	-4.90E-04
Non-hazardous waste disposed	kg	5.25E-02	6.40E-03	4.28E-03	3.25E-02	3.53E-05	1.20E-02	5.88E-01	-1.05E-02
Radioactive waste disposed	kg	8.28E-05	0.00E+00	0.00E+00	3.60E-06	0.00E+00	0.00E+00	0.00E+00	-1.66E-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
Materials for recycling	kg	0.00E+00	0.00E+00	1.22E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recover	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
Exported energy	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

Table 8. Environmental product characteristic – 1 m^2 of thermPIR (60 mm)

Environmental impacts: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential	kg CO_2 eq.	3.77E+00	1.49E-01	4.22E-02	2.83E-01	6.84E-03	1.76E+00	3.02E-03	-7.54E-01
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.	9.88E-06	0.00E+00	2.16E-09	3.12E-09	0.00E+00	2.59E-08	1.04E-09	-1.98E-06
Acidification potential of soil and water	kg SO_2 eq.	9.51E-02	1.10E-03	4.53E-05	2.49E-04	4.99E-05	1.01E-03	2.23E-05	-1.90E-02
Formation potential of tropospheric ozone	kg Ethene eq.	1.81E-02	7.80E-05	1.48E-05	1.29E-03	3.64E-06	0.00E+00	7.63E-07	-3.62E-03
Eutrophication potential	kg $(PO_4)^{3-}$ eq.	7.33E-03	1.93E-04	1.40E-04	1.04E-05	8.81E-06	5.04E-03	3.50E-05	-1.47E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb eq.	9.56E-03	0.00E+00	5.24E-07	2.10E-03	0.00E+00	2.88E-04	0.00E+00	-1.91E-03
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	9.22E+01	1.36E+00	1.76E+00	3.24E+00	2.27E-01	5.33E-01	1.01E-01	-1.84E+01
Environmental aspects: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	2.45E+00	2.73E-02	1.76E-02	4.86E-01	2.39E-01	7.20E-02	5.04E-03	-4.91E-01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	1.05E+02	1.43E+00	1.89E+00	3.56E+00	2.39E-01	5.60E-01	1.04E-01	-2.11E+01
Use of secondary material	kg	1.12E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.24E-07
Use of renewable secondary fuels	MJ	2.09E-05	7.16E-02	0.00E+00	0.00E+00	1.19E-02	0.00E+00	0.00E+00	-4.17E-06
Use of non-renewable secondary fuels	MJ	1.91E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.82E-07
Net use of fresh water	m^3	1.38E-01	1.80E-06	3.24E-04	1.02E-03	2.16E-03	7.20E-05	2.88E-04	-2.77E-02
Other environmental information describing waste categories: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	2.94E-03	8.27E-06	0.00E+00	4.32E-06	4.56E-08	1.51E-06	7.20E-03	-5.88E-04
Non-hazardous waste disposed	kg	6.30E-02	7.68E-03	5.14E-03	3.90E-02	4.23E-05	1.44E-02	7.06E-01	-1.26E-02
Radioactive waste disposed	kg	9.94E-05	0.00E+00	0.00E+00	4.32E-06	0.00E+00	0.00E+00	0.00E+00	-1.99E-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
Materials for recycling	kg	0.00E+00	0.00E+00	1.47E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recover	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
Exported energy	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

Table 9. Environmental product characteristic – 1 m^2 of thermPIR (80 mm)

Environmental impacts: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential	kg CO_2 eq.	5.03E+00	1.99E-01	5.63E-02	3.78E-01	9.12E-03	2.35E+00	4.03E-03	-1.01E+00
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.	1.32E-05	0.00E+00	2.88E-09	4.16E-09	0.00E+00	3.46E-08	1.38E-09	-2.63E-06
Acidification potential of soil and water	kg SO_2 eq.	1.27E-01	1.46E-03	6.04E-05	3.32E-04	6.66E-05	1.34E-03	2.98E-05	-2.54E-02
Formation potential of tropospheric ozone	kg Ethene eq.	2.41E-02	1.04E-04	1.98E-05	1.72E-03	4.85E-06	0.00E+00	1.02E-06	-4.82E-03
Eutrophication potential	kg $(PO_4)^{3-}$ eq.	9.78E-03	2.58E-04	1.86E-04	1.38E-05	1.17E-05	6.72E-03	4.67E-05	-1.96E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb eq.	1.27E-02	0.00E+00	6.98E-07	2.80E-03	0.00E+00	3.84E-04	0.00E+00	-2.55E-03
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	1.23E+02	1.82E+00	2.35E+00	4.32E+00	3.03E-01	7.10E-01	1.34E-01	-2.46E+01
Environmental aspects: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	3.27E+00	3.64E-02	2.35E-02	6.48E-01	3.19E-01	9.60E-02	6.72E-03	-6.54E-01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	1.40E+02	1.91E+00	2.52E+00	4.75E+00	3.18E-01	7.46E-01	1.39E-01	-2.81E+01
Use of secondary material	kg	1.49E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.98E-07
Use of renewable secondary fuels	MJ	2.78E-05	9.55E-02	0.00E+00	0.00E+00	1.59E-02	0.00E+00	0.00E+00	-5.56E-06
Use of non-renewable secondary fuels	MJ	2.55E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-5.10E-07
Net use of fresh water	m^3	1.84E-01	2.40E-06	4.32E-04	1.37E-03	2.88E-03	9.60E-05	3.84E-04	-3.69E-02
Other environmental information describing waste categories: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	3.92E-03	1.10E-05	0.00E+00	5.76E-06	6.08E-08	2.02E-06	9.60E-03	-7.84E-04
Non-hazardous waste disposed	kg	8.41E-02	1.02E-02	6.85E-03	5.20E-02	5.64E-05	1.92E-02	9.41E-01	-1.68E-02
Radioactive waste disposed	kg	1.32E-04	0.00E+00	0.00E+00	5.76E-06	0.00E+00	0.00E+00	0.00E+00	-2.65E-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
Materials for recycling	kg	0.00E+00	0.00E+00	1.96E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recover	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
Exported energy	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

Table 10. Environmental product characteristic – 1 m^2 of thermPIR (100 mm)

Environmental impacts: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential	kg CO_2 eq.	6.28E+00	2.48E-01	7.04E-02	4.72E-01	1.14E-02	2.94E+00	5.04E-03	-1.26E+00
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.	1.65E-05	0.00E+00	3.60E-09	5.20E-09	0.00E+00	4.32E-08	1.73E-09	-3.29E-06
Acidification potential of soil and water	kg SO_2 eq.	1.59E-01	1.83E-03	7.55E-05	4.15E-04	8.32E-05	1.68E-03	3.72E-05	-3.17E-02
Formation potential of tropospheric ozone	kg Ethene eq.	3.01E-02	1.30E-04	2.47E-05	2.15E-03	6.07E-06	0.00E+00	1.27E-06	-6.03E-03
Eutrophication potential	kg $(PO_4)^{3-}$ eq.	1.22E-02	3.22E-04	2.33E-04	1.73E-05	1.47E-05	8.40E-03	5.83E-05	-2.44E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb eq.	1.59E-02	0.00E+00	8.73E-07	3.50E-03	0.00E+00	4.80E-04	0.00E+00	-3.19E-03
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	1.54E+02	2.27E+00	2.94E+00	5.40E+00	3.79E-01	8.88E-01	1.68E-01	-3.07E+01
Environmental aspects: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	4.09E+00	4.55E-02	2.94E-02	8.10E-01	3.99E-01	1.20E-01	8.40E-03	-8.18E-01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	1.76E+02	2.39E+00	3.15E+00	5.94E+00	3.98E-01	9.33E-01	1.74E-01	-3.51E+01
Use of secondary material	kg	1.86E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.73E-07
Use of renewable secondary fuels	MJ	3.48E-05	1.19E-01	0.00E+00	0.00E+00	1.99E-02	0.00E+00	0.00E+00	-6.96E-06
Use of non-renewable secondary fuels	MJ	3.19E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-6.37E-07
Net use of fresh water	m^3	2.30E-01	3.00E-06	5.40E-04	1.71E-03	3.60E-03	1.20E-04	4.80E-04	-4.61E-02
Other environmental information describing waste categories: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	4.90E-03	1.38E-05	0.00E+00	7.20E-06	7.59E-08	2.52E-06	1.20E-02	-9.79E-04
Non-hazardous waste disposed	kg	1.05E-01	1.28E-02	8.56E-03	6.50E-02	7.05E-05	2.40E-02	1.18E+00	-2.10E-02
Radioactive waste disposed	kg	1.66E-04	0.00E+00	0.00E+00	7.20E-06	0.00E+00	0.00E+00	0.00E+00	-3.31E-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
Materials for recycling	kg	0.00E+00	0.00E+00	2.45E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recover	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
Exported energy	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

Table 11. Environmental product characteristic – 1 m^2 of thermPIR (120 mm)

Environmental impacts: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential	kg CO_2 eq.	7.54E+00	2.98E-01	8.45E-02	5.66E-01	1.37E-02	3.53E+00	6.05E-03	-1.51E+00
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.	1.98E-05	0.00E+00	4.32E-09	6.24E-09	0.00E+00	5.18E-08	2.07E-09	-3.95E-06
Acidification potential of soil and water	kg SO_2 eq.	1.90E-01	2.19E-03	9.06E-05	4.98E-04	9.99E-05	2.02E-03	4.46E-05	-3.81E-02
Formation potential of tropospheric ozone	kg Ethene eq.	3.62E-02	1.56E-04	2.96E-05	2.58E-03	7.28E-06	0.00E+00	1.53E-06	-7.23E-03
Eutrophication potential	kg $(PO_4)^{3-}$ eq.	1.47E-02	3.87E-04	2.79E-04	2.08E-05	1.76E-05	1.01E-02	7.00E-05	-2.93E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb eq.	1.91E-02	0.00E+00	1.05E-06	4.20E-03	0.00E+00	5.76E-04	0.00E+00	-3.82E-03
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	1.84E+02	2.73E+00	3.53E+00	6.48E+00	4.55E-01	1.07E+00	2.02E-01	-3.69E+01
Environmental aspects: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	4.91E+00	5.46E-02	3.53E-02	9.72E-01	4.79E-01	1.44E-01	1.01E-02	-9.81E-01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	2.11E+02	2.87E+00	3.77E+00	7.13E+00	4.78E-01	1.12E+00	2.09E-01	-4.21E+01
Use of secondary material	kg	2.24E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-4.48E-07
Use of renewable secondary fuels	MJ	4.17E-05	1.43E-01	0.00E+00	0.00E+00	2.39E-02	0.00E+00	0.00E+00	-8.35E-06
Use of non-renewable secondary fuels	MJ	3.82E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-7.65E-07
Net use of fresh water	m^3	2.77E-01	3.60E-06	6.48E-04	2.05E-03	4.32E-03	1.44E-04	5.76E-04	-5.53E-02
Other environmental information describing waste categories: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	5.88E-03	1.65E-05	0.00E+00	8.64E-06	9.11E-08	3.02E-06	1.44E-02	-1.18E-03
Non-hazardous waste disposed	kg	1.26E-01	1.54E-02	1.03E-02	7.80E-02	8.46E-05	2.88E-02	1.41E+00	-2.52E-02
Radioactive waste disposed	kg	1.99E-04	0.00E+00	0.00E+00	8.64E-06	0.00E+00	0.00E+00	0.00E+00	-3.97E-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
Materials for recycling	kg	0.00E+00	0.00E+00	2.94E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recover	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
Exported energy	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

Table 12. Environmental product characteristic – 1 m^2 of thermPIR (150 mm)

Environmental impacts: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential	kg CO_2 eq.	9.43E+00	3.73E-01	1.06E-01	7.08E-01	1.71E-02	4.41E+00	7.56E-03	-1.89E+00
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.	2.47E-05	0.00E+00	5.40E-09	7.80E-09	0.00E+00	6.48E-08	2.59E-09	-4.94E-06
Acidification potential of soil and water	kg SO_2 eq.	2.38E-01	2.74E-03	1.13E-04	6.23E-04	1.25E-04	2.52E-03	5.58E-05	-4.76E-02
Formation potential of tropospheric ozone	kg Ethene eq.	4.52E-02	1.95E-04	3.70E-05	3.23E-03	9.10E-06	0.00E+00	1.91E-06	-9.04E-03
Eutrophication potential	kg $(PO_4)^{3-}$ eq.	1.83E-02	4.83E-04	3.49E-04	2.60E-05	2.20E-05	1.26E-02	8.75E-05	-3.67E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb eq.	2.39E-02	0.00E+00	1.31E-06	5.25E-03	0.00E+00	7.20E-04	0.00E+00	-4.78E-03
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	2.30E+02	3.41E+00	4.41E+00	8.10E+00	5.69E-01	1.33E+00	2.52E-01	-4.61E+01
Environmental aspects: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	#ARG!	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	MJ	#ARG!	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	6.13E+00	6.82E-02	4.41E-02	1.22E+00	5.99E-01	1.80E-01	1.26E-02	-1.23E+00
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	#ARG!	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	MJ	#ARG!	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	2.63E+02	3.58E+00	4.72E+00	8.91E+00	5.97E-01	1.40E+00	2.61E-01	-5.27E+01
Use of secondary material	kg	2.80E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-5.59E-07
Use of renewable secondary fuels	MJ	5.22E-05	1.79E-01	0.00E+00	0.00E+00	2.98E-02	0.00E+00	0.00E+00	-1.04E-05
Use of non-renewable secondary fuels	MJ	4.78E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-9.56E-07
Net use of fresh water	m^3	3.46E-01	4.50E-06	8.09E-04	2.56E-03	5.40E-03	1.80E-04	7.20E-04	-6.91E-02
Other environmental information describing waste categories: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	7.35E-03	2.07E-05	0.00E+00	1.08E-05	1.14E-07	3.78E-06	1.80E-02	-1.47E-03
Non-hazardous waste disposed	kg	1.58E-01	1.92E-02	1.28E-02	9.75E-02	1.06E-04	3.60E-02	1.76E+00	-3.15E-02
Radioactive waste disposed	kg	2.48E-04	0.00E+00	0.00E+00	1.08E-05	0.00E+00	0.00E+00	0.00E+00	-4.97E-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
Materials for recycling	kg	0.00E+00	0.00E+00	3.67E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recover	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
Exported energy	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

Table 13. Environmental product characteristic – 1 m^2 of thermPIR (180 mm)

Environmental impacts: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential	kg CO_2 eq.	1.13E+01	4.47E-01	1.27E-01	8.50E-01	2.05E-02	5.29E+00	9.07E-03	-2.26E+00
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.	2.96E-05	0.00E+00	6.48E-09	9.36E-09	0.00E+00	7.78E-08	3.11E-09	-5.93E-06
Acidification potential of soil and water	kg SO_2 eq.	2.85E-01	3.29E-03	1.36E-04	7.47E-04	1.50E-04	3.02E-03	6.70E-05	-5.71E-02
Formation potential of tropospheric ozone	kg Ethene eq.	5.42E-02	2.34E-04	4.44E-05	3.87E-03	1.09E-05	0.00E+00	2.29E-06	-1.08E-02
Eutrophication potential	kg $(PO_4)^{3-}$ eq.	2.20E-02	5.80E-04	4.19E-04	3.11E-05	2.64E-05	1.51E-02	1.05E-04	-4.40E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb eq.	2.87E-02	0.00E+00	1.57E-06	6.30E-03	0.00E+00	8.64E-04	0.00E+00	-5.74E-03
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	2.77E+02	4.09E+00	5.29E+00	9.72E+00	6.82E-01	1.60E+00	3.02E-01	-5.53E+01
Environmental aspects: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	7.36E+00	8.19E-02	5.29E-02	1.46E+00	7.18E-01	2.16E-01	1.51E-02	-1.47E+00
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	3.16E+02	4.30E+00	5.66E+00	1.07E+01	7.16E-01	1.68E+00	3.13E-01	-6.32E+01
Use of secondary material	kg	3.36E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-6.71E-07
Use of renewable secondary fuels	MJ	6.26E-05	2.15E-01	0.00E+00	0.00E+00	3.58E-02	0.00E+00	0.00E+00	-1.25E-05
Use of non-renewable secondary fuels	MJ	5.73E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.15E-06
Net use of fresh water	m^3	4.15E-01	5.40E-06	9.71E-04	3.07E-03	6.48E-03	2.16E-04	8.64E-04	-8.30E-02
Other environmental information describing waste categories: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	8.81E-03	2.48E-05	0.00E+00	1.30E-05	1.37E-07	4.54E-06	2.16E-02	-1.76E-03
Non-hazardous waste disposed	kg	1.89E-01	2.30E-02	1.54E-02	1.17E-01	1.27E-04	4.32E-02	2.12E+00	-3.78E-02
Radioactive waste disposed	kg	2.98E-04	0.00E+00	0.00E+00	1.30E-05	0.00E+00	0.00E+00	0.00E+00	-5.96E-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
Materials for recycling	kg	0.00E+00	0.00E+00	4.41E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recover	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
Exported energy	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

Table 14. Environmental product characteristic – 1 m^2 of thermPIR (200 mm)

Environmental impacts: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential	kg CO_2 eq.	1.26E+01	4.97E-01	1.41E-01	9.44E-01	2.28E-02	5.88E+00	1.01E-02	-2.51E+00
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.	3.29E-05	0.00E+00	7.20E-09	1.04E-08	0.00E+00	8.64E-08	3.46E-09	-6.59E-06
Acidification potential of soil and water	kg SO_2 eq.	3.17E-01	3.65E-03	1.51E-04	8.30E-04	1.66E-04	3.36E-03	7.44E-05	-6.34E-02
Formation potential of tropospheric ozone	kg Ethene eq.	6.03E-02	2.60E-04	4.94E-05	4.30E-03	1.21E-05	0.00E+00	2.54E-06	-1.21E-02
Eutrophication potential	kg $(PO_4)^{3-}$ eq.	2.44E-02	6.45E-04	4.65E-04	3.46E-05	2.94E-05	1.68E-02	1.17E-04	-4.89E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb eq.	3.19E-02	0.00E+00	1.75E-06	7.00E-03	0.00E+00	9.60E-04	0.00E+00	-6.37E-03
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	3.07E+02	4.55E+00	5.88E+00	1.08E+01	7.58E-01	1.78E+00	3.36E-01	-6.15E+01
Environmental aspects: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	8.18E+00	9.10E-02	5.88E-02	1.62E+00	7.98E-01	2.40E-01	1.68E-02	-1.64E+00
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	3.51E+02	4.78E+00	6.29E+00	1.19E+01	7.96E-01	1.87E+00	3.48E-01	-7.02E+01
Use of secondary material	kg	3.73E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-7.46E-07
Use of renewable secondary fuels	MJ	6.96E-05	2.39E-01	0.00E+00	0.00E+00	3.98E-02	0.00E+00	0.00E+00	-1.39E-05
Use of non-renewable secondary fuels	MJ	6.37E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.27E-06
Net use of fresh water	m^3	4.61E-01	6.00E-06	1.08E-03	3.41E-03	7.20E-03	2.40E-04	9.60E-04	-9.22E-02
Other environmental information describing waste categories: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	9.79E-03	2.76E-05	0.00E+00	1.44E-05	1.52E-07	5.04E-06	2.40E-02	-1.96E-03
Non-hazardous waste disposed	kg	2.10E-01	2.56E-02	1.71E-02	1.30E-01	1.41E-04	4.80E-02	2.35E+00	-4.20E-02
Radioactive waste disposed	kg	3.31E-04	0.00E+00	0.00E+00	1.44E-05	0.00E+00	0.00E+00	0.00E+00	-6.62E-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
Materials for recycling	kg	0.00E+00	0.00E+00	4.90E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recover	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
Exported energy	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

Table 15. Environmental product characteristic – 1 m^2 of thermPIR (220 mm)

Environmental impacts: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential	kg CO_2 eq.	1.38E+01	5.47E-01	1.55E-01	1.04E+00	2.51E-02	6.47E+00	1.11E-02	-2.76E+00
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.	3.62E-05	0.00E+00	7.92E-09	1.14E-08	0.00E+00	9.50E-08	3.80E-09	-7.24E-06
Acidification potential of soil and water	kg SO_2 eq.	3.49E-01	4.02E-03	1.66E-04	9.13E-04	1.83E-04	3.70E-03	8.18E-05	-6.98E-02
Formation potential of tropospheric ozone	kg Ethene eq.	6.63E-02	2.86E-04	5.43E-05	4.73E-03	1.34E-05	0.00E+00	2.80E-06	-1.33E-02
Eutrophication potential	kg $(PO_4)^{3-}$ eq.	2.69E-02	7.09E-04	5.12E-04	3.81E-05	3.23E-05	1.85E-02	1.28E-04	-5.38E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb eq.	3.51E-02	0.00E+00	1.92E-06	7.70E-03	0.00E+00	1.06E-03	0.00E+00	-7.01E-03
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	3.38E+02	5.00E+00	6.47E+00	1.19E+01	8.34E-01	1.95E+00	3.70E-01	-6.76E+01
Environmental aspects: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	8.99E+00	1.00E-01	6.47E-02	1.78E+00	8.78E-01	2.64E-01	1.85E-02	-1.80E+00
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	3.86E+02	5.25E+00	6.92E+00	1.31E+01	8.76E-01	2.05E+00	3.83E-01	-7.72E+01
Use of secondary material	kg	4.10E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-8.21E-07
Use of renewable secondary fuels	MJ	7.65E-05	2.63E-01	0.00E+00	0.00E+00	4.38E-02	0.00E+00	0.00E+00	-1.53E-05
Use of non-renewable secondary fuels	MJ	7.01E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.40E-06
Net use of fresh water	m^3	5.07E-01	6.60E-06	1.19E-03	3.75E-03	7.92E-03	2.64E-04	1.06E-03	-1.01E-01
Other environmental information describing waste categories: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	1.08E-02	3.03E-05	0.00E+00	1.58E-05	1.67E-07	5.54E-06	2.64E-02	-2.15E-03
Non-hazardous waste disposed	kg	2.31E-01	2.82E-02	1.88E-02	1.43E-01	1.55E-04	5.28E-02	2.59E+00	-4.62E-02
Radioactive waste disposed	kg	3.64E-04	0.00E+00	0.00E+00	1.58E-05	0.00E+00	0.00E+00	0.00E+00	-7.29E-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
Materials for recycling	kg	0.00E+00	0.00E+00	5.39E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recover	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
Exported energy	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

Table 16. Environmental product characteristic – 1 m^2 of thermPIR (250 mm)

Environmental impacts: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential	kg CO_2 eq.	1.57E+01	6.21E-01	1.76E-01	1.18E+00	2.85E-02	7.35E+00	1.26E-02	-3.14E+00
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.	4.12E-05	0.00E+00	9.00E-09	1.30E-08	0.00E+00	1.08E-07	4.32E-09	-8.23E-06
Acidification potential of soil and water	kg SO_2 eq.	3.96E-01	4.57E-03	1.89E-04	1.04E-03	2.08E-04	4.20E-03	9.30E-05	-7.93E-02
Formation potential of tropospheric ozone	kg Ethene eq.	7.53E-02	3.25E-04	6.17E-05	5.38E-03	1.52E-05	0.00E+00	3.18E-06	-1.51E-02
Eutrophication potential	kg $(PO_4)^{3-}$ eq.	3.05E-02	8.06E-04	5.82E-04	4.33E-05	3.67E-05	2.10E-02	1.46E-04	-6.11E-03
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb eq.	3.98E-02	0.00E+00	2.18E-06	8.75E-03	0.00E+00	1.20E-03	0.00E+00	-7.97E-03
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	3.84E+02	5.68E+00	7.35E+00	1.35E+01	9.48E-01	2.22E+00	4.20E-01	-7.68E+01
Environmental aspects: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	1.02E+01	1.14E-01	7.35E-02	2.03E+00	9.98E-01	3.00E-01	2.10E-02	-2.04E+00
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	4.39E+02	5.97E+00	7.86E+00	1.49E+01	9.95E-01	2.33E+00	4.35E-01	-8.78E+01
Use of secondary material	kg	4.66E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-9.32E-07
Use of renewable secondary fuels	MJ	8.69E-05	2.98E-01	0.00E+00	0.00E+00	4.97E-02	0.00E+00	0.00E+00	-1.74E-05
Use of non-renewable secondary fuels	MJ	7.96E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.59E-06
Net use of fresh water	m^3	5.76E-01	7.50E-06	1.35E-03	4.27E-03	9.00E-03	3.00E-04	1.20E-03	-1.15E-01
Other environmental information describing waste categories: (DU) 1 m^2									
Indicator	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	1.22E-02	3.45E-05	0.00E+00	1.80E-05	1.90E-07	6.30E-06	3.00E-02	-2.45E-03
Non-hazardous waste disposed	kg	2.63E-01	3.20E-02	2.14E-02	1.63E-01	1.76E-04	6.00E-02	2.94E+00	-5.25E-02
Radioactive waste disposed	kg	4.14E-04	0.00E+00	0.00E+00	1.80E-05	0.00E+00	0.00E+00	0.00E+00	-8.28E-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
Materials for recycling	kg	0.00E+00	0.00E+00	6.12E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recover	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
Exported energy	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

Results interpretation

Interpretation of the results has been carried out considering the methodology. data-related assumptions and any limitations declared in the EPD. The environmental impact of thermPIR panel (cradle to gate with options) is mainly dependent on production of raw materials (A1) on which the manufacturer has only a little influence (in almost all impact categories impact of production of resources is higher than 90%). The amount of carbon dioxide necessary to produce raw materials (A1) for production of 1 kg of thermPIR product is 1.26 kg, where only MDI production is 81% of all carbon impact. There is emitted 6.28 kg CO_2/m^2 for a 100mm panel production (A1-A3) and the energy input is 176 MJ/m^2 (where only MDI gives impact 76% and next pentane 10%). All impact values (A1) are about several dozen times higher than the production process A3 itself. The production of faces for the cladding alone A1 gives a value of few percent of the value of the impacts of the panel production A1-A3. This means that the search for improvement of the environmental quality of the products may take place through the purchase of chemistry (mostly MDI). The impact of the PIR insulation increases with the thickness of the panel and is almost linear to its mass. For the thickest pallet variant 20mm GWP (carbon) value is 1.26 kg/m^2 and for 250 mm is 15.7 kg/m^2. The production in manufacturing plant A3 itself is not very energy demanding and emissive. Emissions mainly come from the combustion of natural gas. The electricity consumption of 0.22 kW /kg seems not worth noting. The transport of raw materials from considerable distances is rather not significant to overall values (1.5 - 4% of all impacts). The product utilization scenario after its disassembly from building assumes 20% re-use, 40% incineration and 40% landfill storage. PIR incineration provides heat. Currently landfilling is not a good option but this value is expected to change in the future. The sandwich panel products due to the 20% potential for reuse has some expected environmental gains provided in module D.

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 and ITB PCR A
Independent verification corresponding to ISO 14025 (subclause 8.1.3.) [x] external [ ] internal
External verification of EPD: Ph.D. Eng. Halina Prejzner LCA. LCI audit and input data verification: Ph.D. Eng. Michał Piasecki. m.piasecki@itb.pl Verification of LCA: Ph.D. Eng. Justyna Tomaszewska. j.tomaszewska@itb.pl

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

Normative references

- PU Europe - the European association of PU insulation manufacturers (www.pu-europe.eu)
- ITB PCR A General Product Category Rules for Construction Products
- 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+A1:2013 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
- PN-EN 15942:2012 Sustainability of construction works – Environmental product declarations – Communication format business-to-business
- KOBiZE Wskaźniki emisyjności CO_2, SO_2, NO_x, CO i pyłu całkowitego dla energii elektrycznej. grudzień 2019
- PN-EN 13165+A2:2016-08 Wyroby do izolacji cieplnej w budownictwie -- Wyroby ze sztywnej pianki poliuretanowej (PU) produkowane fabrycznie - Specyfikacja

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Thermal Physics, Acoustics and Environment Department
02-656 Warsaw, Ksawerów 21

CERTIFICATE № 145/2021
of TYPE III ENVIRONMENTAL DECLARATION

Product:

thermPIR insulation panels

Manufacturer:

Gór-Stal Sp. z o.o.

ul. Przemysłowa 11, 38-300 Gorlice, Poland

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

PN-EN 15804+A1

Sustainability of construction works.
Environmental product declarations.
Core rules for the product category of construction products.

This certificate, issued for the first time on 31st January 2021 is valid for 5 years
or until amendment of mentioned Environmental Declaration

Deputy Head of the Thermal Physic, Acoustics and Environment Department
Agnieszka Winkler-Skalna, PhD

INSTYTUT TECHNIKI BUDOWLANEJ

Deputy Director for Research and Innovation
Krzysztof Kuczyński, PhD

Warsaw, January 2021