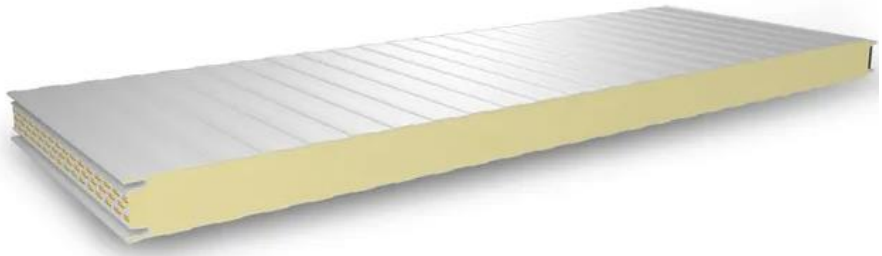
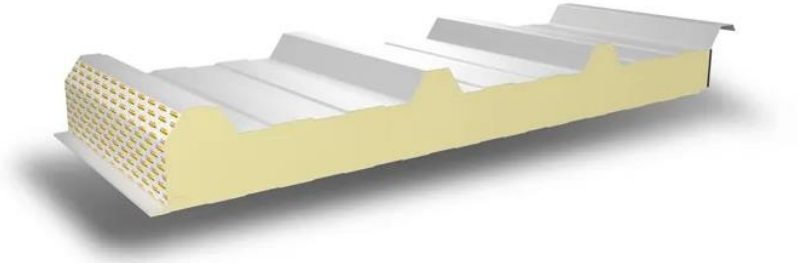
ENVIRONMENTAL PRODUCT DECLARATION

EPD Ref. No. 2024-0054-1

SANDWICH PANELS PIRTECH





In accordance with EN 15804+A2

OWNER OF THE EPD:

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DECLARED UNIT (DU): 1 m^2

Contents

1. GENERAL INFORMATION

This Environmental Product Declaration (EPD) is developed in accordance with the European standard EN 15804. It contains the information on the impacts of the declared construction materials on the environment.
EPDs may not be comparable if they do not comply with the EN 15804 standard and if the core systems are not based on the same database.

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EPD program operator	CERTBUD Sp. z o.o. ul. Mokotowska 46 lok. 8, 00-543 Warszawa e-mail: biuro@certyfikacja-certbud.pl www.certyfikacja-certbud.pl
Declared product(s)	Sandwich panels PIRTECH: - PWS – PIR – ST - PWS – PIR – PL - PWS – PIR – CH - PWD – PIR
Declaration reference number	EPD Ref. No. 2024-0054-1
PCR	PCR in accordance with EN 15804:2012+A2:2019
Date of issue	01-07-2024
Validity date	01-07-2029
Declared unit	1 m^2
Life cycle analysis (LCA)	A1-A3, C1-C4, D modules
Service Life	Depending of application up to 50 years
Reason for performing LCA	Bussines-to-bussines
Representativeness	Polish product, 2023

2. VERIFICATION

This Environmental Product Declaration (EPD) has been verified in accordance with ISO14025 and is valid for 5 years from the date of issue if the underlying data have not changed significantly.

CEN EN 15804 standard serves as the main PCR document.
Independent verification corresponding to ISO 14025:2010 ☐ Internal ☒ External
Third party verifier: Monika Kotkiewicz, CERTBUD Sp. z o.o.
External verification of EPD: Monika Kotkiewicz, CERTBUD Sp. z o. o. Input data verification, LCA: Krzysztof Bałkowiec, TBF Systemy Jakości Verification of LCA: Dominika Młot, CERTBUD Sp. z o. o.

Note: CERTBUD Sp. z o. o. is a notified body (No. 2310) of the European Commission and Member States designated for the tasks specified in the Regulation (EU) No 305/2011 of the European Parliament and of the Council laying down harmonised conditions for the marketing of construction products. In addition, CERTBUD Sp. z o.o. is a unit accredited by the Polish Centre for Accreditation - in the field of certification of construction products (accreditation number AC 158). CERTBUD Sp. z o.o. acts as an independent, third-party verification organization (17065/17025 certified).

CERTBUD Sp. z o.o. ZAKŁAD CERTYFIKACJI CERTBUD

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3. MANUFACTURER

3.1. GENERAL INFORMATION

Pruszyński Sp. z o.o. is the largest Polish manufacturer of steel roofing and facades and one of the biggest in Europe in this industry. The company is located in Sokołów, Poland. Blachy Pruszyński has started the production in 1985 by launched the production of tin accessories. Since the beginning of the activity, the company has been constantly developing and expanding construction products range.

Figure 3.1: A view of the Pruszyński Sp. z o.o. production hall

The company's commercial offer includes:

- Custom-made Steel Tiles, trapezoidal sheets
- Steel profiles
- Sandwich panels with PIR and MW core
- Elevation cassettes and panels
- Sheet metal processes
- Steel cassettes
- Smoke curtains

Each product is created individually for the needs of specific order using the latest technologies and machines and the use of the best raw materials.

3.2. MACHINE PARK

Internal logistics in the production process are based on 3 cranes, over 40 leading and side forklifts and specialized loading prams. All production lines and machines are served by experienced and highly qualified staff.

The machine park covers over 100 modern machines, including:

- 8 production lines for the production of roof tiles
- 2 modern lines for production of complete gutter system
- 25 production lines for trapezoidal profiles
- Line for the production of facade coffers
- Line for the production of wall cassetts
- 4 lines with guillotines for flat sheets
- 3 lines for the production of roof gags

Figure 3.2: Line with guillotines

- 2 lines for production cover on the so-colled standing
- Line for the production of wall panels
- Line for the production of sandwich panels with a core of mineral wool
- Line for production of sandwich panels with polyurethane core

All products have adequate technical and hygiene certification and meet the quality requirements for construction products.

Figure 3.3: Technology line for wall and roof sandwich panels with PIR core

4. DESCRIPTION AND CLASSIFICATION OF PRODUCTS

Sandwich panels are constructed from materials which consist of construction elements (external steel facings) and construction-insulation layer (core of the panels). Components are connected permanently on whole surface in order to get the static collaboration among them. The production process of sandwich panels with rigid polyisocyanurate (PIR) is carried out continuously. Technological process of production of sandwich panels consists of injecting the mixed components, which then foam a rigid PIR core with density of 40±3 kg/m^3, between two moving continuously steel facings; at the same time there is the application of gasket and aluminum foil into the joints of the panel.

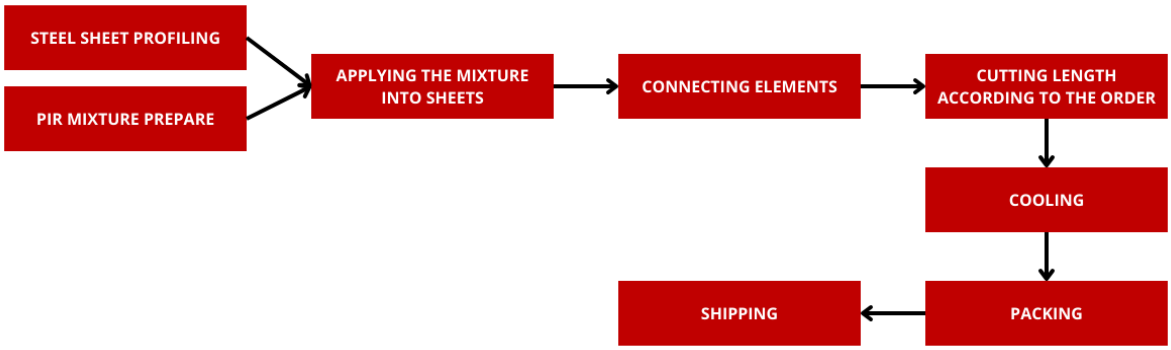


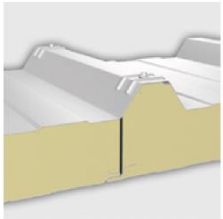
Figure 4.1: Sandwich panels with PIR core production scheme

Application:

- Curtain walls;
- Roofs;
- Internal partition walls;
- Occasionally as load-bearing walls;
- Ceiling elements.

The use of sandwich panels in the construction industry is due to the benefits of both small mass, as well as the specificity of raising from these products. To these benefits we can also include:

- Speed and ease of assembling
- Ability to exclude the heavy equipment from construction
- Clear reduction for heavy means of transport
- Easily removable and reassembled
- Decoupling of assembly work from atmospheric conditions
- Limitation of finishing works
- Particular ease in obtaining required thermal insulation of partitions, without the need for technological changes in production

Types of PIRTECH panels				
Name	STANDARD - ST	PLUS - PL	COLD STORAGE - CH	ROOF
joint				
designation	PWS-PIR-ST	PWS-PIR-PL	PWS-PIR-CH	PWD-PIR
core	PIR polyurethane			
thickness (mm)	40/50/60/80/100/110/120	60/80/100/120	120/140/160/180/200/220	40/60/80/100/120/160
effective width (mm)	1000, 1150	1000, 1050	1150	1050
thickness of the facing (mm)	0,50	0,50	0,50	0,50
range of external profiling	trapezoidal - T / micro - M / wave - F / no profiling*			trapezoidal T40
range of internal profiling	trapezoidal - T			
anti-corrosion coating	polyester gloss, polyester matt, polyurethane (PURMAT, PURLAK), hybrid coating PURMAX, HPS, PVDF			

*panels without profiling can be produced only for special order after consultations with producer

Figure 4.2: Types of sandwich panels PIRTECH produced in Pruszyński sp. z o.o.

5. LIFE CYCLE ASSESSMENT (LCA) - RULES

5.1. DECLARED UNIT (DU)

The declaration refers do declared unit – 1 m² of sandwich panels in the metal facings with PIR core manufactured by Pruszyński sp. z o.o.

5.2. ALLOCATION

The allocation rules used for this EPD are based on EN 15804+A2. PIR core sandwich panels are produced in one production hall, manufactured at Pruszyński sp. z o.o. in Sokołów, Poland. For the life cycle assessment (LCA) calculation purpose – mass basis allocation was done.

5.3. SYSTEM BOUNDARY

The system limits for the environmental characteristics of sandwich panels are shown in figure 5.1. Data used in LCA calculation were declared by manufacturer and reflected the actual status of the year 2023.

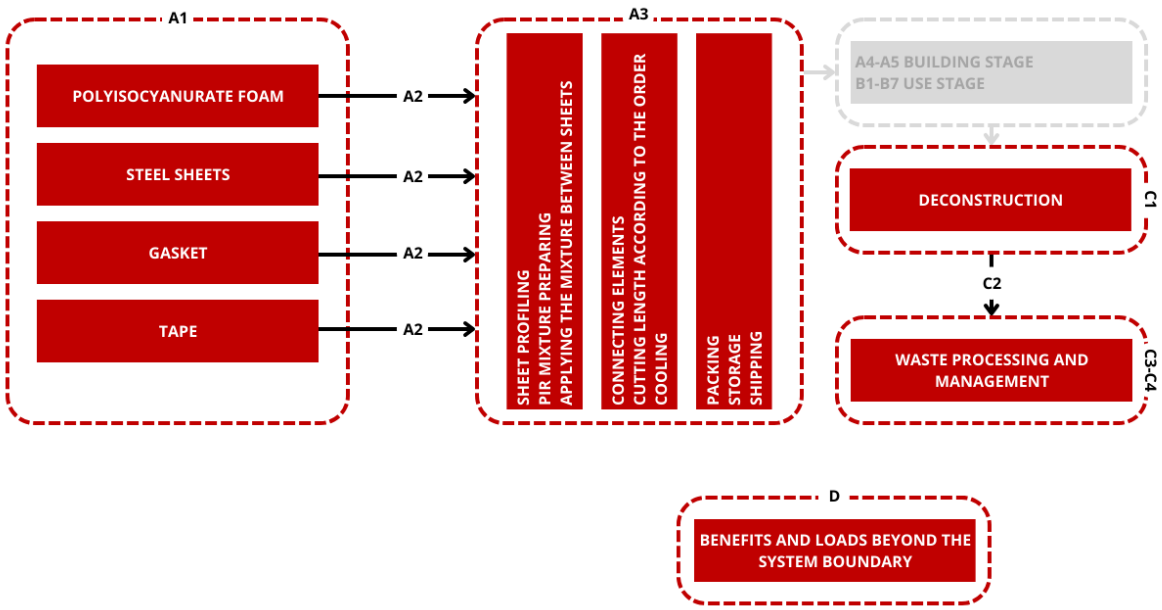


Figure 5.1: System boundary

This Environmental Product Declaration includes a life cycle assessment (LCA) for the Cradle-to-Gate with modules C1-C4, D according to EN 15804+A2.
Impacts from the two Pruszyński's production hall were inventoried and 60% were allocated to the production of PIRTECH sandwich panels.
All-important parameters from collected production data, i.e. all materials used by recipe, electricity consumed, internal fuel consumption and thermal energy, direct production waste, and the results of all available emission measurements were included in the calculations. In accordance with EN 15804, machinery and equipment (capital assets) needed for and during production, as well as the transportation of production facility employees, were not included.
The sum of omitted total flows does not exceed 1% and excluded consumption of renewable and non-renewable primary energy is no more than 1% according to EN 15804+A2.

5.3.1. A1 – RAW MATERIALS SUPPLY

This module takes into account the extraction and processing of all raw materials, as well as Energy consumption. The extraction and consumption of raw materials refers to specific mass shares in the production process per unit of declared product. Raw materials for the production of components of PIR core sandwich panels come from Polish and foreign suppliers.

5.3.2. A2 – TRANSPORT TO THE PRODUCTION SITE

Raw materials are transported to the production plant prom Polish and foreign suppliers. Distances from the place of obtaining raw materials to the production plant are individual for each raw material. The means of transport were diversified depending on the method of delivery of raw materials. The adopted model includes road transport (average values) for each raw material. For calculation purposes European fuel averages are applied in module A2.

5.3.3. A3 – PRODUCTION

Module A3 covers all production-related process – including the production of sandwich panels components, their packaging and internal transport.
A schematic of the production line for sandwich panels is shown in Fig.4.1.
This module takes into account energy consumption and wastages generated in the production plant, as well as losses generated in the production process.

5.3.4. C1-C2 – DEMOLITION AND TRANSPORT

The end of life stage commence with demolition. C1 module covers object's deconstruction within selective waste collection at deconstruction location (tab. 5.1.).
C2 module is the beginning of waste treatment and describe waste transport. It was assumed that waste transport carried out to waste management plant and landfill (tab. 5.1.). For calculation purposes European fuel averages are applied.

5.3.5. C3-C4 – WASTE PROCESSING AND MANAGEMENT

For the purpose of life cycle analysis, scenarios were developed for modules C3 and C4. In C3 module was assumed that 98% of steel scrap is recycled and waste PIR foam is use as RDF in energy recovery process. A remaining 2% of steel scrap and waste PIR foam will undergo landfilling (tab.5.1.).

Table 5.1: End of life scenario for sandwich panels PIRTECH

Module	Assumption
C1	• 42.8 MJ/kg – caloric value of diesel
C2	• 50 km – landfill • 50 km – waste management plant
C3	• 98% - steel recycling • 98% - PIR foam energy recovery
C4	• 2% - steel and PIR foam landfilling

5.3.6. D – BENEFITS AND LOADS BEYOND THE SYTEM BOUNDARY

Module D describe the environmental benefits and loads of reuse, recycling and energy recovery of waste material sat the end of life.
In apply scenario 98% of steel scrap and 98% PIR foam is process. In the recycling process, steel scrap is incorporated into the production of a new product. Waste PIR foam is incinerated with energy recovery. Caloric value of PIR foam is 7000 kcal/kg.

DATA COLLECTION PERIOD	The data regarding the production of products refer to period from 01.01.2023 to 31.12.2023
DATA QUALITY	The values determined to calculate the LCA originate from verified Pruszyński sp z o.o. inventory data. The LCA analysis uses data prepared based on actual consumption at the production site. The details collected are no more than two years old.
CALCULATION RULES	The impacts of the representative Blachy Pruszyński products were aggregated using weighted average. The weighted average method was used according to the percentage of each product of sandwich panels, based on the relations to whole production quantity. Impacts were calculated for all PIR core sandwich panels in the metal facings and are shown in tables 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14. The LCA analysis was conducted in accordance with the EN 15804+A2.
BACKGROUND DATA	The main source of general and auxiliary data is the Ecoinvent 3.9 database.

6. LIFE CYCLE ASSESSMENT (LCA) - RESULTS

Life cycle assessment (LCA) of this environmental declaration covers A1-A3, C1-C4, D modules („cradle to gate" with modules C1-C4, D). Tabel 6.1. shows the LCA modules considerate in calculating the environmental impact categories for the products covered by this declaration.

Table 6.1: Modules defined and not declared in system boundary

Product stage			Construction process stage		Use stage							End of life stage				
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use stage	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse, recovery, recycling potential
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

X – modules definded
MND – modules not declared

Indicators describing environmental impact of product can be categorized as general environmental impacts, additional impacts and environmental aspects related to resources. The abbreviations and its explanations used to describe the environmental impact of sandwich panels are shown below (tab. 6.2). The tables 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 614 present the results of the LCA analysis for sandwich panels PIRTECH products.

Tabel 6.2: Abbreviations and its explanations used in LCA analysis

ENVIRONMENTAL IMPACT INDICATORS	
GWP-total	Global Warming Potential – total
GWP-fossil	Greenhouse potential - fossil
GWP-biogenic	Greenhouse potential - biogenic
GWP-luluc	Global warming potential - land use and land use change
ODP	Stratospheric ozone depletion potential

AP	Soil and water acidification potential
EP-freshwater	Eutrophication potential - freshwater
EP-marine	Eutrophication potential - seawater
EP-terrestrial	Eutrophication potential - terrestrial
POCP	Potential for photochemical ozone synthesis
ADP-minerals &metals*	Potential for depletion of abiotic resources - non-fossil resources
ADP-fossil*	Abiotic depletion potential – fossil fuels
WDP	Water deprivation potential

ADDITIONAL ENVIRONAMENTAL IMPACTS INDICATORS

PM	Particulate matter
IRP**	Potential human exposure efficiency relative to U235
ETP-fw*	Potential comparative toxic unit for ecosystems
HTP-c*	Potential comparative toxic unit for humans (cancer effects)
HTP-nc*	Potential comparative toxic unit for humans (non-cancer effects)
SQP*	Potential soil quality index

ENVIRONMENTAL ASPECTS RELATED TO RESOURCE INDICATORS

PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials
PERM	Use of renewable primary energy resources used as raw materials
PERT	Total use of renewable primary energy resources
PEN-RE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials
RE	Use of non-renewable primary energy resources used as raw materials
PENRT	Total use of non-renewable primary energy resources
SM	Use of secondary material
RSF	Use of renewable secondary fuels
NRSF	Use of non-renewable secondary fuels
FW	Use of net fresh water

ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES INDICATORS

HWD	Hazardous waste disposed
NHWD	Non-hazardous waste disposed
RWD	Radioactive waste disposed
CRU	Components for reuse
MFR	Materials for recycling
MER	Materials for energy recovery
EEE	Exported electrical energy
EET	Exported thermal energy

*The results should be used with caution because there is high uncertainty or limited experience with this indicators.
**Apply mainly the possible impact of the nuclear fuel cycle on human health resulting from low ionizing radiation.

Table 6.3: LCA analysis results for sandwich panels in steel facings with PIR core with thickness 40 mm

Results per 1 m²: sandwich panels PIRTECH 40 mm										
ENVIRONMENTAL IMPACTS										
PARAMETER	UNIT	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-total	eq. kg CO2	2.48E+01	8.11E-01	2.86E-01	2.59E+01	3.57E-03	8.63E-02	4.42E+00	4.26E-03	-1.88E+01
GWP-fossil	eq. kg CO2	2.59E+01	8.10E-01	2.71E-01	2.70E+01	3.57E-03	8.62E-02	4.42E+00	4.25E-03	-1.88E+01
GWP-biogenic	eq. kg CO2	-1.43E+00	7.15E-04	1.55E-02	-1.42E+00	7.72E-07	6.61E-05	-2.76E-03	6.04E-06	-7.71E-03
GWP-luluc	eq. kg CO2	1.71E+00	3.99E-04	8.05E-05	1.71E+00	4.01E-07	4.21E-05	3.10E-04	7.92E-07	-2.86E-03
ODP	eq. kg CFC 11	3.13E-07	1.76E-08	1.77E-09	3.32E-07	5.67E-11	1.96E-09	9.65E-09	3.77E-11	-2.24E-07
AP	mol H+	7.55E-02	1.77E-03	1.96E-03	7.93E-02	3.31E-05	2.13E-04	5.64E-03	9.20E-06	-1.13E-01
EP-freshwater	eq. kg P	5.91E-03	5.75E-05	3.14E-04	6.28E-03	1.10E-07	6.36E-06	1.28E-04	1.66E-07	-1.82E-02
EP-marine	eq. kg N	2.58E-02	4.46E-04	3.08E-04	2.65E-02	1.53E-05	5.82E-05	3.30E-03	6.75E-04	-1.83E-02
EP-terrestrial	eq. mol N	2.16E-01	4.53E-03	2.59E-03	2.23E-01	1.67E-04	5.97E-04	2.48E-02	3.90E-05	-1.71E-01
POCP	eq. kq NMVOC	4.63E-02	2.75E-03	7.82E-04	4.98E-02	4.93E-05	3.49E-04	6.34E-03	1.49E-05	-7.00E-02
ADP-minerals & metals	eq. kg Sb.	1.41E-03	2.71E-06	1.06E-06	1.41E-03	1.28E-09	2.47E-07	1.15E-05	2.60E-09	-4.25E-05
ADP-fossil	MJ	3.09E+02	1.16E+01	3.26E+00	3.24E+02	4.70E-02	1.32E+00	4.80E+00	3.09E-02	-1.94E+02
WDP	eq. m3	2.50E+01	5.75E-02	5.71E-02	2.51E+01	1.16E-04	6.77E-03	1.97E-01	1.60E-04	-3.74E+00
ADDITIONAL IMPACTS										
PM	Disease incidence	2.08E-06	6.02E-08	5.16E-09	2.14E-06	9.22E-10	8.54E-09	3.99E-08	1.97E-10	-5.10E-07
IRP	eq. kBq U235	1.24E+00	1.56E-02	8.67E-03	1.27E+00	2.22E-05	1.65E-03	2.15E-02	5.40E-05	1.16E-01
ETP-fw	CTUe	3.94E+02	5.69E+00	1.08E+00	4.00E+02	2.23E-02	6.30E-01	1.20E+01	7.93E-02	-3.84E+01
HTTP-c	CTUh	1.41E-07	3.70E-10	1.29E-10	1.42E-07	1.09E-12	3.85E-11	6.73E-10	5.69E-13	8.79E-08
HTTP-nc	CTUh	4.66E-07	8.21E-09	5.23E-09	4.79E-07	7.68E-12	9.42E-10	2.54E-08	1.48E-11	-2.27E-07
SQP	dimensionless	1.99E+02	6.93E+00	6.71E-01	2.07E+02	3.14E-03	1.33E+00	4.64E+00	6.09E-02	-3.80E+01

ENVIRONMENTAL ASPECTS RELATED TO RESOURCE										
PERE	MJ	6.11E+01	1.81E-01	2.83E-01	6.16E+01	2.66E-04	1.91E-02	4.25E-01	8.48E-04	-1.08E+01
PERM	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
PERT	MJ	6.11E+01	1.81E-01	2.83E-01	6.16E+01	2.66E-04	1.91E-02	4.25E-01	8.48E-04	-1.08E+01
PEN-RE	MJ	3.09E+02	1.06E+01	3.21E+00	3.23E+02	4.28E-02	1.20E+00	4.55E+00	2.83E-02	-1.93E+02
PENRM	MJ	8.46E+00	1.00E+00	4.98E-02	9.51E+00	4.29E-03	1.14E-01	2.52E-01	2.62E-03	-1.33E+00
PENRT	MJ	3.18E+02	1.16E+01	3.26E+00	3.33E+02	4.70E-02	1.32E+00	4.80E+00	3.09E-02	-1.94E+02
SM	MJ	1.89E+00	1.27E-02	1.60E-02	1.92E+00	2.72E-05	1.32E-03	6.94E+00	2.86E-05	4.41E+00
RSF	MJ	1.28E-01	3.45E-03	9.10E-03	1.41E-01	3.00E-06	3.22E-04	5.24E-03	1.04E-05	-2.95E-01
NRSF	MJ	2.13E-01	6.98E-03	3.13E-02	2.51E-01	8.10E-06	6.67E-04	6.97E-03	1.59E-05	-1.39E+00
FW	m3	4.45E-01	1.40E-03	7.74E-03	4.54E-01	2.52E-06	1.76E-04	8.95E-03	3.27E-05	-3.80E-01
ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES										
HWD	kg	8.51E-01	1.08E-02	9.25E-03	8.71E-01	3.91E-05	1.24E-03	7.70E-02	2.81E-05	5.50E-01
NHWD	kg	5.27E-01	5.59E-01	1.77E-02	1.10E+00	2.90E-05	1.13E-01	1.15E-01	1.73E-01	-5.56E-01
RWD	kg	3.28E-03	3.80E-06	2.13E-06	3.29E-03	5.12E-09	3.99E-07	5.48E-06	1.28E-08	3.51E-05
CRU	kg	5.70E-21	-4.45E-22	2.43E-22	5.50E-21	-3.59E-25	-2.51E-23	3.52E-23	-1.13E-24	-2.51E-20
MFR	kg	1.27E+00	1.15E-02	1.56E-02	1.30E+00	2.24E-05	1.14E-03	1.16E-02	2.46E-05	-2.10E+00
MER	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
EEE	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
EET	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

Table 6.4: LCA analysis results for sandwich panels in steel facings with PIR core with thickness 50 mm

Results per 1 m²: sandwich panels PIRTECH 50 mm										
ENVIRONMENTAL IMPACTS										
PARAMETER	UNIT	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-total	eq. kg CO2	2.47E+01	8.31E-01	3.61E-01	2.59E+01	5.35E-03	1.05E-01	5.48E+00	5.13E-03	-2.20E+01
GWP-fossil	eq. kg CO2	2.59E+01	8.30E-01	3.42E-01	2.71E+01	5.35E-03	1.05E-01	5.48E+00	5.12E-03	-2.19E+01
GWP-biogenic	eq. kg CO2	-1.75E+00	7.33E-04	1.96E-02	-1.73E+00	1.16E-06	8.04E-05	-2.65E-03	6.95E-06	-2.46E-02
GWP-luluc	eq. kg CO2	1.73E+00	4.09E-04	1.02E-04	1.73E+00	6.02E-07	5.12E-05	3.22E-04	9.50E-07	-3.82E-03
ODP	eq. kg CFC 11	3.70E-07	1.81E-08	2.24E-09	3.90E-07	8.51E-11	2.38E-09	1.14E-08	4.03E-11	-2.38E-07
AP	mol H+	8.01E-02	1.81E-03	2.48E-03	8.44E-02	4.96E-05	2.60E-04	6.55E-03	1.02E-05	-1.36E-01
EP-freshwater	eq. kg P	6.02E-03	5.90E-05	3.96E-04	6.48E-03	1.64E-07	7.75E-06	1.33E-04	1.98E-07	-2.20E-02
EP-marine	eq. kg N	2.88E-02	4.57E-04	3.89E-04	2.97E-02	2.30E-05	7.08E-05	4.01E-03	8.44E-04	-2.16E-02
EP-terrestrial	eq. mol N	2.28E-01	4.64E-03	3.27E-03	2.36E-01	2.50E-04	7.27E-04	2.97E-02	4.27E-05	-2.00E-01
POCP	eq. kq NMVOC	5.22E-02	2.81E-03	9.88E-04	5.60E-02	7.40E-05	4.24E-04	7.54E-03	1.63E-05	-7.83E-02
ADP-minerals & metals	eq. kg Sb.	1.36E-03	2.78E-06	1.34E-06	1.36E-03	1.92E-09	3.01E-07	1.17E-05	3.03E-09	-5.52E-05
ADP-fossil	MJ	3.22E+02	1.19E+01	4.12E+00	3.38E+02	7.06E-02	1.60E+00	5.38E+00	3.35E-02	-2.30E+02
WDP	eq. m3	2.82E+01	5.89E-02	7.21E-02	2.83E+01	1.75E-04	8.24E-03	2.36E-01	1.82E-04	-4.43E+00
ADDITIONAL IMPACTS										
PM	Disease incidence	2.13E-06	6.16E-08	6.52E-09	2.20E-06	1.38E-09	1.04E-08	4.29E-08	2.14E-10	-5.51E-07
IRP	eq. kBq U235	1.30E+00	1.60E-02	1.09E-02	1.32E+00	3.33E-05	2.01E-03	2.21E-02	6.27E-05	1.26E-02
ETP-fw	CTUe	4.52E+02	5.83E+00	1.37E+00	4.59E+02	3.35E-02	7.66E-01	1.46E+01	9.69E-02	-4.87E+01
HTTP-c	CTUh	1.36E-07	3.79E-10	1.63E-10	1.37E-07	1.64E-12	4.69E-11	7.73E-10	6.44E-13	8.66E-08
HTTP-nc	CTUh	4.68E-07	8.42E-09	6.61E-09	4.83E-07	1.15E-11	1.15E-09	2.86E-08	1.76E-11	-2.88E-07
SQP	dimensionless	2.26E+02	7.10E+00	8.47E-01	2.34E+02	4.70E-03	1.62E+00	4.72E+00	6.56E-02	-4.59E+01

ENVIRONMENTAL ASPECTS RELATED TO RESOURCE										
PERE	MJ	7.00E+01	1.86E-01	3.57E-01	7.06E+01	3.99E-04	2.33E-02	4.37E-01	9.59E-04	-1.42E+01
PERM	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
PERT	MJ	7.00E+01	1.86E-01	3.57E-01	7.06E+01	3.99E-04	2.33E-02	4.37E-01	9.59E-04	-1.42E+01
PEN-RE	MJ	3.21E+02	1.08E+01	4.05E+00	3.36E+02	6.41E-02	1.47E+00	5.11E+00	3.07E-02	-2.29E+02
PENRM	MJ	1.02E+01	1.03E+00	6.29E-02	1.12E+01	6.44E-03	1.39E-01	2.80E-01	2.80E-03	-1.59E+00
PENRT	MJ	3.31E+02	1.19E+01	4.12E+00	3.47E+02	7.06E-02	1.60E+00	5.39E+00	3.35E-02	-2.30E+02
SM	MJ	2.07E+00	1.31E-02	2.02E-02	2.10E+00	4.08E-05	1.61E-03	6.94E+00	3.17E-05	4.21E+00
RSF	MJ	1.51E-01	3.54E-03	1.15E-02	1.66E-01	4.50E-06	3.92E-04	5.31E-03	1.15E-05	-4.06E-01
NRSF	MJ	2.42E-01	7.20E-03	3.96E-02	2.89E-01	1.22E-05	8.12E-04	7.30E-03	1.87E-05	-1.77E+00
FW	m3	5.25E-01	1.43E-03	9.78E-03	5.36E-01	3.78E-06	2.14E-04	1.09E-02	3.51E-05	-4.75E-01
ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES										
HWD	kg	8.80E-01	1.11E-02	1.17E-02	9.03E-01	5.87E-05	1.50E-03	9.36E-02	3.25E-05	4.43E-01
NHWD	kg	5.66E-01	5.73E-01	2.24E-02	1.16E+00	4.35E-05	1.38E-01	1.28E-01	1.81E-01	-6.76E-01
RWD	kg	3.16E-03	3.89E-06	2.69E-06	3.17E-03	7.68E-09	4.85E-07	5.62E-06	1.49E-08	9.65E-06
CRU	kg	6.63E-21	-4.56E-22	3.07E-22	6.48E-21	-5.38E-25	-3.05E-23	2.69E-23	-8.69E-25	-2.82E-20
MFR	kg	1.48E+00	1.18E-02	1.97E-02	1.51E+00	3.35E-05	1.38E-03	1.19E-02	2.71E-05	-2.29E+00
MER	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
EEE	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
EET	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

Table 6.5: LCA analysis results for sandwich panels in steel facings with PIR core with thickness 60 mm

Results per 1 m²: sandwich panels PIRTECH 60 mm										
ENVIRONMENTAL IMPACTS										
PARAMETER	UNIT	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-total	eq. kg CO2	2.67E+01	9.20E-01	4.29E-01	2.80E+01	3.57E-03	3.31E-01	6.54E+00	5.99E-03	-2.51E+01
GWP-fossil	eq. kg CO2	2.82E+01	9.19E-01	4.05E-01	2.96E+01	3.57E-03	3.30E-01	6.54E+00	5.98E-03	-2.51E+01
GWP-biogenic	eq. kg CO2	-2.15E+00	8.11E-04	2.32E-02	-2.13E+00	7.72E-07	2.53E-04	-2.55E-03	7.85E-06	-4.14E-02
GWP-luluc	eq. kg CO2	1.90E+00	4.53E-04	1.21E-04	1.90E+00	4.01E-07	1.61E-04	3.34E-04	1.11E-06	-4.77E-03
ODP	eq. kg CFC 11	4.50E-07	2.00E-08	2.66E-09	4.72E-07	5.67E-11	7.50E-09	1.31E-08	4.28E-11	-2.53E-07
AP	mol H+	9.07E-02	2.01E-03	2.94E-03	9.56E-02	3.31E-05	8.18E-04	7.46E-03	1.12E-05	-1.59E-01
EP-freshwater	eq. kg P	6.64E-03	6.53E-05	4.70E-04	7.17E-03	1.10E-07	2.44E-05	1.38E-04	2.31E-07	-2.58E-02
EP-marine	eq. kg N	3.38E-02	5.06E-04	4.61E-04	3.47E-02	1.53E-05	2.23E-04	4.71E-03	1.01E-03	-2.49E-02
EP-terrestrial	eq. mol N	2.58E-01	5.14E-03	3.88E-03	2.67E-01	1.67E-04	2.29E-03	3.46E-02	4.64E-05	-2.29E-01
POCP	eq. kq NMVOC	6.15E-02	3.12E-03	1.17E-03	6.58E-02	4.93E-05	1.34E-03	8.73E-03	1.76E-05	-8.65E-02
ADP-minerals & metals	eq. kg Sb.	1.43E-03	3.07E-06	1.59E-06	1.44E-03	1.28E-09	9.47E-07	1.18E-05	3.47E-09	-6.80E-05
ADP-fossil	MJ	3.60E+02	1.31E+01	4.88E+00	3.78E+02	4.70E-02	5.05E+00	5.97E+00	3.61E-02	-2.66E+02
WDP	eq. m3	3.32E+01	6.52E-02	8.55E-02	3.33E+01	1.16E-04	2.60E-02	2.76E-01	2.04E-04	-5.11E+00
ADDITIONAL IMPACTS										
PM	Disease incidence	2.37E-06	6.82E-08	7.74E-09	2.44E-06	9.22E-10	3.27E-08	4.59E-08	2.31E-10	-5.92E-07
IRP	eq. kBq U235	1.46E+00	1.78E-02	1.30E-02	1.49E+00	2.22E-05	6.33E-03	2.26E-02	7.13E-05	-9.10E-02
ETP-fw	CTUe	5.38E+02	6.46E+00	1.62E+00	5.46E+02	2.23E-02	2.41E+00	1.71E+01	1.15E-01	-5.90E+01
HTTP-c	CTUh	1.45E-07	4.19E-10	1.94E-10	1.45E-07	1.09E-12	1.48E-10	8.72E-10	7.18E-13	8.52E-08
HTTP-nc	CTUh	5.11E-07	9.32E-09	7.84E-09	5.28E-07	7.68E-12	3.61E-09	3.19E-08	2.05E-11	-3.50E-07
SQP	dimensionless	2.68E+02	7.86E+00	1.01E+00	2.77E+02	3.14E-03	5.09E+00	4.80E+00	7.04E-02	-5.38E+01

ENVIRONMENTAL ASPECTS RELATED TO RESOURCE										
PERE	MJ	8.33E+01	2.06E-01	4.24E-01	8.40E+01	2.66E-04	7.34E-02	4.49E-01	1.07E-03	-1.76E+01
PERM	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
PERT	MJ	8.33E+01	2.06E-01	4.24E-01	8.40E+01	2.66E-04	7.34E-02	4.49E-01	1.07E-03	-1.76E+01
PEN-RE	MJ	3.58E+02	1.20E+01	4.81E+00	3.74E+02	4.28E-02	4.61E+00	5.66E+00	3.31E-02	-2.64E+02
PENRM	MJ	1.23E+01	1.14E+00	7.46E-02	1.36E+01	4.29E-03	4.38E-01	3.07E-01	2.99E-03	-1.85E+00
PENRT	MJ	3.70E+02	1.31E+01	4.88E+00	3.88E+02	4.70E-02	5.05E+00	5.97E+00	3.61E-02	-2.66E+02
SM	MJ	2.40E+00	1.45E-02	2.40E-02	2.44E+00	2.72E-05	5.06E-03	6.94E+00	3.48E-05	4.02E+00
RSF	MJ	1.83E-01	3.92E-03	1.36E-02	2.00E-01	3.00E-06	1.23E-03	5.39E-03	1.25E-05	-5.16E-01
NRSF	MJ	2.86E-01	8.01E-03	4.69E-02	3.41E-01	8.10E-06	2.56E-03	7.62E-03	2.15E-05	-2.15E+00
FW	m3	6.36E-01	1.59E-03	1.16E-02	6.49E-01	2.52E-06	6.74E-04	1.29E-02	3.75E-05	-5.69E-01
ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES										
HWD	kg	9.81E-01	1.23E-02	1.39E-02	1.01E+00	3.91E-05	4.74E-03	1.10E-01	3.69E-05	3.36E-01
NHWD	kg	6.46E-01	6.34E-01	2.66E-02	1.31E+00	2.90E-05	4.35E-01	1.41E-01	1.89E-01	-7.96E-01
RWD	kg	3.34E-03	4.31E-06	3.19E-06	3.35E-03	5.12E-09	1.53E-06	5.75E-06	1.70E-08	-1.58E-05
CRU	kg	7.97E-21	-5.06E-22	3.64E-22	7.83E-21	-3.59E-25	-9.60E-23	1.86E-23	-6.06E-25	-3.13E-20
MFR	kg	1.77E+00	1.31E-02	2.34E-02	1.81E+00	2.24E-05	4.35E-03	1.23E-02	2.96E-05	-2.48E+00
MER	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
EEE	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
EET	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

Table 6.6: LCA analysis results for sandwich panels in steel facings with PIR core with thickness 80 mm

Results per 1 m²: sandwich panels PIRTECH 80 mm										
ENVIRONMENTAL IMPACTS										
PARAMETER	UNIT	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-total	eq. kg CO2	2.85E+01	1.02E+00	5.71E-01	3.01E+01	1.07E-02	1.40E-01	8.66E+00	7.72E-03	-3.14E+01
GWP-fossil	eq. kg CO2	3.06E+01	1.02E+00	5.40E-01	3.22E+01	1.07E-02	1.39E-01	8.66E+00	7.71E-03	-3.13E+01
GWP-biogenic	eq. kg CO2	-2.89E+00	8.99E-04	3.10E-02	-2.86E+00	2.32E-06	1.07E-04	-2.34E-03	9.66E-06	-7.52E-02
GWP-luluc	eq. kg CO2	2.08E+00	5.02E-04	1.61E-04	2.08E+00	1.20E-06	6.80E-05	3.58E-04	1.43E-06	-6.69E-03
ODP	eq. kg CFC 11	5.89E-07	2.22E-08	3.54E-09	6.15E-07	1.70E-10	3.16E-09	1.65E-08	4.78E-11	-2.83E-07
AP	mol H+	1.06E-01	2.22E-03	3.92E-03	1.12E-01	9.92E-05	3.45E-04	9.28E-03	1.32E-05	-2.06E-01
EP-freshwater	eq. kg P	7.38E-03	7.24E-05	6.26E-04	8.07E-03	3.29E-07	1.03E-05	1.49E-04	2.95E-07	-3.34E-02
EP-marine	eq. kg N	4.20E-02	5.61E-04	6.15E-04	4.31E-02	4.60E-05	9.40E-05	6.13E-03	1.35E-03	-3.14E-02
EP-terrestrial	eq. mol N	3.01E-01	5.70E-03	5.17E-03	3.12E-01	5.00E-04	9.65E-04	4.44E-02	5.39E-05	-2.86E-01
POCP	eq. kq NMVOC	7.71E-02	3.45E-03	1.56E-03	8.21E-02	1.48E-04	5.64E-04	1.11E-02	2.03E-05	-1.03E-01
ADP-minerals & metals	eq. kg Sb.	1.46E-03	3.41E-06	2.12E-06	1.47E-03	3.83E-09	3.99E-07	1.20E-05	4.34E-09	-9.36E-05
ADP-fossil	MJ	4.12E+02	1.46E+01	6.51E+00	4.33E+02	1.41E-01	2.13E+00	7.14E+00	4.13E-02	-3.38E+02
WDP	eq. m3	4.15E+01	7.23E-02	1.14E-01	4.17E+01	3.49E-04	1.09E-02	3.54E-01	2.49E-04	-6.47E+00
ADDITIONAL IMPACTS										
PM	Disease incidence	2.66E-06	7.56E-08	1.03E-08	2.75E-06	2.77E-09	1.38E-08	5.20E-08	2.65E-10	-6.74E-07
IRP	eq. kBq U235	1.67E+00	1.97E-02	1.73E-02	1.71E+00	6.65E-05	2.67E-03	2.37E-02	8.87E-05	-2.98E-01
ETP-fw	CTUe	6.86E+02	7.16E+00	2.16E+00	6.95E+02	6.70E-02	1.02E+00	2.21E+01	1.50E-01	-7.95E+01
HTTP-c	CTUh	1.48E-07	4.65E-10	2.58E-10	1.49E-07	3.28E-12	6.23E-11	1.07E-09	8.66E-13	8.26E-08
HTTP-nc	CTUh	5.57E-07	1.03E-08	1.05E-08	5.77E-07	2.30E-11	1.52E-09	3.84E-08	2.61E-11	-4.74E-07
SQP	dimensionless	3.38E+02	8.71E+00	1.34E+00	3.49E+02	9.41E-03	2.15E+00	4.96E+00	7.98E-02	-6.95E+01

ENVIRONMENTAL ASPECTS RELATED TO RESOURCE										
PERE	MJ	1.06E+02	2.28E-01	5.65E-01	1.07E+02	7.97E-04	3.10E-02	4.73E-01	1.29E-03	-2.45E+01
PERM	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
PERT	MJ	1.06E+02	2.28E-01	5.65E-01	1.07E+02	7.97E-04	3.10E-02	4.73E-01	1.29E-03	-2.45E+01
PEN-RE	MJ	4.06E+02	1.33E+01	6.41E+00	4.26E+02	1.28E-01	1.95E+00	6.78E+00	3.80E-02	-3.35E+02
PENRM	MJ	1.63E+01	1.26E+00	9.95E-02	1.77E+01	1.29E-02	1.85E-01	3.61E-01	3.36E-03	-2.36E+00
PENRT	MJ	4.23E+02	1.46E+01	6.51E+00	4.44E+02	1.41E-01	2.13E+00	7.14E+00	4.14E-02	-3.38E+02
SM	MJ	2.92E+00	1.60E-02	3.19E-02	2.97E+00	8.15E-05	2.13E-03	6.94E+00	4.10E-05	3.63E+00
RSF	MJ	2.39E-01	4.35E-03	1.82E-02	2.61E-01	8.99E-06	5.20E-04	5.54E-03	1.46E-05	-7.37E-01
NRSF	MJ	3.61E-01	8.97E-03	6.26E-02	4.32E-01	2.43E-05	1.08E-03	8.27E-03	2.70E-05	-2.92E+00
FW	m3	8.31E-01	1.76E-03	1.55E-02	8.48E-01	7.56E-06	2.84E-04	1.68E-02	4.22E-05	-7.59E-01
ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES										
HWD	kg	1.11E+00	1.36E-02	1.85E-02	1.14E+00	1.17E-04	2.00E-03	1.43E-01	4.58E-05	1.21E-01
NHWD	kg	7.68E-01	7.03E-01	3.54E-02	1.51E+00	8.69E-05	1.83E-01	1.66E-01	2.05E-01	-1.04E+00
RWD	kg	3.40E-03	4.79E-06	4.25E-06	3.41E-03	1.54E-08	6.45E-07	6.03E-06	2.13E-08	-6.67E-05
CRU	kg	1.03E-20	-5.62E-22	4.85E-22	1.02E-20	-1.08E-24	-4.05E-23	2.05E-24	-8.11E-26	-3.76E-20
MFR	kg	2.28E+00	1.45E-02	3.12E-02	2.33E+00	6.71E-05	1.84E-03	1.30E-02	3.46E-05	-2.85E+00
MER	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
EEE	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
EET	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

Table 6.7: LCA analysis results for sandwich panels in steel facings with PIR core with thickness 100 mm

Results per 1 m²: sandwich panels PIRTECH 100 mm										
ENVIRONMENTAL IMPACTS										
PARAMETER	UNIT	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-total	eq. kg CO2	3.03E+01	1.14E+00	7.15E-01	3.22E+01	1.43E-02	1.58E-01	1.08E+01	8.83E-03	-3.77E+01
GWP-fossil	eq. kg CO2	3.30E+01	1.14E+00	6.76E-01	3.48E+01	1.43E-02	1.58E-01	1.08E+01	8.82E-03	-3.76E+01
GWP-biogenic	eq. kg CO2	-3.63E+00	1.00E-03	3.88E-02	-3.59E+00	3.09E-06	1.21E-04	-2.13E-03	9.60E-06	-1.09E-01
GWP-luluc	eq. kg CO2	2.27E+00	5.62E-04	2.01E-04	2.27E+00	1.61E-06	7.72E-05	3.82E-04	1.62E-06	-8.60E-03
ODP	eq. kg CFC 11	7.29E-07	2.48E-08	4.43E-09	7.58E-07	2.27E-10	3.59E-09	1.99E-08	3.14E-11	-3.13E-07
AP	mol H+	1.22E-01	2.49E-03	4.90E-03	1.29E-01	1.32E-04	3.92E-04	1.11E-02	1.13E-05	-2.52E-01
EP-freshwater	eq. kg P	8.11E-03	8.10E-05	7.83E-04	8.98E-03	4.38E-07	1.17E-05	1.60E-04	3.31E-07	-4.09E-02
EP-marine	eq. kg N	5.01E-02	6.27E-04	7.69E-04	5.15E-02	6.13E-05	1.07E-04	7.55E-03	1.68E-03	-3.79E-02
EP-terrestrial	eq. mol N	3.44E-01	6.37E-03	6.47E-03	3.57E-01	6.66E-04	1.10E-03	5.41E-02	4.26E-05	-3.43E-01
POCP	eq. kq NMVOC	9.26E-02	3.86E-03	1.95E-03	9.84E-02	1.97E-04	6.40E-04	1.35E-02	1.56E-05	-1.20E-01
ADP-minerals & metals	eq. kg Sb.	1.49E-03	3.81E-06	2.65E-06	1.49E-03	5.11E-09	4.53E-07	1.22E-05	4.54E-09	-1.19E-04
ADP-fossil	MJ	4.64E+02	1.63E+01	8.14E+00	4.88E+02	1.88E-01	2.42E+00	8.31E+00	3.07E-02	-4.09E+02
WDP	eq. m3	4.99E+01	8.09E-02	1.43E-01	5.01E+01	4.65E-04	1.24E-02	4.32E-01	2.39E-04	-7.84E+00
ADDITIONAL IMPACTS										
PM	Disease incidence	2.96E-06	8.45E-08	1.29E-08	3.06E-06	3.69E-09	1.57E-08	5.81E-08	1.98E-10	-7.57E-07
IRP	eq. kBq U235	1.89E+00	2.21E-02	2.16E-02	1.93E+00	8.87E-05	3.03E-03	2.48E-02	9.10E-05	-5.06E-01
ETP-fw	CTUe	8.34E+02	8.01E+00	2.71E+00	8.44E+02	8.93E-02	1.16E+00	2.72E+01	1.79E-01	-1.00E+02
HTTP-c	CTUh	1.52E-07	5.20E-10	3.23E-10	1.53E-07	4.38E-12	7.07E-11	1.27E-09	8.05E-13	7.99E-08
HTTP-nc	CTUh	6.02E-07	1.16E-08	1.31E-08	6.27E-07	3.07E-11	1.73E-09	4.49E-08	2.89E-11	-5.97E-07
SQP	dimensionless	4.09E+02	9.73E+00	1.68E+00	4.20E+02	1.25E-02	2.44E+00	5.12E+00	5.68E-02	-8.52E+01

ENVIRONMENTAL ASPECTS RELATED TO RESOURCE										
PERE	MJ	1.29E+02	2.55E-01	7.07E-01	1.30E+02	1.06E-03	3.51E-02	4.98E-01	1.20E-03	-3.14E+01
PERM	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
PERT	MJ	1.29E+02	2.55E-01	7.07E-01	1.30E+02	1.06E-03	3.51E-02	4.98E-01	1.20E-03	-3.14E+01
PEN-RE	MJ	4.55E+02	1.49E+01	8.02E+00	4.78E+02	1.71E-01	2.21E+00	7.90E+00	2.85E-02	-4.06E+02
PENRM	MJ	2.03E+01	1.41E+00	1.24E-01	2.18E+01	1.72E-02	2.10E-01	4.15E-01	2.28E-03	-2.87E+00
PENRT	MJ	4.75E+02	1.63E+01	8.14E+00	5.00E+02	1.88E-01	2.42E+00	8.31E+00	3.07E-02	-4.09E+02
SM	MJ	3.44E+00	1.80E-02	3.99E-02	3.50E+00	1.09E-04	2.42E-03	6.94E+00	3.46E-05	3.24E+00
RSF	MJ	2.95E-01	4.88E-03	2.27E-02	3.22E-01	1.20E-05	5.90E-04	5.69E-03	1.18E-05	-9.58E-01
NRSF	MJ	4.36E-01	1.01E-02	7.83E-02	5.24E-01	3.24E-05	1.22E-03	8.92E-03	2.88E-05	-3.68E+00
FW	m3	1.03E+00	1.97E-03	1.93E-02	1.05E+00	1.01E-05	3.23E-04	2.07E-02	2.89E-05	-9.49E-01
ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES										
HWD	kg	1.24E+00	1.52E-02	2.31E-02	1.28E+00	1.56E-04	2.27E-03	1.77E-01	4.65E-05	-9.35E-02
NHWD	kg	8.90E-01	7.85E-01	4.43E-02	1.72E+00	1.16E-04	2.08E-01	1.92E-01	1.12E-01	-1.28E+00
RWD	kg	3.45E-03	5.36E-06	5.31E-06	3.46E-03	2.05E-08	7.32E-07	6.30E-06	2.21E-08	-1.18E-04
CRU	kg	1.26E-20	-6.29E-22	6.07E-22	1.26E-20	-1.44E-24	-4.60E-23	-1.45E-23	2.13E-24	-4.39E-20
MFR	kg	2.80E+00	1.63E-02	3.90E-02	2.85E+00	8.94E-05	2.08E-03	1.36E-02	2.85E-05	-3.23E+00
MER	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
EEE	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
EET	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

Table 6.8: LCA analysis results for sandwich panels in steel facings with PIR core with thickness 110 mm

Results per 1 m²: sandwich panels PIRTECH 110 mm										
ENVIRONMENTAL IMPACTS										
PARAMETER	UNIT	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-total	eq. kg CO2	3.00E+01	1.16E+00	7.82E-01	3.20E+01	1.61E-02	1.72E-01	1.18E+01	1.03E-02	-4.09E+01
GWP-fossil	eq. kg CO2	3.29E+01	1.15E+00	7.40E-01	3.48E+01	1.61E-02	1.72E-01	1.18E+01	1.03E-02	-4.07E+01
GWP-biogenic	eq. kg CO2	-3.91E+00	1.02E-03	4.24E-02	-3.86E+00	3.47E-06	1.32E-04	-2.03E-03	1.24E-05	-1.26E-01
GWP-luluc	eq. kg CO2	2.28E+00	5.68E-04	2.20E-04	2.28E+00	1.81E-06	8.39E-05	3.94E-04	1.90E-06	-9.55E-03
ODP	eq. kg CFC 11	7.77E-07	2.51E-08	4.85E-09	8.07E-07	2.55E-10	3.90E-09	2.16E-08	5.53E-11	-3.28E-07
AP	mol H+	1.25E-01	2.52E-03	5.37E-03	1.33E-01	1.49E-04	4.26E-04	1.20E-02	1.63E-05	-2.75E-01
EP-freshwater	eq. kg P	8.19E-03	8.20E-05	8.57E-04	9.12E-03	4.93E-07	1.27E-05	1.66E-04	3.92E-07	-4.47E-02
EP-marine	eq. kg N	5.28E-02	6.35E-04	8.42E-04	5.43E-02	6.90E-05	1.16E-04	8.25E-03	1.85E-03	-4.12E-02
EP-terrestrial	eq. mol N	3.55E-01	6.45E-03	7.08E-03	3.68E-01	7.50E-04	1.19E-03	5.90E-02	6.50E-05	-3.72E-01
POCP	eq. kq NMVOC	9.78E-02	3.91E-03	2.14E-03	1.04E-01	2.22E-04	6.95E-04	1.47E-02	2.43E-05	-1.28E-01
ADP-minerals & metals	eq. kg Sb.	1.43E-03	3.86E-06	2.90E-06	1.44E-03	5.75E-09	4.93E-07	1.24E-05	5.64E-09	-1.32E-04
ADP-fossil	MJ	4.74E+02	1.65E+01	8.91E+00	5.00E+02	2.12E-01	2.63E+00	8.90E+00	4.92E-02	-4.45E+02
WDP	eq. m3	5.27E+01	8.19E-02	1.56E-01	5.29E+01	5.24E-04	1.35E-02	4.71E-01	3.16E-04	-8.52E+00
ADDITIONAL IMPACTS										
PM	Disease incidence	3.00E-06	8.55E-08	1.41E-08	3.10E-06	4.15E-09	1.70E-08	6.11E-08	3.15E-10	-7.98E-07
IRP	eq. kBq U235	1.93E+00	2.23E-02	2.37E-02	1.98E+00	9.98E-05	3.29E-03	2.54E-02	1.15E-04	-6.09E-01
ETP-fw	CTUe	8.85E+02	8.11E+00	2.96E+00	8.96E+02	1.00E-01	1.26E+00	2.97E+01	2.03E-01	-1.10E+02
HTTP-c	CTUh	1.47E-07	5.26E-10	3.53E-10	1.48E-07	4.92E-12	7.68E-11	1.37E-09	1.09E-12	7.86E-08
HTTP-nc	CTUh	6.02E-07	1.17E-08	1.43E-08	6.28E-07	3.45E-11	1.88E-09	4.81E-08	3.45E-11	-6.59E-07
SQP	dimensionless	4.33E+02	9.85E+00	1.84E+00	4.45E+02	1.41E-02	2.65E+00	5.21E+00	9.40E-02	-9.31E+01

ENVIRONMENTAL ASPECTS RELATED TO RESOURCE										
PERE	MJ	1.37E+02	2.59E-01	7.74E-01	1.38E+02	1.20E-03	3.82E-02	5.10E-01	1.63E-03	-3.48E+01
PERM	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
PERT	MJ	1.37E+02	2.59E-01	7.74E-01	1.38E+02	1.20E-03	3.82E-02	5.10E-01	1.63E-03	-3.48E+01
PEN-RE	MJ	4.64E+02	1.51E+01	8.78E+00	4.88E+02	1.92E-01	2.40E+00	8.46E+00	4.53E-02	-4.42E+02
PENRM	MJ	2.18E+01	1.43E+00	1.36E-01	2.34E+01	1.93E-02	2.28E-01	4.42E-01	3.92E-03	-3.12E+00
PENRT	MJ	4.86E+02	1.65E+01	8.91E+00	5.11E+02	2.12E-01	2.63E+00	8.90E+00	4.92E-02	-4.45E+02
SM	MJ	3.60E+00	1.82E-02	4.37E-02	3.66E+00	1.22E-04	2.63E-03	6.94E+00	5.03E-05	3.05E+00
RSF	MJ	3.15E-01	4.94E-03	2.49E-02	3.45E-01	1.35E-05	6.42E-04	5.76E-03	1.77E-05	-1.07E+00
NRSF	MJ	4.61E-01	1.03E-02	8.57E-02	5.57E-01	3.65E-05	1.33E-03	9.24E-03	3.53E-05	-4.06E+00
FW	m3	1.10E+00	1.99E-03	2.12E-02	1.12E+00	1.13E-05	3.51E-04	2.26E-02	4.93E-05	-1.04E+00
ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES										
HWD	kg	1.27E+00	1.54E-02	2.53E-02	1.31E+00	1.76E-04	2.46E-03	1.93E-01	5.90E-05	-2.01E-01
NHWD	kg	9.23E-01	7.95E-01	4.85E-02	1.77E+00	1.30E-04	2.26E-01	2.05E-01	2.29E-01	-1.40E+00
RWD	kg	3.33E-03	5.43E-06	5.81E-06	3.34E-03	2.30E-08	7.95E-07	6.44E-06	2.76E-08	-1.43E-04
CRU	kg	1.34E-20	-6.37E-22	6.65E-22	1.35E-20	-1.61E-24	-5.00E-23	-2.28E-23	7.07E-25	-4.71E-20
MFR	kg	2.98E+00	1.65E-02	4.27E-02	3.04E+00	1.01E-04	2.27E-03	1.40E-02	4.22E-05	-3.42E+00
MER	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
EEE	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
EET	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

Table 6.9: LCA analysis results for sandwich panels in steel facings with PIR core with thickness 120 mm

Results per 1 m²: sandwich panels PIRTECH 120 mm										
ENVIRONMENTAL IMPACTS										
PARAMETER	UNIT	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-total	eq. kg CO2	3.25E+01	1.24E+00	8.57E-01	3.46E+01	1.78E-02	1.83E-01	1.29E+01	1.12E-02	-4.40E+01
GWP-fossil	eq. kg CO2	3.56E+01	1.24E+00	8.11E-01	3.76E+01	1.78E-02	1.83E-01	1.29E+01	1.12E-02	-4.39E+01
GWP-biogenic	eq. kg CO2	-4.10E+00	1.09E-03	4.65E-02	-4.05E+00	3.86E-06	1.40E-04	-1.92E-03	1.33E-05	-1.43E-01
GWP-luluc	eq. kg CO2	2.46E+00	6.11E-04	2.41E-04	2.46E+00	2.01E-06	8.93E-05	4.05E-04	2.06E-06	-1.05E-02
ODP	eq. kg CFC 11	8.10E-07	2.70E-08	5.31E-09	8.42E-07	2.84E-10	4.15E-09	2.33E-08	5.78E-11	-3.43E-07
AP	mol H+	1.34E-01	2.71E-03	5.88E-03	1.42E-01	1.65E-04	4.53E-04	1.29E-02	1.73E-05	-2.98E-01
EP-freshwater	eq. kg P	8.81E-03	8.81E-05	9.39E-04	9.83E-03	5.48E-07	1.35E-05	1.71E-04	4.24E-07	-4.85E-02
EP-marine	eq. kg N	5.58E-02	6.82E-04	9.23E-04	5.74E-02	7.66E-05	1.23E-04	8.96E-03	2.02E-03	-4.45E-02
EP-terrestrial	eq. mol N	3.78E-01	6.93E-03	7.76E-03	3.93E-01	8.33E-04	1.27E-03	6.39E-02	6.87E-05	-4.01E-01
POCP	eq. kq NMVOC	1.03E-01	4.20E-03	2.34E-03	1.10E-01	2.47E-04	7.40E-04	1.59E-02	2.57E-05	-1.36E-01
ADP-minerals & metals	eq. kg Sb.	1.57E-03	4.15E-06	3.17E-06	1.58E-03	6.39E-09	5.24E-07	1.25E-05	6.07E-09	-1.45E-04
ADP-fossil	MJ	5.06E+02	1.77E+01	9.77E+00	5.34E+02	2.35E-01	2.80E+00	9.48E+00	5.18E-02	-4.81E+02
WDP	eq. m3	5.56E+01	8.80E-02	1.71E-01	5.59E+01	5.82E-04	1.44E-02	5.11E-01	3.38E-04	-9.20E+00
ADDITIONAL IMPACTS										
PM	Disease incidence	3.22E-06	9.19E-08	1.55E-08	3.33E-06	4.61E-09	1.81E-08	6.41E-08	3.32E-10	-8.39E-07
IRP	eq. kBq U235	2.07E+00	2.40E-02	2.60E-02	2.12E+00	1.11E-04	3.50E-03	2.59E-02	1.23E-04	-7.13E-01
ETP-fw	CTUe	9.33E+02	8.71E+00	3.25E+00	9.45E+02	1.12E-01	1.34E+00	3.23E+01	2.21E-01	-1.21E+02
HTTP-c	CTUh	1.61E-07	5.66E-10	3.87E-10	1.62E-07	5.47E-12	8.17E-11	1.47E-09	1.16E-12	7.72E-08
HTTP-nc	CTUh	6.50E-07	1.26E-08	1.57E-08	6.79E-07	3.84E-11	2.00E-09	5.14E-08	3.73E-11	-7.21E-07
SQP	dimensionless	4.57E+02	1.06E+01	2.01E+00	4.70E+02	1.57E-02	2.82E+00	5.29E+00	9.88E-02	-1.01E+02

ENVIRONMENTAL ASPECTS RELATED TO RESOURCE										
PERE	MJ	1.44E+02	2.78E-01	8.48E-01	1.45E+02	1.33E-03	4.06E-02	5.22E-01	1.74E-03	-3.82E+01
PERM	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
PERT	MJ	1.44E+02	2.78E-01	8.48E-01	1.45E+02	1.33E-03	4.06E-02	5.22E-01	1.74E-03	-3.82E+01
PEN-RE	MJ	4.96E+02	1.62E+01	9.62E+00	5.22E+02	2.14E-01	2.56E+00	9.01E+00	4.77E-02	-4.78E+02
PENRM	MJ	2.27E+01	1.54E+00	1.49E-01	2.44E+01	2.15E-02	2.43E-01	4.69E-01	4.10E-03	-3.38E+00
PENRT	MJ	5.19E+02	1.77E+01	9.77E+00	5.46E+02	2.35E-01	2.80E+00	9.48E+00	5.18E-02	-4.81E+02
SM	MJ	3.82E+00	1.95E-02	4.79E-02	3.88E+00	1.36E-04	2.80E-03	6.94E+00	5.34E-05	2.86E+00
RSF	MJ	3.30E-01	5.30E-03	2.73E-02	3.63E-01	1.50E-05	6.83E-04	5.84E-03	1.87E-05	-1.18E+00
NRSF	MJ	4.86E-01	1.10E-02	9.39E-02	5.90E-01	4.05E-05	1.42E-03	9.57E-03	3.81E-05	-4.44E+00
FW	m3	1.15E+00	2.14E-03	2.32E-02	1.18E+00	1.26E-05	3.73E-04	2.46E-02	5.16E-05	-1.14E+00
ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES										
HWD	kg	1.36E+00	1.66E-02	2.77E-02	1.40E+00	1.96E-04	2.62E-03	2.10E-01	6.34E-05	-3.08E-01
NHWD	kg	9.80E-01	8.54E-01	5.32E-02	1.89E+00	1.45E-04	2.41E-01	2.18E-01	2.37E-01	-1.52E+00
RWD	kg	3.65E-03	5.83E-06	6.37E-06	3.67E-03	2.56E-08	8.47E-07	6.58E-06	2.97E-08	-1.69E-04
CRU	kg	1.42E-20	-6.84E-22	7.29E-22	1.42E-20	-1.79E-24	-5.32E-23	-3.10E-23	9.69E-25	-5.02E-20
MFR	kg	3.14E+00	1.77E-02	4.68E-02	3.20E+00	1.12E-04	2.41E-03	1.43E-02	4.47E-05	-3.60E+00
MER	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
EEE	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
EET	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

Table 6.10: LCA analysis results for sandwich panels in steel facings with PIR core with thickness 140 mm

Results per 1 m²: sandwich panels PIRTECH 140 mm										
ENVIRONMENTAL IMPACTS										
PARAMETER	UNIT	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-total	eq. kg CO2	3.51E+01	1.29E+00	9.94E-01	3.74E+01	2.14E-02	2.37E-01	1.50E+01	1.29E-02	-5.03E+01
GWP-fossil	eq. kg CO2	3.80E+01	1.29E+00	9.40E-01	4.02E+01	2.14E-02	2.36E-01	1.50E+01	1.29E-02	-5.01E+01
GWP-biogenic	eq. kg CO2	-3.86E+00	1.14E-03	5.39E-02	-3.80E+00	4.63E-06	1.81E-04	-1.71E-03	1.51E-05	-1.76E-01
GWP-luluc	eq. kg CO2	2.61E+00	6.36E-04	2.80E-04	2.61E+00	2.41E-06	1.15E-04	4.29E-04	2.38E-06	-1.24E-02
ODP	eq. kg CFC 11	7.34E-07	2.81E-08	6.16E-09	7.68E-07	3.40E-10	5.37E-09	2.67E-08	6.29E-11	-3.73E-07
AP	mol H+	1.35E-01	2.82E-03	6.82E-03	1.45E-01	1.98E-04	5.85E-04	1.47E-02	1.93E-05	-3.45E-01
EP-freshwater	eq. kg P	9.22E-03	9.17E-05	1.09E-03	1.04E-02	6.57E-07	1.74E-05	1.82E-04	4.88E-07	-5.61E-02
EP-marine	eq. kg N	5.46E-02	7.11E-04	1.07E-03	5.64E-02	9.20E-05	1.59E-04	1.04E-02	2.36E-03	-5.10E-02
EP-terrestrial	eq. mol N	3.83E-01	7.22E-03	9.00E-03	4.00E-01	1.00E-03	1.64E-03	7.37E-02	7.61E-05	-4.58E-01
POCP	eq. kq NMVOC	1.00E-01	4.37E-03	2.72E-03	1.07E-01	2.96E-04	9.55E-04	1.83E-02	2.83E-05	-1.53E-01
ADP-minerals & metals	eq. kg Sb.	1.77E-03	4.32E-06	3.68E-06	1.78E-03	7.67E-09	6.77E-07	1.27E-05	6.94E-09	-1.70E-04
ADP-fossil	MJ	5.17E+02	1.85E+01	1.13E+01	5.47E+02	2.82E-01	3.61E+00	1.07E+01	5.70E-02	-5.53E+02
WDP	eq. m3	5.42E+01	9.16E-02	1.98E-01	5.45E+01	6.98E-04	1.86E-02	5.89E-01	3.83E-04	-1.06E+01
ADDITIONAL IMPACTS										
PM	Disease incidence	3.35E-06	9.58E-08	1.79E-08	3.47E-06	5.53E-09	2.34E-08	7.02E-08	3.66E-10	-9.21E-07
IRP	eq. kBq U235	2.11E+00	2.49E-02	3.01E-02	2.16E+00	1.33E-04	4.53E-03	2.70E-02	1.41E-04	-9.20E-01
ETP-fw	CTUe	9.01E+02	9.07E+00	3.76E+00	9.14E+02	1.34E-01	1.73E+00	3.73E+01	2.56E-01	-1.41E+02
HTTP-c	CTUh	1.81E-07	5.89E-10	4.49E-10	1.82E-07	6.57E-12	1.06E-10	1.67E-09	1.31E-12	7.46E-08
HTTP-nc	CTUh	6.93E-07	1.31E-08	1.82E-08	7.24E-07	4.61E-11	2.58E-09	5.79E-08	4.29E-11	-8.44E-07
SQP	dimensionless	4.43E+02	1.10E+01	2.33E+00	4.57E+02	1.88E-02	3.64E+00	5.45E+00	1.08E-01	-1.17E+02

ENVIRONMENTAL ASPECTS RELATED TO RESOURCE										
PERE	MJ	1.39E+02	2.89E-01	9.84E-01	1.40E+02	1.59E-03	5.25E-02	5.46E-01	1.96E-03	-4.51E+01
PERM	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
PERT	MJ	1.39E+02	2.89E-01	9.84E-01	1.40E+02	1.59E-03	5.25E-02	5.46E-01	1.96E-03	-4.51E+01
PEN-RE	MJ	5.09E+02	1.69E+01	1.12E+01	5.37E+02	2.57E-01	3.30E+00	1.01E+01	5.25E-02	-5.49E+02
PENRM	MJ	2.11E+01	1.60E+00	1.73E-01	2.29E+01	2.58E-02	3.14E-01	5.23E-01	4.47E-03	-3.89E+00
PENRT	MJ	5.31E+02	1.85E+01	1.13E+01	5.60E+02	2.82E-01	3.61E+00	1.07E+01	5.70E-02	-5.53E+02
SM	MJ	3.78E+00	2.03E-02	5.55E-02	3.85E+00	1.63E-04	3.62E-03	6.95E+00	5.95E-05	2.47E+00
RSF	MJ	3.12E-01	5.51E-03	3.16E-02	3.49E-01	1.80E-05	8.82E-04	5.99E-03	2.08E-05	-1.40E+00
NRSF	MJ	4.67E-01	1.13E-02	1.09E-01	5.87E-01	4.86E-05	1.83E-03	1.02E-02	4.37E-05	-5.20E+00
FW	m3	1.10E+00	2.23E-03	2.69E-02	1.13E+00	1.51E-05	4.82E-04	2.85E-02	5.63E-05	-1.33E+00
ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES										
HWD	kg	1.40E+00	1.73E-02	3.21E-02	1.45E+00	2.35E-04	3.39E-03	2.43E-01	7.23E-05	-5.23E-01
NHWD	kg	9.77E-01	8.90E-01	6.16E-02	1.93E+00	1.74E-04	3.11E-01	2.44E-01	2.53E-01	-1.76E+00
RWD	kg	4.13E-03	6.06E-06	7.39E-06	4.14E-03	3.07E-08	1.09E-06	6.85E-06	3.39E-08	-2.19E-04
CRU	kg	1.37E-20	-7.10E-22	8.45E-22	1.39E-20	-2.15E-24	-6.87E-23	-4.76E-23	1.49E-24	-5.65E-20
MFR	kg	3.01E+00	1.84E-02	5.42E-02	3.08E+00	1.34E-04	3.11E-03	1.50E-02	4.98E-05	-3.98E+00
MER	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
EEE	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
EET	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

Table 6.11: LCA analysis results for sandwich panels in steel facings with PIR core with thickness 160 mm

Results per 1 m²: sandwich panels PIRTECH 160 mm										
ENVIRONMENTAL IMPACTS										
PARAMETER	UNIT	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-total	eq. kg CO2	3.69E+01	1.46E+00	1.14E+00	3.95E+01	2.50E-02	2.33E-01	1.71E+01	1.46E-02	-5.66E+01
GWP-fossil	eq. kg CO2	4.08E+01	1.45E+00	1.08E+00	4.33E+01	2.50E-02	2.32E-01	1.71E+01	1.46E-02	-5.64E+01
GWP-biogenic	eq. kg CO2	-5.26E+00	1.28E-03	6.20E-02	-5.19E+00	5.40E-06	1.78E-04	-1.51E-03	1.69E-05	-2.10E-01
GWP-luluc	eq. kg CO2	2.85E+00	7.16E-04	3.22E-04	2.85E+00	2.81E-06	1.13E-04	4.53E-04	2.69E-06	-1.43E-02
ODP	eq. kg CFC 11	1.01E-06	3.17E-08	7.08E-09	1.05E-06	3.97E-10	5.27E-09	3.01E-08	6.79E-11	-4.03E-07
AP	mol H+	1.61E-01	3.17E-03	7.84E-03	1.72E-01	2.31E-04	5.75E-04	1.65E-02	2.13E-05	-3.91E-01
EP-freshwater	eq. kg P	1.03E-02	1.03E-04	1.25E-03	1.16E-02	7.67E-07	1.72E-05	1.93E-04	5.53E-07	-6.37E-02
EP-marine	eq. kg N	6.93E-02	8.00E-04	1.23E-03	7.14E-02	1.07E-04	1.57E-04	1.18E-02	2.69E-03	-5.75E-02
EP-terrestrial	eq. mol N	4.55E-01	8.13E-03	1.03E-02	4.74E-01	1.17E-03	1.61E-03	8.35E-02	8.36E-05	-5.16E-01
POCP	eq. kq NMVOC	1.28E-01	4.93E-03	3.12E-03	1.37E-01	3.45E-04	9.39E-04	2.07E-02	3.10E-05	-1.69E-01
ADP-minerals & metals	eq. kg Sb.	1.71E-03	4.87E-06	4.23E-06	1.72E-03	8.94E-09	6.66E-07	1.29E-05	7.81E-09	-1.96E-04
ADP-fossil	MJ	6.00E+02	2.08E+01	1.30E+01	6.34E+02	3.29E-01	3.55E+00	1.18E+01	6.22E-02	-6.24E+02
WDP	eq. m3	6.94E+01	1.03E-01	2.28E-01	6.97E+01	8.14E-04	1.83E-02	6.67E-01	4.28E-04	-1.19E+01
ADDITIONAL IMPACTS										
PM	Disease incidence	3.79E-06	1.08E-07	2.06E-08	3.92E-06	6.45E-09	2.30E-08	7.62E-08	3.99E-10	-1.00E-06
IRP	eq. kBq U235	2.46E+00	2.82E-02	3.46E-02	2.52E+00	1.55E-04	4.45E-03	2.81E-02	1.58E-04	-1.13E+00
ETP-fw	CTUe	1.17E+03	1.02E+01	4.33E+00	1.19E+03	1.56E-01	1.70E+00	4.24E+01	2.91E-01	-1.62E+02
HTTP-c	CTUh	1.76E-07	6.63E-10	5.16E-10	1.77E-07	7.66E-12	1.04E-10	1.87E-09	1.46E-12	7.19E-08
HTTP-nc	CTUh	7.49E-07	1.47E-08	2.09E-08	7.85E-07	5.37E-11	2.54E-09	6.44E-08	4.85E-11	-9.68E-07
SQP	dimensionless	5.72E+02	1.24E+01	2.68E+00	5.87E+02	2.20E-02	3.58E+00	5.61E+00	1.18E-01	-1.32E+02

ENVIRONMENTAL ASPECTS RELATED TO RESOURCE										
PERE	MJ	1.81E+02	3.26E-01	1.13E+00	1.82E+02	1.86E-03	5.16E-02	5.70E-01	2.18E-03	-5.19E+01
PERM	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
PERT	MJ	1.81E+02	3.26E-01	1.13E+00	1.82E+02	1.86E-03	5.16E-02	5.70E-01	2.18E-03	-5.19E+01
PEN-RE	MJ	5.86E+02	1.90E+01	1.28E+01	6.17E+02	2.99E-01	3.25E+00	1.12E+01	5.74E-02	-6.20E+02
PENRM	MJ	2.87E+01	1.80E+00	1.99E-01	3.07E+01	3.01E-02	3.08E-01	5.78E-01	4.84E-03	-4.40E+00
PENRT	MJ	6.14E+02	2.08E+01	1.30E+01	6.48E+02	3.29E-01	3.55E+00	1.18E+01	6.22E-02	-6.24E+02
SM	MJ	4.70E+00	2.29E-02	6.39E-02	4.78E+00	1.90E-04	3.56E-03	6.95E+00	6.57E-05	2.08E+00
RSF	MJ	4.18E-01	6.22E-03	3.63E-02	4.61E-01	2.10E-05	8.67E-04	6.14E-03	2.29E-05	-1.62E+00
NRSF	MJ	6.05E-01	1.29E-02	1.25E-01	7.44E-01	5.67E-05	1.80E-03	1.09E-02	4.92E-05	-5.96E+00
FW	m3	1.47E+00	2.51E-03	3.09E-02	1.50E+00	1.76E-05	4.74E-04	3.24E-02	6.11E-05	-1.52E+00
ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES										
HWD	kg	1.60E+00	1.94E-02	3.69E-02	1.66E+00	2.74E-04	3.33E-03	2.76E-01	8.11E-05	-7.37E-01
NHWD	kg	1.19E+00	1.00E+00	7.08E-02	2.26E+00	2.03E-04	3.06E-01	2.70E-01	2.70E-01	-2.00E+00
RWD	kg	3.97E-03	6.84E-06	8.49E-06	3.99E-03	3.58E-08	1.07E-06	7.13E-06	3.81E-08	-2.70E-04
CRU	kg	1.80E-20	-8.03E-22	9.71E-22	1.81E-20	-2.51E-24	-6.75E-23	-6.41E-23	2.02E-24	-6.28E-20
MFR	kg	3.96E+00	2.07E-02	6.23E-02	4.05E+00	1.57E-04	3.06E-03	1.56E-02	5.48E-05	-4.36E+00
MER	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
EEE	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
EET	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

Table 6.12: LCA analysis results for sandwich panels in steel facings with PIR core with thickness 180 mm

Results per 1 m²: sandwich panels PIRTECH 180 mm										
ENVIRONMENTAL IMPACTS										
PARAMETER	UNIT	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-total	eq. kg CO2	3.78E+01	1.46E+00	1.29E+00	4.06E+01	2.85E-02	2.61E-01	1.93E+01	1.64E-02	-6.29E+01
GWP-fossil	eq. kg CO2	4.15E+01	1.46E+00	1.22E+00	4.42E+01	2.85E-02	2.60E-01	1.93E+01	1.63E-02	-6.27E+01
GWP-biogenic	eq. kg CO2	-4.98E+00	1.28E-03	6.99E-02	-4.91E+00	6.18E-06	1.99E-04	-1.30E-03	1.87E-05	-2.44E-01
GWP-luluc	eq. kg CO2	2.89E+00	7.18E-04	3.63E-04	2.89E+00	3.21E-06	1.27E-04	4.77E-04	3.01E-06	-1.62E-02
ODP	eq. kg CFC 11	9.32E-07	3.17E-08	7.99E-09	9.72E-07	4.54E-10	5.91E-09	3.35E-08	7.29E-11	-4.33E-07
AP	mol H+	1.58E-01	3.18E-03	8.85E-03	1.70E-01	2.65E-04	6.44E-04	1.84E-02	2.33E-05	-4.37E-01
EP-freshwater	eq. kg P	1.03E-02	1.03E-04	1.41E-03	1.18E-02	8.76E-07	1.92E-05	2.04E-04	6.17E-07	-7.13E-02
EP-marine	eq. kg N	6.70E-02	8.02E-04	1.39E-03	6.92E-02	1.23E-04	1.75E-04	1.32E-02	3.03E-03	-6.41E-02
EP-terrestrial	eq. mol N	4.49E-01	8.15E-03	1.17E-02	4.68E-01	1.33E-03	1.80E-03	9.33E-02	9.10E-05	-5.73E-01
POCP	eq. kq NMVOC	1.23E-01	4.94E-03	3.53E-03	1.32E-01	3.95E-04	1.05E-03	2.31E-02	3.37E-05	-1.86E-01
ADP-minerals & metals	eq. kg Sb.	1.81E-03	4.87E-06	4.77E-06	1.82E-03	1.02E-08	7.45E-07	1.32E-05	8.68E-09	-2.22E-04
ADP-fossil	MJ	5.95E+02	2.08E+01	1.47E+01	6.30E+02	3.76E-01	3.98E+00	1.30E+01	6.74E-02	-6.96E+02
WDP	eq. m3	6.69E+01	1.03E-01	2.57E-01	6.73E+01	9.31E-04	2.04E-02	7.46E-01	4.72E-04	-1.33E+01
ADDITIONAL IMPACTS										
PM	Disease incidence	3.80E-06	1.08E-07	2.33E-08	3.93E-06	7.38E-09	2.58E-08	8.23E-08	4.33E-10	-1.09E-06
IRP	eq. kBq U235	2.43E+00	2.82E-02	3.91E-02	2.50E+00	1.77E-04	4.98E-03	2.92E-02	1.75E-04	-1.33E+00
ETP-fw	CTUe	1.13E+03	1.02E+01	4.88E+00	1.14E+03	1.79E-01	1.90E+00	4.74E+01	3.27E-01	-1.82E+02
HTTP-c	CTUh	1.86E-07	6.65E-10	5.82E-10	1.87E-07	8.76E-12	1.16E-10	2.07E-09	1.61E-12	6.92E-08
HTTP-nc	CTUh	7.62E-07	1.48E-08	2.36E-08	8.00E-07	6.14E-11	2.84E-09	7.09E-08	5.42E-11	-1.09E-06
SQP	dimensionless	5.50E+02	1.24E+01	3.03E+00	5.66E+02	2.51E-02	4.01E+00	5.77E+00	1.27E-01	-1.48E+02

ENVIRONMENTAL ASPECTS RELATED TO RESOURCE										
PERE	MJ	1.74E+02	3.26E-01	1.28E+00	1.75E+02	2.13E-03	5.78E-02	5.94E-01	2.40E-03	-5.88E+01
PERM	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
PERT	MJ	1.74E+02	3.26E-01	1.28E+00	1.75E+02	2.13E-03	5.78E-02	5.94E-01	2.40E-03	-5.88E+01
PEN-RE	MJ	5.82E+02	1.90E+01	1.45E+01	6.15E+02	3.42E-01	3.63E+00	1.24E+01	6.22E-02	-6.91E+02
PENRM	MJ	2.70E+01	1.81E+00	2.25E-01	2.91E+01	3.43E-02	3.45E-01	6.32E-01	5.22E-03	-4.91E+00
PENRT	MJ	6.09E+02	2.08E+01	1.47E+01	6.45E+02	3.76E-01	3.98E+00	1.30E+01	6.75E-02	-6.96E+02
SM	MJ	4.57E+00	2.29E-02	7.21E-02	4.66E+00	2.17E-04	3.98E-03	6.95E+00	7.19E-05	1.69E+00
RSF	MJ	3.96E-01	6.22E-03	4.10E-02	4.43E-01	2.40E-05	9.71E-04	6.29E-03	2.50E-05	-1.84E+00
NRSF	MJ	5.79E-01	1.28E-02	1.41E-01	7.33E-01	6.48E-05	2.01E-03	1.15E-02	5.47E-05	-6.72E+00
FW	m3	1.40E+00	2.52E-03	3.49E-02	1.43E+00	2.02E-05	5.31E-04	3.63E-02	6.58E-05	-1.71E+00
ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES										
HWD	kg	1.60E+00	1.95E-02	4.17E-02	1.66E+00	3.13E-04	3.73E-03	3.10E-01	8.99E-05	-9.52E-01
NHWD	kg	1.16E+00	1.00E+00	7.99E-02	2.24E+00	2.32E-04	3.42E-01	2.96E-01	2.86E-01	-2.23E+00
RWD	kg	4.21E-03	6.84E-06	9.59E-06	4.23E-03	4.09E-08	1.20E-06	7.40E-06	4.23E-08	-3.21E-04
CRU	kg	1.73E-20	-8.02E-22	1.10E-21	1.76E-20	-2.87E-24	-7.56E-23	-8.07E-23	2.55E-24	-6.91E-20
MFR	kg	3.79E+00	2.08E-02	7.03E-02	3.88E+00	1.79E-04	3.43E-03	1.63E-02	5.98E-05	-4.73E+00
MER	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
EEE	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
EET	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

Table 6.13: LCA analysis results for sandwich panels in steel facings with PIR core with thickness 200 mm

Results per 1 m²: sandwich panels PIRTECH 200 mm										
ENVIRONMENTAL IMPACTS										
PARAMETER	UNIT	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-total	eq. kg CO2	3.92E+01	1.54E+00	1.43E+00	4.22E+01	3.21E-02	2.84E-01	2.14E+01	1.81E-02	-6.92E+01
GWP-fossil	eq. kg CO2	4.33E+01	1.54E+00	1.35E+00	4.62E+01	3.21E-02	2.83E-01	2.14E+01	1.81E-02	-6.89E+01
GWP-biogenic	eq. kg CO2	-5.54E+00	1.36E-03	7.75E-02	-5.46E+00	6.95E-06	2.17E-04	-1.09E-03	2.05E-05	-2.77E-01
GWP-luluc	eq. kg CO2	3.04E+00	7.59E-04	4.02E-04	3.04E+00	3.61E-06	1.38E-04	5.00E-04	3.33E-06	-1.82E-02
ODP	eq. kg CFC 11	1.03E-06	3.35E-08	8.86E-09	1.07E-06	5.11E-10	6.43E-09	3.69E-08	7.79E-11	-4.63E-07
AP	mol H+	1.70E-01	3.36E-03	9.81E-03	1.83E-01	2.98E-04	7.01E-04	2.02E-02	2.53E-05	-4.84E-01
EP-freshwater	eq. kg P	1.09E-02	1.09E-04	1.57E-03	1.26E-02	9.86E-07	2.09E-05	2.15E-04	6.82E-07	-7.89E-02
EP-marine	eq. kg N	7.32E-02	8.47E-04	1.54E-03	7.56E-02	1.38E-04	1.91E-04	1.46E-02	3.37E-03	-7.06E-02
EP-terrestrial	eq. mol N	4.81E-01	8.61E-03	1.29E-02	5.03E-01	1.50E-03	1.96E-03	1.03E-01	9.84E-05	-6.30E-01
POCP	eq. kq NMVOC	1.35E-01	5.22E-03	3.91E-03	1.44E-01	4.44E-04	1.14E-03	2.55E-02	3.64E-05	-2.02E-01
ADP-minerals & metals	eq. kg Sb.	1.83E-03	5.15E-06	5.29E-06	1.84E-03	1.15E-08	8.11E-07	1.34E-05	9.55E-09	-2.47E-04
ADP-fossil	MJ	6.33E+02	2.20E+01	1.63E+01	6.72E+02	4.23E-01	4.33E+00	1.42E+01	7.27E-02	-7.67E+02
WDP	eq. m3	7.32E+01	1.09E-01	2.85E-01	7.36E+01	1.05E-03	2.22E-02	8.24E-01	5.17E-04	-1.47E+01
ADDITIONAL IMPACTS										
PM	Disease incidence	4.03E-06	1.14E-07	2.58E-08	4.17E-06	8.30E-09	2.80E-08	8.83E-08	4.66E-10	-1.17E-06
IRP	eq. kBq U235	2.60E+00	2.98E-02	4.33E-02	2.67E+00	2.00E-04	5.42E-03	3.03E-02	1.93E-04	-1.54E+00
ETP-fw	CTUe	1.24E+03	1.08E+01	5.41E+00	1.25E+03	2.01E-01	2.07E+00	5.25E+01	3.62E-01	-2.03E+02
HTTP-c	CTUh	1.89E-07	7.02E-10	6.45E-10	1.90E-07	9.85E-12	1.26E-10	2.27E-09	1.76E-12	6.66E-08
HTTP-nc	CTUh	7.96E-07	1.56E-08	2.61E-08	8.38E-07	6.91E-11	3.10E-09	7.74E-08	5.98E-11	-1.21E-06
SQP	dimensionless	6.04E+02	1.32E+01	3.35E+00	6.21E+02	2.82E-02	4.36E+00	5.93E+00	1.37E-01	-1.64E+02

ENVIRONMENTAL ASPECTS RELATED TO RESOURCE										
PERE	MJ	1.91E+02	3.45E-01	1.41E+00	1.93E+02	2.39E-03	6.29E-02	6.18E-01	2.62E-03	-6.56E+01
PERM	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
PERT	MJ	1.91E+02	3.45E-01	1.41E+00	1.93E+02	2.39E-03	6.29E-02	6.18E-01	2.62E-03	-6.56E+01
PEN-RE	MJ	6.18E+02	2.01E+01	1.60E+01	6.54E+02	3.85E-01	3.95E+00	1.35E+01	6.71E-02	-7.62E+02
PENRM	MJ	3.00E+01	1.91E+00	2.49E-01	3.21E+01	3.86E-02	3.76E-01	6.86E-01	5.59E-03	-5.42E+00
PENRT	MJ	6.48E+02	2.20E+01	1.63E+01	6.86E+02	4.23E-01	4.33E+00	1.42E+01	7.27E-02	-7.68E+02
SM	MJ	4.96E+00	2.42E-02	7.99E-02	5.07E+00	2.45E-04	4.33E-03	6.95E+00	7.81E-05	1.31E+00
RSF	MJ	4.38E-01	6.58E-03	4.54E-02	4.90E-01	2.70E-05	1.06E-03	6.44E-03	2.70E-05	-2.06E+00
NRSF	MJ	6.35E-01	1.36E-02	1.57E-01	8.05E-01	7.29E-05	2.19E-03	1.22E-02	6.03E-05	-7.49E+00
FW	m3	1.55E+00	2.66E-03	3.87E-02	1.59E+00	2.27E-05	5.78E-04	4.02E-02	7.05E-05	-1.90E+00
ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES										
HWD	kg	1.70E+00	2.06E-02	4.62E-02	1.77E+00	3.52E-04	4.06E-03	3.43E-01	9.88E-05	-1.17E+00
NHWD	kg	1.25E+00	1.06E+00	8.86E-02	2.40E+00	2.61E-04	3.73E-01	3.21E-01	3.02E-01	-2.47E+00
RWD	kg	4.25E-03	7.24E-06	1.06E-05	4.27E-03	4.61E-08	1.31E-06	7.68E-06	4.66E-08	-3.72E-04
CRU	kg	1.91E-20	-8.49E-22	1.21E-21	1.94E-20	-3.23E-24	-8.23E-23	-9.72E-23	3.07E-24	-7.54E-20
MFR	kg	4.18E+00	2.20E-02	7.80E-02	4.28E+00	2.01E-04	3.73E-03	1.70E-02	6.49E-05	-5.11E+00
MER	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
EEE	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
EET	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

Table 6.14: LCA analysis results for sandwich panels in steel facings with PIR core with thickness 220 mm

Results per 1 m²: sandwich panels PIRTECH 220 mm										
ENVIRONMENTAL IMPACTS										
PARAMETER	UNIT	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-total	eq. kg CO2	4.06E+01	1.63E+00	1.56E+00	4.37E+01	3.57E-02	3.51E-01	2.35E+01	1.98E-02	-7.55E+01
GWP-fossil	eq. kg CO2	4.51E+01	1.62E+00	1.47E+00	4.82E+01	3.57E-02	3.50E-01	2.35E+01	1.98E-02	-7.52E+01
GWP-biogenic	eq. kg CO2	-6.10E+00	1.43E-03	8.45E-02	-6.01E+00	7.72E-06	2.68E-04	-8.80E-04	2.23E-05	-3.11E-01
GWP-luluc	eq. kg CO2	3.18E+00	7.99E-04	4.38E-04	3.18E+00	4.01E-06	1.71E-04	5.24E-04	3.65E-06	-2.01E-02
ODP	eq. kg CFC 11	1.13E-06	3.53E-08	9.65E-09	1.18E-06	5.67E-10	7.95E-09	4.03E-08	8.29E-11	-4.93E-07
AP	mol H+	1.81E-01	3.54E-03	1.07E-02	1.96E-01	3.31E-04	8.67E-04	2.20E-02	2.74E-05	-5.30E-01
EP-freshwater	eq. kg P	1.14E-02	1.15E-04	1.71E-03	1.33E-02	1.10E-06	2.58E-05	2.26E-04	7.46E-07	-8.65E-02
EP-marine	eq. kg N	7.94E-02	8.93E-04	1.68E-03	8.19E-02	1.53E-04	2.36E-04	1.60E-02	3.70E-03	-7.71E-02
EP-terrestrial	eq. mol N	5.14E-01	9.07E-03	1.41E-02	5.37E-01	1.67E-03	2.43E-03	1.13E-01	1.06E-04	-6.88E-01
POCP	eq. kq NMVOC	1.47E-01	5.50E-03	4.26E-03	1.57E-01	4.93E-04	1.42E-03	2.78E-02	3.91E-05	-2.19E-01
ADP-minerals & metals	eq. kg Sb.	1.85E-03	5.43E-06	5.77E-06	1.86E-03	1.28E-08	1.00E-06	1.36E-05	1.04E-08	-2.73E-04
ADP-fossil	MJ	6.72E+02	2.32E+01	1.77E+01	7.13E+02	4.70E-01	5.36E+00	1.53E+01	7.79E-02	-8.39E+02
WDP	eq. m3	7.96E+01	1.15E-01	3.11E-01	8.00E+01	1.16E-03	2.75E-02	9.02E-01	5.62E-04	-1.60E+01
ADDITIONAL IMPACTS										
PM	Disease incidence	4.25E-06	1.20E-07	2.81E-08	4.40E-06	9.22E-09	3.47E-08	9.44E-08	5.00E-10	-1.25E-06
IRP	eq. kBq U235	2.76E+00	3.14E-02	4.72E-02	2.84E+00	2.22E-04	6.71E-03	3.14E-02	2.10E-04	-1.75E+00
ETP-fw	CTUe	1.35E+03	1.14E+01	5.90E+00	1.37E+03	2.23E-01	2.56E+00	5.76E+01	3.97E-01	-2.23E+02
HTTP-c	CTUh	1.91E-07	7.40E-10	7.03E-10	1.93E-07	1.09E-11	1.56E-10	2.46E-09	1.91E-12	6.39E-08
HTTP-nc	CTUh	8.31E-07	1.64E-08	2.85E-08	8.76E-07	7.68E-11	3.83E-09	8.39E-08	6.54E-11	-1.34E-06
SQP	dimensionless	6.58E+02	1.39E+01	3.65E+00	6.75E+02	3.14E-02	5.39E+00	6.09E+00	1.46E-01	-1.80E+02

ENVIRONMENTAL ASPECTS RELATED TO RESOURCE										
PERE	MJ	2.08E+02	3.64E-01	1.54E+00	2.10E+02	2.66E-03	7.78E-02	6.42E-01	2.85E-03	-7.25E+01
PERM	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
PERT	MJ	2.08E+02	3.64E-01	1.54E+00	2.10E+02	2.66E-03	7.78E-02	6.42E-01	2.85E-03	-7.25E+01
PEN-RE	MJ	6.54E+02	2.12E+01	1.75E+01	6.93E+02	4.28E-01	4.89E+00	1.46E+01	7.19E-02	-8.33E+02
PENRM	MJ	3.29E+01	2.01E+00	2.71E-01	3.52E+01	4.29E-02	4.65E-01	7.40E-01	5.96E-03	-5.93E+00
PENRT	MJ	6.87E+02	2.32E+01	1.77E+01	7.28E+02	4.70E-01	5.36E+00	1.53E+01	7.79E-02	-8.39E+02
SM	MJ	5.36E+00	2.56E-02	8.70E-02	5.47E+00	2.72E-04	5.36E-03	6.95E+00	8.43E-05	9.18E-01
RSF	MJ	4.80E-01	6.94E-03	4.95E-02	5.36E-01	3.00E-05	1.31E-03	6.59E-03	2.91E-05	-2.28E+00
NRSF	MJ	6.91E-01	1.43E-02	1.71E-01	8.76E-01	8.10E-05	2.71E-03	1.28E-02	6.58E-05	-8.25E+00
FW	m3	1.69E+00	2.80E-03	4.21E-02	1.74E+00	2.52E-05	7.15E-04	4.41E-02	7.52E-05	-2.09E+00
ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES										
HWD	kg	1.80E+00	2.17E-02	5.03E-02	1.87E+00	3.91E-04	5.02E-03	3.76E-01	1.08E-04	-1.38E+00
NHWD	kg	1.34E+00	1.12E+00	9.65E-02	2.56E+00	2.90E-04	4.61E-01	3.47E-01	3.18E-01	-2.71E+00
RWD	kg	4.29E-03	7.63E-06	1.16E-05	4.31E-03	5.12E-08	1.62E-06	7.96E-06	5.08E-08	-4.23E-04
CRU	kg	2.09E-20	-8.95E-22	1.32E-21	2.13E-20	-3.59E-24	-1.02E-22	-1.14E-22	3.60E-24	-8.17E-20
MFR	kg	4.56E+00	2.31E-02	8.49E-02	4.67E+00	2.24E-04	4.62E-03	1.76E-02	6.99E-05	-5.49E+00
MER	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
EEE	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
EET	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

7. REFERENCES

- PN-EN 15804+A2:2020-03 Sustainability of construction works -- Environmental product declarations -- Core rules for the product category of construction products;
- PN-EN ISO 14025:2010 Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures
- PN-EN ISO 14044:2009 Environmental management -- Life cycle assessment -- Requirements and guidelines
- PN-EN 15942:2012 Sustainability of construction works -- Environmental product declarations -- Communication format business-to-business
- PN-EN ISO 14067:2018 Greenhouse gases -- Carbon footprint of products -- Requirements and guidelines for quantification
- ISO 21930:2017 Sustainability in buildings and civil engineering works -- Core rules for environmental products declarations of construction products and services
- ISO 20915:2018 Life cycle inventory calculation methodology for steel products
- Ecoinvent 3.9 database

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CERTYFICATE No. 2024- 0054-1
of TYPE III ENVIRONMENTAL DECLARATION

Product:

Sandwich panels PIRTECH

- PWS – PIR – ST
- PWS – PIR – PL
- PWS – PIR – CH
- PWD – PIR

Manufacturer:

PRUSZYŃSKI Sp. z o.o.
ul. Sokołowska 32B, Sokołów
05-806 Komorów
NIP: 534-21-39-235

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

EN 15804:2012+A2:2019

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

This certificate, issued for the first time on 01/07/2024 and is valid for 5 years or until amendment of mentioned Environmental Declaration .

Director of the Certification Department
CERTBUD Sp. z o.o.

Kamil PAWŁOWSKI

Warsaw, 01/07/2024 r.