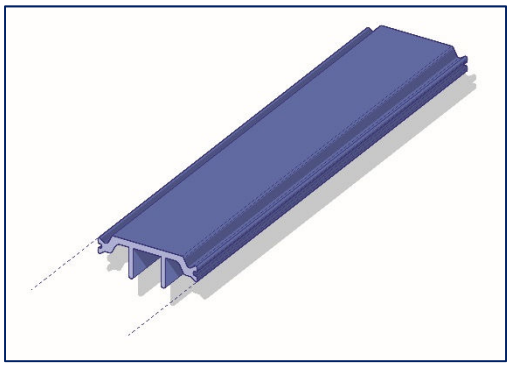
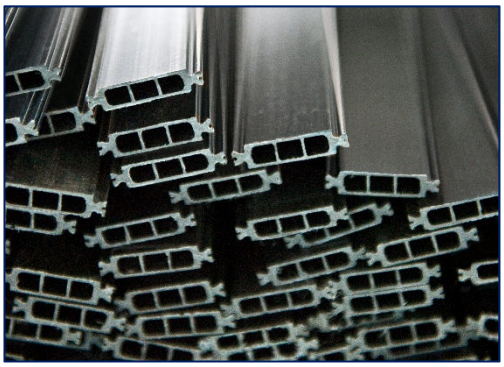
Environmental Product Declaration (EPD)

Declaration Code: EPD-PAT-GB-82.0





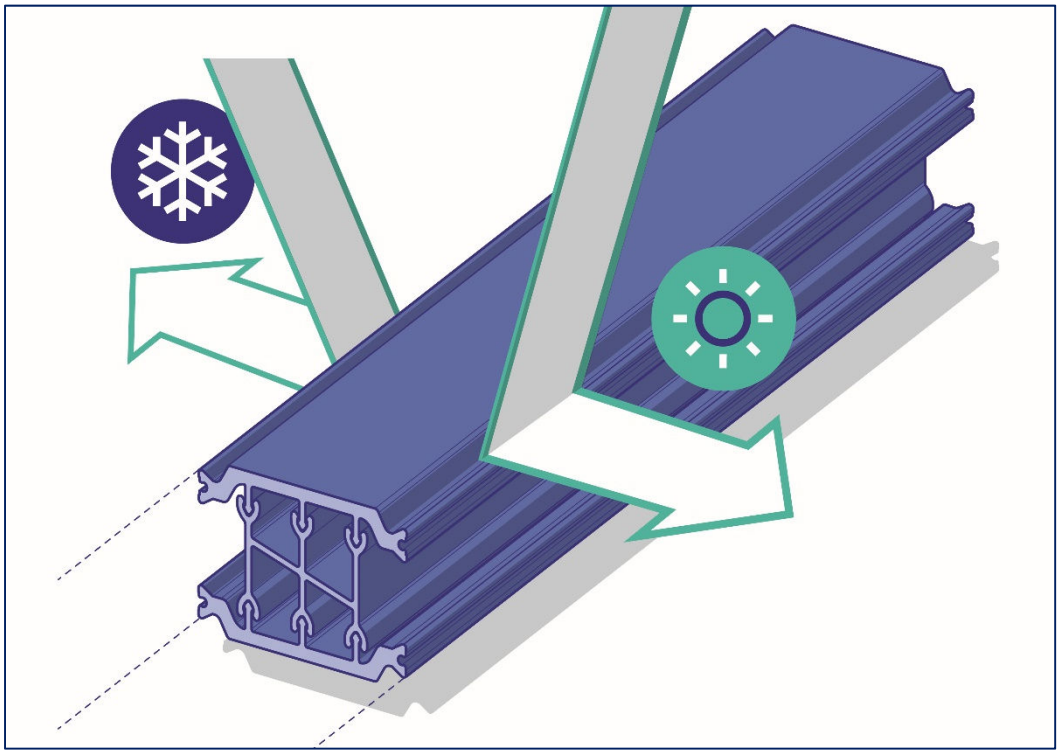
TECHNOFORM

Technoform Bautec Asia Pacific P/L

ECO PLATFORM EPD VERIFIED

Insulating bars

Insulating bars made of PA 66 GF25



EPD © ift Rosenheim

Basis:

DIN EN ISO 14025
EN 15804 + A2

Company EPD **E**nvironmental **P**roduct **D**eclaration

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Environmental Product Declaration (EPD)

Declaration Code: EPD-PAT-GB-82.0

Programme operator	ift Rosenheim GmbH Theodor-Gietl-Straße 7-9 D-83026 Rosenheim		
Practitioner of the LCA	ift Rosenheim GmbH Theodor-Gietl-Straße 7-9 D-83026 Rosenheim		
Declaration holder	Technoform Bautec Asia Pacific P/L 6 Temasek Boulevard, Suntec Tower 4 #28-06, Singapore 038986 www.technoform.com		
Declaration code	EPD-PAT-GB-82.0		
Designation of declared product	Insulating bars made of PA 66 GF25		
Scope	Thermal break of aluminium window, door and façade systems		
Basis	This EPD was prepared on the basis of EN ISO 14025:2011 and DIN EN 15804:2012+A2:2019. In addition, the “Allgemeiner Leitfaden zur Erstellung von Typ III Umweltproduktdeklarationen” (Guidance on preparing Type III Environmental Product Declarations) applies. The Declaration is based on the PCR documents “PCR Part A" PCR-A-1.0:2023 and "Semifinished products" PCR-HZ-3.0:2023.		
Validity	Publication date: 05.08.2024	Last revision: 09.01.2025	Valid until 05.08.2029
	This verified company Environmental Product Declaration applies solely to the specified products and is valid for a period of five years from the date of publication in accordance with DIN EN 15804.		
LCA basis	The LCA was prepared in accordance with DIN EN ISO 14040 and DIN EN ISO 14044. The base data includes both the data collected at the production sites of Technoform Bautec (Suzhou) Thermal Insulation Material Co., Ltd. and Technoform Bautec Hong Kong Limited and the generic data from the ”LCA for Experts 10“ database. LCA calculations were carried out for the included “cradle to gate – with options” life cycle including all upstream chains (e.g. raw material extraction, etc.).		
Notes	The “Conditions and Guidance on the Use of ift Test Documents” apply. The declaration holder assumes full liability for the underlying data, certificates and verifications.		

Christoph Seehauser Deputy Head of Sustainability	Dr. Torsten Mielecke Chairman of Expert Committee ift-EPD and PCR	Susanne Volz External verifier

Declaration holder (Non-producing site)	**Technoform Bautec Asia Pacific P/L** 6 Temasek Boulevard, Suntec Tower 4 #28-06, Singapore 038986
Further declaration holders (Producing sites)	**Technoform Bautec Hong Kong Limited** 2 Chun Cheong Street, Tseung Kwan O Industrial Estate, Tseung Kwan O, Kowloon, Hong Kong **Technoform Bautec (Suzhou) Thermal Insulation Materials Co., Ltd.** 283, Qing Qiu Street, Modern Avenue East, S.I.P. Suzhou 215024, P.R.C.

1 General product information

Product definition

The EPD relates to the product group insulating bars and applies to:

1 kg of insulating bar made of PA 66 GF25
made by Technoform Bautec (Suzhou) Thermal Insulation Material Co., Ltd. and Technoform Bautec Hong Kong Limited

The declared unit is obtained as follows:

Assessed product	Declared unit	Density
Insulating bars made of PA 66 GF25	1 kg	1300 +/- 50 kg/m^3

Table 1: Product groups

The average unit is declared as follows:
Directly used material flows are determined using the masses produced (kg), and assigned to the declared unit. All other inputs and outputs in the production were scaled to the declared unit in their entirety since no typical functional unit was available due to the great diversity of variants. The reference period is the year 2023.

The validity of the EPD applies to insulating bars made of PA 66 GF25 with the following types of finishing:

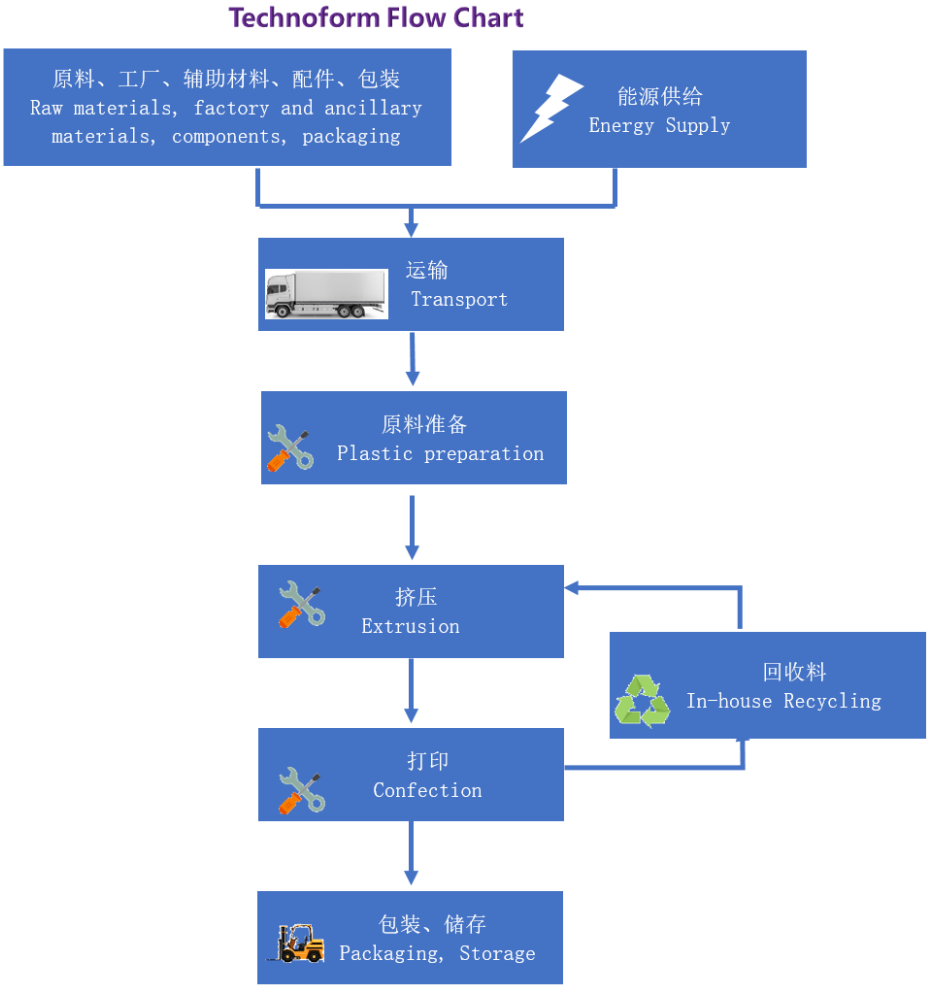
- Glue wire
- Aluminum wire
- Aluminum strip
- Laser marking

It does not apply to insulating bars with PU foam finishing.

Product description

The polyamide based Technoform insulating profiles connect the aluminium components of windows, doors and façade systems and separate them thermally. The profiles minimise heating and cooling losses and ensure the stability of the window. Technoform uses glass-fibre reinforced polyamide to produce especially slim structural and stiffening profiles.
For a detailed product description refer to the manufacturer specifications or the product specifications of the respective offer/quotation.

Product manufacture



Scope

Thermal break of aluminium window, door and façade systems

Verifications

The mechanical strength parameters of the composition specified in EN14024 for the profile category CW/TC2/A are fulfilled.
The profile meets the requirements of the national standard of the People's Republic of China GB/T 23615.1-2017.
Further and current certificates (including other national approvals) can be found at www.technoform.com.

Management systems

The following management systems are in place:

- Quality management system in accordance with DIN EN ISO 9001:2015
- Occupational health and safety Management System in accordance with DIN EN ISO 45001:2018
- Environmental management system in accordance with DIN EN ISO 14001:2015

Additional information

For additional evidence of fitness for use or certificates of conformity, if applicable, please refer to the CE marking and the documents accompanying the product.

2 Materials used

Primary materials

The primary materials used are specified in Section 6.2 Inventory analysis (Inputs).

Declarable substances

The product contains no substances from the REACH candidate list (declaration dated January 2022).

All relevant safety data sheets are available from Technoform Bautec (Suzhou) Thermal Insulation Material Co., Ltd. and Technoform Bautec Hong Kong Limited.

3 Construction process stage

Processing recommendations, installation

For further processing of the insulating profiles, please follow the instructions for storage, painting and rolling, which are available from Technoform

4 Use stage

Emissions to the environment

No emissions to indoor air, water or soil are known. There may be VOC emissions.

Reference service life (RSL)

The RSL information was provided by the manufacturer. The RSL shall be specified under defined reference in-use conditions and shall refer to the declared technical and functional performance of the product within the building. It shall be established in accordance with any specific rules given in European product standards, or, if not available, in accordance with a c-PCR. It shall also take into account ISO 15686-1, -2, -7 and -8. Where European product standards or a c-PCR provide guidance on deriving the RSL, such guidance shall have priority.
If it is not possible to determine the service life as the RSL in accordance with ISO 15686, the BBSR table “Nutzungsdauer von Bauteilen zur Lebenszyklusanalyse nach BNB” (service life of building components for life cycle assessment in accordance with the sustainable construction evaluation system) can be used. For further information and explanations refer to www.nachhaltigesbauen.de.

For this EPD the following applies:
For a “Cradle to gate with options” EPD with the modules C1-C4 and module D (A1-A3 + C + D and one or more additional modules from A4 to B7), the reference service life (RSL) can only be stated if the reference in-use conditions are specified.
The reference service life (RSL) of Insulating bars made of PA 66 GF25 made by Technoform Bautec (Suzhou) Thermal Insulation Material Co., Ltd. and Technoform Bautec Hong Kong Limited is not specified.

5 End-of-life stage

Possible end-of-life stages

Windows and façade parts made of aluminium, including the installed PA 66 GF25 insulating bars, are sent to central collection points. There the material compound is shredded and sorted, if necessary, with the main objective of the material recycling of aluminium. The plastic fractions are usually thermally recycled.

The after-use (Module C1-C4 and Module D) was largely modeled by using European data sets. The validity of the EPD is therefore limited to the European sales area with production in Suzhou (China) and Hong Kong.

Disposal routes

The LCA includes the average disposal routes.

All life cycle scenarios are detailed in the Annex.

6 Life Cycle Assessment (LCA)

Environmental product declarations are based on life cycle assessments (LCAs) which use material and energy flows for the calculation and subsequent representation of environmental impacts.

Such a life cycle assessment was developed for Insulating bars made of PA 66 GF25, serving as the basis. The LCA is in conformity with the requirements set out in DIN EN 15804 and the international standards DIN EN ISO 14040, DIN EN ISO 14044 and EN ISO 14025 as well as based on ISO 21930.

The LCA is representative of the products presented in the Declaration and the specified reference period.

6.1 Definition of goal and scope

Goal

The goal of the LCA is to demonstrate the environmental impacts of the products. In accordance with DIN EN 15804, the environmental impacts covered by this Environmental Product Declaration are presented for the entire product life cycle in the form of basic information. Apart from these, no other environmental impacts are specified.

Data quality, data availability and geographical and time-related system boundaries

The specific data originate exclusively from the 2023 fiscal year. They were collected on-site at the plant located in Hong Kong and Suzhou and come in parts from company records and partly from values directly obtained by measurement. Validity of the data was checked by the ift Rosenheim.

The generic data come from the “LCA for Experts 10” professional and building materials databases. The last update of both databases was in 2023. Data from before this date come also from these databases and are not more than five years old. No other generic data were used for the calculation.

The generic data selected are as accurate as possible in terms of geographical reference. If no country-specific datasets are available or regional reference cannot be established, European or global datasets are used.

Data gaps were either filled with comparable data or conservative assumptions, or the data were cut off in compliance with the 1% rule.

The life cycle was modelled using the sustainability software tool “LCA for Experts" for the development of life cycle assessments.

The data quality complies with the requirements of prEN15941:2022.

Scope / system boundaries

The system boundaries refer to the supply of raw materials and purchased parts, production, use and end-of-life stage of Insulating bars made of PA 66 GF25.
No additional data from pre-suppliers were taken into consideration.

Cut-off criteria

All the data that the company records, i.e. all commodities/input and raw materials used, the thermal energy used and electricity consumption, were taken into consideration.

The boundaries cover only the product-relevant data. Building sections/parts of facilities that are not relevant to the manufacture of the products, were excluded.

The transport distances of the raw materials and packagings were taken into consideration.

Transport routes for auxiliary materials were not taken into account, as these were cut off in compliance with the 1% rule.

In addition to the transport distances for pre-products, the transport distances for waste were also taken into account. The transportation of waste in A3 was modeled with the following standard scenario according to the manufacturer:

- Transport to collection point with 40 t truck (Euro 0-6 mix), diesel, 27 t payload, 50 % capacity, 100 km.

The criteria for the exclusion of inputs and outputs as set out in DIN EN 15804 are fulfilled. From the data analysis it can be assumed that the total of negligible processes per life cycle stage does not exceed 1% of the mass/primary energy. All in all, the total of negligible processes does not exceed 5% of the energy and mass input. The life cycle calculation also includes material and energy flows that account for less than 1%.

6.2 Inventory analysis

Goal	All material and energy flows are described below. The processes covered are presented as input and output parameters and refer to the declared unit.
Life cycle stages	The Annex shows the life cycle of Insulating bars made of PA 66 GF25. The “Product stage” (A1 - A3), “Construction process stage” (A4), “End-of-life stage” (C1 - C4) and the “Benefits and loads beyond the system boundaries” (D) are considered.
Benefits	The below benefits have been defined in accordance with DIN EN 15804: • Benefits (thermal and electrical) from incineration
Allocation of co-products	The manufacture does not give rise to allocations.
Allocations for reuse, recycling and recovery	The system boundaries were set following their disposal, reaching the end-of-waste state.
Allocations beyond life cycle boundaries	No allocation was made beyond the life cycle boundaries.
Secondary material	The use of secondary material was considered in module A3. Secondary material was not used.

Inputs

The LCA includes the following production-relevant inputs per 1 kg of insulating bar made of PA 66 GF25:

Energy

The gas mix "CN: Natural gas mix" was assumed for the input natural gas. was assumed. The "CN: Electricity grid mix"

A portion of the process heat is used for space heating. This can, however, not be quantified and a “worst case” figure was taken into account for the product.

Water

0,004 l per kg of insulating profile water was consumed by the individual process steps for the production.
The consumption of freshwater specified in Section 6.3 originates (among others) from the process chain of the pre-products and the process water used for cooling.

Raw material/pre-products

The chart below shows the share of raw materials/pre-products in %.

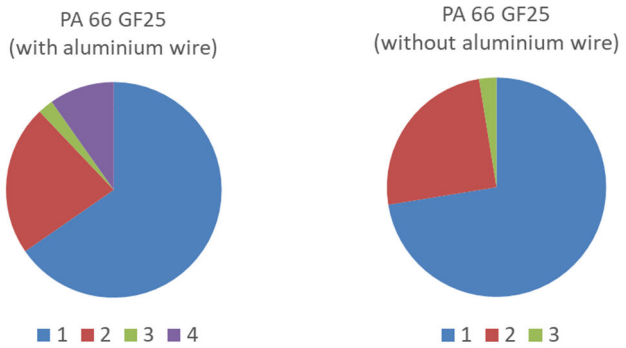


Figure 1: Percentage of individual materials per declared unit

No.	Material	Mass in %	
		PA 66 GF25 With aluminium wire (3% of all produced Insulating bars) (Worst-Case, modeled in the LCA)	PA 66 GF25 Without aluminium wire (97% of all produced Insulating bars)
1	Polyamide 66	66.1	72.4
2	Glass fibers	22.8	25.0
3	Batch	2.3	2.6
4	Aluminum wire	8.8	-

Table 2: Percentage of individual materials per declared unit

Ancillary materials and consumables

Auxiliary and operating materials were cut off taking into account the 1% rule.

Product packaging
The amounts used for product packaging are as follows:

No.	Material	Mass in g per kg
1	PE packaging	3,4
2	Wood	12,2

Table 3: Weight in g of packaging per declared unit (kg)

Biogenic carbon content
Only the biogenic carbon content of the associated packaging is specified, as the total mass of substances containing biogenic carbon is less than 5% of the total mass of the product and associated packaging. In accordance with EN 16449, packaging produces the following amounts of biogenic carbon :

No.	Component	Content in kg C per kg
1	Associated packaging	0,01

Table 4: Biogenic carbon content of packaging at gate

Outputs

The LCA includes the following production-relevant outputs per 1 kg of insulating profile:

Waste
Secondary raw materials were included in the benefits.
See Section 6.3 Impact assessment.

Waste water
The manufacture produces 0,004 l of waste water

6.3 Impact assessment

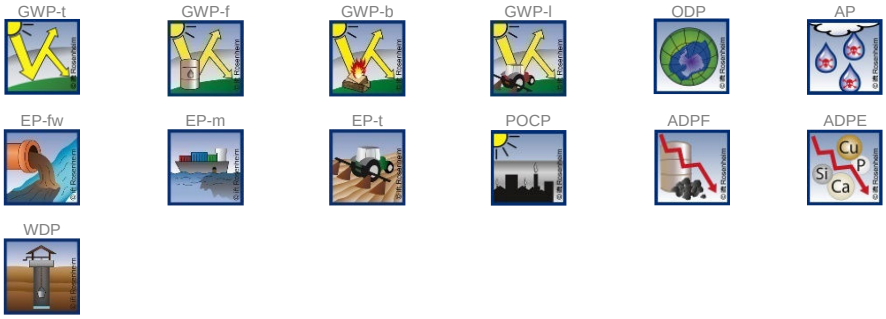
Goal

The impact assessment covers both inputs and outputs. The impact categories applied are named below:

Core indicators

The models for impact assessment were applied as described in DIN EN 15804+A2.
The impact categories presented in the EPD as core indicators are as follows:

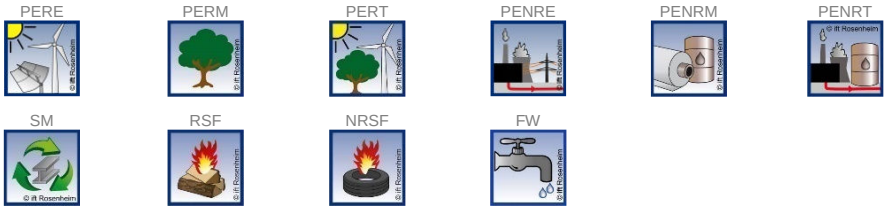
- Climate change – total (GWP-t)
- Climate change – fossil (GWP-f)
- Climate change – biogenic (GWP-b)
- Climate change - land use and land use change (GWP-l)
- Ozone depletion (ODP)
- Acidification (AP)
- Eutrophication aquatic freshwater (EP-fw)
- Eutrophication aquatic marine (EP-m)
- Eutrophication terrestrial (EP-t)
- Photochemical ozone creation (POCP)
- Depletion of abiotic resources - fossil fuels (ADPF)
- Depletion of abiotic resources - minerals and metals (ADPE)
- Water use (WDP)



Use of resources

The models for impact assessment were applied as described in DIN EN 15804-A2.
The following parameters for the use of resources are shown in the EPD:

- Renewable primary energy as energy source (PERE)
- Renewable primary energy for material use (PERM)
- Total use of renewable primary energy (PERT)
- Non-renewable primary energy as energy resource (PENRE)
- Renewable primary energy for material use (PENRM)
- Total use of non-renewable primary energy (PENRT)
- Use of secondary materials (SM)
- Use of renewable secondary fuels (RSF)
- Use of non-renewable secondary fuels (NRSF)
- Net use of freshwater resources (FW)

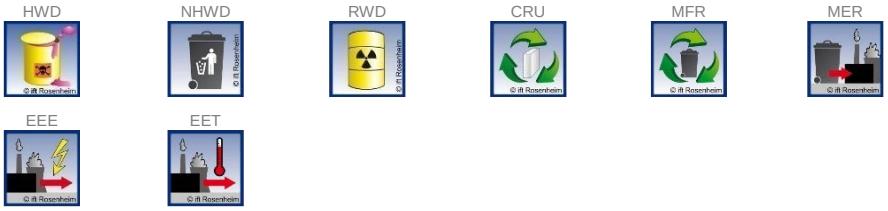


Waste

The waste generate during the production of 1 kg of insulating bar made of PA 66 GF25 is evaluated and shown separately for the fractions trade wastes, special wastes and radioactive wastes. Since waste handling is modelled within the system boundaries, the amounts shown refer to the deposited wastes. A portion of the waste indicated is generated during the manufacture of the pre-products.

The models for impact assessment were applied as described in DIN EN 15804-A2.
The waste categories and indicators for output material flows presented in the EPD are as follows:

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



Additional environmental impact indicators

The models for impact assessment were applied as described in DIN EN 15804-A2.
The additional impact categories presented in the EPD are as follows:

- Particulate matter emissions (PM)
- Ionising radiation, human health (IRP)
- Ecotoxicity – freshwater (ETP-fw)
- Human toxicity - cancer effect (HTP-c)
- Human toxicity - non-cancer effect (HTP-nc)
- Land use related impacts / soil quality (SQP)

	Results per 1 kg of insulating bar made of PA 66 GF25															
	Unit	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Core indicators																
GWP-t	kg CO_2 eq.	11,90	0,51	ND	ND	ND	ND	ND	ND	ND	ND	0,00	8,67E-03	1,48	5,72E-03	-0,60
GWP-f	kg CO_2 eq.	11,85	0,51	ND	ND	ND	ND	ND	ND	ND	ND	0,00	8,73E-03	1,48	5,72E-03	-0,60
GWP-b	kg CO_2 eq.	4,51E-02	-5,07E-03	ND	ND	ND	ND	ND	ND	ND	ND	0,00	-2,08E-04	5,64E-04	-3,43E-05	-2,91E-03
GWP-l	kg CO_2 eq.	3,14E-03	4,34E-03	ND	ND	ND	ND	ND	ND	ND	ND	0,00	1,40E-04	3,01E-05	3,35E-05	-5,03E-05
ODP	kg CFC-11 eq.	1,75E-11	5,58E-14	ND	ND	ND	ND	ND	ND	ND	ND	0,00	1,23E-15	1,14E-12	1,51E-14	-4,56E-12
AP	mol H^+ eq.	5,99E-02	4,29E-03	ND	ND	ND	ND	ND	ND	ND	ND	0,00	1,12E-05	4,99E-04	3,96E-05	-5,73E-04
EP-fw	kg P eq.	7,44E-06	1,16E-06	ND	ND	ND	ND	ND	ND	ND	ND	0,00	3,55E-08	2,26E-07	1,27E-08	-8,54E-07
EP-m	kg N eq.	1,32E-02	1,79E-03	ND	ND	ND	ND	ND	ND	ND	ND	0,00	4,15E-06	1,50E-04	1,02E-05	-1,80E-04
EP-t	mol N eq.	0,14	1,97E-02	ND	ND	ND	ND	ND	ND	ND	ND	0,00	4,82E-05	2,22E-03	1,12E-04	-1,94E-03
POCP	kg NMVOC eq.	4,22E-02	4,92E-03	ND	ND	ND	ND	ND	ND	ND	ND	0,00	1,13E-05	3,92E-04	3,12E-05	-5,15E-04
ADPF*[2]	MJ	166,03	6,24	ND	ND	ND	ND	ND	ND	ND	ND	0,00	0,11	1,20	7,36E-02	-10,30
ADPE*[2]	kg Sb eq.	6,62E-07	2,73E-08	ND	ND	ND	ND	ND	ND	ND	ND	0,00	7,20E-10	9,13E-09	3,56E-10	-4,45E-08
WDP*[2]	m^3 world eq. deprived	1,80	4,49E-03	ND	ND	ND	ND	ND	ND	ND	ND	0,00	1,29E-04	0,16	6,39E-04	-5,59E-02
Use of resources																
PERE	MJ	12,85	0,31	ND	ND	ND	ND	ND	ND	ND	ND	0,00	9,44E-03	0,72	1,28E-02	-3,05
PERM	MJ	0,20	0,00	ND	ND	ND	ND	ND	ND	ND	ND	0,00	0,00	0,00	0,00	0,00
PERT	MJ	13,05	0,31	ND	ND	ND	ND	ND	ND	ND	ND	0,00	9,44E-03	0,72	1,28E-02	-3,05
PENRE	MJ	151,11	6,24	ND	ND	ND	ND	ND	ND	ND	ND	0,00	0,11	1,27	7,71E-02	-10,30
PENRM	MJ	14,92	0,00	ND	ND	ND	ND	ND	ND	ND	ND	0,00	0,00	-6,62E-02	-3,49E-03	0,00
PENRT	MJ	166,03	6,24	ND	ND	ND	ND	ND	ND	ND	ND	0,00	0,11	1,20	7,36E-02	-10,30
SM	kg	0,00	0,00	ND	ND	ND	ND	ND	ND	ND	ND	0,00	0,00	0,00	0,00	0,00
RSF	MJ	0,00	0,00	ND	ND	ND	ND	ND	ND	ND	ND	0,00	0,00	0,00	0,00	0,00
NRSF	MJ	0,00	0,00	ND	ND	ND	ND	ND	ND	ND	ND	0,00	0,00	0,00	0,00	0,00
FW	m^3	4,31E-02	3,44E-04	ND	ND	ND	ND	ND	ND	ND	ND	0,00	1,05E-05	3,92E-03	1,95E-05	-2,34E-03
Waste categories																
HWD	kg	2,46E-08	2,15E-10	ND	ND	ND	ND	ND	ND	ND	ND	0,00	4,20E-12	1,47E-09	1,83E-11	-6,19E-09
NHWD	kg	0,46	8,07E-04	ND	ND	ND	ND	ND	ND	ND	ND	0,00	1,79E-05	3,14E-02	0,37	-5,06E-03
RWD	kg	6,89E-04	9,18E-06	ND	ND	ND	ND	ND	ND	ND	ND	0,00	2,00E-07	1,43E-04	7,73E-07	-6,74E-04
Output material flows																
CRU	kg	0,00	0,00	ND	ND	ND	ND	ND	ND	ND	ND	0,00	0,00	0,00	0,00	0,00
MFR	kg	0,00	0,00	ND	ND	ND	ND	ND	ND	ND	ND	0,00	0,00	0,00	0,00	0,00
MER	kg	0,00	0,00	ND	ND	ND	ND	ND	ND	ND	ND	0,00	0,00	0,00	0,00	0,00
EEE	MJ	0,00	0,00	ND	ND	ND	ND	ND	ND	ND	ND	0,00	0,00	2,42	0,00	0,00
EET	MJ	0,00	0,00	ND	ND	ND	ND	ND	ND	ND	ND	0,00	0,00	5,54	0,00	0,00

Key:

GWP-t – climate change - total **GWP-f** – climate change - fossil **GWP-b** – climate change - biogenic **GWP-l** – climate change - land use and land use change **ODP** – ozone depletion **AP** - acidification **EP-fw** - eutrophication - aquatic freshwater **EP-m** - eutrophication - aquatic marine **EP-t** - eutrophication - terrestrial **POCP** - photochemical ozone formation **ADPF*[2]** - depletion of abiotic resources – fossil fuels **ADPE*[2]** - depletion of abiotic resources – minerals and metals **WDP*[2]** – water use **PERE** - use of renewable primary energy **PERM** - use of renewable primary energy resources used as raw materials **PERT** - total use of renewable primary energy **PENRE** - use of non-renewable primary energy **PENRM** - use of non-renewable primary energy resources used as raw materials **PENRT** - total use of non-renewable primary energy **SM** - use of secondary materials **RSF** - use of renewable secondary fuels **NRSF** - use of non-renewable secondary fuels **FW** - net use of freshwater **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

	Results per 1 kg of insulating bar made of PA 66 GF25															
	Unit	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Additional environmental impact indicators																
PM	Disease incidence	6,39E-07	1,07E-07	ND	ND	ND	ND	ND	ND	ND	ND	0,00	1,09E-10	2,97E-09	4,97E-10	-4,68E-09
IRP*[1]	kBq U235 eq.	4,94E-02	1,30E-03	ND	ND	ND	ND	ND	ND	ND	ND	0,00	2,90E-05	2,29E-02	8,95E-05	-0,11
ETP-fw*[2]	CTUe	126,84	4,74	ND	ND	ND	ND	ND	ND	ND	ND	0,00	8,06E-02	0,52	4,28E-02	-2,02
HTP-c*[2]	CTUh	5,70E-04	9,10E-11	ND	ND	ND	ND	ND	ND	ND	ND	0,00	1,64E-12	2,86E-11	1,00E-12	-1,13E-10
HTP-nc*[2]	CTUh	9,13E-08	4,42E-09	ND	ND	ND	ND	ND	ND	ND	ND	0,00	8,78E-11	1,22E-09	6,61E-11	-3,45E-09
SQP*[2]	Dimensionless.	9,49	1,68	ND	ND	ND	ND	ND	ND	ND	ND	0,00	5,39E-02	0,47	2,03E-02	-1,79

Key:
PM – particulate matter emissions **IRP*[1]** – ionising radiation – human health **ETP-fw*[2]** - ecotoxicity – aquatic freshwater **HTP-c*[2]** - human toxicity potential – cancer effect **HTP-nc*[2]** - human toxicity potential – non-cancer effect **SQP*[2]** – land use related impacts / soil quality

Disclaimers

*1 This impact category deals mainly with the eventual impact of low-dose ionising radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionising radiation from the soil, from radon and from some building materials is also not measured by this indicator

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

6.4 Interpretation, LCA presentation and critical review

Evaluation

The results of the life cycle assessment do not relate to a single type of insulating bar, but represent the average values for all insulating bar types manufactured by Technoform with the same material composition.

In terms of production, the environmental impact of insulating bars made of PA 66 GF25 is mainly due to the use of PA 66 and its upstream chains. Thermal recycling of the products plays a key role in the end-of-life phase.

In scenario C4, only marginal expenses for physical pre-treatment and landfill operation are to be expected. Allocation to the individual products is difficult in the case of landfilling.

The breakdown of the main environmental impacts is shown in the diagram below.

The values obtained from the LCA calculation are suitable for the certification of buildings.

Chart

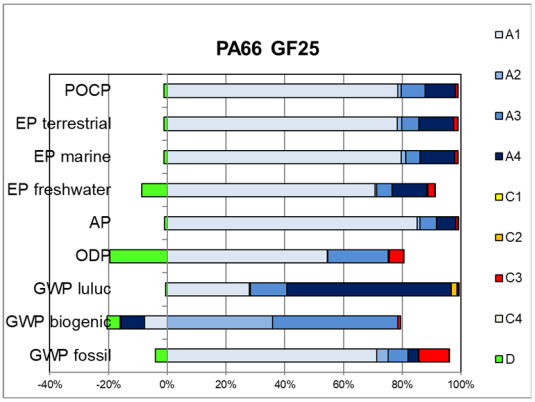


Figure 2: Percentage of the modules in selected environmental impact categories

Report

The LCA report underlying this EPD was developed according to the requirements of DIN EN ISO 14040 and DIN EN ISO 14044 as well as DIN EN 15804 and DIN EN ISO 14025. It is not addressed to third parties for reasons of confidentiality. It is deposited with the ift Rosenheim. The results and conclusions reported to the target group are complete, correct, without bias and transparent. The results of the study are not designed to be used for comparative statements intended for publication.

Critical review

The critical review of the LCA and the report took place in the course of verification of the EPD and was carried out by Susanne Volz, an external verifier.

7 General information regarding the EPD

Comparability

This EPD was prepared in accordance with DIN EN 15804 and is therefore only comparable to those EPDs that also comply with the requirements set out in DIN EN 15804.
Any comparison must refer to the building context and the same boundary conditions of the various life cycle stages.
For comparing EPDs of construction products, the rules set out in DIN EN 15804 (Clause 5.3) apply.

The detailed individual results of the products were summarised on the basis of conservative assumptions and differ from the average results. The establishment of the product groups and the resulting variations are documented in the background report.

Communication

The communications format of this EPD meets the requirements of EN 15942:2012 and is therefore the basis for B2B communication. Only the nomenclature has been changed according to DIN EN 15804.

Verification

Verification of the Environmental Product Declaration is documented in accordance with the ift "Richtlinie zur Erstellung von Typ III Umweltproduktdeklarationen" (Guidance on preparing Type III Environmental Product Declarations) in accordance with the requirements set out in DIN EN ISO 14025.

The Declaration is based on the PCR documents “PCR Part A" PCR-A-1.0:2023 and "Semifinished products" PCR-HZ-3.0:2023.

The European standard EN 15804 serves as the core PCR [a)]
Independent external verification of the Declaration and statement according to EN ISO 14025:2010
Independent third party verifier: [b)] [Susanne, Volz]
[a)] Product category rules [b)] Optional for business-to-business communication Mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)

Revisions of this document

No.	Date	Note:	Practitioner	Verifier
1	05.08.2024	External verification	Dumproff	Volz
2	22.08.2024	Change of declaration holder	Dumproff	Volz
3	23.09.2024	Adaption of confektion	Dumproff	
4	09.01.2025	Adaption of matrial-mix table	Dumproff	

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9 Annex

Description of life cycle scenarios for Insulating bars made of PA 66 GF25

Product stage			Con-struction process stage		Use stage							End-of-life stage				Benefits and loads from beyond the system boundaries
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material supply	Transport	Manufacture	Transport	Construction/installation process	Use	Maintenance	Repair	Replacement	Modification/refurbishment	Operational energy use	Operational water use	Deconstruction/demolition	Transport	Waste processing	Disposal	Reuse Recovery Recycling potential
✓	✓	✓	✓	—	—	—	—	—	—	—	—	✓	✓	✓	✓	✓

Table 5: Overview of applied life cycle stages

The scenarios were based on information provided by the manufacturer.

Note: The standard scenarios selected are presented in bold type. They were also used for calculating the indicators in the summary table.

✓ Included in the LCA
— Not included in the LCA

A4 Transport

No.	Scenario	Description
A4	Transportation from production in China and Hong Kong to the European distribution area	**Transportation from production (Suzhou) to the port (Shanghai):** 40 t truck (Euro 0-6 mix), diesel, 27 t payload, 50 % capacity[1], 200 km there and back empty **Transportation by container ship from Shanghai (China) to Hamburg:** Container ship, 52,134 t payload, 70 % utilized, 26400 km **Transportation within Europe:** 40 t truck (Euro 0-6 mix), diesel, 27 t payload, 50 % utilized[1], 3000 km

[1] Capacity used: used loading capacity of truck

A4 Transport to construction site	Density [kg/m³]	Volume capacity utilisation factor[2]
PG1	1300	<1

[2] Volume capacity utilisation factor:
= 1 product completely fills packaging (without air inclusion)
< 1 packaging contains unused volume (e.g.: air, filling material)
> 1 product is packed in compressed form

Since only one scenario is used, the results are shown in the summary table.

C1 Deconstruction, demolition

No.	Scenario	Description
C1	Deconstruction	**according to EN 17213:** **Metal windows:** **95% dismantling of non-glass parts** **30% dismantling glass** **Further deconstruction rates are possible, give adequate reasons.**

No relevant inputs or outputs apply to the scenario selected. The energy consumed for deconstruction is negligible. Any arising consumption is marginal.

Since only one scenario is used, the results are shown in the summary table.

In case of deviating consumption the removal of the products forms part of the site management and is covered at the construction works level.

C2 Transport

No.	Scenario	Description
C2	Transport	**Transport to collection point with 40 t truck (Euro 0-6 mix), diesel, 27 t payload, 80 % capacity, 50 km**

Since only one scenario is used, the results are shown in the summary table.

C3 Waste management

No.	Scenario	Description
C3	Waste disposal	Proportion for recycling materials in accordance with EN 17213 (see C1), of which Plastics 100% thermal recycling

Electricity consumption of incineration plant 0.5 MJ/kg.

As the products are placed on the European market, the disposal scenario is based on average European datasets. In the absence of European datasets, german datasets were used.

The table below describes the disposal processes and their percentage by mass/weight. The calculation is based on the above mentioned shares in percent related to the declared unit of the product system.

C3 Disposal	Unit	C3
Collection process, collected separately	kg	0,95
Collection process, collected as mixed construction waste	kg	0,05
Recovery system, for reuse	kg	0,00
Recovery system, for recycling	kg	0,00
Recovery system, for energy recovery	kg	0,95
Disposal	kg	0,05

Since only one scenario is used, the results are shown in the summary table.

C4 Disposal

No.	Scenario	Description
C4	Market situation	The non-recordable amounts and losses within the re-use/recycling chain (C1 and C3) are modelled as “dis-posed”(RER).

The consumptions in scenario C4 result from physical pre-treatment, waste recycling and management of the disposal site. The benefits obtained here from the substitution of primary material production are allocated to module D, e.g. electricity and heat from waste incineration.

Since only one scenario is used, the results are shown in the summary table.

D Benefits and loads from beyond the system boundaries

No.	Scenario	Description[1]
D1	Recycling potential (current market situation)	Benefits from waste incineration: electricity replaces electricity mix (RER); thermal energy replaces thermal energy from natural gas (RER).

Since only one scenario is used, the results are shown in the summary table.

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