

Owner: Danpor A/S
No.: MD-23060-EN
Issued: 10-03-2023
Valid to: 10-03-2028

3rd PARTY VERIFIED

EPD

VERIFIED ENVIRONMENTAL PRODUCT DECLARATION | ISO 14025 & EN 15804



Owner of declaration

Danpor A/S
Sletten 1, 8543 Hornslet, Denmark
VAT: 26451914



Issued:
10-03-2023

Valid to:
10-03-2028

Programme

EPD Danmark
www.epddanmark.dk



- Industry EPD
- Product EPD

Declared product(s)

B60 Grafit
B80 Grafit, B80 Grafit strips
B150 Grafit

Number of declared datasets/product variations: 4

Production site

Production WEST: Sletten 1, 8543 Hornslet, Denmark
Production EAST: Odensevej 4 - 4200 Slagelse, Denmark

Certificates on green electricity are used in module A3.

Product(s) use

Expanded polystyrene (EPS) consists of 2% raw material and 98% air, which provides good insulating properties. EPS products are used in the construction industry throughout Denmark. The products are used for insulation in floor construction and facade insulation, both in new construction and renovation of existing buildings. The products are supplied in various thicknesses, compressive stresses, and lambda values.

Declared unit

1 m² of insulation material with a thickness designed to provide a thermal resistance (R-value) of 1 m²K/W.

Year of production site data (A3): 2021

EPD version

1

Basis of calculation

This EPD is developed in accordance with the European standard EN 15804+A2.

Comparability

EPDs of construction products may not be comparable if they do not comply with the requirements in EN 15804. EPD data may not be comparable if the datasets used are not developed in accordance with EN 15804 and if the background systems are not based on the same database.

Validity

This EPD has been verified in accordance with ISO 14025 and is valid for 5 years from the date of issue.

Use

The intended use of an EPD is to communicate scientifically based environmental information for construction products, for the purpose of assessing the environmental performance of buildings.

EPD type

- Cradle-to-gate with modules C1-C4 and D
- Cradle-to-gate with options, modules C1-C4 and D
- Cradle-to-grave and module D
- Cradle-to-gate
- Cradle-to-gate with options

CEN standard EN 15804 serves as the core PCR

Independent verification of the declaration and data, according to EN ISO 14025

- internal
- external

Third party verifier:

David Althoff Palm

Martha Katrine Sørensen
EPD Danmark

Life cycle stages and modules (MND = module not declared)

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

Product information

Product description

The main product components are shown in the table below.

Material	Weight-% of declared product
Expanded polystyrene (EPS) with graphite and flame retardant	100

Product packaging:

The composition of the sales- and transport packaging of the products is shown in the table below.

Material	Weight-% of packaging
LDPE foil	100

Representativity

This declaration - including data collection, the modeled foreground system, and results - represents the production of B60 Grafit, B80 Grafit, B80 Grafit strips and B150 Grafit on the production site located in Hornslet and Slagelse, Denmark. Product specific data are based on average values from 2021. Background data are based on GaBi Professional 2022 and Ecoinvent 3.8 and are less than 4 years old. Generally, the used background datasets are of high quality, and the majority of the datasets are only a couple of years old.

Hazardous substances

Danpor's EPS products do not contain substances listed on the "Candidate List of Substances of Very High Concern for authorisation" (<http://echa.europa.eu/candidate-list-table>)

Danpor's EPS products are produced using Neopor® from BASF and the products are produced in accordance with DS/EN 13163.

Expanded polystyrene (EPS) consists of 2% raw material and 98% air, thus, EPS products have a low density while the products provide good insulating properties. Moreover, Danpor's EPS products contain graphite and are often referred to as 'grey' EPS products, while EPS without graphite is referred to as 'white' EPS. Both white and grey EPS can be produced with the same compressive stress, yet due to the graphite content, grey EPS has a lower lambda-value than white EPS. Thus, grey EPS can provide the same insulation properties as white EPS with 18% less material.

EPS products are 100% recyclable and Danpor offers its customers to take back EPS waste and EPS cut-offs free of charge. Danpor can replace up to 20-30% of the raw materials with EPS waste or EPS cut-offs while still maintaining the quality and technical properties of the EPS products. Note, that the EPS waste or EPS cut off must stem from EPS produced with Neopor® from BASF. Currently, Danpor's EPS products contain 3-4% w/w recycled EPS.

Further technical information can be obtained by contacting the manufacturer or on the manufacturer's website:

<https://danpor.dk/>

Reference Service Life (RSL)

The reference service life (RSL) of EPS products depends on where the products are used in a building or construction. In general, the service life tables from BUILD¹ are used to determine the reference service life of EPS in a Danish building context.

Essential characteristics

¹ [BUILD levetidstabel](#)

Picture of product(s)



LCA

Declared unit

The LCI and LCIA results in this EPD relates to 1 m² of insulation material with a thickness designed to provide a thermal resistance (R-value) of 1 m²K/W.

Name	B60 Grafit	B80 Grafit	B150 Grafit	Unit
Declared unit	1	1	1	m ²
Density	13	15	25	kg/m ³
Thickness with R-value=1 [mm]	33	31	30	mm
Volume pr. declared unit	0.034	0.032	0.031	m ³
Masse pr declared unit	0.44	0.47	0.77	kg
Conversion factor to 1 kg.	2.3	2.1	1.3	-

Conversion factors to other thicknesses and to B80 strips are presented on the next page.

Functional unit

Not defined.

background

PCR

This EPD is developed according to the core rules for the product category of construction products in EN 15804+A2 and the complementary Product Category Rules (c-PCR) EN 16783:2017.

Guarantee of Origin – certificates

Foreground system:

The product is produced using electricity covered by certificates on green electricity from biogas and wind power. The electricity is used for the manufacturing at Danpor's production sites in Hornslet and Slagelse, Denmark. No other energy processed are included in the foreground.

Background system:

Both upstream and downstream processes are modelled using grid mix.

Conversion factors to other thicknesses [mm] and B80 strips

Danpor delivers its EPS products in various thicknesses: B60 Grafit is delivered with a thickness of 50-350 mm while both B80 Grafit and B150 are delivered with a thickness of 10-600 mm. Moreover, B80 Grafit is delivered in strips in thicknesses of 10-50 mm. Since there is a linear relationship between the product composition of the EPS products and the thickness, the results in this EPD can be recalculated using the conversion factors below.

Conversion factor to other thicknesses:

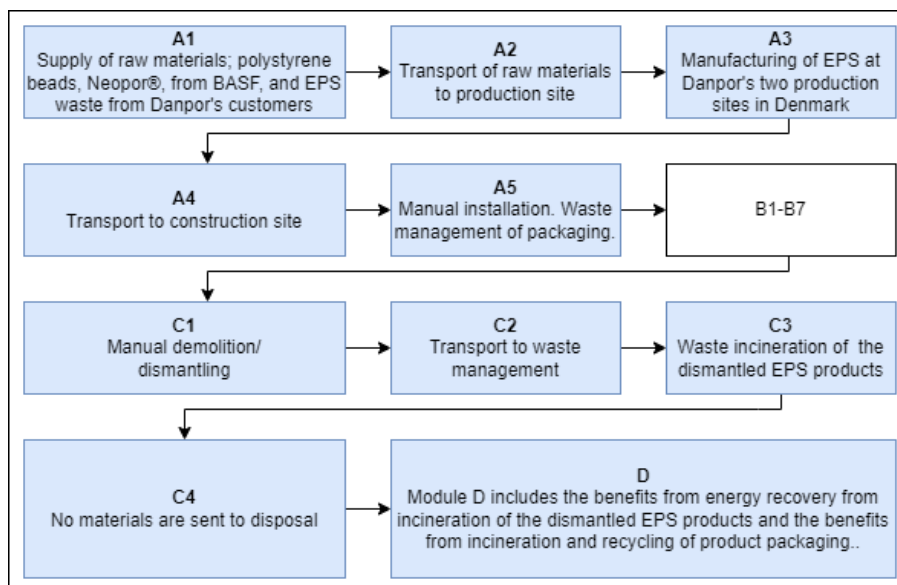
Product \ Thickness	30 mm	31 mm	33 mm	50 mm	100 mm	300 mm
B60 Grafit	0.91	0.94	1.00	1.5	3.0	9.1
B80 Grafit	0.97	1.00	1.06	1.6	3.2	9.7
B150 Grafit	1.00	1.03	1.10	1.7	3.3	10.0

Conversion factor to B80 strips:

Note, that B80 Grafit strips are bought in running meter, thus, the conversion factor is based on the volume and mass per running meter with different thicknesses.

Strip sizes thickness	10 mm	20 mm	30 mm	40 mm	50 mm
Volume per running meter [m³]	0.001	0.002	0.003	0.004	0.005
Mass per running meter [kg]	0.015	0.030	0.045	0.060	0.075
B80 Grafit strips conversion factor	0.03	0.06	0.09	0.13	0.16

Flowdiagram



System boundary

This EPD is based on a cradle-to-gate with options LCA, in which 100 weight-% has been accounted for. The general rules for the exclusion of inputs and outputs follows the requirements in EN 15804+A2, 6.3.5, where the total of neglected input flows per module shall be a maximum of 5 % of energy usage and mass and 1 % of energy usage and mass for unit processes.

Product stage (A1-A3) includes:

A1 – Extraction and processing of raw materials

A2 – Transport to the production site

A3 – Manufacturing processes

The product stage comprises the acquisition of all raw materials, products and energy, transport to the production site, packaging and waste processing up to the “end-of-waste” state or final disposal. The LCA results are declared in aggregated form for the product stage, which means, that the sub-modules A1, A2 and A3 are declared as one module A1-A3.

Danpor’s EPS products are manufactured using Neopor® polystyrene beads from BASF. Polystyrene beads contain encapsulated pentane which is released through the use of steam. The release of pentane makes the polystyrene beads expand and it creates EPS blocks which comprise of 98% air and 2% raw materials.

Danpor can replace part of the Neopor® polystyrene beads with EPS waste or EPS cut off while still maintaining the quality and technical properties of the EPS products. Note, that the EPS waste or EPS cut off must stem from EPS produced with Neopor®.

Currently, Danpor’s EPS products contain ca. 4% w/w recycled EPS. Since EPS can be recycled directly in the production, no solid EPS waste is generated at Danpor’s production sites.

Thus, the waste from Danpor’s manufacturing sites stem from raw material packaging, e.g., wood pallets, cardboard, and inner liner. The wood pallets are reused, and the cardboard and inner liner are recycled.

Construction process stage (A4-A5) includes:

The EPS products are transported to the construction site by Danpor’s own EURO 6 diesel trucks. A weighted average distance is calculated based on Danpor’s two production sites and outlying areas in Denmark: The production site in Hornslet only delivers products to Jutland and Fyn, thus, the weighted average was based on distances to Svendborg, Esbjerg and Aalborg. The production site in Slagelse only delivers to Zealand, thus, the weighted average was based on distances to Vordingborg, Helsingør and Nykøbing Sjælland.

EPS products are installed manually and there are therefore no environmental impacts associated with the installation.

Module A5 includes the waste management of the product packaging, LDPE foil, until it reaches its end-of-waste stage.

Based on the recycling rate of packaging waste in Denmark², 62% of the LDPE foil is sent to recycling, while the remaining 38% of the LDPE foil is incinerated and used for energy recovery.

End of Life (C1-C4) includes:

The EPS products are dismantled manually, thus, no environmental impacts are reported in module C1. The dismantled EPS products are transported 20 km to an incineration plant by a EURO 6 diesel truck. The incineration of the EPS products is included in module C3.

Re-use, recovery, and recycling potential (D) includes:

100% of the dismantled EPS is sent to an incineration plant, where generate heat and electricity is generated.

The packaging material, LDPE foil, reaches its end-of-waste stage in module A5, and the benefits from recycling and incineration of the LDPE foil are included in module D.

² [Packaging waste statistics - Statistics Explained \(europa.eu\)](https://europa.eu)

LCA results

ENVIRONMENTAL IMPACTS PER 1 M ² of B60 Grafit									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ eq.]	1.38E+00	4.06E-02	3.15E-02	0.00E+00	7.28E-04	1.37E+00	0.00E+00	-4.62E-01
GWP-fossil	[kg CO ₂ eq.]	1.38E+00	4.06E-02	3.15E-02	0.00E+00	7.28E-04	1.37E+00	0.00E+00	-4.60E-01
GWP-biogenic	[kg CO ₂ eq.]	-6.77E-07	0.00E+00	6.77E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2,20E-03
GWP-luluc	[kg CO ₂ eq.]	1.76E-03	.,78E-04	2.19E-07	0.00E+00	4.94E-06	1.34E-06	0.00E+00	-1,22E-04
ODP	[kg CFC 11 eq.]	9.01E-10	4,06E-15	1.27E-15	0.00E+00	7.20E-17	5.45E-14	0.00E+00	-3,13E-12
AP	[mol H ⁺ eq.]	2.58E-03	5,57E-05	2.84E-06	0.00E+00	8.59E-07	1.20E-04	0.00E+00	-8,23E-04
EP-freshwater	[kg P eq.]	1.51E-05	1,48E-07	3.94E-10	0.00E+00	2.62E-09	1.27E-08	0.00E+00	-2,33E-06
EP-marine	[kg N eq.]	6.48E-04	1,98E-05	6.19E-07	0.00E+00	2.84E-07	2.62E-05	0.00E+00	-2,60E-04
EP-terrestrial	[mol N eq.]	6.99E-03	2,33E-04	1.33E-05	0.00E+00	3.39E-06	5.64E-04	0.00E+00	-2,63E-03
POCP	[kg NMVOC eq.]	1.78E-02	4,93E-05	1.82E-06	0.00E+00	7.45E-07	7.72E-05	0.00E+00	-6,59E-04
ADPm ¹	[kg Sb eq.]	2.77E-07	4,16E-09	3.34E-11	0.00E+00	7.39E-11	1.32E-09	0.00E+00	-1,10E-07
ADPf ¹	[MJ]	3.66E+01	5,42E-01	3.81E-03	0.00E+00	9.62E-03	1.48E-01	0.00E+00	-5,27E+00
WDP ¹	[m ³ world eq. deprived]	1.45E-01	4,62E-04	2.60E-03	0.00E+00	8.20E-06	1.11E-01	0.00E+00	-4,33E-02
Caption	GWP-total = Globale Warming Potential - total; GWP-fossil = Global Warming Potential - fossil fuels; GWP-biogenic = Global Warming Potential - biogenic; GWP-luluc = Global Warming Potential - land use and land use change; ODP = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = Water Depletion Potential								
	The numbers are declared in scientific notation, e.g., 1.95E+02. This number can also be written as: 1.95*10 ² or 195, while 1.12E-11 is the same as 1.12*10 ⁻¹¹ or 0.0000000000112.								
Disclaimer	¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.								

RESOURCE USE PER 1 M ² of B60 Grafit									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	[MJ]	3.53E+00	3.76E-02	8.37E-04	3.53E+00	3.76E-02	8.37E-04	3.53E+00	3.76E-02
PERM	[MJ]	6.97E-02	0.00E+00	0.00E+00	6.97E-02	0.00E+00	0.00E+00	6.97E-02	0.00E+00
PERT	[MJ]	3.60E+00	3.76E-02	8.37E-04	3.60E+00	3.76E-02	8.37E-04	3.60E+00	3.76E-02
PENRE	[MJ]	3.66E+01	5.45E-01	3.81E-03	3.66E+01	5.45E-01	3.81E-03	3.66E+01	5.45E-01
PENRM	[MJ]	1.54E+01	0.00E+00	0.00E+00	1.54E+01	0.00E+00	0.00E+00	1.54E+01	0.00E+00
PENRT	[MJ]	5.20E+01	5.45E-01	3.81E-03	5.20E+01	5.45E-01	3.81E-03	5.20E+01	5.45E-01
SM	[kg]	1.81E-02	0.00E+00	0.00E+00	1.81E-02	0.00E+00	0.00E+00	1.81E-02	0.00E+00
RSF	[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
NRSF	[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
FW	[m ³]	6.85E-03	4.34E-05	6.10E-05	6.85E-03	4.34E-05	6.10E-05	6.85E-03	4.34E-05
Caption	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; PENRE = Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials; PENRM = 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 = Net use of fresh water								
	The numbers are declared in scientific notation, e.g., 1.95E+02. This number can also be written as: 1.95*10 ² or 195, while 1.12E-11 is the same as 1.12*10 ⁻¹¹ or 0.0000000000112.								

WASTE CATEGORIES AND OUTPUT FLOWS PER 1 M ² of B60 Grafit									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	[kg]	2.12E-09	2.88E-12	3.26E-13	0.00E+00	0.00E+00	1.40E-11	0.00E+00	-1.18E-09
NHWD	[kg]	9.23E-03	8.87E-05	1.15E-04	0.00E+00	0.00E+00	4.95E-03	0.00E+00	-1.82E-02
RWD	[kg]	1.06E-04	1.01E-06	2.09E-07	0.00E+00	0.00E+00	8.98E-06	0.00E+00	-1.83E-04

CRU	[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
MFR	[kg]	1.50E-02	0.00E+00	2.15E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+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
EEE	[MJ]	7.85E-04	0.00E+00	5.80E-02	0.00E+00	0.00E+00	2.47E+00	0.00E+00	0.00E+00
EET	[MJ]	1.41E-03	0.00E+00	1.03E-01	0.00E+00	0.00E+00	4.39E+00	0.00E+00	0.00E+00

Caption	HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy								
	The numbers are declared in scientific notation, e.g., 1.95E+02. This number can also be written as: 1.95*10 ² or 195, while 1.12E-11 is the same as 1.12*10 ⁻¹¹ or 0.0000000000112.								

ENVIRONMENTAL IMPACTS PER 1 M ² of B80 Grafit									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ eq.]	1.45E+00	3.46E-02	3.88E-02	0.00E+00	7.85E-04	1.48E+00	0.00E+00	-5.11E-01
GWP-fossil	[kg CO ₂ eq.]	1.45E+00	3.46E-02	3.88E-02	0.00E+00	7.88E-04	1.48E+00	0.00E+00	-5.08E-01
GWP-biogenic	[kg CO ₂ eq.]	-7.38E-07	0.00E+0	7.38E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.44E-03
GWP-luluc	[kg CO ₂ eq.]	1.71E-03	2.40E-04	3.40E-07	0.00E+00	5.34E-06	1.44E-06	0.00E+00	-1.35E-04
ODP	[kg CFC 11 eq.]	1.33E-09	3.49E-15	1.57E-15	0.00E+00	7.78E-17	5.89E-14	0.00E+00	-3.46E-12
AP	[mol H ⁺ eq.]	2.65E-03	4.78E-05	3.55E-06	0.00E+00	9.29E-07	1.30E-04	0.00E+00	-9.07E-04
EP-freshwater	[kg P eq.]	1.95E-05	1.27E-07	5.26E-10	0.00E+00	2.83E-09	1.37E-08	0.00E+00	-2.56E-06
EP-marine	[kg N eq.]	6.71E-04	1.70E-05	7.71E-07	0.00E+00	3.07E-07	2.83E-05	0.00E+00	-2.86E-04
EP-terrestrial	[mol N eq.]	7.22E-03	1.99E-04	1.66E-05	0.00E+00	3.66E-06	6.10E-04	0.00E+00	-2.90E-03
POCP	[kg NMVOC eq.]	1.94E-02	4.23E-05	2.27E-06	0.00E+00	8.05E-07	8.34E-05	0.00E+00	-7.27E-04
ADPm ¹	[kg Sb eq.]	3.66E-07	3.58E-09	4.25E-11	0.00E+00	7.99E-11	1.43E-09	0.00E+00	-1.22E-07
ADPf ¹	[MJ]	3.96E+01	4.67E-01	4.85E-03	0.00E+00	1.04E-02	1.60E-01	0.00E+00	-5.94E+00
WDP ¹	[m ³ world eq. deprived]	1.59E-01	3.98E-04	3.24E-03	0.00E+00	8.87E-06	1.20E-01	0.00E+00	-4.75E-02
Caption	GWP-total = Globale Warming Potential - total; GWP-fossil = Global Warming Potential - fossil fuels; GWP-biogenic = Global Warming Potential - biogenic; GWP-luluc = Global Warming Potential - land use and land use change; ODP = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = Water Depletion Potential								
	The numbers are declared in scientific notation, e.g., 1.95E+02. This number can also be written as: 1.95*10 ² or 195, while 1.12E-11 is the same as 1.12*10 ⁻¹¹ or 0.0000000000112.								
Disclaimer	¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.								

RESOURCE USE PER 1 M ² of B80 Grafit									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	[MJ]	3.51E+00	3.24E-02	1.05E-03	0.00E+00	7.21E-04	3.78E-02	0.00E+00	-7.19E+00
PERM	[MJ]	7.21E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	3.58E+00	3.24E-02	1.05E-03	0.00E+00	7.21E-04	3.78E-02	0.00E+00	-7.19E+00
PENRE	[MJ]	3.97E+01	4.69E-01	4.86E-03	0.00E+00	1.04E-02	1.60E-01	0.00E+00	-5.94E+00
PENRM	[MJ]	1.67E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	[MJ]	5.64E+01	4.69E-01	4.86E-03	0.00E+00	1.04E-02	1.60E-01	0.00E+00	-5.94E+00
SM	[kg]	1.53E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[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
NRSF	[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
FW	[m ³]	7.44E-03	3.74E-05	7.60E-05	0.00E+00	8.33E-07	2.82E-03	0.00E+00	-2.60E-03
Caption	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; PENRE = Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials; PENRM = 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 = Net use of fresh water								
	The numbers are declared in scientific notation, e.g., 1.95E+02. This number can also be written as: 1.95*10 ² or 195, while 1.12E-11 is the same as 1.12*10 ⁻¹¹ or 0.0000000000112.								

WASTE CATEGORIES AND OUTPUT FLOWS PER 1 M ² of B80 Grafit									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	[kg]	2.33E-09	2.48E-12	4.05E-13	0.00E+00	5.53E-14	1.51E-11	0.00E+00	-1.31E-09
NHWD	[kg]	9.73E-03	7.64E-05	1.43E-04	0.00E+00	1.70E-06	5.35E-03	0.00E+00	-2.00E-02
RWD	[kg]	1.14E-04	8.70E-07	2.59E-07	0.00E+00	1.94E-08	9.71E-06	0.00E+00	-2.02E-04
CRU	[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
MFR	[kg]	6.11E-03	0.00E+00	4.70E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+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
EEE	[MJ]	2.62E-04	0.00E+00	7.27E-02	0.00E+00	0.00E+00	2.66E+00	0.00E+00	0.00E+00
EET	[MJ]	4.70E-04	0.00E+00	1.29E-01	0.00E+00	0.00E+00	4.75E+00	0.00E+00	0.00E+00
Caption	HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy								
	The numbers are declared in scientific notation, e.g., 1.95E+02. This number can also be written as: 1.95*10 ² or 195, while 1.12E-11 is the same as 1.12*10 ⁻¹¹ or 0.0000000000112.								

ENVIRONMENTAL IMPACTS PER 1 M ² of B150 Grafit									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ eq.]	2.05E+00	3.62E-02	1.94E-02	0.00E+00	1.27E-03	2.39E+00	0,00E+00	-8.15E-01
GWP-fossil	[kg CO ₂ eq.]	2.05E+00	3.62E-02	1.94E-02	0.00E+00	1.27E-03	2.39E+00	0,00E+00	-8.11E-01
GWP-biogenic	[kg CO ₂ eq.]	-4.12E-07	0.00E+00	4.12E-07	0.00E+00	0.00E+00	0.00E+00	0,00E+00	-3.95E-03
GWP-luluc	[kg CO ₂ eq.]	6.05E-04	2.50E-04	7.12E-07	0.00E+00	8.61E-06	2.33E-06	0,00E+00	-2.13E-04
ODP	[kg CFC 11 eq.]	1.59E-09	3.65E-15	8.00E-16	0.00E+00	1.26E-16	9.51E-14	0,00E+00	-5.51E-12
AP	[mol H ⁺ eq.]	4.00E-03	4.90E-05	1.90E-06	0.00E+00	1.50E-06	2.09E-04	0,00E+00	-1.44E-03
EP-freshwater	[kg P eq.]	2.47E-05	1.33E-07	5.51E-10	0.00E+00	4.57E-09	2.22E-08	0,00E+00	-4.04E-06
EP-marine	[kg N eq.]	9.55E-04	1.72E-05	4.20E-07	0.00E+00	4.96E-07	4.57E-05	0,00E+00	-4.55E-04
EP-terrestrial	[mol N eq.]	1.01E-02	2.03E-04	8.81E-06	0.00E+00	5.91E-06	9.84E-04	0,00E+00	-4.60E-03
POCP	[kg NMVOC eq.]	3.07E-02	4.32E-05	1.23E-06	0.00E+00	1.30E-06	1.35E-04	0,00E+00	-1.16E-03
ADPm ¹	[kg Sb eq.]	4.58E-07	3.75E-09	2.95E-11	0.00E+00	1.29E-10	2.30E-09	0,00E+00	-1.94E-07
ADPf ¹	[MJ]	5.92E+01	4.88E-01	3.50E-03	0.00E+00	1.68E-02	2.59E-01	0,00E+00	-9.84E+00
WDP ¹	[m ³ world eq. deprived]	2.50E-01	4.16E-04	1.65E-03	0.00E+00	1.43E-05	1.94E-01	0,00E+00	-7.48E-02
Caption	GWP-total = Globale Warming Potential - total; GWP-fossil = Global Warming Potential - fossil fuels; GWP-biogenic = Global Warming Potential - biogenic; GWP-luluc = Global Warming Potential - land use and land use change; ODP = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPf = Abiotic Depletion Potential – fossil fuels; WDP = Water Depletion Potential								
	The numbers are declared in scientific notation, e.g., 1.95E+02. This number can also be written as: 1.95*10 ² or 195, while 1.12E-11 is the same as 1.12*10 ⁻¹¹ or 0.0000000000112.								
Disclaimer	¹ The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.								

RESOURCE USE PER 1 M ² of B150 Grafit									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	[MJ]	5.80E+00	3.38E-02	6.01E-04	0.00E+00	1.16E-03	6.10E-02	0.00E+00	-1.13E+01
PERM	[MJ]	1.22E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	5.92E+00	3.38E-02	6.01E-04	0.00E+00	1.16E-03	6.10E-02	0.00E+00	-1.13E+01
PENRE	[MJ]	5.93E+01	4.90E-01	3.51E-03	0.00E+00	1.68E-02	2.59E-01	0.00E+00	-9.84E+00
PENRM	[MJ]	2.68E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	[MJ]	8.61E+01	4.90E-01	3.51E-03	0.00E+00	1.68E-02	2.59E-01	0.00E+00	-9.84E+00
SM	[kg]	3.17E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	[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
NRSF	[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
FW	[m ³]	1.16E-02	3.91E-05	3.87E-05	0.00E+00	1.34E-06	4.55E-03	0.00E+00	-4.14E-03
Caption	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; PENRE = Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials; PENRM = 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 = Net use of fresh water								
	The numbers are declared in scientific notation, e.g., 1.95E+02. This number can also be written as: 1.95*10 ² or 195, while 1.12E-11 is the same as 1.12*10 ⁻¹¹ or 0.0000000000112.								

WASTE CATEGORIES AND OUTPUT FLOWS PER 1 M ² of B150 Grafit									
Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	[kg]	3.68E-09	2.59E-12	2.10E-13	0.00E+00	8.91E-14	2.44E-11	0.00E+00	-2.10E-09
NHWD	[kg]	1.54E-02	7.98E-05	7.25E-05	0.00E+00	2.74E-06	8.64E-03	0.00E+00	-3.16E-02
RWD	[kg]	1.75E-04	9.09E-07	1.33E-07	0.00E+00	3.13E-08	1.57E-05	0.00E+00	-3.21E-04
CRU	[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
MFR	[kg]	1.80E-02	0.00E+00	1.50E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+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
EEE	[MJ]	1.31E-03	0.00E+00	3.79E-02	0.00E+00	0.00E+00	4.30E+00	0.00E+00	0.00E+00
EET	[MJ]	2.35E-03	0.00E+00	6.54E-02	0.00E+00	0.00E+00	7.66E+00	0.00E+00	0.00E+00
Caption	HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy								
	The numbers are declared in scientific notation, e.g., 1.95E+02. This number can also be written as: 1.95*10 ² or 195, while 1.12E-11 is the same as 1.12*10 ⁻¹¹ or 0.0000000000112.								

BIOGENIC CARBON CONTENT AT FACTORY GATE				
Parameter	Unit	1 m ² of B60 Grafit	1 m ² of B80 Grafit	1 m ² of B150 Grafit
Biogenic carbon content in product	[kg C]	0.0	0.0	0.0
Biogenic carbon content in accompanying packaging	[kg C]	0.0	0.0	0.0
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO ₂			

Additional information

LCA interpretation

The raw material, polystyrene, is the main contributor to the environmental impacts, as polystyrene account for the maximum contribution to 11 out of 19 impact categories. Moreover, module A1 accounts for the maximum contribution for 12 out of 19 impact categories. The incineration of EPS at end-of-life accounts for the maximum contribution of 3 out of 19 impact categories.

Technical information on scenarios

Transport to the building site (A4)

Scenario information	B60 Grafit	B80 Grafit	B150 Grafit	Unit
Fuel type	Diesel	Diesel	Diesel	-
Vehicle type	EURO 6, 18.4-ton payload capacity	EURO 6, 18.4-ton payload capacity	EURO 6, 18.4-ton payload capacity	-
Transport distance	167	150	167	km
Capacity utilisation (including empty runs)	7	8	14	%
Gross density of products transported	13	15	25	kg/m ³

Installation of the product in the building (A5)

Scenario information	B60 Grafit	B80 Grafit	B150 Grafit	Unit
Ancillary materials	0	0	0	kg
Water use	0	0	0	m ³
Other resource use	0	0	0	kg
Energy type and consumption	0	0	0	kWh
Waste materials	0.012	0.017	0.021	kg
Output materials	0	0	0	kg
Direct emissions to air, soil, or water	0	0	0	kg

End of life (C1-C4)

Scenario information	B60 Grafit	B80 Grafit	B150 Grafit	Unit
Collected separately	0.43	0.47	0.75	kg
Collected with mixed waste	0	0	0	kg
For reuse	0	0	0	kg
For recycling	0	0	0	kg
For energy recovery through waste incineration	0.43	0.47	0.75	kg
For final disposal	0	0	0	kg
Assumptions for scenario development	Worst-case	Worst-case	Worst-case	As appropriate

Re-use, recovery and recycling potential (D)

Scenario information/Materiel	B60 Grafit	B80 Grafit	B150 Grafit	Unit
Packaging waste from installation (A5)				
Substitution of LDPE from recycling of wrapping foil	0.002	0.005	0.004	kg
Substitution of heat and electricity generation from wrapping foil incineration	0.001	0.003	0.002	kg

- Heat generation	0.016	0.035	0.027	MJ
- Electricity generation	0.009	0.019	0.015	MJ
Amount of waste EPS not credited, since products contain EPS cut-offs from production	0.0003	0.000	0.001	kg
- Heat generation	0.0038	0.0032	0.0010	MJ
- Electricity generation	0.0022	0.0018	0.0017	MJ
Substitution of heat and electricity generation incineration of waste EPS	0.008	0.009	0.014	kg
- Heat generation	0.08	0.09	0.15	MJ
- Electricity generation	0.05	0.05	0.08	MJ
Total available substitution in A5 for electricity and heating*				
- Heat generation	0.103	0.129	0.065	MJ
- Electricity generation	0.058	0.073	0.038	MJ
End of life of the product				
Amount of waste EPS not credited, since products contain EPS cut-offs from production	0.02	0.02	0.03	kg
- Heat generation	0.192	0.162	0.335	MJ
- Electricity generation	0.108	0.091	0.188	MJ
Substitution of heat and electricity generation from incineration of EPS	0.39	0.42	0.68	kg
- Heat generation	4.20	4.59	7.33	MJ
- Electricity generation	2.36	2.57	4.11	MJ
Total available substitution in C3 for electricity and heating*				
- Heat generation	4.39	4.75	7.67	MJ
- Electricity generation	2.47	2.66	4.30	MJ

*note that the electricity and heat from the EPS cut-offs is not credited in module D

Indoor air

The EPD does not give information on release of dangerous substances to indoor air because the horizontal standards on the relevant measurements are not available. Read more in EN15804+A1 chapter 7.4.1.

Soil and water

The EPD does not give information on release of dangerous substances to soil and water because the horizontal standards on the relevant measurements are not available. Read more in EN15804+A1 chapter 7.4.2.

References

Publisher	 www.epddanmark.dk <small>Template version 2022.2</small>
Programme operator	Danish Technological Institute Buildings & Environment Gregersensvej DK-2630 Taastrup www.teknologisk.dk
LCA-practitioner	Rikke Bernberg and Freja Jeppesen COWI A/S Parallevej 2 2800 Kgs. Lyngby
LCA software / background data	GaBi Professional 2022 and Ecoinvent v3.8
3rd party verifier	David Althoff Palm Dalemarken AB

General programme instructions

General Programme Instructions, version 2.0, spring 2020, www.epddanmark.dk

EN 15804

DS/EN 15804 + A2:2019 - "Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products"

EN 16783

E N 16783:2017, "Thermal insulation products – Product category rules (PCR) for factory made and in-situ formed products for preparing environmental product declarations"

EN 15942

DS/EN 15942:2011 – "Sustainability of construction works – Environmental product declarations – Communication format business-to-business"

ISO 14025

DS/EN ISO 14025:2010 – "Environmental labels and declarations – Type III environmental declarations – Principles and procedures"

ISO 14040

DS/EN ISO 14040:2008 – "Environmental management – Life cycle assessment – Principles and framework"

ISO 14044

DS/EN ISO 14044:2008 – "Environmental management – Life cycle assessment – Requirements and guidelines"