

Environmental Product Declaration



according to ISO 14025, ISO 14040/44 and EN 15804+A2:2019 for:

Range of flexible membranes which include a combination of Vapour Permeable/Vapour Tight, Airtight/Air Open Membranes with various Reaction to Fire Classifications - EPD of multiple products, based on worst-case results

Wraptite®
Proctor Air®
Procheck A2®
Procheck FR200®
Proctorwrap Reflect®
Reflectatherm® Plus

Owner of the EPD

Programme:

Programme operator:

EPD registration number:

Publication date:

Valid until:

A. Proctor Group Ltd.

The International EPD® System, www.environdec.com

EPD International AB

EPD-IES-0017163

2025-09-22

2030-09-21

An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com



General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification

Product Category Rules (PCR):	<p>CEN standard EN 15804 serves as the Core Product Category Rules (PCR)</p> <p>Product Category Rules (PCR):</p> <ul style="list-style-type: none">- <i>Construction Products; PCR 2019:14; Version 2.0.1</i>- <i>General Programme Instructions for the International EPD System, Version 5.0.1</i> <p>The PCR was developed within CEN standardisation and adopted as a c-PCR by the International EPD® System. There was thus no additional open consultation period and no additional review in addition to those within standardisation.</p>
Life Cycle Assessment (LCA):	<p>Ramboll Deutschland GmbH Jürgen-Töpfer-Straße 48 22763 Hamburg Germany</p> <p>LCA practitioners:</p> <ul style="list-style-type: none">- <i>Katharina Terörde (Ramboll Deutschland GmbH)</i>- <i>Hiranmayee Kanekar (Ramboll India Private Limited)</i>
Third-party verification:	<p>Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:</p> <p><input checked="" type="checkbox"/> EPD verification by individual verifier</p> <p>Third-party verifier: <i>Kim Allbury</i> Approved by: The International EPD® System</p> <p>Procedure for follow-up of data during EPD validity involves third party verifier:</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison.

Information about EPD owner

Owner of the EPD:	A. Proctor Group Ltd.
Contact:	Iain Fairnington, Sue Menmuir
Website:	https://proctorgroup.com/

The Proctor Group is a leading provider of high-performance membrane and building envelope solutions with a strong global presence and a reputation for excellence. Our products are trusted worldwide in a wide range of demanding applications - from façades to roofing, timber frame, traditional and high-rise developments, and retrofit and refurbishment projects. With decades of specialist expertise, we are known for combining technical innovation with proven performance, delivering solutions that meet the needs of modern construction on internationally. Whilst our roots are in Scotland, our outlook is global, and our customers benefit from the agility and responsiveness of a dedicated team that rivals much larger organisations.

At the heart of our success is a strong, people-first culture - led by an ambitious Managing Director, a dedicated Board of Directors, and a loyal workforce. This commitment underpins long-standing partnerships across our supply chain, enabling us to consistently deliver exceptional support to architects, contractors, and distributors alike. Our internal culture built on shared values, long-term dedication, and a passion for excellence forms the foundation of our brand and the reason customers around the world continue to trust the Proctor Group.

Product-related or management system-related certifications:

- ISO 9001

Name and location of retail:

A. Proctor Group Ltd.
The Haugh, Ashgrove Rd
Blairgowrie, PH10 7ER
United Kingdom

Production plants: Several production sites across Europe and Asia.

Product information

The targeted EPD is a manufacturer's declaration of multiple products within a group of thermal, air-tight and fire-resistant membrane solutions.

The products covered in this EPD are:

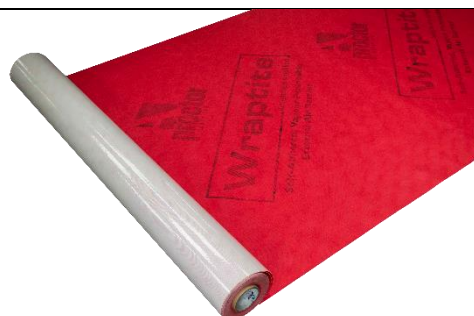
- Wraptite®
- Proctor Air®
- Procheck A2®
- Procheck FR200®
- Proctorwrap Reflect®
- Reflectatherm® Plus

This EPD is based on a worst-case approach. For each indicator and module A-C, the highest result of the included products, and for module D, the lowest benefit of avoided processes and the highest load of included processes are declared. That indicates that the actual results for each product are in most cases lower than the reported values.

Description of technical and functional characteristics

Dimensions of the declared product:	1 m ²
UN CPC code:	3695 Other construction products made of plastic
Geographical scope:	The membranes are made by several suppliers with production sites in Europe and Asia. The distribution takes place from A. Proctor Group's site in UK. The exact production site location is not disclosed to maintain the confidentiality of Proctor Group's suppliers

Wraptite®: Wraptite is an external self-adhesive vapour permeable air barrier for walls, roofs and floors to achieve good airtightness results. The Wraptite range of external air barriers ensures reliable airtightness in buildings with a two-component system: Wraptite and Wraptite Tape. This approach reduces labour and material costs for both commercial and residential projects by relocating the air barrier to the building's exterior, minimizing penetrations and eliminating the need for expensive specialized components. Wraptite is highly vapor-permeable, airtight, and self-adhering, ensuring a consistent external seal. Wraptite has two BBA certificate for use in walls, roofs and floors.



Wraptite®. Source: A. Proctor Group

Proctor Air®: Proctor Air® is an air and vapour permeable pitched roof underlay which allows vapour to escape- but also allows air in- reducing condensation risk. Proctor Air® is a highly water-resistant, air, and vapor permeable roofing underlay. Its design allows complex pitched roofs to breathe without air gaps or extra venting. The meltblown core facilitates natural air movement, enhancing moisture vapor passage and reducing condensation. Proctor Air® features include vapor permeability, full air permeability, water resistance, compliance with BS5534 wind uplift resistance standards, provision of more uniform airflow compared to vents, elimination of the need for a vapor control layer (VCL), a 15-year warranty, and certification by the British Board of Agrément (BBA).

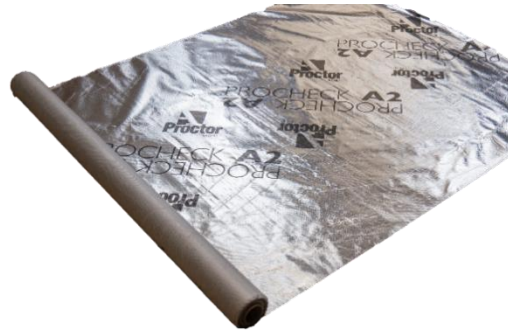


Proctor Air®. Source: A. Proctor Group

¹ <https://proctorgroup.com/products/wraptite>

² <https://proctorgroup.com/products/proctor-air>

Procheck A2®: Procheck A2® is a vapor and airtight membrane with a Class A2-s1, d0 fire classification, making it non-combustible. Constructed with a glass fibre backing, aluminium foil, and a clear lacquer coating, it offers high vapor control properties and airtightness, suitable as an AVCL in construction to enhance thermal efficiency. Procheck® A2 key features include Class A2-s1, d0 fire classification, high vapor resistance, a low emissivity clear lacquered aluminium surface, reflective material with emissivity below 0.05, durability for tough site conditions, and BBA certification.



Procheck A2®. Source: A. Proctor Group

Procheck FR200®: Procheck FR200® functions as a vapor control layer in roofs and walls for new and renovation projects. With a B-s1, d0 Reaction to Fire classification, it ensures reliable fire performance. This air and vapor tight membrane also improves energy efficiency and reduces condensation risk. Procheck FR200's key attributes include independently verified fire performance with an EN 13501-1 B-s1, d0 classification, enhanced energy efficiency, reduced risk of condensation, and a reinforced membrane that withstands tough site conditions.



Procheck FR200®. Source: A. Proctor Group

Proctorwrap Reflect®: Proctorwrap Reflect® is a low emissivity, vapor permeable membrane that enhances the thermal performance of timber and steel frames. Made from non-woven polypropylene foil laminate, it provides breathability and protection during construction. Installed on the external face of the frame, it meets TRADA and NHBC vapor resistance standards with an S_d 0.08m / 0.4 MNs/g. Cover within 3 months and repair any damage immediately. Proctorwrap Reflect® features an R value of 0.71, competitive pricing, enhanced foil surface, low vapor resistance compliant with TRADA and NHBC, high strength-to-weight ratio, W2 water penetration rating, and availability in 1.5-, 2.7-, and 3-meter-wide rolls.



Proctorwrap Reflect®. Source: A. Proctor Group

Reflectatherm® Plus: Reflectatherm® Plus is a high resistance, reflective air and vapor control layer for internal walls, ceilings, and floors, enhancing thermal performance when placed on the warm side of insulation. Reflectatherm® Plus boasts high vapor resistance and improved airtightness, offers an R value of 0.72 m² K/W with a 19mm service cavity, creates an unbroken vapor control layer, and has an S_d value greater than 150m. Install with the foil side facing the cavity, overlap sheets by 150mm, and seal all joints.



Reflectatherm® Plus. Source: A. Proctor Group

³ <https://proctorgroup.com/products/procheck-a2>

⁴ <https://proctorgroup.com/products/procheck-fr200>

⁵ <https://proctorgroup.com/products/proctorwrap-reflect>

⁶ <https://proctorgroup.com/products/reflectatherm-plus>

Content information

Product component	Weight [kg]	Post-consumer material, weight-%	Biogenic material, weight-% and g C/product or declared unit ⁷
Raw materials			
PP Thermobond	0 - 1.76E-01	-	-
Acrylic resin	0 - 6.19E-02	-	-
PET	0 - 5.21E-02	-	-
Propylene glycol	0 - 2.54E-03	-	-
Urethane resin	0 - 8.94E-04	-	-
Aluminium foil	0 - 8.00E-02	-	-
Curing agent	0 - 4.94E-04	-	-
Glass Fibre Fabric	0 - 8.30E-02	-	-
Grafik paper	0 - 3.20E-04	-	-
Ink	0 - 9.88E-04	-	-
LDPE bag	0 - 4.17E-04	-	-
LDPE film	0 - 2.75E-02	-	-
LDPE granulate	0 - 8.89E-03	-	-
Plastic granulate	0 - 2.96E-03	-	-
Polymer additives	0 - 2.96E-03	-	-
Polymer coating	0 - 9.88E-04	-	-
Polyurethane dispersion (glue)	0 - 4.94E-03	-	-
PP granulate	0 - 9.98E-02	-	-
Packaging			
Packaging Cardboard	6.52E-03 - 3.55E-02	~ 88% ⁸	42% resp. 2.7 g
EUR Pallet	0 - 2.20E-02	-	44% resp. 0 g
Packaging wood	0 - 2.38E-03	-	44% resp. 0 g
Packaging plastic film	8.71E-05 - 2.53E-03	-	-
Packaging Plastic pallet	0 - 2.50E-02	-	-
Packaging PP band	0 - 3.30E-05	-	-
Grand Total			

The content information indicates a range of materials used for any of the products in scope of this EPD. The main materials for the products excluding the packaging are:

Wraptite: PP (59%), Acrylic Resin (22%), and PET (18%).

Proctorwrap Reflect: PP (75%) and Aluminium foil (16%).

Reflectatherm: PP (75%) and Aluminium foil (16%).

Proctor Air: PP (>99%)

Procheck FR200: Aluminium foil (52%), LDPE (30%) and Glass Fiber fabric (7%)

Procheck A2 has the main materials Glass Fibre Fabric (49%) and Aluminium foil (47%).

The Products do not contain substances listed in the “Candidate List of Substances of Very High Concern for authorisation” (<http://echa.europa.eu/candidate-list-table>). Last accessed: 11.03.2025.

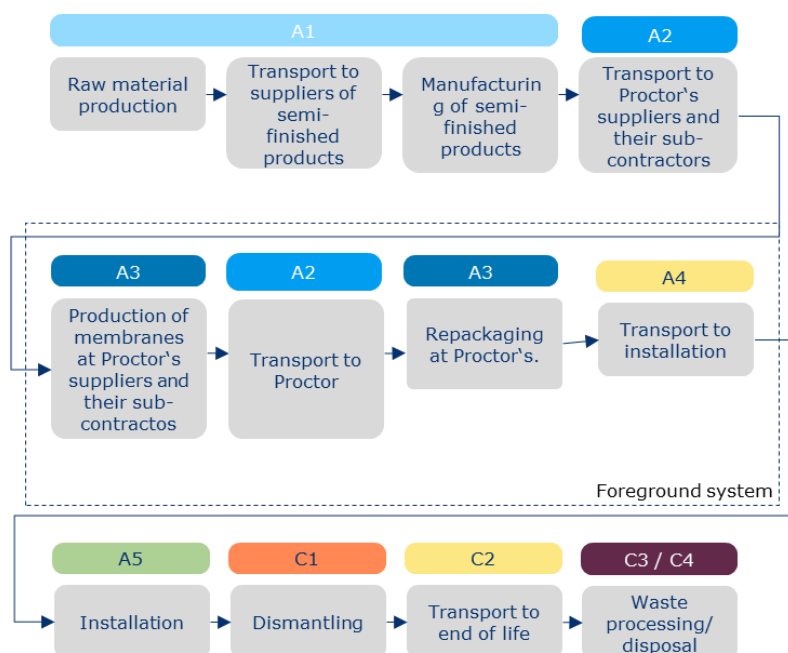
⁷ Minimum biogenic content declared.

⁸ Based on background datasets.

LCA information

Declared unit:	1 m ²
Weight per m ² (incl. packaging):	0,436 ⁹ kg/m ²
Reference service life:	N.A.
Time representativeness:	2023 to 2024 ¹⁰
Database(s) used:	ecoinvent EN 15804 (2024) database, version 3.11
LCA software used:	Umberto, version 11.15.1
Description of system boundaries:	Cradle to gate with options (A1-A3, A4-A5, C1-C4, D)
System boundaries for infrastructure/capital goods and employees:	<p>The production and end-of-life processes of infrastructure or capital goods used in the product system were excluded for all upstream, core and downstream processes. This also applies to personnel-related processes, such as transportation of employees to and from work. However, it is possible that this data on infrastructure/capital goods is contained in generic LCI datasets and cannot be removed with reasonable effort.</p> <p>Disclaimer: <i>The results of the impact categories abiotic depletion of minerals and metals, land use, human toxicity (cancer), human toxicity, non-cancer and ecotoxicity (freshwater) may be highly uncertain in LCAs that include capital goods/infrastructure in generic datasets, in case infrastructure/capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used to quantify these indicators in currently available generic datasets sometimes lack temporal, technological and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.</i></p>

System diagram:



⁹ The is the weight of the highest weighting included product. The lowest weighting included product has a weight of 0,102 kg/m².

¹⁰ Some of the products were only produced in 2023 and some only in 2024. For this reason the data collection was conducted for the production period of 2023 to 2024.

Manufacturing process:

Procheck A2®: Glass fibre fabric, aluminium foil and a polymer coating are joined by a glue lamination process. This is a one phase gluing and inline printing processes. Afterwards the membranes are slitted and sent to a sub-contractor for small reel making, from where they are sent to A. Proctor Group in UK and further distributed to the final clients.

Wraptite®: One roll PP spun bond red layer, two breathable membrane rolls, and one roll PP spun bond white are bonded together within defined pressure and measured temperature. In the next step the jumbo rolls of the laminate labelled, packed and palletized. From Europe, the rolls are sent to a sub-contractor by an international over-sea transport. An additional coating is applied. Afterwards they are labelled, packed and palletized. The final product is directly sent from the sub-contractor to the final client for clients in the US or in Australia, otherwise it is sent to A. Proctor Group in UK and further distributed to the final clients.

Proctor Air®: One roll PP spun bond purple layer and two rolls of melt blown layer and one roll PP spun bond grey layer are bonded together within defined pressure and measured temperature. In the next step the bigger rolls of the laminate are converted to smaller 50m rolls, labelled, packed and palletized. The final products are sent to A. Proctor Group in UK from where they are sent to the final clients.

Procheck FR200®: Glass fibre fabric, aluminium foil and LDPE are merged by a polymer lamination which is a one phase process. Afterwards the membranes are slitted and sent to a sub-contractor for small reel making, from where they are sent to A. Proctor Group in UK and further distributed to the final clients.

Proctorwrap®Reflect: Different polymer granulates are merged by Polymer lamination. This is a one phase process. Afterwards, the membranes are perforated on a flexoline. Jumbo reels are sent to sub-contractor where they are slit into small reels. After packaging and palletizing, the final products are sent to A. Proctor Group in UK from where they are sent to the final clients.

Reflectatherm® Plus: Different polymer granulates are merged by Polymer lamination. This is a one phase process. Jumbo reels are sent to sub-contractor where they are slit into small reels. After packaging and palletizing, the final products are sent to A. Proctor Group in UK from where they are sent to the final clients.

For electricity, the country-specific residual electricity grid mixes from the ecoinvent database were used for electricity consumption during manufacturing phase (in accordance with EN 15804:2012+A2:2019). The manufacturing takes place in different European and Asian countries. The electricity mix with the highest GWP impacts has a GHG-GWP of 0,820 kg CO₂/kWh, the electricity mix with the lowest GWP impacts has a GHG-GWP of 0,084 kg CO₂/kWh.

Scenario description

A4 – Transport to building site

Module A4 covers the transports from the final production site directly to the client or with an intermediate stop at A. Proctor Groups' site.

Scenario information	Value	Unit
Distance Container ship	476	km
Distance Medium sized truck	150	km

A5 – Installation

In this module, the efforts for the installation and the separation of the packaging as well as its treatment is modelled. For the installation, no impacts are considered. Any impacts related to the installation are considered to fall under cut-off. Packaging is separated from the product and sent to treatment.

Scenario information	Value	Unit
Vehicle type	Lorry 16-32 metric ton, EURO6	
Fuel type	Diesel	
Distance	50	km
Load factor	5.79	t
Gross vehicle weight (GVW)	15.79	t

	<table><tr><th>Waste</th><th>Recycling [%]</th><th>Incineration [%]</th><th>Landfill [%]</th></tr><tr><td>Packaging plastic</td><td>5</td><td>0</td><td>95</td></tr><tr><td>Packaging paper</td><td>0</td><td>100</td><td>0</td></tr><tr><td>Packaging wood</td><td>5</td><td>0</td><td>95</td></tr></table>	Waste	Recycling [%]	Incineration [%]	Landfill [%]	Packaging plastic	5	0	95	Packaging paper	0	100	0	Packaging wood	5	0	95		
Waste	Recycling [%]	Incineration [%]	Landfill [%]																
Packaging plastic	5	0	95																
Packaging paper	0	100	0																
Packaging wood	5	0	95																
C1 – Deconstruction and demolition	This module includes dismantling and demolition of the final product from the building. Hydraulic diggers are assumed for dismantling and loading the resulting post-consumer demolition waste to truck, for further transporting (see next module). As the volume of this product is negligibly small compared to the rest of the building, no impacts of the dismantling are allocated to this product.																		
C2 – Transportation to waste processing or final disposal	<p>Module C2 covers the transports to waste processing and disposal.</p> <table><tr><th>Scenario information</th><th>Value</th><th>Unit</th></tr><tr><td>Vehicle type</td><td>Lorry 16-32 metric ton, EURO6</td><td></td></tr><tr><td>Fuel type</td><td>Diesel</td><td></td></tr><tr><td>Distance</td><td>50</td><td>km</td></tr><tr><td>Load factor</td><td>5.79 t</td><td>t</td></tr><tr><td>Gross vehicle weight (GVW)</td><td>15.79 t</td><td>t</td></tr></table>	Scenario information	Value	Unit	Vehicle type	Lorry 16-32 metric ton, EURO6		Fuel type	Diesel		Distance	50	km	Load factor	5.79 t	t	Gross vehicle weight (GVW)	15.79 t	t
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C3 – Waste processing for reuse, recovery and/or recycling	<p>Module C3 contains the waste treatment processes at the end of the product life cycle. It includes sorting processes for all materials and the incineration of plastic parts. Treatment methods are based on market conditions (World Bank, 2024) in the receiving countries.</p> <table><tr><th>Incineration [%]</th><th>Landfill [%]</th></tr><tr><td>40</td><td>60</td></tr></table>	Incineration [%]	Landfill [%]	40	60														
Incineration [%]	Landfill [%]																		
40	60																		
C4 – Disposal	This module includes burdens associated to the transportation and final disposal of waste. A generic background data set was used for the modelling																		
D – Reuse, recovery and/or recycling potentials	<p>The energy resulting from the thermal utilisation of the waste (thermal energy and electricity are credited in this module as follows¹¹:</p> <table><tr><th>Scenario information</th><th>Value</th><th>Unit</th></tr><tr><td>Exported electric energy</td><td>0.0052</td><td>MJ</td></tr><tr><td>Exported thermal energy</td><td>0.0370</td><td>MJ</td></tr></table>	Scenario information	Value	Unit	Exported electric energy	0.0052	MJ	Exported thermal energy	0.0370	MJ									
Scenario information	Value	Unit																	
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Exported thermal energy	0.0370	MJ																	

More information

Assumptions:

Packaging from sub-contractor to final client was assumed in case no primary data was given. This does not majorly contribute to the results as these are only small values compared to the overall packaging.

Raw material and packaging waste had to be assumed where no primary data was given. 10% were taken as default. The true waste streams could be lower or higher, which would have an impact in A1-A3 for the raw material and waste treatment processes.

All land transportation is assumed to involve trucks with EURO 6 engines. However, in some destination countries, environmental standards for transportation may be lower, and trucks with less stringent emission classes might be used. This could potentially increase the environmental impacts during the distribution phase.

Intercontinental transport was assumed to be carried out with heavy fuel oil and container ships. Other fuels or the use of smaller ships could be influencing the results. Air transport was not considered.

During the material recovery and energy recovery phases, possible elements such as sorting efforts, human labour, electricity usage, forklifts or other vehicles, wood pellets, and chemicals (if required) are not considered. Additionally, all additive materials like acrylic resin and polymer coating are modelled with the same impacts as plastic end of life.

¹¹ The lowest exported energy value across all products is declared here.

Allocations:	<p>For all suppliers: Since the energy consumption for the production of the products is not recorded individually for each process and product, but is only available as total annual consumption, this total consumption for 2023 was allocated to a single square meter of final product.</p> <p>No multi-output allocation is applied for the systems assessed. It was considered that the product systems have one single output each, even though for two of the products it was indicated that waste is sold. For the end-of-life allocation a credit approach was chosen.</p>
Cut-off Criteria for the Exclusion of Inputs and Outputs:	<p>In compliance with the rules in EN 15804:2012+A2:2019, 6.3.6, the cut-off criteria are 1 % of renewable and non-renewable primary energy usage and 1 % of the total mass input of a unit process.</p> <p>All known inputs and outputs were included. Data gaps were filled with conservative assumptions and generic data. The neglected input flows are each below 1% of the total mass or the total impact of primary energy. In total, they constitute less than 5% of the overall mass or 5% of the total energy.</p>
Validity of data:	<p>Completeness: All relevant process steps are included in the study with respect to the goal and scope.</p> <p>Consistency: All primary data was collected at the same level of detail from different suppliers. All background data was taken from the ecoinvent database.</p> <p>Reliability: Data were collected with respect to the used technology in close exchange with the manufacturers. Data received from the manufacturers was checked for completeness and quality. Background data was taken from ecoinvent database. Where exact matching datasets were not found, the best-fitting alternative datasets have been used.</p> <p>Reproducibility: The information contained in this report makes it possible to reproduce the result, provided that the same database is used in the same version, as well as software version and impact assessment method. Additionally, distribution data is specific to each year and may vary accordingly. Changes in export data, such as distance, material weight, and port of arrival, could potentially impact the environmental results.</p>

Modules declared, geographical scope and share of specific data (in GWP-GHG results):

	Product stage	Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw materials and manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X
Geography	RER, APAC	RER	RER								GLO	GLO	GLO	GLO	GLO
Specific data used	>90%	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Environmental performance

Results of the environmental performance indicators are provided in this section

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3).

Disclaimer: This EPD is based on a worst-case approach. For each indicator and module A-C, the highest result of the included products, and for module D, the lowest benefit of avoided processes and the highest load of included processes are declared. That indicates that the actual results for each product are in most cases lower than the reported values.

Mandatory impact category indicators according to EN 15804

For the characterization factors (CF) to be used, EN 15804 refers to the “EN 15804 reference package” available at the JRC webpage. In February 2023, this reference package was updated to be based on the EF 3.1 package for CFs to be used in the PEF framework. For this EPD, the EN 15804 reference package based on EF 3.1 is being used.

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	2.04E+00	1.01E-01	5.91E-02	0.00E+00	3.50E-03	3.64E-01	2.08E-02	-2.72E-03
GWP-fossil	kg CO ₂ eq.	2.05E+00	1.01E-01	5.91E-02	0.00E+00	3.50E-03	3.64E-01	2.07E-02	-2.70E-03
GWP-biogenic	kg CO ₂ eq.	-9.55E-03	3.47E-06	2.91E-02	0.00E+00	2.27E-06	3.90E-05	1.01E-05	-1.02E-05
GWP-luluc	kg CO ₂ eq.	5.14E-03	5.19E-05	6.60E-07	0.00E+00	1.18E-06	2.01E-05	2.04E-06	-2.24E-07
ODP	kg CFC 11 eq.	8.62E-07	1.52E-09	3.13E-11	0.00E+00	7.63E-11	2.43E-10	6.20E-11	-6.94E-11
AP	mol H ⁺ eq.	1.28E-02	2.63E-03	1.47E-05	0.00E+00	7.51E-06	1.22E-04	1.84E-05	-2.51E-06
EP-freshwater	kg P eq.	6.03E-04	4.00E-06	2.33E-07	0.00E+00	2.43E-07	2.30E-06	1.63E-06	-5.25E-08
EP-marine	kg N eq.	2.27E-03	6.55E-04	1.05E-05	0.00E+00	1.81E-06	6.08E-05	4.62E-04	-9.13E-07
EP-terrestrial	mol N eq.	2.31E-02	7.28E-03	6.82E-05	0.00E+00	1.95E-05	5.50E-04	7.27E-05	-9.75E-06
POCP	kg NMVOC eq.	7.92E-03	2.00E-03	1.84E-05	0.00E+00	1.19E-05	1.53E-04	3.00E-05	-6.16E-06
ADP-minerals&metals*	kg Sb eq.	2.88E-05	1.34E-07	6.11E-09	0.00E+00	1.23E-08	4.74E-08	4.83E-09	-1.57E-09
ADP-fossil*	MJ	3.52E+01	1.26E+00	1.94E-02	0.00E+00	4.97E-02	1.90E-01	5.49E-02	-4.34E-02
WDP*	m ³	6.16E-01	4.05E-03	3.93E-03	0.00E+00	2.64E-04	2.66E-02	2.41E-03	-1.50E-04
Acronyms	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 = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption								

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

Additional mandatory impact category indicators

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG¹²	kg CO ₂ eq.	2.33E+00	1.01E-01	-2.37E-01	0.00E+00	3.50E-03	3.64E-01	2.08E-02	-2.72E-03
Particulate matter emissions potential (PM)	Incidence of disease	1.52E-07	3.54E-09	1.15E-10	0.00E+00	2.62E-10	4.04E-09	3.98E-10	-1.23E-11
Ionizing radiation potential - human health (IRP)	kBq U235-eq.	1.66E-01	6.80E-04	2.88E-05	0.00E+00	6.01E-05	3.32E-04	5.40E-05	-1.13E-05
Eco-toxicity potential - freshwater (ETP-fw)	CTUe	1.15E+01	1.00E-01	1.20E-01	0.00E+00	6.68E-03	8.17E-01	1.03E+01	-1.45E-03
Human toxicity, cancer effects (HTP-c)	CTUh	1.41E-09	2.08E-11	5.08E-12	0.00E+00	5.89E-13	3.21E-11	1.39E-12	-2.22E-13
Human toxicity, non-cancer effects (HTP-nc)	CTUh	2.49E-08	3.73E-10	1.81E-10	0.00E+00	3.13E-11	1.13E-09	2.41E-10	-3.71E-12
Soil quality potential (SQP)	dimensionless	9.58E+00	1.83E-01	8.78E-03	0.00E+00	2.98E-02	1.82E-01	1.30E-01	-8.39E-04
Acronyms	HTP-c = Human toxicity, cancer effects; HTP-nc = Human toxicity, non-cancer effects; SQP = Soil quality potential; PM = Particulate matter emissions potential; IRP = Ionizing radiation potential - human health; ETP-fw = Eco-toxicity potential - freshwater								

* Disclaimer: The results of the impact categories abiotic depletion of minerals and metals, land use, human toxicity (cancer), human toxicity, non-cancer and ecotoxicity (freshwater) may be highly uncertain in LCAs that include capital goods/infrastructure in generic datasets, in case infrastructure/capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used to quantify these indicators in currently available generic datasets sometimes lack temporal, technological and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.

Resource use indicators

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1.21E-01	1.12E-02	6.09E-01	0.00E+00	8.20E-04	6.18E-03	8.46E-04	-1.51E-04
PERM	MJ	2.51E+00	0.00E+00	-2.51E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	2.63E+00	1.12E-02	-1.90E+00	0.00E+00	8.20E-04	6.18E-03	8.46E-04	-1.51E-04
PENRE	MJ	1.79E+00	1.26E+00	2.39E+01	0.00E+00	4.97E-02	1.26E+01	5.49E-02	-4.34E-02
PENRM	MJ	5.54E+01	0.00E+00	-1.85E+00	0.00E+00	0.00E+00	-1.26E+01	0.00E+00	0.00E+00
PENRT	MJ	3.52E+01	1.26E+00	-3.12E-03	0.00E+00	4.97E-02	2.51E-02	5.49E-02	-4.34E-02
SM	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
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	1.45E-02	9.28E-05	6.20E-05	0.00E+00	6.09E-06	2.45E-04	-2.87E-04	-3.52E-06
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water								

For the calculation of the primary energy indicators, option A according to PCR 2019:14 was chosen. In option A, the energy used as raw material is declared as an input to the module where it enters the product system (in module A1-A3)

¹² This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

and as an equally large output from the product system where it exits the product system (i.e., module A5 for packaging content and module C3 and/or C4 for product content) for use in another product system or as waste.

Outputs in the form of waste were, in the module where the loss occurs, reported as an input in the indicator for energy used as energy carriers (even if the energy is not used in the product system).

The rationale behind this option is that the indicator for energy used as raw materials shall reflect the input of energy that becomes part of the product and packaging, and the output of this energy from the product system regardless of when and how it exits the product system. That is, this indicator shows how much energy that is stored in the product or packaging at any given time. At the end of module C, energy is no longer stored in the product, and the energy used as raw materials will therefore be zero over the product life cycle.

Waste indicators

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	kg	3.41E-01	1.70E-03	9.13E-04	0.00E+00	7.22E-05	5.80E-03	1.63E-04	-2.35E-05
Non-hazardous waste disposed	kg	1.00E+01	2.65E-02	3.07E-02	0.00E+00	1.55E-03	3.23E-01	5.95E-01	-3.89E-04
Radioactive waste disposed	kg	4.15E-05	1.66E-07	7.22E-09	0.00E+00	1.48E-08	8.21E-08	1.32E-08	-2.73E-09

Output flow indicators

Results per functional or declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00	7.10E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	0.00E+00	0.00E+00	9.64E-02	0.00E+00	0.00E+00	5.89E-01	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	1.88E-01	0.00E+00	0.00E+00	1.15E+00	0.00E+00	0.00E+00

Additional environmental information

Carbon storage

The biogenic carbon content quantifies the amount of biogenic carbon in a product leaving the factory gate and is separately declared for the product and for any accompanying packaging (see following table).

Parameter	Unit	Product
Biogenic carbon content in product	kg C	0
Biogenic carbon content in accompanying packaging	kg C	0.0027

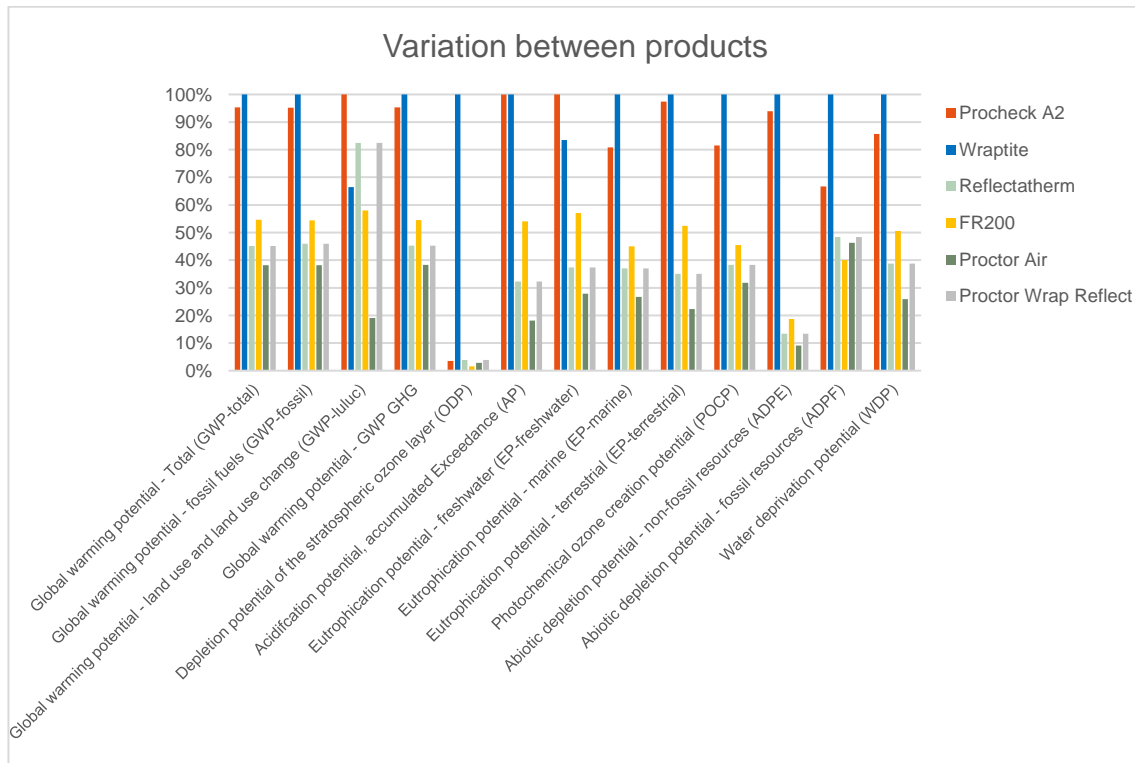
Note: 1 kg biogenic carbon is equivalent to 44/12 kg of CO₂

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

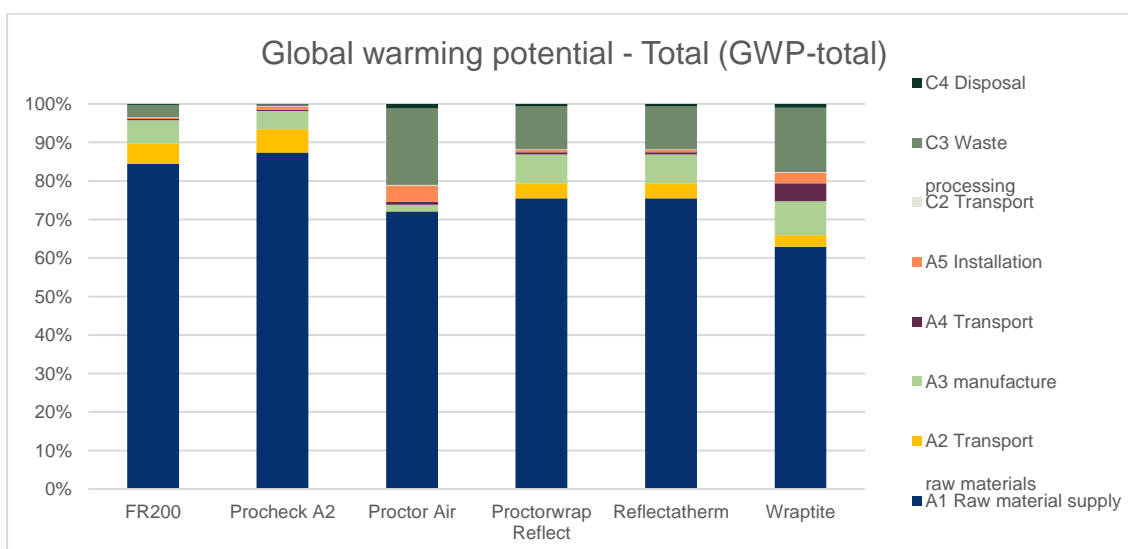
The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3).

Interpretation

The figure below shows for the mandatory impact category indicators according to EN 15804 the variation of the environmental impacts accumulated from the modules A-C for the different products. It is visible that for most of the impact categories, Wraptite has the highest impacts, followed by Procheck A2. For Procheck A2 the Aluminium foil and the glass fibre fabric are mainly responsible for the high impacts. For Wraptite, this is due to raw materials like PP thermobond, acrylic resin, and PET but also due to the incineration at the end of life. For FR200 which follows often on third place most of the impacts results from the use of aluminium foil and plastics like LDPE.



When exemplary analysing the GWP-total below, it is visible that module A1 raw material supply is the most important module for all products. The also waste processing at the end of life and raw material supply has visible impacts for some of the products.



Data Quality Assessment

Primary data used in the calculations was either measured or calculated data based on procurement and manufacturing information for same assessment year as the EPD. Background data was sourced from the ecoinvent version 3.11. Data quality ranged from good to very good during the assessment of relevant data using Data quality level and criteria of the UN Environment Global Guidance on LCA database development (EN 15804:2012+A2:2019, Annex E, only E.1). The data quality assessment is done in accordance with EN 15941:2024.

The geographical representativeness can be described as good to very good level of data quality as major materials and energy datasets chosen were representative of the location at a regional level. The technological representativeness can be described as between good to very good level of data quality for 75% of the datasets while 27% can be described as fair where generic datasets have been used to represent similar technology. Only 3% of the datasets can be described as poor level of data quality as substitute material datasets have been used which represented the type of materials. The time representativeness can be described as good to very good level of data quality, as the latest updated database was used which was within the one-year limit of EPD and the reference year. Overall, the data quality can be described as good. The EN 15804 reference package used is based on EF 3.1.

Share of primary data used:

Procheck A2 is the product which has the highest impacts for GWP-GHG in A1-A3. For this product, the processes contributing to more than 10% to the GWP-GHG results in A1-A3 were determined and additionally assessed in the following table.

Additional dataset evaluation for datasets contributing to more than 10% to the GWP-GHG results in A1-A3

Results per declared unit					
Process	Type of source	Source	Reference year	Data category	Share of GWP-GHG results of module A1-A3
Aluminium foil - A1-A3	Database	ecoinvent EN 15804-3.11	2000-2024	Primary data	59%
Glass Fibre Fabric - A1-A3	Database	ecoinvent EN 15804-3.11	2000-2024	Primary data	17%
Packaging Cardboard - Product - A1-A3	Database	ecoinvent EN 15804-3.11	2009-2024	Primary data	10%

Note that this indicator does not encompass all relevant aspects of data quality and is not comparable across different product categories.

The total share of primary data contributing to the declared GWP-GHG results of modules A1-A3 is >90%. The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.

Additional End of life results

In section 4.8.4 of the PCR it is stated that, if any of the declared scenarios is a mix of end-of-life alternatives (reuse, recycling, incineration with energy recovery, landfill, etc.), also the corresponding 100% scenarios (100% reuse, 100% recycling, 100% incineration with energy recovery, 100% landfill, etc.) shall be declared.

Following, the 100% scenarios for landfill and recycling are presented. As the worst-case results are composed of different products, the 100% scenarios are also composed of these products. For each indicator and life cycle stage in the baseline scenario the worst-case product was chosen. The 100% scenarios represent the end of life of these exact products.

Results for EoL scenario of 100% landfill

Mandatory impact category indicators according to EN 15804

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	2.04E+00	1.01E-01	5.91E-02	0.00E+00	3.50E-03	7.46E-03	3.46E-02	-1.79E-03
GWP-fossil	kg CO ₂ eq.	2.05E+00	1.01E-01	5.91E-02	0.00E+00	3.50E-03	7.43E-03	3.46E-02	-1.78E-03
GWP-biogenic	kg CO ₂ eq.	-9.55E-03	3.47E-06	2.91E-02	0.00E+00	2.27E-06	1.58E-05	1.69E-05	-6.65E-06
GWP-luluc	kg CO ₂ eq.	5.14E-03	5.19E-05	6.60E-07	0.00E+00	1.18E-06	1.73E-05	2.06E-06	-1.47E-07
ODP	kg CFC 11 eq.	2.33E+00	1.01E-01	-2.37E-01	0.00E+00	3.50E-03	7.46E-03	3.46E-02	-1.79E-03
AP	mol H ⁺ eq.	8.62E-07	1.52E-09	3.13E-11	0.00E+00	7.63E-11	1.30E-10	1.03E-10	-4.57E-11
EP-freshwater	kg P eq.	1.28E-02	2.63E-03	1.47E-05	0.00E+00	7.51E-06	4.02E-05	1.86E-05	-1.65E-06
EP-marine	kg N eq.	6.03E-04	4.00E-06	2.33E-07	0.00E+00	2.43E-07	1.13E-06	1.64E-06	-3.46E-08
EP-terrestrial	mol N eq.	2.27E-03	6.55E-04	1.05E-05	0.00E+00	1.81E-06	1.44E-05	7.69E-04	-6.01E-07
POCP	kg NMVOC eq.	2.31E-02	7.28E-03	6.82E-05	0.00E+00	1.95E-05	1.55E-04	1.21E-04	-6.42E-06
ADP-minerals&metals*	kg Sb eq.	7.92E-03	2.00E-03	1.84E-05	0.00E+00	1.19E-05	5.36E-05	4.99E-05	-4.06E-06
ADP-fossil*	MJ	2.88E-05	1.34E-07	6.11E-09	0.00E+00	1.23E-08	2.25E-08	4.89E-09	-1.04E-09
WDP*	m ³	3.52E+01	1.26E+00	1.94E-02	0.00E+00	4.97E-02	1.23E-01	9.15E-02	-2.86E-02
Acronyms	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 = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption								

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

Additional mandatory impact category indicators

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Particulate matter emissions potential (PM)	Incidence of disease	1.52E-07	3,54E-09	1,15E-10	0,00E+00	2,62E-10	3,61E-09	6,64E-10	-8,09E-12
Ionizing radiation potential - human health (IRP)	kBq U235-eq.	1.66E-01	6,80E-04	2,88E-05	0,00E+00	6,01E-05	2,18E-04	5,45E-05	-7,44E-06
Eco-toxicity potential - freshwater (ETP-fw)	CTUe	1.15E+01	1,00E-01	1,20E-01	0,00E+00	6,68E-03	1,16E-01	1,03E+01	-9,56E-04

Human toxicity, cancer effects (HTP-c)	CTUh	1.41E-09	2,08E-11	5,08E-12	0,00E+00	5,89E-13	1,64E-12	2,31E-12	-1,46E-13
Human toxicity, non-cancer effects (HTP-nc)	CTUh	2.49E-08	3,73E-10	1,81E-10	0,00E+00	3,13E-11	6,81E-11	4,02E-10	-2,44E-12
Soil quality potential (SQP)	dimensionless	9.58E+00	1,83E-01	8,78E-03	0,00E+00	2,98E-02	1,63E-01	2,16E-01	-5,52E-04
Acronyms	HTP-c = Human toxicity, cancer effects; HTP-nc = Human toxicity, non-cancer effects; SQP = Soil quality potential; PM = Particulate matter emissions potential; IRP = Ionizing radiation potential - human health; ETP-fw = Eco-toxicity potential - freshwater								

** Disclaimer: The results of the impact categories abiotic depletion of minerals and metals, land use, human toxicity (cancer), human toxicity, non-cancer and ecotoxicity (freshwater) may be highly uncertain in LCAs that include capital goods/infrastructure in generic datasets, in case infrastructure/capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used to quantify these indicators in currently available generic datasets sometimes lack temporal, technological and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.*

Resource use indicators

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1.21E-01	1.12E-02	6.09E-01	0.00E+00	8.20E-04	3.43E-03	8.56E-04	-9.96E-05
PERM	MJ	2.51E+00	0.00E+00	-2.51E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	2.63E+00	1.12E-02	-1.90E+00	0.00E+00	8.20E-04	3.43E-03	8.56E-04	-9.96E-05
PENRE	MJ	1.79E+00	1.26E+00	2.39E+01	0.00E+00	4.97E-02	2.42E+01	9.15E-02	-2.86E-02
PENRM	MJ	5.54E+01	0.00E+00	-1.85E+00	0.00E+00	0.00E+00	-2.42E+01	0.00E+00	0.00E+00
PENRT	MJ	3.52E+01	1.26E+00	-3.12E-03	0.00E+00	4.97E-02	5.59E-02	9.15E-02	-2.86E-02
SM	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
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	1.45E-02	9.28E-05	6.20E-05	0.00E+00	6.09E-06	-1.57E-04	-3.42E-04	-2.32E-06
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water								

Waste indicators

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	kg	3.41E-01	1.70E-03	9.13E-04	0.00E+00	7.22E-05	2.94E-04	1.64E-04	-1.55E-05
Non-hazardous waste disposed	kg	1.00E+01	2.65E-02	3.07E-02	0.00E+00	1.55E-03	1.58E-01	9.91E-01	-2.56E-04
Radioactive waste disposed	kg	4.15E-05	1.66E-07	7.22E-09	0.00E+00	1.48E-08	5.32E-08	1.33E-08	-1.80E-09

Output flow indicators

Results per functional or declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00	7.10E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Exported energy, electricity	MJ	0.00E+00	0.00E+00	9.64E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	1.88E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Results for EoL scenario of 100% incineration

Mandatory impact category indicators according to EN 15804

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	2.04E+00	1.01E-01	5.91E-02	0.00E+00	3.50E-03	8.99E-01	0.00E+00	-4.11E-03
GWP-fossil	kg CO ₂ eq.	2.05E+00	1.01E-01	5.91E-02	0.00E+00	3.50E-03	8.99E-01	0.00E+00	-4.09E-03
GWP-biogenic	kg CO ₂ eq.	-9.55E-03	3.47E-06	2.91E-02	0.00E+00	2.27E-06	7.38E-05	0.00E+00	-1.55E-05
GWP-luluc	kg CO ₂ eq.	5.14E-03	5.19E-05	6.60E-07	0.00E+00	1.18E-06	2.43E-05	8.29E-06	-3.39E-07
ODP	kg CFC 11 eq.	2.33E+00	1.01E-01	-2.37E-01	0.00E+00	3.50E-03	8.99E-01	0.00E+00	-4.11E-03
AP	mol H ⁺ eq.	8.62E-07	1.52E-09	3.13E-11	0.00E+00	7.63E-11	4.12E-10	0.00E+00	-1.05E-10
EP-freshwater	kg P eq.	1.28E-02	2.63E-03	1.47E-05	0.00E+00	7.51E-06	2.44E-04	2.73E-05	-3.79E-06
EP-marine	kg N eq.	6.03E-04	4.00E-06	2.33E-07	0.00E+00	2.43E-07	4.06E-06	7.14E-07	-7.94E-08
EP-terrestrial	mol N eq.	2.27E-03	6.55E-04	1.05E-05	0.00E+00	1.81E-06	1.30E-04	0.00E+00	-1.38E-06
POCP	kg NMVOC eq.	2.31E-02	7.28E-03	6.82E-05	0.00E+00	1.95E-05	1.14E-03	0.00E+00	-1.47E-05
ADP-minerals&metals*	kg Sb eq.	7.92E-03	2.00E-03	1.84E-05	0.00E+00	1.19E-05	3.02E-04	0.00E+00	-9.32E-06
ADP-fossil*	MJ	2.88E-05	1.34E-07	6.11E-09	0.00E+00	1.23E-08	8.47E-08	1.24E-08	-2.38E-09
WDP*	m ³	3.52E+01	1.26E+00	1.94E-02	0.00E+00	4.97E-02	2.91E-01	0.00E+00	-6.56E-02
Acronyms	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 = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption								

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

Additional mandatory impact category indicators

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Particulate matter emissions potential (PM)	Incidence of disease	1.52E-07	3.54E-09	1.15E-10	0.00E+00	2.62E-10	4.68E-09	0.00E+00	-1.86E-11
Ionizing radiation potential - human health (IRP)	kBq U235-eq.	1.66E-01	6.80E-04	2.88E-05	0.00E+00	6.01E-05	5.04E-04	6.83E-05	-1.71E-05
Eco-toxicity potential - freshwater (ETP-fw)	CTUe	1.15E+01	1.00E-01	1.20E-01	0.00E+00	6.68E-03	1.87E+00	1.19E-01	-2.19E-03
Human toxicity, cancer effects (HTP-c)	CTUh	1.41E-09	2.08E-11	5.08E-12	0.00E+00	5.89E-13	7.77E-11	0.00E+00	-3.36E-13
Human toxicity, non-cancer effects (HTP-nc)	CTUh	2.49E-08	3.73E-10	1.81E-10	0.00E+00	3.13E-11	2.73E-09	0.00E+00	-5.61E-12
Soil quality potential (SQP)	dimensionless	9.58E+00	1.83E-01	8.78E-03	0.00E+00	2.98E-02	2.11E-01	0.00E+00	-1.27E-03

Acronyms	HTP-c = Human toxicity, cancer effects; HTP-nc = Human toxicity, non-cancer effects; SQP = Soil quality potential; PM = Particulate matter emissions potential; IRP = Ionizing radiation potential - human health; ETP-fw = Eco-toxicity potential - freshwater
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* Disclaimer: The results of the impact categories abiotic depletion of minerals and metals, land use, human toxicity (cancer), human toxicity, non-cancer and ecotoxicity (freshwater) may be highly uncertain in LCAs that include capital goods/infrastructure in generic datasets, in case infrastructure/capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used to quantify these indicators in currently available generic datasets sometimes lack temporal, technological and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.

Resource use indicators

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1.21E-01	1.12E-02	6.09E-01	0.00E+00	8.20E-04	1.03E-02	1.28E-03	-2.29E-04
PERM	MJ	2.51E+00	0.00E+00	-2.51E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	2.63E+00	1.12E-02	-1.90E+00	0.00E+00	8.20E-04	1.03E-02	1.28E-03	-2.29E-04
PENRE	MJ	1.79E+00	1.26E+00	2.39E+01	0.00E+00	4.97E-02	2.41E+01	0.00E+00	-6.56E-02
PENRM	MJ	5.54E+01	0.00E+00	-1.85E+00	0.00E+00	0.00E+00	-2.42E+01	0.00E+00	0.00E+00
PENRT	MJ	3.52E+01	1.26E+00	-3.12E-03	0.00E+00	4.97E-02	-2.12E-02	0.00E+00	-6.56E-02
SM	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
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	1.45E-02	9.28E-05	6.20E-05	0.00E+00	6.09E-06	8.48E-04	1.48E-05	-5.33E-06
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water								

Waste indicators

Results per declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	kg	3.41E-01	1.70E-03	9.13E-04	0.00E+00	7.22E-05	1.41E-02	2.70E-04	-3.56E-05
Non-hazardous waste disposed	kg	1.00E+01	2.65E-02	3.07E-02	0.00E+00	1.55E-03	5.72E-01	0.00E+00	-5.88E-04
Radioactive waste disposed	kg	4.15E-05	1.66E-07	7.22E-09	0.00E+00	1.48E-08	1.25E-07	1.68E-08	-4.12E-09

Output flow indicators

Results per functional or declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00	7.10E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	0.00E+00	0.00E+00	9.64E-02	0.00E+00	0.00E+00	1.47E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	1.88E-01	0.00E+00	0.00E+00	2.88E+00	0.00E+00	0.00E+00

Abbreviations

Abbreviation	Definition
General Abbreviations	
EN	European Norm (Standard)
EPD	Environmental Product Declaration
EF	Environmental Footprint
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
PCR	Product Category Rules
c-PCR	Complementary Product Category Rules
CEN	European Committee for Standardization
CPC	Central product classification
JRC	Joint Research Centre
Other Relevant Terms	
APAC	Asia-Pacific
GLO	Global
LDPE	Low-Density Polyethylene
ND	Not Declared
PEF	Product Environmental Footprint
PET	Polyethylene Terephthalate
PP	Polypropylene
RER	European region
Units	
MJ	Megajoule
kg	Kilogram
m ³	Cubic Meter
NM VOC	Non-Methane Volatile Organic Compounds
Sb eq.	Antimony Equivalents
P eq.	Phosphorus Equivalents
N eq.	Nitrogen Equivalents
CFC-11 eq.	Chlorofluorocarbon-11 Equivalents
CO ₂ eq.	Carbon Dioxide Equivalents
kg C	Kilograms of Carbon
kg CO ₂ eq.	Kilograms of Carbon Dioxide Equivalent
ppm	Parts per million

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Version history

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