Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Durakerb

from

Duraproducts Limited

Programme:	The International EPD® System, www.environdec.com
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An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at 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
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Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): EPD International Product Category Rules (PCR) for construction products (PCR 2019:14 v1.2.5). The product group classification for the assessed products is UN CPC 36990.
PCR review was conducted by: The Technical Committee of the International EPD System. See https://www.environdec.com/about-us/the-international-epd-system-about-the-system for a list of members. Review chair: Claudia Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat https://www.environdec.com/contact-us.
Life Cycle Assessment (LCA)
LCA accountability: Dr Matthew Fishwick, Fishwick Environmental Ltd
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: *Chris Foster – LCA practitioner at EuGeos SRL* Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

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

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same 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 equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply

identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: Duraproducts Limited.

Contact details: Philip Sutton, Director, 55 Hoghton Street, Southport, Merseyside, PR9 0PG, United Kingdom, +44(0)1244 289003, info@econpro.co.uk.

Description of the organisation: Duraproducts Ltd is a manufacturer of unique lightweight recycled kerbing products, kerbside drainage systems, and surface drainage systems. Manufacturing their products from recycled plastics, Duraproducts' motivation is to reduce carbon emissions, mitigate risk and improve sustainability. More than 600,000 units of their award-winning products have been installed across the UK, Ireland, and mainland Europe.

Product-related or management system-related certifications: ISO 14001:2004 and ISO 9001:2008.

Name and location of production site(s): Durakerb assessed in this study is manufactured by Duraproducts' contract manufacturer in the United Kingdom.

Product information

Product name: Durakerb.

Product identification: Durakerb HB2 half battered standard unit.

Product description: Durakerb is a lightweight recycled plastic kerbing system used in the construction of roads, carparks etc. It complies with EN 1340:2003 and displays the CE mark.

Durakerb is lightweight, easier, safer, and quicker to cut and fit, removing the need for heavy cutting tools and large machinery, reducing working time on live networks and reducing heavy lifting. Winning awards from the Institute of Highways and Transportation, Highways Magazine, Building Magazine and Innovation in Plastics, more than 600,000 units of Duraproducts have been installed across the UK, Ireland, and mainland Europe. Durakerb is manufactured by moulding a blend of high recycled content polymer and calcium carbonate to produce the unique units, which have a lightweight structure whilst ensuring maximum strength. The individual units have a simple interlocking design to ensure swift and easy installation.

UN CPC code: The product group classification for the assessed product is UN CPC 36990.

Geographical scope of EPD: Europe.

Further product information: https://www.durakerb.co.uk/products/durakerb/

LCA information

Functional unit / declared unit: One unit of Durakerb HB2 half battered standard unit (5.6 kg).

Reference service life: n/a

Time representativeness: 2022.

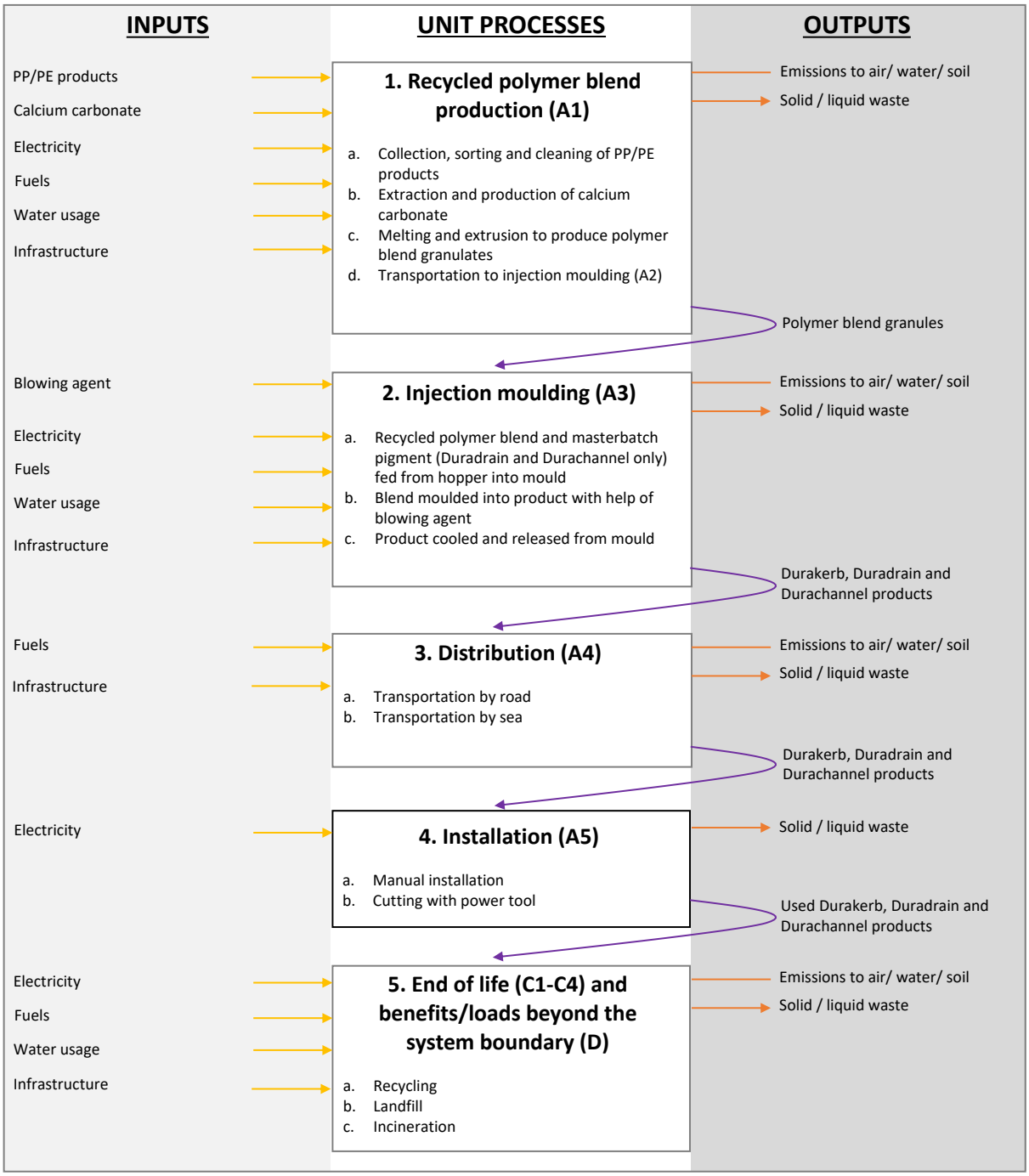
Database(s) and LCA software used: All secondary data were from Eugeos' 15804+A2_IA v4.1 extended version of ecoinvent v3.6 (cut-off) and the LCA software openLCA (version 1.10.3) and Microsoft Excel.

Description of system boundaries: The system boundary of a product system determines the unit processes to be included in the LCA study and which data as inputs and/or outputs to/from the system can be omitted. In this LCA study and resulting EPD, the system boundary was defined as cradle-to-gate with options (modules A4-A5, C1-C4 and D), covering extraction/cultivation of raw materials, processing of raw materials, production of the finished product, construction, and all transportation and waste stages until the grave stage. This boundary comprises the following modules given in EN 15798:2011: the product, construction, end-of-life stages, and benefits/loads beyond the system boundary (modules A1-A5, C1-C4, D).

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results). ND = not declared, DE = Germany.

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	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**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	DE	EU	UK	EU	EU	-	-	-	-	-	-	-	EU	EU	EU	EU	EU
Specific data used	>90%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-

System diagram:



Yellow line = input of material/energy, orange line = output of waste/direct emission, purple line = output of product/co-product, arrowhead on line = transportation stage considered.

Module A1 – raw material supply, comprising:

- Extraction and production of all raw materials for the production of all Duraproducts, including:
  - Reuse of products or materials from a previous product system;
  - Processing of secondary materials used as input for manufacturing the product, but not including those processes that are part of the waste processing in the previous product system;
  - Generation of electricity, steam and heat from primary energy resources, also including their extraction, refining and transport; and
  - Energy recovery and other recovery processes from secondary fuels, but not including those processes that are part of waste processing in the previous product system.

Module A2 – transport, comprising:

- Transportation of raw materials to manufacturing site from direct suppliers, i.e. from previous production or extraction process.

Module A3 – manufacturing:

- Manufacturing of Durakerb, Duradrain, and Durachannel units ready for transportation to customer, including:
  - Production and use of operating and auxiliary materials consumed;
  - Production of intermediate packaging materials, incl. such that are necessary to protect the Duraproducts during their transport from the manufacturing site to the highway/project site;
  - Direct emissions to air, water or soils; and
  - Treatment of waste generated from the manufacturing and assembly of main parts.

Module A4 – transport:

- Transportation of Duraproducts from manufacturing site to the highway/project site.

Module A5 – construction-installation process:

- Cutting using power tools and manual installation.
- Treatment of waste packaging and offcuts.
- Additional production processes to compensate for the loss of wastage product.

Module C1-C4 – end-of-life:

- Duraproducts are removed using a manual process.
- Transportation of deconstructed Duraproducts from the highway/project site to the waste processing site.
- Waste processing and disposal via incineration with energy recovery, recycled, and landfill.

Module D – reuse, recovery, recycling potential:

- Net benefits and loads arising from the recycling of materials and/or recovery of energy from the product.

<u>Cut-off criteria and exclusions:</u>

In the process of building an LCI it is typical to exclude items considered to have a negligible contribution to results. In order to do this in a consistent and robust manner there must be confidence that the exclusion is fair and reasonable. To this end, cut-off criteria were defined in this study, which allow items to be neglected if they meet the criteria. In accordance with EPD International's PCR for construction products (PCR 2019:14), exclusions could be made if they were expected to be within the below criteria:

- A process can be excluded if it contributes to <1% of the total mass or energy input of a unit process;
- A maximum of 5% of the total mass or energy of the lifecycle can be excluded; and
- The excluded process doesn't meet the following exceptions:
    - Significant effects on energy use in extraction, use or disposal;
    - Significant environmental relevance (i.e. likely to contribute to an increase/decrease in impacts of more than 1%); and
    - Are classed as hazardous waste.

The following exclusions from the scope of the study were made:

- Human and animal energy inputs to processes;
- Transport of employees to and from their normal place of work and business travel;
- Environmental impacts associated with support functions (e.g. R&D, marketing, finance, management etc.);
- Packaging of incoming raw materials and ancillary materials (immaterial [calculated to be <1% of lifecycle impact for carbon footprint, which is a good proxy for many other impact categories]);
- Storage of Durakerb (assumed to be immaterial as can be stored outside or ambiently); and
- All excavation and filling activities were considered to be already required for the road construction.

Allocation procedures:

For cases where there is more than one product in the system being studied, EPD International's PCR for construction products (PCR 2019:14) prescribes the following procedure for the allocation of material and energy flows and environmental emissions.

- In the first instance, allocation should be avoided, by process sub-division.
- Where these methods are not applicable, the ISO 14040/44 requires that allocation reflects the physical relationships of the different products or functions. Allocation based on physical relationships such as mass or energy is a practical interpretation of this and is an approach often used in LCA.
- For some processes, allocation based on mass is not considered appropriate and, in these cases, economic allocation is used.

In this study, allocation procedures for multi-product processes followed the approach above. In terms of co-product allocation of generic data, the main database used, ecoinvent v3.6 (cut-off), defaults to an economic allocation for most processes. However, in some cases a mass-based allocation is used, where there is a direct physical relationship. The allocation approach of specific ecoinvent modules is documented on their website and method reports (see www.ecoinvent.org).

In this study a "cut-off" method (aka recycled content or 100:0 approach) was applied to all cases of end-of-life allocation, including in the case of generic data, where the ecoinvent v3.6 with a cut-off by classification end-of-life allocation method was used. In this approach, environmental burdens and benefits of recycled / reused materials and recovered energy are given to the product system consuming them, rather than the system providing them and are quantified based on recycling content of the material under investigation. The cut-off point is where an end-of-life state is reached, including any sorting, cleaning, and processing of waste prior to recycling, reuse, or energy recovery, following the "polluter pays principle". This is a common approach in LCA for materials where there is a loss in inherent properties during recycling, the supply of recycled material exceeds demand and recycled content of the product is independent of whether it is recycled downstream. It is in conformance with the ISO standards on LCA, EN 15804, EN 15978 and is prescribed in EPD International's PCR for

construction products (PCR 2019:14). The exception to the use of this end-of-life allocation method was for module D, where loads and benefits beyond the system boundary, following a closed-loop approximation end-of-life allocation method, are presented separately.

Data sources:

Quantitative and qualitative data were collected for all processes within the system boundary and these data were used to compile the LCI. These comprised specific data (primary data) and generic data (secondary data). To explain the distinction between these categories, specific data directly refer to the product under investigation, for example the amount of electricity consumed at a Duraproducts' site. Generic data do not directly refer to the product under investigation but refer to a similar process and fulfil the data quality criteria defined for this study.

Specific data were sought as a preference and were collected from Duraproducts' contract manufacturers for Durakerb in the UK. Specific data were also collected from the recycled polymer blend producer in Germany. These specific data were collected using data collection sheets via an iterative process and represent a time period from 2022.01.01 to 2022.12.31. Generic data were collected for all other lifecycle stages from Eugeos' 15804+A2_IA v4.1 extended version of ecoinvent v3.6 (cut-off).

Secondary/generic data were chosen to be to be as geographically specific as possible, however, this was not always possible. In these cases, a geography was selected to match the technology, feedstock source etc., as closely as possible.

Note that no energy values were calculated from volumes or masses of fuels by the LCA practitioners as they were provided in units of energy, however, volume and mass to energy unit conversions have been carried out in the ecoinvent v3.6 (cut-off) database and for this the lower heating value was used throughout.

Electricity use in manufacturing (A3) was modelled using the supplier mix (Npower commercial gas limited), which was used to adjust the fuel mix of "market for electricity, medium voltage | electricity, medium voltage | Cutoff, U – GB" – Eugeos' 15804+A2_IA v4.1 extended version of ecoinvent v3.6 (cut-off). Grid mix year = 2022. Fuel mix = 5.8% coal, 47.4% natural gas, 4.4% nuclear, 24.3% wind, 5.5% hydro, and 12.6% biomass. The climate impact (GWP-GHG) of this purchased electricity is 0.34 kg CO_2e / kWh.

Scenario parameters:

Transportation to customer (A4) scenario parameters modelled in this EPD comprise:

- Vehicle type used for transport: 16-32 tonne EURO 4 lorry (road) and container ship (sea).
- Distance: 480 km road and 23 km sea.
- Capacity utilisation, including return trips: 37% (road) and 70% (sea).
- Bulk density of transported products: 200 kg / m^3.
- Volume capacity utilisation factor: 1.

Construction-installation (A5) scenario parameters modelled in this EPD comprise:

- Ancillary materials for installation: 0 kg – not relevant.
- Water use: 0 m^3 – not relevant.
- Other resource use: 0 kg – not relevant.
- Energy type and consumption during installation process: 0.000077 kWh / unit of UK residual mix electricity (via charging of battery).

- Waste materials on the building site before waste processing, generated by the product's installation (specified by type): 0.005 units wasted / unit, equal to 0.028 kg.
- Output materials (specified by type) as result of waste processing at the building site e.g. of collection for recycling, for energy recovery, disposal (specified by route): 26.0% recycling, 47.5% energy recovery, and 26.5% landfill from Plastics Europe, 2018 for average construction waste plastic in EU28 (for product offcuts and shrinkwrap) and 100% energy recovery (for pallets).
- Direct emissions to ambient air, soil, and water: 0 kg – not relevant.
- No bounding agents or other ancillary materials are required during installation. All excavation and filling activities were considered to be already required for the road construction and therefore not apportioned to Duraproducts.

End-of-life (C1-C4) scenario parameters modelled in this EPD comprise:

- Waste treatment scenario: 26.0% recycling, 47.5% energy recovery, and 26.5% landfill from Plastics Europe, 2018 for average construction waste plastic in EU28.
- Collection process specified by type: 5.6 kg collected separately and 0 kg collected with mixed construction waste.
- Recovery system specified by type: 0 kg for re-use, 1.5 kg, for recycling, and 2.7 kg for energy recovery.
- Disposal specified by type: 1.5 kg product for final disposal (landfill).
- Transportation assumptions: 50 km by municipal waste 21 metric ton lorry.

Benefits and loads beyond the system boundary (D) scenario parameters modelled in this EPD comprise:

- Waste treatment scenario: 26.0% recycling and 47.5% energy recovery, from Plastics Europe, 2018 for average construction waste plastic in EU28.
- For recycling, the avoided product to calculate benefits of module D was estimated using the impact of module A1 of each Duraproduct.
- For energy recovery, benefits were calculated assuming UK residual mix electricity and the following assumptions:
    - Conventional incineration with steam cycle electricity generation assumed;
    - Grid electricity the only avoided product; and waste heat not used, to adopt a conservative assumption;
    - Based on a CV of PP and PE of 35 MJ per kg the CV of Durakerb was estimated to be 31 MJ per kg;
    - Overall electrical efficiency of energy from waste plant = 20% (minimum for electricity only, ERM, 2006); and
    - The above two assumptions give electricity generation of 0.81 kWh per kg of Durakerb at end-of-life.
- For energy recovery, loads were calculated assuming waste incineration.

Data quality: To ensure the quality of data were sufficient, data quality checks were completed in relation to time-related coverage, geographical coverage, technology coverage, completeness, and representativeness. Data quality indicators were applied using a data quality matrix whereby key data were assigned scores between 1 (best) and 5 (worst). All data scored between 1-3.

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Recycled polypropylene	2.46	100%	0% and 0 kg C / kg
Recycled polyethylene	2.46	100%	0% and 0 kg C / kg
Calcium carbonate	0.67	0%	0% and 0 kg C / kg
TOTAL	5.60	88%	0% and 0 kg C / kg
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
Polyethylene shrink-wrap	0.009	0.16%	0 kg C / kg
Wooden pallet	0.05	0.89%	0.53 kg C / kg
TOTAL	0.059	1.05%	0.45 kg C / kg

No substances that are listed in the “Candidate List of Substances of very high concern for authorisation” are contained in Durakerb or the materials used to produce them. Polypropylene, polyethylene, and calcium carbonate are not hazardous materials, according to regulation (EC) No 1272/2008 of the European Parliament and 16 of the Council of December 2008 on classification, labelling, and packaging of substances and mixtures. Durakerb contains 0% bio-based material, however, the pallet used for transportation contains 0.53 kg of carbon per kg.

Results of the environmental performance indicators

The environmental performance of Durakerb HB2 half battered standard unit is declared and reported using the parameters and units as specified in PCR 2019:14. These life cycle impact assessment results and other environmental results are presented in the tables below per declared unit (one unit of Durakerb HB2 half battered standard unit, equal to 5.6 kg), broken down by module.

Mandatory impact category indicators according to EN 15804

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	3.90E+00	4.45E-01	9.75E-03	0.00E+00	3.46E-01	7.28E-01	1.69E-01	3.60E+00
GWP-biogenic	kg CO_2 eq.	-9.42E-02	-9.96E-05	9.77E-02	0.00E+00	5.60E-05	-3.12E-03	3.48E-04	2.00E-03
GWP-luluc	kg CO_2 eq.	7.72E-03	1.60E-04	7.40E-06	0.00E+00	3.08E-05	2.82E-04	3.44E-06	-1.18E-03
GWP-total	kg CO_2 eq.	3.81E+00	4.45E-01	1.07E-01	0.00E+00	3.46E-01	7.25E-01	1.70E-01	3.60E+00
ODP	kg CFC 11 eq.	4.96E-07	1.02E-07	5.89E-10	0.00E+00	7.33E-08	1.24E-08	4.63E-09	-1.96E-07
AP	mol H^+ eq.	1.45E-02	1.06E-03	1.67E-05	0.00E+00	2.08E-03	8.66E-04	4.58E-05	-6.69E-03
EP-freshwater	kg P eq.	1.44E-03	3.31E-05	1.44E-06	0.00E+00	6.22E-06	7.42E-05	1.48E-06	-6.61E-04
EP-marine	kg N eq.	3.00E-03	1.51E-04	6.88E-06	0.00E+00	8.90E-04	3.60E-04	3.13E-03	-8.14E-04
EP-terrestrial	mol N eq.	2.92E-02	1.61E-03	3.84E-05	0.00E+00	9.77E-03	2.02E-03	7.74E-05	-8.94E-03
POCP	kg NMVOC eq.	7.99E-03	7.80E-04	1.08E-05	0.00E+00	3.40E-03	7.15E-04	7.57E-05	-2.50E-03
ADP-minerals&metals*	kg Sb eq.	5.54E-05	1.21E-05	6.66E-08	0.00E+00	2.07E-06	4.62E-06	1.13E-07	-7.10E-06
ADP-fossil*	MJ	6.42E+01	6.68E+00	6.86E-02	0.00E+00	4.47E+00	3.52E+00	3.25E-01	-3.84E+01
WDP*	m^3	6.23E+02	6.44E+00	5.78E-01	0.00E+00	2.72E+00	8.42E+00	2.87E+00	-1.63E+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 and voluntary impact category indicators

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	3.90E+00	4.45E-01	9.75E-03	0.00E+00	3.46E-01	7.28E-01	1.69E-01	3.60E+00
PM	Disease incidence	1.40E-07	2.94E-08	1.81E-10	0.00E+00	4.70E-08	1.56E-08	2.16E-09	-1.98E-08
IRP	kBq U235 eq.	1.05E+00	3.49E-02	1.02E-03	0.00E+00	2.10E-02	1.98E-02	2.33E-03	-1.76E+00
ETP-fw	CTUe	4.68E+00	2.22E-01	4.53E-03	0.00E+00	2.33E-02	1.06E-01	1.60E-02	-1.09E-01
HTP-c	CTUh	1.33E-09	1.40E-10	3.15E-12	0.00E+00	3.53E-11	5.26E-10	8.38E-12	5.19E-10
HTP-nc	CTUh	1.48E-07	8.60E-09	2.21E-10	0.00E+00	1.37E-09	1.75E-08	4.04E-10	-4.27E-08
SQP	dimensionless	1.33E+01	5.43E+00	1.67E-02	0.00E+00	4.42E-02	1.69E-01	-2.49E-01	-7.63E-01

Note that the LCIA results are relative expressions and do not predict impacts on category end-points, the exceeding of thresholds, safety margins or risks.

Resource use indicators

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2.03E+01	9.54E-02	1.86E-02	0.00E+00	2.34E-02	2.42E-01	1.57E-02	-2.82E+00
PERM	MJ	3.08E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	2.04E+01	9.54E-02	1.86E-02	0.00E+00	2.34E-02	2.42E-01	1.57E-02	-2.82E+00
PENRE	MJ	5.03E+01	6.82E+00	6.09E-03	0.00E+00	4.50E+00	3.87E+00	3.43E-01	-5.37E+01
PENRM	MJ	1.74E+02	0.00E+00	1.54E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-4.48E+01
PENRT	MJ	7.89E+01	6.82E+00	8.27E-02	0.00E+00	4.50E+00	3.87E+00	3.43E-01	-6.16E+01
SM	kg	2.09E-02	2.72E-03	1.46E-03	0.00E+00	5.74E-04	1.61E+00	1.63E-04	-4.90E-03
RSF	MJ	3.18E-01	3.42E-03	2.98E-04	0.00E+00	4.45E-04	8.44E-03	3.26E-04	-9.45E-02

[1] 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 CO_2 is set to zero.

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	2.66E-02	4.84E-04	2.97E-05	0.00E+00	4.84E-04	2.42E-03	4.16E-04	-1.13E-02
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 functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	1.79E-01	6.87E-03	2.42E-04	0.00E+00	1.57E-03	2.93E-02	4.45E-04	-1.16E-01
Non-hazardous waste disposed	kg	7.60E+00	4.71E-01	1.34E-02	0.00E+00	4.89E-02	6.67E-01	1.49E+00	-6.39E-01
Radioactive waste disposed	kg	4.00E-04	4.66E-05	4.18E-07	0.00E+00	3.36E-05	7.41E-06	2.27E-06	-4.47E-04

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	1.33E-02	2.27E-03	2.52E-05	0.00E+00	5.04E-04	1.05E-02	1.33E-04	-2.31E-03
Materials for energy recovery	kg	3.15E-03	3.79E-05	2.96E-06	0.00E+00	5.03E-06	8.91E-05	3.26E-06	-9.45E-04
Exported energy, electricity	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
Exported energy, thermal	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

Interpretation

The following conclusions can be drawn from this study:

- The cradle-to-grave carbon footprint of Durakerb (per declared unit) was calculated to be 5.61 kg CO_2e;
- Raw material supply (A1) is a major hotspot for almost all impact categories, with the exception of ETP-fw and GWP-biogenic, where it is less important;
- Manufacturing (A3) makes a notable contribution for the majority of impact categories, with the exception of SQP and GWP-biogenic, where it immaterial;
- Modules A4, A5, and C1 have a minor to immaterial contribution for all impact categories; and
- Module C3 makes a notable contribution for some impact categories (e.g. HTP-C, GWP-fossil) and module C4 makes a notable contribution to EP-marine.

Additional environmental information

This EPD provides results for one unit of Durakerb HB2 half battered standard unit, which represents the Durakerb range of product. Results for other variants within the range are available to customers via an in-house Excel calculator (calculated using a simple mass-scaling using results of the standard units) upon request.

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