

# Environmental Product Declaration



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

## ***GRAD<sup>®</sup> structural rails for decking and cladding***

from



Programme:	The International EPD <sup>®</sup> System, <a href="http://www.environdec.com">www.environdec.com</a>
Programme operator:	EPD International AB
EPD registration number:	EPD-IES-0015932
Publication date:	2024-08-01
Valid until:	2029-07-31

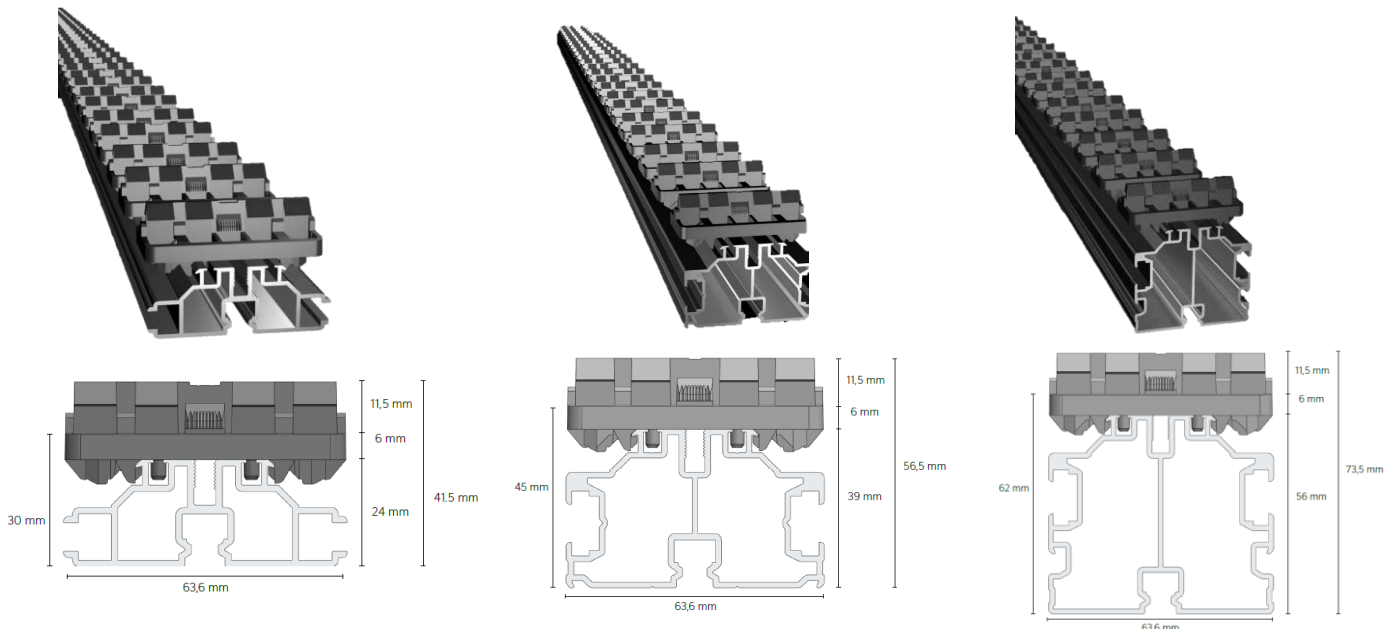
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This EPD covers several variations of the GRAD<sup>®</sup> structural rails

**PR24**

**PR39**

**PR56**



EPD of multiple products, based on a representative product (PR39)

## General information

### Programme information

<b>Programme:</b>	The International EPD® System
<b>Address:</b>	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
<b>Website:</b>	<a href="http://www.environdec.com">www.environdec.com</a>
<b>E-mail:</b>	<a href="mailto:info@environdec.com">info@environdec.com</a>

<b>Accountabilities for PCR, LCA and independent, third-party verification</b>
<b>Product Category Rules (PCR)</b>
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): PCR 2019:14 v1.3.4 Construction Products, valid until 2024-12-20, UN CPC code(s) – 547 Building completion and finishing services
PCR review was conducted by: The Technical Committee of the International EPD System. The review panel may be contacted via <a href="mailto:info@environdec.com">info@environdec.com</a> . Chair of the PCR review: Claudia A Peña
<b>Life Cycle Assessment (LCA)</b>
LCA accountability: Alternative Carbone, 10 rue de la moyenne Corniche, 67210 Obernai – FRANCE
<b>Third-party verification</b>
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:  <input checked="" type="checkbox"/> EPD verification by individual verifier  Third-party verifier: Marcel Gómez Consultoria Ambiental, <a href="mailto:info@marcelgomez.com">info@marcelgomez.com</a> , <a href="http://www.marcelgomez.com">www.marcelgomez.com</a> .  Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier:  <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No  [Procedure for follow-up the validity of the EPD is at minimum required once a year with the aim of confirming whether the information in the EPD remains valid or if the EPD needs to be updated during its validity period. The follow-up can be organized entirely by the EPD owner or together with the original verifier via an agreement between the two parties. In both approaches, the EPD owner is responsible for the procedure being carried out. If a change that requires an update is identified, the EPD shall be re-verified by a verifier]

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:

BURGER & Cie  
Zone industrielle Bois l'Abbesse  
68 660 LIEPVRE  
FRANCE

[contact@grad-system.com](mailto:contact@grad-system.com)

### Contact:

Margot KAPPS, Marketing Project Manager, [mkapps@grad-system.com](mailto:mkapps@grad-system.com)

### Description of the organisation:

BURGER ET CIE carries out several activities marketed under different trademarks, whose products are regularly registered with the National Institute of Intellectual Property. Grad<sup>®</sup> is one of these brands. Under this trademark, BURGER ET CIE designs and markets an invisible fixing system for decking and cladding through various distribution channels in France and abroad, in particular to professionals specialising in exterior and interior design, to retailers, to manufacturers of decking and cladding and directly to private individuals via its website.

In addition to the supply of materials, Grad<sup>®</sup> offers a real technical support service to customers in their projects. For example, Grad<sup>®</sup> does not supply the system for anchoring the rails to their supports but advises its customers in choosing the type of fasteners and their characteristics.



Product-related or management system-related certifications:

An internal control plan ensures the conformity of the products manufactured and marketed. The conformity of our system is tested in collaboration with accredited laboratories, and we work closely with engineering firms. Our aluminium extruders and our POM supplier are ISO 9001 and ISO 14001 certified (certificate number 525778 QM15, 523738UM15, 214958-2017-AQ-NLD-RvA, 209434-2016-AE-NLD-RvA, 10000456736-MS-C-NA-NOR, 10000456735-MS-C-NA-NOR)

Name and location of production site(s):

Aluminium Rail extrusion:

GULLEGEM – Belgium / KERKRADE (foundry) - Netherlands  
PUGET - France

Aluminium rail painting:

RAVES - France

Polyoxymethylene granulate production:

SULZBACH - Germany

Clips and top link injection moulding and final assembly:

BURGER & CIE, Z.I Bois l'Abbesse, 68 660 Lièpvre – France

Steel disassembly key:

Supplier: ESCHAU France (produced in China)

**This EPD covers several variations of the GRAD<sup>®</sup> structural rail with invisible fastening system for decking and cladding.**



Product	Main Components	Materials	Unit Weight [g]	Min number by linear meter	Average number by linear meter	Max number by linear meter
PR56	Rail - 1 linear meter	Aluminium	1505.0	-	1	-
	Paint	Acrylic	7.8	-	1	-
	Clips	Polyoxymethylene	11.9	12	16	21
PR39	Rail - 1 linear meter	Aluminium	1244.0	-	1	-
	Paint	Acrylic	6.1	-	1	-
	Clips	Polyoxymethylene	11.9	10	16	21
PR24	Rail - 1 linear meter	Aluminium	879.0	-	1	-
	Paint	Acrylic	3.7	-	1	-
	Clips	Polyoxymethylene	11.9	10	16	21

## Product information

### Product name:

GRAD<sup>®</sup> Decking and cladding structural rails family

### Product identification:

GRAD<sup>®</sup> structural rails family are parts of invisible fastening system for decking and cladding distributed by Burger & Cie. Invisibility is made possible by an innovative clip-on decking/cladding concept through plastic clips fixed on aluminium rails (Patent n°3018838 – Institut National de la Propriété Intellectuelle). The recognized technical advantages of this innovation are:

- Rigid fastening of the decking concept,
- a parallel arrangement of the cladding/decking,
- Waterproofing (effective protection against rotting and fungal decay, increasing the durability of the wood),
- Easy to install and remove,
- a removable means of fixing the decking/cladding system,
- Aesthetic benefits,
- easier to install/use/dismantle than traditional screw fastening (no pre-drilling required).

This EPD concerns only the fastening systems for the boards: boards and rail anchoring system are not covered by this EPD.



*Decking*



*Cladding*

### Product description:

This EPD covers several variations of the GRAD<sup>®</sup> invisible fastening systems for decking and cladding with structural rails. The combination of these two products allows the boards to be fixed to any type of decking or cladding project, in particular by varying the number of clips installed per linear meter of rail.

The multi-products family covered by this EPD includes:

- GRAD<sup>®</sup> “PR56” product: in aluminium EN AW 6060 T6, single coat water soluble modified acrylic paint, able to accommodate from 12 to 21 removable fixing clips per linear meter of rail, made in Polyoxymethylene (POM) at the Burger factory. Rail weight with 16 clips: +/- 1.703 kg/ml, maximum length: 3 968 mm
- GRAD<sup>®</sup> “PR39” product: Aluminium EN AW 6060 T6, single coat water soluble modified acrylic paint, able to accommodate from 10 to 21 removable fixing clips per linear meter of rail, made in Polyoxymethylene (POM) at the Burger factory. Rail weight with 16 clips: +/- 1.440 kg/ml, maximum length: 3 968 mm

- GRAD<sup>®</sup> "PR24" product: Aluminium EN AW 6060 T6, single coat water soluble modified acrylic paint, able to accommodate from 10 to 21 removable fixing clips per linear meter of rail, made in Polyoxymethylene (POM) at the Burger factory. Rail weight with 16 clips: +/- 1.072 kg/ml, maximum length: 3 968 mm
- A dispatcher: used exclusively with structural rails and positioned perpendicular to them. It is an aid to rail positioning. Made of Aluminium EN AW 6060 T6 unpainted, able to accommodate from 2 to 4 removable fixing clips per linear meter of rail, made in Polyoxymethylene (POM) at the Burger factory. Weight of one linear meter of dispatcher with 2 clips: +/- 0.946 kg/ml,
- A component used to maintain a stable connection between two rails, known as a "top link", made in POM at Burger factory, with a unit weight of 20 g.
- A steel disassembly key with white electro-galvanized surface treatment, manufactured in China by a supplier located in France and weighing 100g.

The expected service lifetime is 20 years. This life expectancy of GRAD<sup>®</sup> products is based in part on ageing tests and laboratory trials, as well as feedback from field experience.

GRAD<sup>®</sup> systems comply with the requirements of NF DTU 51.4 "Travaux de bâtiment - Platelage extérieur en bois", December 2018 for decking and NF DTU 41.2 "revêtement extérieur en bois", August 2015 for cladding.

UN CPC code: 547 Building completion and finishing services

Geographical scope:

Production and assembly of components and the final product are made in several countries, including France, Belgium, the Netherlands, Germany and China.

The use stage and end-of-life scenarios are based on main customer location which is Europe.

## **LCA information**

Functional unit / declared unit:

The declared unit is "One linear meter of structural rail for cladding or decking in accordance with GRAD<sup>®</sup> manufacturer's recommendations", including packaging and accessories.

The GRAD<sup>®</sup> structural rail fastening system includes different structural rails: PR24, PR39 and PR56, which use the same material and production processes.

But there are differences in:

- weight of the aluminium profile,
- weight of paint,
- the number of clips varying from 10 to 21 by linear meter.
- quantity of aluminium profile coming from different suppliers.

This EPD is based on PR39 product, defined as the average of the structural rail products presented above, with 16 clips, which is representative of the best-selling configuration.



Product	Main Components	Materials	Unit Weight [g]	Average number by linear meter
PR39	Rail - 1 linear meter	Aluminium	1244,0	1
	Paint	Acrylic	6,1	1
	Clips	Polyoxymethylene	11,9	16

The declared unit includes accessories (dispatcher, top link and disassembly key) weighted based on one linear meter of aluminium structural rail and most common number of clips (16). 2 Clips are also considered for the dispatcher. The values presented in the table below are the same for all structural rails.

Accessories	Main Components	Materials	Unit Weight [g]	Average number by linear meter of rail
Dispatcher	Rail	Aluminium	1,898	0,185
	clips	Polyoxymethylene	11,9	0,370
Top link	-	Polyoxymethylene	20	0,336
Disassembly key	-	Steel	100	0,017

Total weight per linear meter is 1,804kg.

Product packaging and manufacturing steps are included in the assessment.

Results can be scaled for the different types of structural rail with a combination of 10 clips per linear meter of a PR24 structural rail, 16 clips per linear meter of PR39 and 21 clips per linear meter of PR56. The conversion factors for the different types are available in the Annex.

Reference service life: 20 years

Reference year: 2022

Database(s) and LCA software used: OPEN LCA v2 and Ecoinvent v3.9.1 - 15804+A2 (20230629), based on EF3.1

Description of system boundaries: Cradle to grave and module D (A + B + C + D)

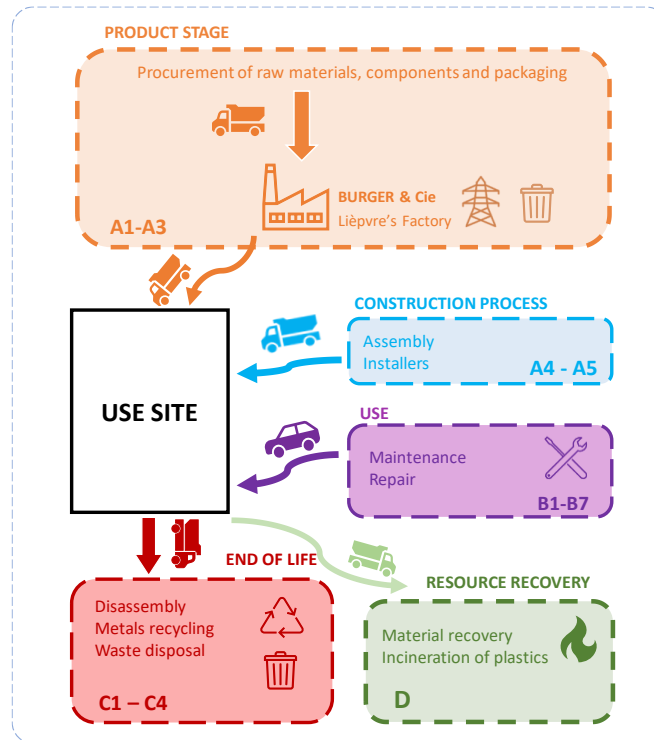
Heating consumption, which is specific to administrative buildings have not been included in the calculation, as well as production, maintenance and end of life of capital goods (or infrastructure) as their renewal frequency is more than 1 year, as allowed by the standard. For GRAD<sup>®</sup>, these are the buildings, equipment and tools used in the production of fastening systems for decking and cladding.

Most of the consumables were included in the calculation, despite their very low mass, because their data were considered available. Only dry ice was not included as there was no relevant model to integrate.

Flows associated with transporting Lièpvre employees (homeworking) and sales staff have been excluded from the system boundaries.



Flow chart:



### Product Stage (A1-A3)

Products manufactured at the Lièpvre plant require the supply of raw materials and components, as well as their packaging:

- Supply of aluminium rails: processes are included from raw material extraction to profile extrusion. Manufacturing data specific to the various production sites, as well as recycled aluminium rates (pre- and post-consumer) were provided by each supplier and for the aluminium alloy supplied. Loss rates during billet manufacture and rail extrusion were also provided. Transport between sites and to the Lièpvre plant is included.
- Painting of aluminium rails: the process includes the manufacture of the paint and transport of the rails to the subcontractor and then to the Lièpvre plant,
- Manufacture of clips and Top Link at the Lièpvre plant: the process includes the manufacture of POM granules and the injection/moulding of components on site,
- Manufacture of the disassembly keys: the process includes extraction of raw materials and moulding of the product by the supplier.
- Supply of packaging: processes are included from raw material to fabrication in France, including transports from supplier to Lièpvre plant.

The manufacturing and assembly stage includes all flows, other than raw materials, required to operate the Lièpvre plant for the production of the GRAD<sup>®</sup> structural rails fastening system, down to the functional unit. This step includes:

- The plant's energy consumption. This is exclusively electrical, supplied by the RTE network (mix France 2021),
- Plant's water consumption, the use of consumables: release agent (POM process), glue, lubricant, degreaser.
- Waste linked to factory production losses and raw materials packaging.

### **Transport to Building (A4)**

The product leaving the factory (including packaging) is transported from the Lièpvre factory to the installers and/or installation sites. All data concerning installation sites and modes of transport have been provided by Burger & Cie for the year 2022. 95% of installation sites are located in Europe. The remainder is split between North America, Asia and the Middle East and has been integrated too in a worst-case approach (use of air transport).

Type of transport are :

- road, lorry 16-32 metric tons, with an averaged load factor of 36.6%
- sea, container ship, 43 000tons, capacity utilisation factor : 70%
- air, 57.3% long haul, 29.2% medium haul, 9.5% short haul and 4% very short haul, with an average load factor of 80%.

### **Installation into Building (A5)**

The installation stage includes the installer travelling 50km, energy consumption (electricity) for installation and waste treatment from rail cutting and packaging.

### **Use Phase (B4)**

The replacement phase involves the replacement of clips during the life of the fastening system when they break. The clips in use are reused as they are from the installation waste recovered in phase A5. Incineration of used clips is assumed.

### **End-of-life stage (C1-C4)**

Structural rails are assumed to be dismantled using the same amount of energy and travelling used for installation.

The energy consumption for dismantling is included in C1.

Transportation of dismantled rails and clips is made by road, with a lorry 16-32 metric tons, with an averaged load factor of 36.6% in C2.

For the corresponding waste destinations, the following distances are used :

- The recycling facility (metals): 100km
- To incineration facility (plastics): 75.15km

Aluminium rails are recycled with a ratio of 96%. Utilities consumption for metal sorting (diesel) is also included in C3. The end-of-life scenario for clips is based on an European market model assuming 61.5% of municipal incineration with energetic valorisation.

In module C4, the end-of-life scenario for non recycled clips is based on an European market model assuming 38% of sanitary landfill and 0.5% of open burning.

### **Module D**

According to the guidelines of EN 15804+A2 and the PCR from EPD International, calculations are made for Module D. The loads and benefits result from the export of secondary materials and the energy which comes from incineration. In Module D also the benefits from the product packaging waste are included (wood incineration).

### **Cut-off rule**

Consistent with the PCR, materials and processes with insignificant contributions of less than 1 % are excluded (dry ice only). For the use and end-of-life stage, scenarios are used, taking into account geographical conditions (such as electricity mix) and applications (waste treatment practices).

**Data quality**

Based on site specific information, this LCA study reflects the production for 2022. Components are supplied by external suppliers, therefore manufacturing processes are modelled using Ecoinvent v3.9.1 models database, with the best fitting representative geographical conditions and applications.

**Electricity Grid**

For production in Lièpvre, France, the corresponding electricity grid mix as stated on the invoice is used: Nuclear Power (82.7%), Natural Gas (7.5%), Wind (3.1%), Hydro (2.0%), Solar (1.9%), Bioenergy (1%), Coal (0.9%), other fossils (0.4%), Oil (0.4%) and geothermal (0.1%). The value for GWP-GHG is 0.095 kg CO<sub>2e</sub>/kWh.

Modules declared, geographical scope,

share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	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	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	GLO	GLO	FR	RER	FR-RER	-	-	-	FR-RER	-	-	-	FR-RER	RER	FR-RER	RER	FR - RER	
Specific data used	>90% GWP-GHG					-	-	-	-	-	-	-	-	-	-	-	-	
Variation – products	+15%/-20%					-	-	-	-	-	-	-	-	-	-	-	-	
Variation – sites	0%					-	-	-	-	-	-	-	-	-	-	-	-	
Acronyms	GLO = Global, RER = Europe, FR = France																	

## Content information

Product components	Weight, kg	Weight-% (versus total weight)	Post-consumer material, weight-%	Biogenic material, weight-%
Aluminium (supplier 1)	1,255	69,6%	53,6%	0%
Aluminium (supplier 2)	0,340	18,8%	21,2%	0%
Paint	0,0061	0,3%	0%	0%
Polyoxymethylene (POM)	0,201	11,1%	0%	0%
Steel	0,0017	>0,1%	0%	0%
TOTAL	1,804	100%	41,3%	0%
Packaging materials	Weight, kg		Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Polyethylene	0,0014		0,07%	0
Wood	0,0095		0,53%	0,42
Cardboard box	0,0002		0,01%	0,23
TOTAL	0,0111		0,61%	

The products do not contain any REACH and RoHS SVHC substances in amounts greater than 0.1 % (1000 ppm).

## Results of the environmental performance indicators

### Mandatory impact category indicators according to EN 15804

Results per functional unit : “One linear meter of structural rail for cladding or decking in accordance with GRAD<sup>®</sup> manufacturer's recommendations”

Results per functional or declared unit																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-fossil	kg CO <sub>2</sub> eq.	6,87 E+00	9,88 E-02	1,84 E-01	0,00 E+00	0,00 E+00	0,00 E+00	5,70 E-03	0,00 E+00	0,00 E+00	0,00 E+00	1,82 E-01	3,24 E-02	4,07 E-01	1,29 E-02	- 4,76 E+00
GWP-biogenic	kg CO <sub>2</sub> eq.	- 1,54 E-02	0,00 E+00	1,54 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	8,46 E-03
GWP-luluc	kg CO <sub>2</sub> eq.	6,00 E-02	5,00 E-05	1,00 E-04	0,00 E+00	0,00 E+00	0,00 E+00	5,92 E-08	0,00 E+00	0,00 E+00	0,00 E+00	1,00 E-04	1,60 E-05	7,18 E-05	4,12 E-06	- 1,38 E-02
GWP-total	kg CO <sub>2</sub> eq.	6,91 E+00	9,88 E-02	2,00 E-01	0,00 E+00	0,00 E+00	0,00 E+00	5,70 E-03	0,00 E+00	0,00 E+00	0,00 E+00	1,82 E-01	3,24 E-02	4,07 E-01	1,29 E-02	- 4,76 E+00
ODP	kg CFC 11 eq.	5,15 E-02	1,55 E-09	4,53 E-09	0,00 E+00	0,00 E+00	0,00 E+00	6,55 E-12	0,00 E+00	0,00 E+00	0,00 E+00	4,52 E-09	7,06 E-10	2,70 E-09	5,41 E-11	1,49 E-07
AP	mol H <sup>+</sup> eq.	5,15 E-02	3,00 E-04	7,30 E-04	0,00 E+00	0,00 E+00	0,00 E+00	1,36 E-06	0,00 E+00	0,00 E+00	0,00 E+00	7,30 E-04	7,08 E-05	3,90 E-04	3,10 E-05	2,40 E-02
EP-freshwater	kg P eq.	3,55 E-03	7,63 E-06	3,28 E-05	0,00 E+00	0,00 E+00	0,00 E+00	1,93 E-08	0,00 E+00	0,00 E+00	0,00 E+00	3,28 E-05	2,30 E-06	1,58 E-05	8,95 E-07	2,19 E-03
EP-marine	kg N eq.	6,67 E-03	7,74 E-05	2,10 E-04	0,00 E+00	0,00 E+00	0,00 E+00	7,56 E-07	0,00 E+00	0,00 E+00	0,00 E+00	2,10 E-04	1,79 E-05	1,30 E-04	1,70 E-04	2,39 E-03
EP-terrestrial	mol N eq.	6,82 E-02	8,10 E-04	2,18 E-03	0,00 E+00	0,00 E+00	0,00 E+00	6,48 E-06	0,00 E+00	0,00 E+00	0,00 E+00	2,17 E-03	1,80 E-04	1,27 E-03	1,10 E-04	2,25 E-02
POCP	kg NMVOC eq.	2,43 E-02	3,70 E-04	8,60 E-04	0,00 E+00	0,00 E+00	0,00 E+00	1,69 E-06	0,00 E+00	0,00 E+00	0,00 E+00	8,60 E-04	1,10 E-04	5,30 E-04	3,93 E-05	1,08 E-02
ADP-minerals&metals*	kg Sb eq.	1,61 E-04	3,08 E-07	2,01 E-06	0,00 E+00	0,00 E+00	0,00 E+00	4,97 E-10	0,00 E+00	0,00 E+00	0,00 E+00	2,01 E-06	1,08 E-07	4,50 E-07	8,19 E-09	1,85 E-04
ADP-fossil*	MJ	9,86 E+01	1,39 E+00	2,57 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,54 E-03	0,00 E+00	0,00 E+00	0,00 E+00	2,57 E+00	4,64 E-01	1,74 E+00	5,93 E-02	5,89 E+01
WDP*	m <sup>3</sup>	1,48 E+01	6,35 E-03	2,61 E-02	0,00 E+00	0,00 E+00	0,00 E+00	2,30 E-04	0,00 E+00	0,00 E+00	0,00 E+00	2,57 E-02	2,30 E-03	2,35 E-02	6,40 E-04	1,37 E+01
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.

\* Disclaimer: 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

\* Disclaimer: as module C are included in this EPD, user are discouraging using results of modules A1-A3 without considering results the results of module C1-C4.

## Additional mandatory and voluntary impact category indicators

### Results per functional unit

Results per functional or declared unit																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG <sup>1</sup>	Kg CO <sub>2</sub> eq.	6,90 E+00	9,88 E-02	1,85 E-01	0,00 E+00	0,00 E+00	0,00 E+00	5,70 E-03	0,00 E+00	0,00 E+00	0,00 E+00	1,82 E-01	3,24 E-02	4,07 E-01	1,29 E-02	- 4,76 E+00
Ecotoxicity potential (freshwater)	CTU e	3,78 E+01	7,55 E-01	1,48 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,14 E-02	0,00 E+00	0,00 E+00	0,00 E+00	1,48 E+00	2,28 E-01	1,34 E+00	6,05 E-01	- 1,20 E+01
Human toxicity (carcinogenic)	CTU h	1,31 E-08	4,30 E-11	1,80 E-10	0,00 E+00	0,00 E+00	0,00 E+00	5,09 E-13	0,00 E+00	0,00 E+00	0,00 E+00	1,79 E-10	1,48 E-11	7,67 E-11	3,87 E-11	- 5,79 E-09
Human toxicity (non-carcinogenic)	CTU h	2,69 E-07	1,00 E-09	2,61 E-09	0,00 E+00	0,00 E+00	0,00 E+00	1,78 E-11	0,00 E+00	0,00 E+00	0,00 E+00	2,59 E-09	3,29 E-10	2,08 E-09	1,52 E-10	- 6,38 E-08
Ionising radiation (human health)	kBq U235 eq	1,73 E+00	1,14 E-03	1,05 E-02	0,00 E+00	0,00 E+00	0,00 E+00	2,73 E-06	0,00 E+00	0,00 E+00	0,00 E+00	1,05 E-02	6,20 E-04	7,28 E-03	1,90 E-04	- 1,85 E-01
Land use and land use change	dimensions	3,59 E+01	7,87 E-01	9,28 E-01	0,00 E+00	0,00 E+00	0,00 E+00	5,70 E-04	0,00 E+00	0,00 E+00	0,00 E+00	9,23 E-01	2,78 E-01	8,99 E-01	9,08 E-02	- 6,20 E+00
Particulate matter formation	diseases incidence	4,95 E-07	6,93 E-09	8,51 E-09	0,00 E+00	0,00 E+00	0,00 E+00	8,95 E-12	0,00 E+00	0,00 E+00	0,00 E+00	8,45 E-09	2,42 E-09	9,62 E-09	2,90 E-09	- 3,79 E-07

## Resource use indicators

### Results per functional unit

Results per functional or declared unit																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	2,12 E+01	1,70 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,03 E-05	0,00 E+00	0,00 E+00	0,00 E+00	1,10 E-01	7,24 E-03	6,63 E-02	2,90 E-03	7,71 E-02
PERM	MJ	8,05 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	- 0,805
PERT	MJ	2,20 E+01	1,70 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,03 E-05	0,00 E+00	0,00 E+00	0,00 E+00	1,10 E-01	7,24 E-03	6,63 E-02	2,90 E-03	- 7,28 E-01
PENRE	MJ	9,57 E+01	1,27 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	- 1,04 E-01	0,00 E+00	0,00 E+00	0,00 E+00	2,38 E+00	4,24 E-01	- 3,68 E+00	5,55 E-02	5,43 E+00
PENRM	MJ	1,21 E+01	1,20 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	9,36 E-05	0,00 E+00	0,00 E+00	0,00 E+00	1,91 E-01	4,02 E-02	1,35 E-01	3,81 E-03	0,00 E+00
PENRT	MJ	1,08 E+02	1,39 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	- 1,04 E-01	0,00 E+00	0,00 E+00	0,00 E+00	2,57 E+00	4,64 E-01	- 3,55 E+00	5,93 E-02	5,43 E+00
SM	kg	1,80 E+00	9,90 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,51 E-06	0,00 E+00	0,00 E+00	0,00 E+00	7,43 E-03	5,10 E-04	4,18 E-03	8,53 E-05	2,48 E-01

<sup>1</sup> 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<sub>2</sub> is set to zero.



RSF	MJ	6,52 E-02	1,20 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,35 E-07	0,00 E+00	0,00 E+00	0,00 E+00	2,41 E-03	1,40 E-04	1,85 E-03	2,46 E-05	- 3,22 E-02
NRSF	MJ	7,06 E-01	5,60 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,31 E-06	0,00 E+00	0,00 E+00	0,00 E+00	3,31 E-03	2,70 E-04	2,29 E-03	1,30 E-04	- 3,33 E-02
FW	m <sup>3</sup>	4,18 E+03	1,60 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	8,17 E-06	0,00 E+00	0,00 E+00	0,00 E+00	6,10 E-04	5,60 E-05	7,50 E-04	4,71 E-05	- 2,52 E-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 unit

Results per functional or declared unit																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1,03 E+00	1,53 E-03	6,76 E-03	0,00 E+00	0,00 E+00	0,00 E+00	8,58 E-05	0,00 E+00	0,00 E+00	0,00 E+00	6,70 E-03	4,40 E-04	6,00 E-03	9,30 E-04	- 7,55 E-01
Non-hazardous waste disposed	kg	8,45 E-01	6,24 E-02	6,46 E-02	0,00 E+00	0,00 E+00	0,00 E+00	9,14 E-05	0,00 E+00	0,00 E+00	0,00 E+00	6,11 E-02	2,25 E-02	7,22 E-02	1,43 E-01	- 5,35 E-02
Radioactive waste disposed	kg	4,46 E-04	2,71 E-07	2,64 E-06	0,00 E+00	0,00 E+00	0,00 E+00	6,85 E-10	0,00 E+00	0,00 E+00	0,00 E+00	2,64 E-06	1,51 E-07	1,84 E-06	4,69 E-08	- 4,67 E-05

## Output flow indicators

### Results per functional unit

Results per functional or declared unit																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0,00 E+00	0,00 E+00	1,01 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
Material for recycling	kg	2,23 E-01	8,80 E-04	2,23 E-02	0,00 E+00	0,00 E+00	0,00 E+00	1,84 E-06	0,00 E+00	0,00 E+00	0,00 E+00	1,16 E-02	4,60 E-04	1,54 E+00	6,03 E-05	- 3,89 E-02
Materials for energy recovery	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
Exported energy, electricity	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,80 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,97 E+00	0,00 E+00	0,00 E+00
Exported energy, thermal	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,40 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,81 E+00	0,00 E+00	0,00 E+00

## Additional environmental information

### Reference service life (per application)

	Decking	Cladding
RSL, years	20	20

### End-of-life (C1-C4)

Scenario (product)	Structural rail weighted average (PR39)	Unit
Collected separately	1,804	kg
Collected with mixed (construction) waste	0	kg
For reuse	0	kg
For recycling	1,539	kg
For energy recovery	0,124	kg
For final disposal	0,141	kg

### Module D

Scenario (contributing materials, incl.packaging)	Structural rail weighted average (PR39)	Unit
Materials for recycling	0,338	kg
Materials for export secondary fuels	0	kg
Materials for incineration	4,87	MJ
Material for landfilling	0	kg

## ANNEX

The conversion factor can be used for the others Structural Rails variations. The different Structural rails use the same materials and components. For this reason, the increase or decrease of environmental impact can be scaled using the given conversion factors.

Structural rail	A1-A3 : production	A4 : Transports	A5 : installation	B4 : replacement	C1-C4 : End of life	D : Resource recovery
PR 24 with 10 clips	0,80	0,70	1,00	0,62	0,78	0,78
PR 39 with 16 clips	1,00	1,00	1,00	1,00	1,00	1,00
PR 56 with 21 clips	1,15	1,22	1,00	1,31	1,18	1,16

With sustainability in mind, GRAD<sup>®</sup> has developed several solutions and resources and organises training courses to advise and support installers and users so that they can install and maintain their work in the best possible way. Installation and maintenance guides for decking and cladding are available. These include recommendations for cleaning and maintenance.

To minimise its environmental footprint, GRAD<sup>®</sup> strongly encourages its users to re-use off-cuts during installation. For example, rail cuttings can be reused for finishing and clips retained if they need to be replaced.

GRAD<sup>®</sup> is already applying these principles for the manufacture of accessory and finishing parts.

At the end of its life, the strength of the GRAD<sup>®</sup> system lies in its ease of dismantling. All components can be easily separated, making selective sorting easier. Aluminium and POM can be channelled into existing recycling channels to enter a new manufacturing cycle.

GRAD<sup>®</sup>'s commitments are available via a CSR presentation and online at the following link:  
<https://grad-system.com/engagements/>

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## Additional social and economic information

GRAD<sup>®</sup>'s commitments are available via a CSR presentation and online at the following link:  
<https://grad-system.com/engagements/>

## Information related to Sector EPD

This EPD is not a sector EPD

## Differences versus previous versions

This document is the first version of the EPD.

## References

General Programme Instructions of the International EPD<sup>®</sup> System. Version 4.0.

Product category rules (PCR) 2019:14 Construction products version 1.3.4, 2024, The EPD International, 2022

EN 15804:2012+A2:2029 Sustainability of construction works — Environmental product declarations - Core rules for the product category of construction products

ISO 14025:2006 - Environmental labels and declarations - Type III environmental declarations - Principles and procedures

ISO 14040 Environmental management - Life cycle assessment - Principles and framework

ISO 14044 Environmental management - Life cycle assessment - Requirements and guidelines

The EN15804 add-on for ecoinvent by GreenDelta - report version v1.4, Andreas Ciroth, 29  
September 2022

