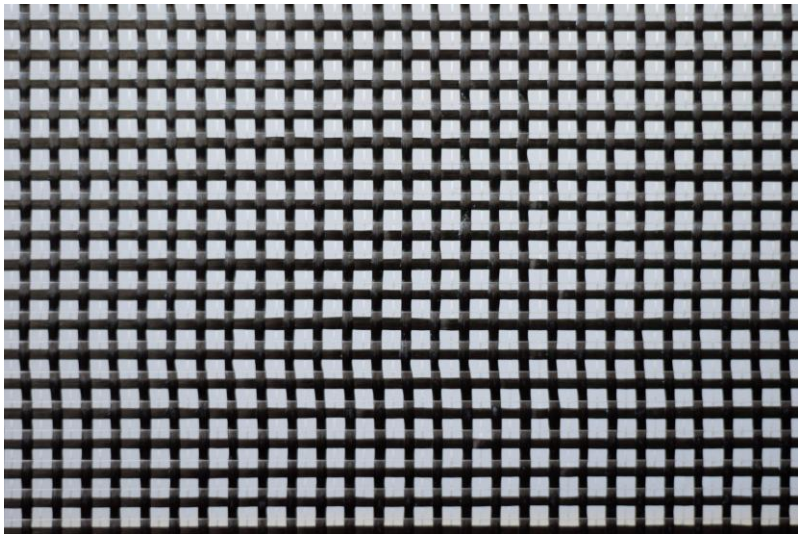
Rakennustieto Oy



# Carbon fibergrid

| | |
|---|---|
| **Program operator, publisher:** | Rakennustieto Oy<br>Malminkatu 16 A<br>00100 Helsinki<br>cer.rts.fi/en/ |
| **Owner of the declaration:** | Tolnatext Bt. |
| **Name of the product:** | Carbon fibergrid |
| **Declaration number:** | RTS_446_25 |
| **Registration number:** | |
| **ECO Platform reference number:** | |
| **Issue date:** | 10.12.2025 (revision 27.01.2026.) |
| **Valid to:** | 10.12.2030 |
| **Scope of the declaration** | This environmental product declaration covers the environmental impacts of the Open weave fiberglass (AR glass) product.The declaration has been prepared in accordance with EN 15804:2012+A2:2019 and ISO 14025 standards and the additional requirements stated in the RTS PCR Protocol for drawing up Environmental Product Declarations of building products (SFS-EN 15804:2012 + A2:2019/AC:2021, version 121124). The Characterization Factors are based on EF 3.1 package. This declaration covers the life cycle stages from cradle-to-gate with options (modules A1-A3, C1-C4, and D). |
| RAKENNUSTIETO | |
| **Verified according to the requirements of EN 15804:2012+A2:2019** | |
| **Independent verification of the declaration and data, according to ISO 14025:2010** | |
| ☐ **Internal** | ☒ **External** |
| **Third party verifier** | Mari Kirss |

Rakennustieto Oy

Postal address and location: 7130 Tolna, Bezerédj Pál tér 1.

https://www.tolnatext.hu/index.html

Email: info@tolnatext.hu

## 2. Product name and number

Carbon fibergrid

## 3. Manufacturing plant

Tolna, Hungary

## 4. Description of the Product

The current business of Tolnatext Bt. is mainly the manufacturing of a variety of technical glass fibre textiles. The machine pool, consisting of various machinery, makes it possible to manufacture textiles of several weave types, width, reel length, to apply special logos and to produce textiles with many other parameters. Tolnatext Bt. possesses state-of-the-art weaving and knitting machines therefore Tolnatext Bt. can also satisfy any unique requirements its partners might have.

The glass-grid fabrics are widely used in the construction industry whether building facades or for reinforcing asphalt roads and concrete. The roving fabrics are primarily used for manufacturing composite materials; while the fabrics combined with special copper fibre or carbon fibre form the raw material for advanced heating panels or heating foils.

## 5. Product Category Rules and the scope of the declaration

The declaration has been prepared in accordance with EN 15804:2012+A2:2019 and ISO 14025 and 14040/44 standards and the additional requirements stated in the RTS PCR Protocol for drawing up Environmental Product Declarations of building products (SFS-EN 15804:2012 + A2:2019/AC:2021, version 121124).

EPD of construction products may not be comparable if they do not comply with EN15804 and seen in a building context.

## 6. Author of the life-cycle assessment and declaration

Csongor Bajnóczki, Dominika Szűcs, EY denkstatt Kft.

Hungary, 1132 Budapest, Váci road 20.

denkstatt@denkstatt.hu

https://denkstatt.at/en

## 7. Verification

This EPD has been verified according to the requirements of EN 15804:2012+A2:2019 and RTS PCR Protocol for drawing up Environmental Product Declarations of building products (SFS-EN 15804:2012 + A2:2019/AC:2021, version 121124) by a third party. The verification has been carried out by:

Mari Kirss, Product LCA/EPD Specialist

Meetripuu OÜ

mari.kirss@meetripuu.ee

## 8. Declaration issue date and validity

Declaration issue date is 22.10.2025. The declaration is valid 5 years.

## 9. Product description

The declaration has been conducted for Carbon fibergrid product manufactured in Hungary.

## 10. Environmental/hazardous properties

The Carbon fibergrid product is not dangerous. The basic and auxiliary materials used in the production of the product do not contain chemicals that are on the REACH list, the list of very hazardous substances (SVHC).

The final product is not expected to produce significant adverse health effects when the recommended instruction for use is followed.

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## 11. Raw materials of the product and product information

| Product structure / composition / raw-material | quantity p% | Usability | | | Origin of the raw materials |
|---|---|---|---|---|---|
| | | Renewable | Non-renewable | Recycled | |
| Glass yarn | <5% | | X | | EU/Middle East |
| Carbon yarn | 45-55% | | X | | EU |
| Chemicals | 35-45% | | X | | EU |

Product main composition, at least metals, stone materials, fossil materials, bio-based materials

| Product structure /composition / raw-material | quantityp%* | Origin of the raw materials |
|---|---|---|
| Metal derivative | 0% | N/A |
| Stone-based materials (minerals) | 2,7% | EU/Middle East |
| Fossil materials | 97,3% | EU |
| Bio-based materials | 0% | N/A |

*Order of magnitude, not exact composition

Mass inputs for the packaging materials for the Carbon fibergrid product:

| Packaging materials | Weight, kg (per declared unit) |
|---|---|
| Plastic packaging: foils, adhesive tapes, strapping tape | 0,01 |
| Paper packaging | 0,08 |
| EUR wooden pallet | 0,10 |

## 12. Declared unit

Indicators are for 1 kg of Carbon fibergrid product.

## 13. System boundary

This EPD covers the following modules: Cradle-to-gate with modules C1–C4 and module D (A1–A3 + C + D).

The scenarios included are currently in use and are representative for one of the most likely scenario alternatives.

| 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 |
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| x | x | x | ND[1] | ND | ND | ND | ND | ND | ND | ND | ND | x | x | x | x | x |

| | |
|---|---|
| | Mandatory modules |
| | Mandatory as per the RTS PCR section 6.2.3 rules and terms |
| | Optional modules based on scenarios |

## 14. Cut-off criteria

A1 raw material supply, A2 transportation, A3 manufacturing. All used materials, energy, packaging, and transportation until the end-of-waste state have been included. The information from transportation A4 is included in the LCA-calculation, but is excluded from the present EPD, because the A4 module's GWP (global warming potential) is below 20% of the GWP of modules A1–A3. Information from B-module has not been calculated nor included in the LCA-calculations. Modules C1 – C4 have been included. Module D is also included.

[1] The RTS PCR Guideline outlines that the environmental impacts of the A4 module must be declared if their GWP (global warming potential) is over 20% of the GWP of modules A1–A3; as per calculated during the LCA and displayed in the LCA background report, it is below 20% thus A4 does not need to be declared.

## 15. Environmental impacts

### Carbon fibergrid product

| Results per declared unit | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1** | **A2** | **A3** | **Tot. A1-A3** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| GWP-fossil | kg $CO_2$ eq. | 1,56E+01 | 1,73E-01 | 1,03E-02 | 1,58E+01 | 0,00E+00 | 6,13E-06 | 7,41E-03 | 0,00E+00 | 2,59E-05 | 0,00E+00 |
| GWP-biogenic | kg $CO_2$ eq. | -2,10E-01 | 3,19E-04 | 2,52E-01 | 4,26E-02 | 1,64E-01 | 6,12E-10 | 4,19E-06 | 0,00E+00 | 7,00E-08 | 0,00E+00 |
| GWP-luluc | kg $CO_2$ eq. | 8,98E-03 | 1,02E-04 | 2,09E-06 | 9,09E-03 | 0,00E+00 | 5,33E-10 | 2,51E-06 | 0,00E+00 | 5,14E-08 | 0,00E+00 |
| GWP-total | kg $CO_2$ eq. | 1,54E+01 | 1,73E-01 | 2,62E-01 | 1,58E+01 | 0,00E+00 | 6,13E-06 | 7,42E-03 | 0,00E+00 | 2,60E-05 | 0,00E+00 |
| ODP | kg CFC 11 eq. | 2,89E-07 | 2,98E-09 | 1,47E-10 | 2,92E-07 | 0,00E+00 | 9,38E-14 | 1,48E-10 | 0,00E+00 | 5,50E-13 | 0,00E+00 |
| AP | mol $H^+$ eq. | 8,91E-02 | 2,13E-03 | 4,40E-05 | 9,13E-02 | 0,00E+00 | 5,53E-08 | 2,33E-05 | 0,00E+00 | 1,48E-07 | 0,00E+00 |
| EP-freshwater | kg P eq. | 3,78E-03 | 1,84E-05 | 3,16E-06 | 3,80E-03 | 0,00E+00 | 1,79E-10 | 5,06E-07 | 0,00E+00 | 5,88E-09 | 0,00E+00 |
| EP-marine | kg N eq. | 2,56E-02 | 5,55E-04 | 2,81E-05 | 2,61E-02 | 0,00E+00 | 2,57E-08 | 7,85E-06 | 0,00E+00 | 5,25E-08 | 0,00E+00 |
| EP-terrestrial | mol N eq. | 1,72E-01 | 6,12E-03 | 1,65E-04 | 1,79E-01 | 0,00E+00 | 2,81E-07 | 8,54E-05 | 0,00E+00 | 5,66E-07 | 0,00E+00 |
| POCP | kg NMVOC eq. | 5,02E-02 | 1,85E-03 | 5,78E-05 | 5,21E-02 | 0,00E+00 | 8,38E-08 | 3,72E-05 | 0,00E+00 | 1,99E-07 | 0,00E+00 |
| ADP-minerals&metals[1] | kg Sb eq. | 1,07E-04 | 4,28E-07 | 1,86E-08 | 1,07E-04 | 0,00E+00 | 2,20E-12 | 2,32E-08 | 0,00E+00 | 8,30E-11 | 0,00E+00 |
| ADP-fossil[1] | MJ | 2,87E+02 | 2,38E+00 | 1,06E-01 | 2,90E+02 | 0,00E+00 | 8,02E-05 | 1,05E-01 | 0,00E+00 | 4,59E-04 | 0,00E+00 |
| WDP | $m^3$ | 4,91E+00 | 1,60E-02 | 1,32E-03 | 4,93E+00 | 0,00E+00 | 1,96E-07 | 5,26E-04 | 0,00E+00 | 2,60E-06 | 0,00E+00 |
| Acronyms | GWP-total = Global Warming Potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; 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 depletion potential | | | | | | | | | | |
| Disclaimer | [1] The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator. | | | | | | | | | | |

## 16. Use of natural resources

### Carbon fibergrid product

| | Results per declared unit | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1** | **A2** | **A3** | **Tot. A1-A3** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| PERE | MJ | 1,36E+01 | 8,16E-02 | 0,00E+00 | 1,36E+01 | -3,83E-01 | 4,91E-07 | 1,81E-03 | 0,00E+00 | 1,36E-05 | 0,00E+00 |
| PERM | 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 | 0,00E+00 | 0,00E+00 |
| PERT | MJ | 1,36E+01 | 8,16E-02 | 0,00E+00 | 1,36E+01 | -3,83E-01 | 0,00E+00 | 1,81E-03 | 0,00E+00 | 1,36E-05 | 0,00E+00 |
| PENRE | MJ | 2,15E+02 | 2,39E+00 | 0,00E+00 | 2,18E+02 | -8,17E-02 | 8,02E-05 | 1,05E-01 | 0,00E+00 | 4,60E-04 | 0,00E+00 |
| PENRM | MJ. | 4,73E+01 | 0,00E+00 | -1,48E+01 | 3,24E+01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | -4,14E+01 | 0,00E+00 |
| PENRT | MJ | 2,63E+02 | 2,39E+00 | 0,00E+00 | 2,65E+02 | -1,49E+01 | 0,00E+00 | 1,05E-01 | 0,00E+00 | -4,14E+01 | 0,00E+00 |
| 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 | 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 | 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 | 0,00E+00 | 0,00E+00 |
| FW | $m^3$ | 4,91E+00 | 1,60E-02 | 1,32E-03 | 4,93E+00 | 0,00E+00 | 1,96E-07 | 5,26E-04 | 0,00E+00 | 2,60E-06 | 0,00E+00 |
| 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 | | | | | | | | | | |

## 17. End-of-life – Waste

### Carbon fibergrid product

| | Results per declared unit | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1** | **A2** | **A3** | **Tot. A1-A3** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| Hazardous waste disposed | kg | 8,37E-01 | 4,68E-03 | 6,64E-04 | 8,42E-01 | 0,00E+00 | 8,96E-08 | 1,53E-04 | 0,00E+00 | 7,27E-07 | 0,00E+00 |
| Non-hazardous waste disposed | kg | 2,02E+01 | 1,08E-01 | 6,11E-01 | 2,09E+01 | 0,00E+00 | 1,22E-06 | 3,21E-03 | 0,00E+00 | 1,00E+00 | 0,00E+00 |
| Radioactive waste disposed | kg | 3,34E-04 | 1,99E-06 | 0,00E+00 | 3,36E-04 | 0,00E+00 | 8,80E-12 | 3,44E-08 | 0,00E+00 | 2,96E-10 | 0,00E+00 |

## 18. End-of-life – Output flow

### Carbon fibergrid product

| | Results per declared unit | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1** | **A2** | **A3** | **Tot. A1-A3** | **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 | 0,00E+00 | 0,00E+00 |
| Material for recycling | 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 | 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 | 0,00E+00 | 0,00E+00 |
| 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 | 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 | 0,00E+00 | 0,00E+00 |

## 19. Key information table

| | Carbon fibergrid product: Key information table (RTS) - Key information per 1 kg of product | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1** | **A2** | **A3** | **Tot. A1-A3** | **A5** | **C1** | **C2** | **C3** | **C4** | **D** |
| GWP-total | kg $CO_2$ eq. | 1,54E+01 | 1,73E-01 | 2,62E-01 | 1,58E+01 | 1,64E-01 | 6,13E-06 | 7,42E-03 | 0,00E+00 | 2,60E-05 | 0,00E+00 |
| ADP-minerals & metals | kg Sb eq. | 1,07E-04 | 4,28E-07 | 1,86E-08 | 1,07E-04 | 0,00E+00 | 2,20E-12 | 2,32E-08 | 0,00E+00 | 8,30E-11 | 0,00E+00 |
| ADP-fossil | MJ | 2,87E+02 | 2,38E+00 | 1,06E-01 | 2,90E+02 | 0,00E+00 | 8,02E-05 | 1,05E-01 | 0,00E+00 | 4,59E-04 | 0,00E+00 |
| WDP | $m^3$ | 4,91E+00 | 1,60E-02 | 1,32E-03 | 4,93E+00 | 0,00E+00 | 1,96E-07 | 5,26E-04 | 0,00E+00 | 2,60E-06 | 0,00E+00 |
| 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 | 0,00E+00 | 0,00E+00 |
| Biogenic carbon content in product | kg C | N/A | N/A | 0,00E+00 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Biogenic carbon content in accompanying packaging | kg C | N/A | N/A | 4,30E-02 | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Acronyms | GWP-total = Global Warming Potential total; 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; SM = Use of secondary material | | | | | | | | | | |

## 20. Energy in the manufacturing phase

| | | |
|---|---|---|
| A3 Electricity information and $CO_2$ emission kg $CO_2$-eq./kWh | electricity, low voltage, residual mix // HU, electricity, low voltage (Ecoinvent 3.10) | 0,41 kg $CO_2$-eq./kWh |

## 21. End-of-life process description

C1: building demolition with skid-steer loaders, including energy for dismantling, particulate matter emissions from dismantling and handling.

C2: the following distances are assumed for the respective waste destinations:

- To the sorting facility – 50 km;
- To landfill – 50 km;

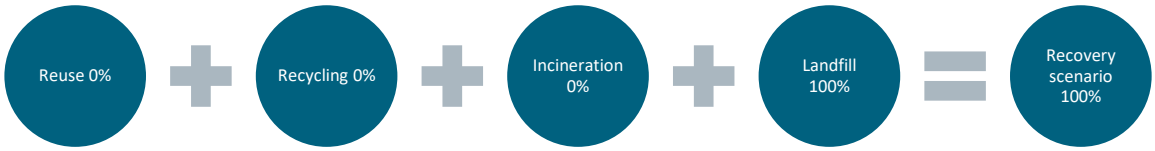
C3 and C4: the Carbon fibergrid products are sold over many European markets with varying levels of waste treatment services. One waste treatment scenario is modelled – for broad European context (100% market share). The table below summarises the total share of the of the Carbon fibergrid product by waste treatment.

- Collection rate: 100 %;
- Sanitary landfill: 100 %.

D: the product is landfilled at the end of its lifecycle, thus there is no calculation for module D.

| Processes | Unit (expressed per declared unit) |
|---|---|
| Collection process specified by type | 1 kg collected separately |
| Recovery system specified by type | 0 kg for recycling (C3)<br>0 kg for recycling (C3)<br>0 kg material for incineration (C4) |
| Disposal specified by type | 1 kg for sanitary landfill (C4) |
| Assumptions for scenario development, e.g., transportation | The following distances are assumed for the respective waste destinations:<br>- To the sorting facility – 50 km;<br>- To landfill – 50 km; |

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| Product | Reuse of components | Recycling of material | | Energy content | Disposal of product or material, including losses |
|---|---|---|---|---|---|
| | | Recycling method | System boundaries (module D) | | |
| **Carbon fibergrid** | Reused if meeting the requirements of the new application | N/A | N/A | N/A | Waste Carbon fibergrid goes to landfill for disposal. |

## 22. Additional information

a) emissions to soil

The information is not available.

b) emissions to water

The information is not available.

c) emissions to indoor air

The information is not available.

## 23. Product declaration

The information is available at the web pages, please see link.

## 24. Information on biogenic carbon content

*Carbon fibergrid product*

| Results per declared unit | | |
|---|---|---|
| **BIOGENIC CARBON CONTENT** | **Unit** | **QUANTITY** |
| Biogenic carbon content in product | kg C | 0,00E+00 |
| Biogenic carbon content in packaging | kg C | 4,30E-02 |

## 25. Data Quality Assessment

The data quality assessment performed during the analysis was based on the Data quality level and criteria of the UN Environment Global Guidance on LCA database development.

The data quality information has been provided according to the requirements of EN 15941.

ISO 14044 was applied in terms of data collection and quality requirements. The data concerning the modules A1 (raw material supply), A2 (transportation) and A3 (product manufacturing) were provided by Tolnatext Bt. and involved all input and output materials to the plant, the consumed utilities (energy, water) and the distances and means of transport for each input stream. Data reliability is considered good for energy consumption, material inputs, material outputs, waste management and very good for transportation. Proxy had to be applied for two processes (Carbon yarn and module C1 deconstruction)

This LCA report is based on site-specific data from the manufacturer and is representative for the production for 2024 January – 2024 December (12-month period). The manufacturing location is in Tolna, Hungary. However, since the components are delivered by external suppliers, their production processes are modelled using data from the Ecoinvent 3.10 database.

In case of Glass yarn the characterization factor used is of poor quality in means of temporal representativeness. In case of Chemicals the characterization factor chosen are of very poor quality in means of temporal representativeness. However, these datasets are highly relevant in terms of technological representativeness to the materials.

**Proxy data**

Tolnatext applies various chemicals onto the fibres based on the orders of customers. However primary data was not available for these chemicals, therefore proxy data had to be applied. The most appropriate Ecoinvent characterization factor for these chemicals is ‘acrylonitrile-butadiene-styrene copolymer production’. It was averaged with ‘chemical production, organic’ and applied for the LCA calculation. The chemicals used during the manufacturing of products account for approximately 10-15% of GWP results. For this reason, it is important to emphasise that GWP results’ representativeness could be greatly influenced if characterization factors on chemicals could be obtained from primary data sources.

## 26. References

Ecoinvent v3.10 database, 2023

EN 15804:2012+A2:2019 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products, 2019

EN 15941 Sustainability of construction works - Data quality for environmental assessment of products and construction work - Selection and use of data

ISO 14040:2006 (E) Environmental management — Life cycle assessment — Principles and framework, 2006-07

ISO 14044:2006 + Amd 1:2017 Environmental management — Life cycle assessment — Requirements and guidelines, 2018

RTS EPD, general rules, 2020

RTS PCR Protocol for drawing up Environmental Product Declarations of building products (SFS-EN 15804:2012 + A2:2019/AC:2021, version 121124)

The Finnish RTS EPD programme RTS EPD Guideline - Programme operator The Building Information Foundation RTS sr According to the standard EN 15804, 18.2.2021

## 27. Revision History

| | Date | Subject |
|---|---|---|
| 1. | 27.01.2026 | *Product name change* |