Belgotex
INTERNATIONAL CARPET & FLOORING

**Compliant to ISO 14025**

**SDN Tufted Bitumen Back Carpet**

This Environmental Product Declaration (EPD) discloses potential environmental outcomes compliant with ISO 14025 for business-to-business communication.

The declared SDN Tufted Bitumen Backed Carpet Tile was made by Belgotex in South Africa in 2021. In South Africa it is sold with a 15-year warranty for flooring application in commercial sectors.

**Figure 1 SDN Tufted Bitumen Backed Carpet**

Belgotex is a leading South African carpet and artificial grass manufacturer.

A soft flooring specialist, it designs, makes and distributes high quality broadloom and modular carpets to the commercial market.

A global exporter, its focus it is to offer customer solutions, innovation, quality and environmental responsibility.

It is ISO 9001, 14001 and 45001 certified and a member of the Supplier Ethical Data Exchange.

The company works continuously to understand and leverage opportunity to reduce its negative social impacts and environmental footprints.

Belgotex monitors its energy, water, waste and carbon flows.

The company aims for good and fair labour practices and workplace safety.

It is committed to recruiting and developing employees drawn from communities surrounding its factory.

It is a Level 2 Broad-based Black Economic Empowerment contributor.

Belgotex Foundation: The Go Group is a 25.01% shareholder in the business.

All social investment aligns with The Go Group human and social development philosophy and programmes.

The http://www.belgotex.co.za/ site offers more information.

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Different program EPDs may not be comparable as e.g. South African transport may be different from elsewhere. **Further explanatory information is found at** http://www.globalgreentag.com/ or contact: certification1@globalgreentag.com 

## 1. Details of This Declaration

| | |
|---|---|
| **Program Operator** | GreenTag Global Pty Ltd hereafter called Global GreenTag noted at www.globalgreentag.com |
| **EPD Number** | BEL-001-2022 |
| **Date issue** | 5 July 2022 |
| **Validity** | 5 July 2025 |
| **Reference PCR** | Interior Floor Covering PCR FC:2021-2024 |
| **Time** | Made in and sold from 2021 for 20 years use |
| **Geography** | Made in South Africa. Uses are assumed as for South Africa. |
| **Application** | Function in commercial and residential building interiors |
| **Declared Unit** | SDN Tufted Bitumen Backed Carpet Tile/m$^2$ cradle to gate |
| **Functional unit** | SDN Tufted Bitumen Backed Carpet Tile kg/m$^2$ flooring 20year use cradle to fate |

## 2. Product Characterisation

| | |
|---|---|
| **Definition** | SDN Tufted Bitumen Back Carpet Tile by Belgotex used as interior floorcovering in buildings |
| **Standard** | SANS 1375 Ed. 3.02 (2012) Textile Floor Covering: Pile Construction<br>SANS 10177 Ed. 1.03 (2005) Part 4 Floor Covering Surface Fire Index (SFI)<br>SANS 10361 Ed. 2 (2015) Textile Floor Coverings Appearance Retention (AR) |

## 3. Verification of this Declaration

This EPD was approved on 5th July 2022 according to requirements of ISO14025 8.1.3b.

| Role | Name | Position | Signature |
|---|---|---|---|
| **PCR Review Chair** | Murray Jones | Ecquate Pty Ltd CEO | 29 June 2022 |
| **LCA Review EPD Developer** | Delwyn Jones | The Evah Institute | 29 June 2022 |
| **LCI & LCIA Developer. EPD Review** | Mathilde Vlieg | MalaikaLCT Consultant | 28 June 2022 |
| **Internal EPD Audit** | David Baggs | Global GreenTag CEO & Program Director | 06/07/22 |

## 4. Base Material Origin and Detail

Table 1 lists key components by sources, function, type, key operations and % mass amounts.

**Table 1 Base Material**

| Function | Component | Source | % Mass |
|---|---|---|---|
| Filler | Limestone 5% Magnesite | South Africa | >51 <55 |
| Face fibre | Nylon 6 | Belgium | >15 <17 |
| Binder | Bitumen | South Africa | >13<15 |
| 2nd backing | Polyester Fabric | China, South Africa | >9<12 |
| 1st backing | Polyester Propylene fabric | Saudi Arabia, Netherlands | >6<8 |
| Binder Latex | Styrene Butadiene in water | Belgium, South Africa, South Korea | >3<7 |
| Pigments | Black White & Colours | Denmark Germany | <1.0 |
| Additives in water | 5% PMOA[1] Spin finish, 45% SAS[2] Stabiliser, Polyacrylate Thickener | Germany South Africa | <1.0 |
| Solvent | Hydrocarbons | South Africa | <1.0 |

## 5. Packaging, Installation, Use & Disposal

| | |
|---|---|
| Packaging | Cardboard boxes & plastic wrap on reused pallets. |
| Service life | Commercial refits vary but 20-year life is assumed typical. |
| Health Safety & Environment | Apart from compliance to occupational and workplace health safety and environmental laws no additional personal protection is considered essential. |
| Residual Scrap | Mill off-cuts are reused. Installation scrap of 5% is assumed to recycling. |
| Maintenance & Cleaning | The recommended cleaning and maintenance, raises no ecosystem or human health concerns. Care and maintenance guides are on company websites. |
| Scenario | Weekly vacuum cleaning, twice yearly deep steam cleaning. |
| Recycling | Home mill, fabrication and installation scrap is reworked into new product. |
| Re-use | This study assumes 60% product is serviceable for reuse over 40 more years. |
| Disposal | The fate is assumed recycled or donated. Incineration is rare in South Africa. |

## 6. Whole of life Performance

| | |
|---|---|
| Health Protection | The product does not contain levels of carcinogenic, toxic or hazardous substances that warrant ecological or human health concern cradle to grave. It passed the Ecospecifier Cautionary Assessment Process (ESCAP) and no issues or red-light concerns existed for product human or ecological toxicity. |
| Effluent | The LCI results and ESCAP raised no red -ight concerns in emissions to water[3]. |
| Waste | Cradle to grave waste to landfill was non-hazardous. |
| Environmental Protection | Continuous improvement under the maker's certified ISO14001 EMS aims to avoid toxics, waste and pollution plus reduce their material and energy use. |
| Environmental Health Effects | Installed products are certified as having VOC's compliant with Green Star® IEQ VOC credits for indoor environment[4] quality credits. No other potential in-use impacts on environment or health are known. |

1 Potassium Methyl Oxooctadecenyl Aminoacetate
2 Sodium alkyl sulphate
3 According with national standards in ANZECC Guideline For Fresh & Marine Water Quality (2000)
4 in accordance with national standards and practice

## 7. Life Cycle Inventory Results

Table 2 lists material and energy resources use per functional unit. Figure 3 depicts the phases:

- Production including supply manufacture with transport cradle to gate then upstream;
- Construction with transport to site, installation and commissioning;
- Use and operation including maintenance, repair, replacement, refurbishment with transport, and
- End-of-life from deconstruction, demolition, reuse, recycling and disposal with transport.

**Table 2 Cradle to Grave Inventory of Flows/ Functional Unit**

| Total Input use of | Unit | Results |
|---|---|---|
| Product Mass | kg | 4.2 |
| Embodied Water | kl | 473 |
| Total Renewable Fuel + Feedstock Energy | MJncv | 12 |
| Total Fossil Fuel + Feedstock Energy | MJncv | 299 |

## 8. Life Cycle Impact Potential Results

Table 3 shows Life Cycle Impact Assessment (LCIA) results for product use cradle to grave.

**Table 3 Cradle to Grave Potential Impact Results/ Functional Unit**

| Evaluation Category | Unit | Results |
|---|---|---|
| Global warming Potential | kg $CO_{2e}$ | 21 |
| Ozone Depletion | kg $R11_e$ | 2.4 E-10 |
| Acidification | kg $SO_{2e}$ | 0.55 |
| Eutrophication | kg $PO_4^{3-}e$ | 8.03E-03 |
| Ecosystem Quality Damages | PDF*$m^2$*yr | 1.2E-04 |
| Human Health Damages | DALY | 1.9E-03 |
| Fossil Fuel Depletion | $MJ_{surplus}$ | 19 |
| Mineral Resource | $MJ_{surplus}$ | 6.9E-02 |
| EcoIndicator 99 | ecopoint | 1.27 |

## 9. Supply Chain Modelling

Processes to acquire, refine, transport, fabricate, coat, use, clean, repair, reuse and dispose of metal, masonry, ceramic, timber, glass, plastic and composites are modelled. A flow chart in Figure 2 shows key product supply chain operations from cradle to fate including those of:

- Mining, extracting and refining resources to make commodities and packaging;
- Acquiring, cultivating, harvesting, extracting, refining produce and biomass;
- Fuel production to supply power and process energy and freight;
- Chemicals use in processing resources, intermediates and ancillaries;
- Process energy, fuel and freight of resources, intermediates and ancillaries;
- Use, cleaning, recoating, repair, recycling, re-use and landfill, as well as
- Infrastructure process energy transformed and material wear loss e.g. tyres.

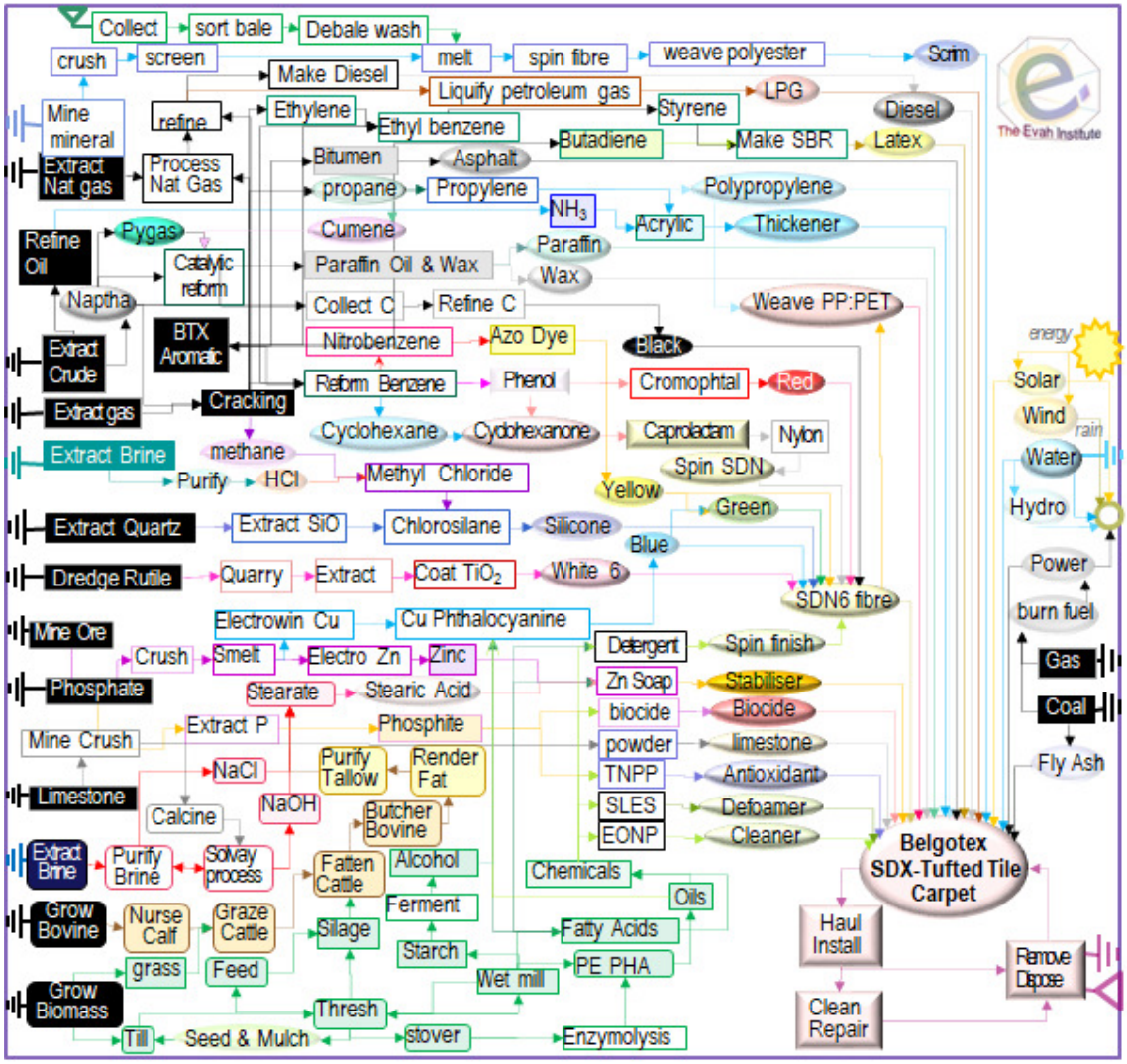


*Figure 2 Major Product Operations*

## 10. Life Cycle Assessment Method

| | |
|---|---|
| **LCA Author** | The Evah Institute as described at www.evah.com.au |
| **Study Period** | Factory data was collected from 2020 to 2022 |
| **LCA Method** | Compliant with ISO 14040 and ISO 14044 Standards |
| **LCIA method** | EcoIndicator 99 Life Cycle Impact (LCIA) Assessment |
| **Scope** | Cradle to Fate including all supply chain phases and stages depicted in Figure 2. |
| **Phases** | The LCA covered all known flows in all known stages cradle to end of life fate. |
| **Assumptions** | Typical use is to Australian Facility Management professional practice. |
| **Scenarios** | Use, cleaning, maintenance plus disposal and re-use were scenario-based using Facility Management Association denoted and published typical operations. |
| **System Boundaries** | The LCA system boundary depicted in Figure A includes all operations A1-A3 production with upstream supply & transport; A4 package & deliver & A5 construct; B1 use with cleaning, B2 maintain, B3 repair[5] B5 refurbish, C1 demolish, C2 transport and C4 disposal. |
| **Processes** | All significant resource acquisition, water, fuel & energy use, power generation & distribution, freight, refining, intermediates, manufacture, scrap re-use, packing and dispatch, installation, use, maintenance, landfill waste and emission flows from all supply chain operations involved to make, pack and install the product are included. |

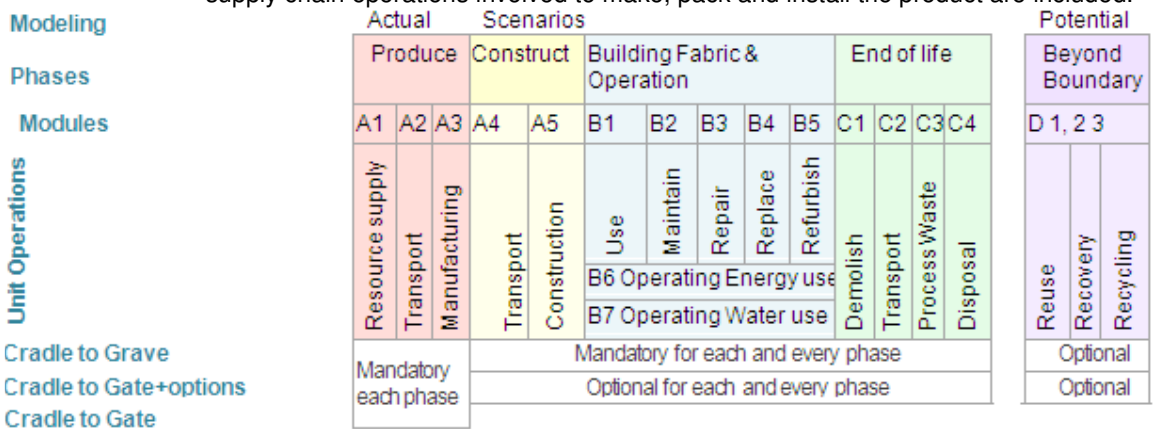


**Figure A Phases and Stages Cradle to Grave**

Evah industry databases cover all known domestic and global scope 1 and 2 operations. They exclude scope 3 burdens from capital facilities, equipment churn, noise and dehydration as well as incidental activities and employee commuting. The databases exist in top zones of commercial global modelling and calculating engines. Electricity supply models in active databases are updated annually. As each project is modelled and new data is available the databases are updated and audited by external Type 1 ecolabel certifiers. Quality control methods are applied to ensure:

- Coverage of place in time with all information[6] for each dataset noted, checked and updated;
- Consistency to Evah guidelines[7] for all process technology, transport and energy demand;
- Completeness of modeling based on in-house reports, literature and industry reviews;
- Plausibility in 2-way checks of LCI input and output flows of data checked for validity, plus Mathematical correctness of all calculations in mass and energy balance cross checks.

5 No activities are assumed to occur in B4, B6 or B7 or C4 waste processing.
6 Jones D G (2004) LCI Database for Commercial Building Report 2001-006-B-15 Icon.net, Australia
7 Evah Tools, Databases and Methodology Queensland, Australia at http://www.evah.com.au/tools.html

## 11. Data Sources Representativeness and Quality

Primary data used for modelling the state of art of each operation includes all known process for:

- Technology sequences;
- Energy and water use;
- Landfill and effluent plus
- Reliance on raw and recycled material;
- High and reduced process emissions;
- Freight and distribution systems.

Primary data is sourced from clients, annual reports and their publications on corporate locations, logistics, technology use, market share, management systems, standards and commitment to improved environmental performance. Information on operations is also sourced from client:

- Supply chain mills, their technical manuals, corporate annual reports and sector experts, and
- Manufacturing specifications websites and factory site development licensed applications.

Background data is sourced from the International Energy Agency, IBISWorld, USGS Minerals, Franklin Associates, Boustead 6, Plastics Europe, CML2, Simapro 8, EcoInvent 3 and NREL USLCI model databases. Information on operations is also sourced from:

- Library, document, NPI and web searches, review papers, building manuals and
- Global Industry Association and Government reports on Best Available Technology (BAT).

For benchmarking, comparison and integrity checks inventory data is developed to represent BAT, business as usual and worst practice options with operations covering industry sector supply and infrastructure in Australia and overseas.

Such technology, performance and license conditions were modelled and evaluated across mining, farming, forestry, freight, infrastructure and manufacturing and building industry sectors since 1995.

As most sources do not provide estimates of accuracy, a pedigree matrix of uncertainty estimates to 95% confidence levels of geometric standard deviation[2] ($\sigma_g$) is used to define quality as in Table A[8].

**Table A Data Quality Parameters and Uncertainty (U)**

| Correlation | Metric $\sigma_g$ | U ±0.01 | U ±0.05 | U ±0.10 | U ±0.20 | U ±0.30 |
|---|---|---|---|---|---|---|
| **Reliability** | Reporting | site audit | expert verify | region | sector | academic |
| | Sample | >66% trend | >25% trend | >10% batch | >5% batch | <1% batch |
| **Completion** | Including | >50% | >25% | >10% | >5% | <5% |
| | Cut-off | 0.01%w/w | 0.05%w/w | 0.1%w/w | 0.5%w/w | 1%w/w |
| **Temporal** | Data Age | <3 years | ≤5 years | <10 years | <15 years | >16 years |
| | Duration | >3 years | <3 years | <2 years | 1 year | <1 year |
| **Geography** | Focus | process | line | plant | corporate | sector |
| | Range | continent | nation | plant | line | process |
| **Technology** | Typology | actual | comparable | in class | convention | in sector |

No data set with >±30% uncertainty is used without notation in the LCA as well as the EPD.

8 Evah Institute data quality control system accords with UNEP SETAC Global LCI Database Quality 2010 Guidelines

## 12. Supply Chain Modelling Assumptions

Australian building sector rules and Evah assumptions applied are defined in Table B.

**Table B Scope Boundaries Assumptions and Metadata**

| Quality/Domain | National including Import and Export |
|---|---|
| Process Model | Typical industry practice with currently most common or best (BAT) technology |
| Resource flows | Regional data for resource mapping, fuels, energy, electricity and logistics |
| Temporal | Project data was collated from 2017 to 2019 |
| Geography | Designated client, site, regional, national, Pacific Rim then European jurisdiction |
| Representation | Designated client, their suppliers and energy supply chains back to the cradle |
| Consistency | Model all operations by known given operations with closest proximity |
| Technology | Pacific Rim industry supply chain technology typical of 2017 to 2019 |
| Functional Unit | Typical product usage with cleaning& disposal/m$^2$ over the set year service life |
| **System Control** | |
| Primary Sources | Client and supplier mills, publications, websites, specifications & manuals |
| Other Sources | IEA 2019, GGT 2019, Boustead 2013, Simapro 2016, IBIS 2019, EcoInvent 2018 |
| Data mix | Power grid and renewable shares updated to latest IEA 2018 reports |
| Operational | Company data for process performance, product share, waste and emissions |
| Logistics | Local data is used for power, fuel mix, water supply, logistics share & capacity |
| New Data Entry | MalaikaLCT, Evah Institute 2019; Global Green Tag Researchers 2019 |
| Data Generator | Manufacturers, Evah Institute 2019; GGT 2019; Meta: IBIS 2019, Other pre-2019 |
| Data Publisher | The Evah Institute Pty Ltd to Global GreenTag and designated client only |
| Author input | All contributors cited in Evah & Global GreenTag records or websites |
| **Data Flow & Mix** | |
| System Boundary | Earth's cradle of all resource & emission flows to end of use, fitout or build life |
| System flows | All known from and to air, land, water and community sources & sinks |
| Capital inclusions | Natural stocks, industry stockpiles, capital wear, system losses and use |
| Arid Practice | Dry technology adopted; Water use is factored by 0.1 as for e.g. mining |
| Transportation | Distance >20% than EU; >20% fuel efficient larger vehicles, load & distance |
| Industrial | Company or industry sector data for manufacturing and minerals involved |
| Mining | All raw material extraction is based on Australian or Pacific Rim technology |
| Imported fuel | Mix is from nearest sources is e.g. UAE, SE Asia, Canada or New Zealand |
| Finishes | Processing inputs with finishing burdens are factored in. If not that is denoted |
| **Validation** | |
| Accuracy | 10$^{th}$ generation study is ± 5 to 15% uncertain due to some background data |
| Completeness | All significant operations are tracked and documented from the cradle to grave |
| Precision | Tracking of >90% flows, applies a 90:10 rule sequentially to 99.9% and beyond |
| Allocation | %100 to co products on reaction stoichiometry by energetic or mass fraction |
| Burdens | All resource use from & emissions to community air land, water, are included |
| Plausibility | Results are checked and benchmarked against BAT, BAU & worst practice |
| Sensitivity | Calculated U is reported & compared to libraries of Bath U RICE & EcoInvent 3.2 |
| Validity Checks | Are made versus Plastics Europe, Ecobilan, GaBi & or Industry LCA Literature |

## 13. References for this LCA & EPD

Australian & New Zealand (ANZECC) Guidelines For Fresh & Marine Water Quality (2000) http://www.environment.gov.au/water/quality/national-water-quality-management-strategy

Basel Convention (2011) Control of Transboundary Movement of Hazardous Waste & Disposal http://www.basel.int/portals/4/basel%20convention/docs/text/baselconventiontext-e.pdf

Boustead (2014) Model 6 LCI database http://www.boustead-consulting.co.uk/publicat.htm USA & UK

EcoInvent (2016) LCI Model 3 database http://www.ecoinvent.ch/ EcoInvent, Switzerland

Evah (2019) LCA Tools, Databases & Methodology at http://www.evah.com.au/tools.html

Franklin Associates (2016) US LCI Database http://www.fal.com/index.html Eastern Research Group US

GreenTag™ Certification (2019) http://www2.ecospecifier.org/services_offered/greentag_certification

GreenTag™ (2019) Product Category Rules http://www.globalgreentag.com/greentag-epd-program

Jones D., Mitchell. P. & Watson P. (2004) LCI Database for Australian Commercial Building Material: Report 2001-006-B-15, Sustainable Built Assets, CRC for Construction Innovation

Jones D.G et al. (2009) Chapter 3: Material Environmental LCA in Newton P et al., (eds) Technology, Design & Process Innovation in the Built Environment, Taylor & Francis, UK

IBISWorld (2019) Market Research, http://www.ibisworld.com.au/ IBISWorld Australia

International Energy Agency (2016) Energy Statistics http://www.iea.org/countries/membercountries/

ISO 9001:2008 Quality Management Systems Requirements

ISO 14001:2004 Environmental management systems: Requirements with guidance for use

ISO 14004:2004 EMS: General guidelines on principles, systems & support techniques

ISO 14015:2001 EMS: Environmental assessment of sites & organizations (EASO)

ISO 14020:2000 Environmental labels & declarations — General principles

ISO 14024:2009 Environmental labels & declarations -- Type I Principles & procedures

ISO 14025:2006 Environmental labelling & declarations Type III EPDs Principles & procedures

ISO 14031:1999 EM: Environmental performance evaluation: Guidelines

ISO 14040:2006 EM: Life cycle assessment (LCA): Principles & framework

ISO 14044:2006 EM: LCA: Requirement & guideline for data review: LCI; LCIA, Interpretation results

ISO 14064:2006 EM: Greenhouse Gases: Organisation & Project reporting, Validation & verification

ISO 15392:2008 Sustainability in building construction General principles

ISO 15686-1:2011 Buildings & constructed assets Service life planning Part 1: General principles

ISO 15686-2:2012 Buildings & constructed assets Service life (SL) planning Part 2: prediction

ISO 15686-8:2008 Buildings & constructed assets SL planning Part 8: Reference & estimation

ISO 21929-1:2011 Sustainability in building construction Sustainability indicators Part 1: Framework

ISO 21930:2007 Building construction: Sustainability, Environmental declaration of building products

ISO/TS 21931-1:2010 Sustainability in building construction: Framework for assessment, Part 1:

ISO 21932:2013 Sustainability in buildings and civil engineering works -- A review of terminology

Plastics Europe (2019) Portal http://www.plasticseurope.org/plastics-sustainability/eco-profiles.aspx

Pre (2016) SimaPro 8 Software, The Netherlands http://www.pre-sustainability.com/simapro-manuals

Myhre et al, 2013, Anthropogenic and Natural Radiative Forcing Chapter 8 in Stocker et al (eds.) Climate Change 2013, AR5 of the IPCC, Cambridge U Press UK. http://www.ipcc.ch/report/ar5/wg1/

Roache S. K. (2012) IMF Report WP/12/115 China's Impact on World Commodity Markets http://www.imf.org/external/pubs/ft/wp/2012/wp12115.pdf International Monetary Fund

UNEP (2016) Persistent Organic Pollutants http://www.chem.unep.ch/pops/ The UN

USLCI (2019) Life-Cycle Inventory Database https://www.lcacommons.gov/nrel/search, USA

U.S. Geological Survey National Minerals (2019) http://minerals.usgs.gov/minerals/pubs/country/ USA

US EPA (2016) Database of Sources of Environmental Releases of Dioxin like Compounds in U.S http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=20797 p 1-38, 6-9, USA

## 14. Reviewers Report Conclusions

The independent LCA reviewer's report confirmed that the LCA project report and addition information addressed the EPD.

The verifier was not involved in developing the LCA or EPD and has no conflict of interests from their organisational position.

While the report is confidential its conclusions confirmed that documentation according to set ISO Standard requirements was provided including evidence from the:

### The Evah Institute, the LCA developer:

a) Recipes of input and output data of unit processes used for LCA calculations √

b) Datasheets of measures, calculations, estimates and emails with sources as in Table 6 √

e) References to literature and databases from which data was extracted as noted in Table 6 √

g) Notes on supply chain processes and scenarios satisfying requirements of this Standard √

i) Embodied Energy shares as used for sensitivity analyses re ISO 14044:2006, 4.5.3.3 √

j) Proof percentages or figures in calculations in the end of life scenario √

k) Notes on proof of % and allocation calculations √

o) All operations covered Vs criteria and substantiation used to determine system boundaries √

### Product Manufacturer in:

c) Specifications used to create the manufacturer's product √

d) Citations, references, specifications or regulations & data showing completeness √

f) Specification demonstrating that the building product can fulfil the intended use √

### The Certifier Global GreenTag on:

l) Notes and calculation of averages of different locations yielding generic data √

m) Substantiating additional environmental information ISO 14025:2006, 7.2.4 √

n) Procedures for data collection, questionnaires, instructions, confidentiality deeds √

### Requiring No Evidence:

As the EPD is cradle to grave as well as PCR compliant the independent reviewer did not need to:

h) Substantiate a few stages as all stages were substantiated √

p) Substantiate alternatives when no other choices and assumptions were applied √

q) Demonstrate consistency for few stages as the same rules in Tables 5 and 6 applied to all. √

This Environmental Product Declaration (EPD) discloses potential environmental outcomes compliant with ISO 14025 for business-to-business communication.

**Further and explanatory information is found at**

http://www.globalgreentag.com/

or contact:

certification1@globalgreentag.com

GLOBAL GREEN TAG INTERNATIONAL PTY LTD
green product certification trust brands

**Global GreenTagCertTM EPD Program**

**Environmental Product Declaration**

**Compliant to ISO 14025**