

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.

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.

Figure 1 SDN Tufted Bitumen Backed Carpet



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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 © This EPD remains the property of Global GreenTag Pty Ltd.

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 SANS 10177 Ed. 1.03 (2005) Part 4 Floor Covering Surface Fire Index (SFI) 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
2 nd backing	Polyester Fabric	China, South Africa	>9<12
1 st 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 Waste	The LCI results and ESCAP raised no red -ight concerns in emissions to water ³ . 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
EcolIndicator 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.

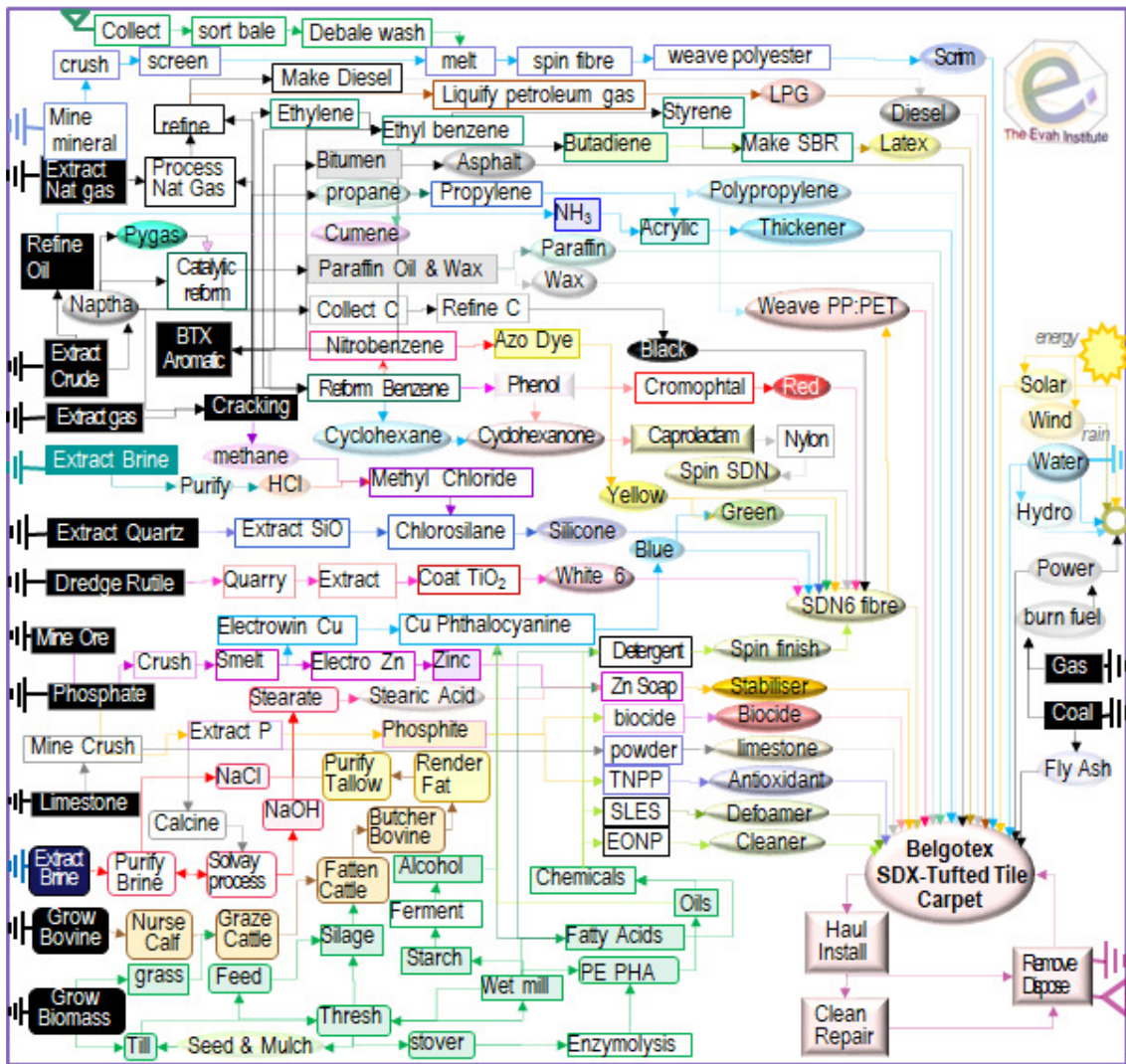


Figure 2 Major Product Operations



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 repair⁵ 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.

Modeling

Phases

Modules

Unit Operations

Cradle to Grave

Cradle to Gate+options

Cradle to Gate

		Actual Scenarios										Potential							
		Produce			Construct		Building Fabric & Operation					End of life				Beyond Boundary			
		A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	D 1, 2, 3			
Unit Operations	Resource supply	Transport			Manufacturing		Transport		Construction			Use				Demolish			
	Transport	Manufacturing			Transport		Construction			Use				Demolish			Reuse		
	Manufacturing	Transport			Manufacturing		Construction			Use				Demolish			Recovery		
	Construction	Transport			Manufacturing		Construction			Use				Demolish			Recycling		
		Mandatory			Mandatory		Mandatory					Mandatory				Optional			
		each phase			each phase		for each and every phase					for each and every phase				Optional			

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 information⁶ for each dataset noted, checked and updated;
- Consistency to Evah guidelines⁷ 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 deviation² (σ_g) is used to define quality as in Table A⁸.

Table A Data Quality Parameters and Uncertainty (U)

Correlation	Metric σ_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, EcolInvent 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 & EcolInvent 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>
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- 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/>

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