

Baltimore.

Baltimore was specifically designed with the needs of the corporate and hospitality environments in mind. Baltimore is a densely constructed wall-to-wall carpet which features a unique yarn system that reduces surface “shading”. Stainproof SDX (Solution Dyed Nylon) fibres also provide excellent colour fastness and resistance to fading. With its international range of colourways Baltimore offers a colour option suited to a wide range of projects.



- BILL OF QUANTITIES:**
- Belgotex BALTIMORE 4m broadloom is manufactured from Stainproof SDX & Stainproof Eco SDX Blend (Solution Dyed Nylon).
 - This product is to be laid in accordance with the SANS 10186 fitting code of practice.
 - Belgotex recommends the use of carpet protector mats where castor wheels are used.



Extended Specifications

| | |
|--------------------------|---|
| Construction | Tufted Cut Pile |
| Production Description | Heavy Commercial, SDN, Tufted Broadloom |
| Yarn Type | Stainproof SDX & Stainproof Eco SDX (Solution Dyed Nylon) |
| Yarn Mass | 1200g/m2 |
| Recycled Content | Pile Yarn (Certain Colours Only) |
| Use Classification | Heavy Commercial |
| Pile Height | 7mm (±0.5mm) |
| Total Thickness | 10mm (±0.5mm) |
| Total Mass | ±2489g/m2** |
| Width | 4m |
| Machine Gauge | 1/10" Patterned Cut Pile |
| Stitches/10cm | 43 |
| Fire Index | 2 (SANS 10177-IV) |
| Colour fastness to: | |
| (i) Light | 7 (ISO 105-B02) |
| (ii) Rubbing | (a) Wet 4-5 (ISO 105-X12) |
| Rubbing | (a) Dry 4-5 (ISO 105-X12) |
| (iii) Water | 4-5 (ISO 105-E01) |
| Electrostatic Propensity | Less than 2.0kV (ISO 6356 & EN1307) |
| Static Control | Permanent |
| VOC Tested | Passed |



Baltimore | Travertine



Belgotex

20 Chesterfield Road, Pietermaritzburg, 3201, South Africa

This is to Certify that the following Product/s have been found in conformance with the Global GreenTag Scheme Standard for the Tier and Level noted herein:

SDX Tufted Broadloom Carpet [LCARate EcoPOINT 0.44], GBCSA Level A

GreenStar SA[®] 'Interiors v1' Credits:

MAT: Flooring, Credit IEQ-6: Reduced Exposure to Air Pollutants

WELL v1.0 Features - IWBI

Feature 04: VOC Reduction, Feature 11: Fundamental Material Safe Part 1c and 5b, Feature 25: Toxic Material Reduction Part 1 Perfluorinated Compound Limitation, Feature 26: Enhanced Material Safety, Feature 97: Material Transparency

WELL v2.0 Features - IWBI

X10: Volatile Compound Reduction, X11: Long-Term Emission Control, X13: Enhanced Material Precaution, X14: Material Transparency

Licensed Sites:

Pietermaritzburg, South Africa

Licence No.:

BEL-003-v1-2019

Licence Date:

28 August 2019

Latest Revision Date:

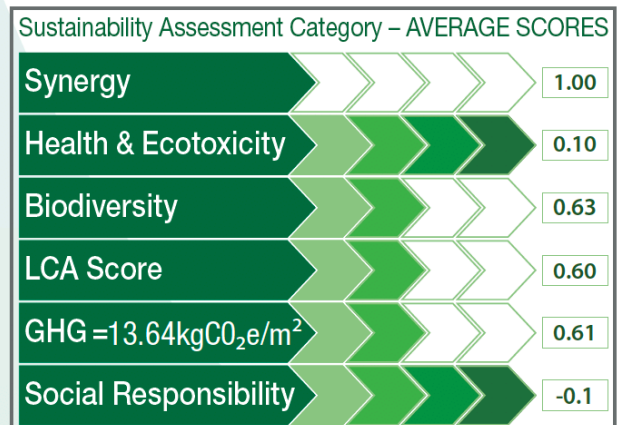
02 October 2019

Valid to:

28 August 2020

GreenTag Standard:

Standard Version 4.0



Range: -1.00 to +1.00. The smaller the number, the better!



www.globalgreentag.co.za

David Baggs
Chief Executive Officer
Global GreenTag[®] Program Director



Conditions of Licence

The conditions of licence are contained in full in the Ecospecifier Global GreenTag Standard, Terms and Conditions, and Rules for the Use of the Mark Documents as sighted and/or executed by the Licensee.

green product certification trust brands

In summary it is the responsibility of the licensee in particular to:

1. always comply with the relevant provisions of the GreenTag certification program;
2. make all necessary arrangements for the conduct of the future evaluation, including provision for examining documentation and access to all areas, records (including internal audit reports) and personnel for the purposes of evaluation (e.g. testing, inspection, assessment surveillance, reassessment) and resolution of complaints;
3. make claims regarding certification only in respect of the scope for which certification has been granted;
4. not use its product certification in such a manner as to bring the GreenTag into disrepute and not make any statement regarding its product certification which the certification body may consider misleading or unauthorized;
5. upon suspension or cancellation of certification, discontinue its use of all advertising matter that contains any reference thereto and returns any certification documents as required by GreenTag;
6. use certification only to indicate that products are certified as being in conformity with specified GreenTag standards;
7. endeavour to ensure that no certificate or report nor any part thereof is used in a misleading manner;
8. make comment or inclusions solely in accordance with license requirements in making reference to its product certification in communication media such as online, emails, documents, brochures or advertising;
9. Inform GreenTag of any change in the Certified product or manufacturing process that is likely to significantly affect the product's design or specification, or changes in the ownership, structure or management of the Licensee, if relevant, or any other information that indicates the product may no longer comply with the requirements of this Standard;
10. In the event of GreenTag determining changes have been made to product or supplier details and not notified to GreenTag, the Licensee will, on receipt of a GreenTag 'Notice to Rectify', immediately provide GreenTag with the required details and any fees necessary to allow recertification. Failure to do so may result in the withdrawal of the Licence. If the product Licence is withdrawn, the Licensee must, within 7 days, cease to further promulgate all product marketing, packaging, advertising or other material carrying the logo. Furthermore all material carrying the Certification Mark/s must be withdrawn within 90 days.

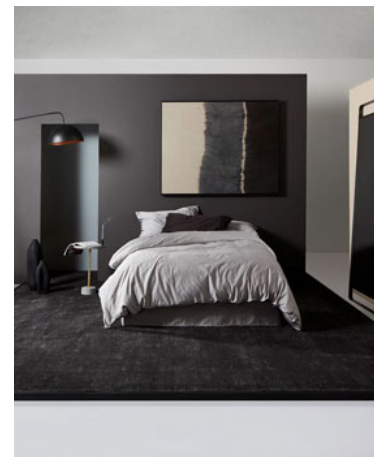
| Revision date | Certificate number | Notes |
|----------------|--------------------|---|
| 28 August 2019 | BEL-003-v1-2019 | Products re-certified to GreenTag Standard v4.0 |
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Belgotex SDX Tufted Broadloom Carpet

SDX Broadloom Commercial Carpet is a solution dyed Nylon Tufted Commercial Broadloom Carpet in an array of colors and designs.

| | |
|---------------------------------|---------------------------------------|
| Products/Ranges: | SDX Tufted Broadloom Carpet |
| Product Stages Assessed: | Manufacturing and in-use |
| CSI Masterformat: | 096816 |
| Licensed Site/s: | Pietermaritzburg, South Africa |
| Licence Number: | BEL-003-v1-2019 |
| Licence Date: | 28th August 2019 |
| Valid To: | 28th August 2020 |
| Standard: | GGT International v4.0 |
| Screening Date: | 29th October 2019 |
| PHD URL: | globalgreentag.com/xxxxxxx |



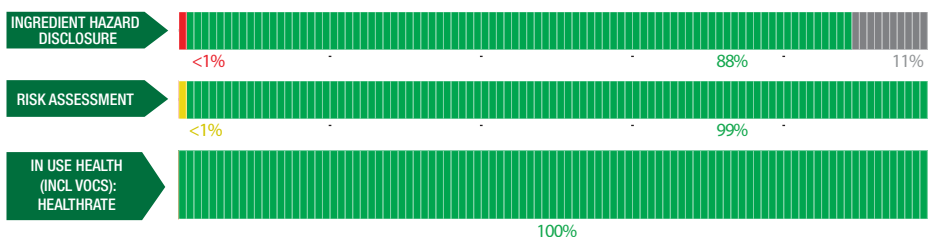
This PHD ceases currency when original GreenTag GreenRate/LCARate certification expires or is revoked. Please check www.globalgreentag.com for currency. [Note disclaimer over.](#)

| | | |
|----------------------------------|-----------------------------|--------------------------|
| PHD Summary | Inventory Threshold: | Inventory Method: |
| Percentage Assessed: 100% | 100ppm Product Level | Nested Materials |

- GreenTag Banned List Compliant
- Meets WELL™ Building Standard: Feature 04 VOC Reduction Part 3: Flooring, X10 Volatile Compound Reduction
- Meets WELL™ Building Standard: Feature 11 Fundamental Material Safety Part 1c and 5b
- Meets WELL™ Building Standard: Feature 25: Toxic Material Reduction
- Meets WELL™ Building Standard: Feature 26 Part 1: Precautionary Material Selection, X13 Enhanced Material Precaution 1
- Meets WELL™ Building Standard: Feature 97: Material Transparency, Feature X14: Material Transparency Part 1
- No worker exposure to Mutagens, Reproductive Toxicant or Endocrine Disruptors
- No user exposure to Carcinogens, Mutagens, Reproductive Toxicant or Endocrine Disruptors
- No environmental exposure to Carcinogens, Mutagens, Reproductive Toxicant or Endocrine Disruptors

INGREDIENT HAZARD DISCLOSURE, RISK ASSESSMENT, & IN USE HEALTH, % by mass.

ASSESSMENT:



Declared by:
Global GreenTag
International Pty Ltd

David Baggs
CEO & Program Director
Verified compliant with:
ISO 14024 & ISO 17065

1.0 Scope

The Global GreenTag International (GGT) Product Health Declaration (PHD) has been designed to provide an additional level of service to the green product sector in facilitating an easier understanding of both the hazard and risk associated with any certified products and is intended to indicate:

- Chemical hazards of both finished product and unique ingredients to a minimum level of 100ppm for each homogeneous ingredient throughout the product life cycle, (including any VOC or other gaseous emissions);
- An assessment of exposure or risk associated with ingredient handling, product use, and disposal in relation to established mitigation and management processes;

It is not intended to assess:

- substances used or created during the manufacturing process unless they remain in the final product; or
- substances created after the product is delivered for end use (e.g., if the product unusually degrades, combusts or otherwise changes chemical composition).

GGT PHDs are only issued to products that have passed GGT Standards' certification requirements. The Level of Assessment (BronzeHEALTH, SilverHEALTH GoldHEALTH or PlatinumHEALTH) rating relates ONLY to GGT Standard Sustainability Assessment Criteria 3, and is declared separately to the overall Bronze, Silver Gold or Platinum Green Tag Certification Mark Tier Levels.

1.2 Preparing an PHD

GGT PHDs are prepared using Hazard Classifications from the UN Globally Harmonised System of Classification and Labelling of Chemicals (GHS) and as an outcome of a successful Application for Certification. Assessments are undertaken by GGT Qualified Exemplar Global Lead Auditors and subsequently accepted for Certification by the GGT Program Director (also a Qualified Exemplar Global Lead Auditor) under the GGT International Standard v4.0, Personal Products Standard v1.0, and Cleaning Products Standard v1.0 and above Program Rules.

1.3 External Peer Review

Every GGT PHD is independently peer reviewed by an external Consultant Toxicologist and Member of the Australian College of Toxicology & Risk Assessment.

2.0 Declaration of Ingredients

Where a manufacturer wishes recognition under a rating program that requires transparency of ingredients such as LEED v4.0, Living Building Challenge, Estidama etc., the following information is declared from audit:

| Colour | Ingredient Name |
|--------|--|
| Green | Ideal- Low No Comment required |
| Yellow | Medium to Low No Comment, or 'Issue of Concern' required depending on % of ingredient. |
| Orange | Moderate 'Issue of Concern' or 'Red Light' Comment depending on % of ingredient. Limit 10% |
| Red | Problematic (Red): Target for Phase 'Issue of Concern' or 'Red Light' Comment depending on % of ingredient. Strict Upper Limit of 1% |
| Grey | Uncategorised Not able to be categorised due to lack of toxicity impact information. |
| Black | Banned Ingredients POPs, SVHCs plus a wide range of compounds depending on specific Standard requirements |

Global GreenTag International Pty Ltd (Global GreenTag) is not a medical professional organisation. Global GreenTag does not purport to provide medical advice, and makes no warranty, representation, or guarantee regarding the declaration that it provides in relation to any allergies, chemical sensitivities or any other medical condition, nor does Global GreenTag assume any liability whatsoever arising out of the application or use of any product or piece of equipment that has been chemically assessed by Global GreenTag.

The chemical assessments carried out provide transparent information peer reviewed by a consultant toxicologist regarding the chemical make-up and ingredients of certain materials and products, but such assessments are not to be taken as any form of medical assessment or health advice and are not targeted towards providing specific solutions to allergenic conditions or any other type of medical concerns.

Users must carry out their own investigations if they are concerned about specific medical conditions and the impact of certain products or ingredients in relation to specific medical concerns.

Global GreenTag takes no responsibility and is not liable in any way with respect to any medical or health issues arising from a person's use of materials or products that have been chemically assessed by Global GreenTag. Global GreenTag shall not be liable for any direct, indirect, punitive, incidental, special or consequential damages to property or life whatsoever, arising out of or connected with the use or misuse of any materials or products that have been assessed by Global GreenTag.

| Ingredient Name | CAS Number OR Function | Proportion in finished product | GHS, IARC & Endocrine Category | Ingredient Assessment (Raw) | Whole Of Life Assessment | In Use Health Assessment | Comment |
|-------------------|------------------------|--------------------------------|-------------------------------------|-----------------------------|--------------------------|--------------------------|--|
| Material: Textile | | | | | | | |
| Nylon | 25038-54-04 | 50-60% | IARC 3, Skin Irrit. 2, Eye Irrit. 2 | | | | The hazard of Skin Irrit. 2 and Eye Irrit. 2 relate to the polymer monomer, which is usually converted in the polymerisation process. It is possible that extremely small quantities of unreacted monomer may remain but as a Level 3 Hazard, users are highly unlikely to be exposed to even minor risk. Recycled Content: Pre-consumer Nanomaterials: Yes |
| Declaration | Additive | 0-5% | None | | | | Recycled Content: Unknown Nanomaterials: Unknown |
| Declaration | Finish | 0-5% | None | | | | Recycled Content: Unknown Nanomaterials: Unknown |

| Material: Primary Backing | | | | | | | |
|--|------------|--------|---|--|--|--|---|
| Polypropylene | 9003-07-0 | 0-5% | IARC 3 | | | | Recycled Content: None Nanomaterials: Yes |
| Declaration | Additive | 0-1% | None | | | | Recycled Content: Unknown Nanomaterials: Unknown |
| Material: Secondary Backing | | | | | | | |
| Polypropylene | 9003-07-0 | 0-5% | IARC 3 | | | | Recycled Content: None Nanomaterials: Yes |
| Declaration | Lubricant | 0-1% | None | | | | Recycled Content: Unknown Nanomaterials: Unknown |
| Polyethylene | 9002-88-4 | 0-1% | IARC 3 | | | | Recycled Content: None Nanomaterials: Yes |
| Declaration | Stabiliser | 0-1% | None | | | | Recycled Content: Unknown Nanomaterials: Unknown |
| Declaration | Filler | 0-1% | None | | | | Recycled Content: Unknown Nanomaterials: Unknown |
| Declaration | Pigment | 0-1% | None | | | | Recycled Content: Unknown Nanomaterials: Unknown |
| Material: Precoat | | | | | | | |
| Declaration | Thickener | 0-1% | None | | | | Recycled Content: Unknown Nanomaterials: Unknown |
| Material: Latex | | | | | | | |
| Declaration | Additive | 5-10% | IARC 3 | | | | Recycled Content: Unknown Nanomaterials: Unknown |
| Water | 7732-18-5 | 5-10% | None | | | | Recycled Content: None Nanomaterials: None |
| Calcium Carbonate | 471-34-1 | 20-25% | None | | | | Recycled Content: None Nanomaterials: None |
| Magnesium Carbonate | 546-93-0 | 0-5% | None | | | | Recycled Content: None Nanomaterials: None |
| Declaration | Filler | 0-5% | None | | | | Recycled Content: Unknown Nanomaterials: Unknown |
| Declaration | Dispersion | 0-1% | None | | | | Recycled Content: Unknown Nanomaterials: Unknown |
| Sulfuric acid, mono-C10-16-alkylesters, sodium salts | 68585-47-7 | 0-1% | Acute Tox. 4, Skin Irrit. 2, eye Dam. 1 | | | | Sulfuric acid, mono-C10-16-alkylesters, sodium salts can be harmful when it directly contacts to skin and eyes, and it is harmful when it is swallowed. However, the ingredient is embedded in the product during the manufacturing process. The hazards will not be presented in the final product. Therefore it is not expected to be harmful to the end user. Recycled Content: None Nanomaterials: None |
| Declaration | Solution | 0-1% | None | | | | Recycled Content: Unknown Nanomaterials: Unknown |
| Water | 7732-18-5 | 0-1% | None | | | | Recycled Content: None Nanomaterials: None |

Comments:

VOC emissions: Global GreenTag International Program Standard v4.0 Formaldehyde Content Supplementary Standard in accordance with requirements of the Green Building Council of Australia and LEED v4, as updated from time to time.

VOC content: TVOC mg/m²/hr for product applied on site is <500 µg/m²/hr measured using Test method ASTM D5116 "Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Material/Products". Sample tested in August 2009 at FORAY Laboratories - ISO 17025 Accredited. Test approved by CETEC.

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

The declared SDX Tufted Miraclebac Broadloom Carpet was made by Belgotex in South Africa in 2017. In South Africa it is sold with a 15 year warranty for flooring application in commercial sectors.

Belgotex is a South African manufacturer serving a worldwide soft flooring export market.

They have a strong focus on innovation, quality, and environmental imperatives.

The company is ISO 14001 certified and monitors its energy and water use, waste flows and carbon emissions.

About 10% of their manufacturing energy needs are generated from renewable energy.

Their waste management applies Reduce, Reuse and Recycle hierarchy.

It continuously works to reduce water by recycling and their processes needing less water.

The company is committed to the recruitment and development of employees drawn from the communities surrounding its factories.

It has initiated a Learnership intake focused on African born females.

Belgotex is a certified Level 7 B-BBEEE contributor.

The company aims for good and fair labour practices and a safe working environment, and furthermore they are OHSAS 18001 certified.

Belgotex 100 000 m² manufacturing facility is 6 Green Star certified demonstrating world leadership for green buildings.

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



Figure 1 SDX Tufted Miraclebac 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-003-2019 |
| Date issue | 05 July 2019 |
| Validity | 05 July 2022 |
| Reference PCR | Compliant with PCR FC: 2017 Floor Coverings |
| Time | Made in and sold from 2017 for 20 years use |
| Geography | Made in South Africa. Uses are assumed as for South Africa. |
| Application | Function in Commercial buildings |
| Declared Unit | SDX Tufted Miraclebac Broadloom Carpet/m ² cradle to gate |
| Functional unit | SDX Tufted Miraclebac Broadloom Carpet kg/m ² flooring 20 year use cradle to fate |

2. Product Characterisation

| | |
|-------------------|---|
| Definition | SDX Tufted Miraclebac Broadloom Carpet by Belgotex used for floor covering in commercial 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 2019 according to requirements of ISO14025 8.1.3b.

| Role | Name | Position | Signature |
|------------------------------------|----------------|--|---|
| PCR Review Chair | Murray Jones | Ecquate Pty Ltd CEO |  05-07-2019 |
| LCA & EPD Review | Delwyn Jones | The Evah Institute |  05-07-2019 |
| LCI, LCIA, LCARate & EPD Developer | Mathilde Vlieg | VliegLCA Consultant |  05-07-2019 |
| Internal EPD Audit | David Baggs | Global GreenTag CEO & Program Director |  05-07-2019 |

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 | Production | Origin | % |
|-------------------|-----------------------|--------------------------------------|--------------|--------|
| SDN Yarn | Nylon 6 Resin | Drill, Refine, Polymerise, Dye, Spin | South Africa | >45<60 |
| Filler | Limestone | Mine, Crush, Sieve, Haul | South Africa | >20<30 |
| Binder | SBR Latex | Drill, Farm, Extract, Polymerise | Germany | >10<20 |
| PP Yarn | Polypropylene | Drill, Refine, Polymerise, Dye, Spin | South Africa | >5<10 |
| Thickener | Polyacrylate | Rill, Farm, Extract, Polymerise | South Africa | <0.5 |
| Stabiliser | Sodium Alkyl Sulphate | Mine, Farm, Extract, Polymerise | Germany | <0.5 |
| Pigments | Inks & Paste | Drill, Extract, Mill, Polymerise | South Africa | <0.5 |
| | White Titania | Mine, Digest, Precipitate, Coat | South Africa | <0.5 |
| | Carbon Black | Drill, Extract, Sieve, Mill, Blend | Germany | <0.5 |

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 light concerns in emissions to water ¹ . 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 ² quality credits. No other potential in-use impacts on environment or health are known. |

¹ According with national standards in ANZECC Guideline For Fresh & Marine Water Quality (2000)

² 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 | Result |
|--------------------|------|--------|
| Product Mass | kg | 2.3 |
| Embodied Water | kl | 146 |
| Fuel + Feedstock | MJ | 235 |

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 | Result |
|---------------------------|------------------------|---------|
| Global warming Potential | kg CO _{2e} | 14.0 |
| Ozone Depletion | kg R11 _e | 3.1E-10 |
| Acidification | kg SO _{2e} | 0.32 |
| Ecosystem Quality Damages | PDF*m ² *yr | 6.4E-05 |
| Human Health Damages | DALY | 1.1E-03 |
| Fossil Fuel Depletion | MJ _{surplus} | 14.0 |
| Mineral Resource | MJ _{surplus} | 4.2E-03 |
| EcoIndicator 99 | ecopoint | 0.82 |

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.

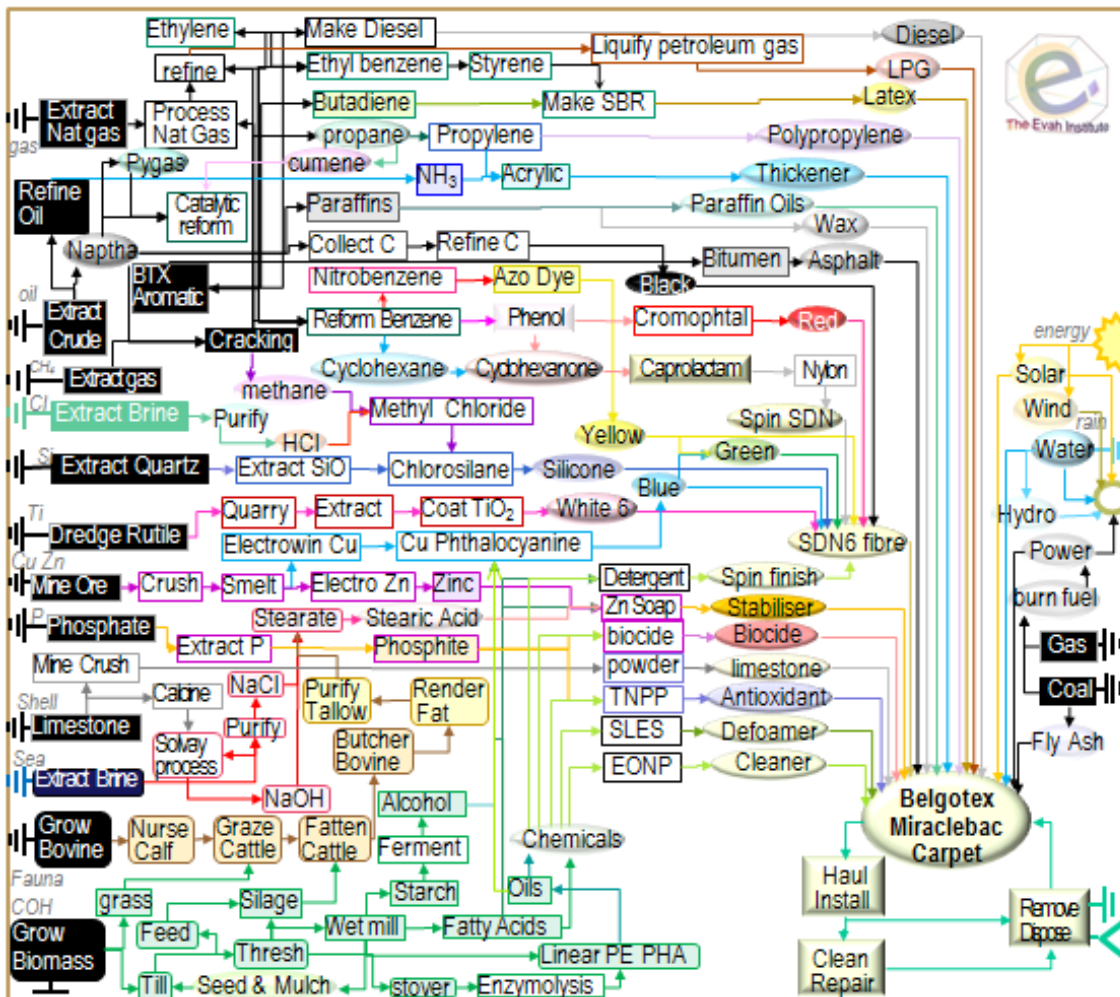


Figure 2 Major Product Operations

10. Life Cycle Assessment Method

LCA Author The Evah Institute as described at www.evah.com.au

Study Period Factory data was collected from 2017 to 2018

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 3 includes all operations A1-A3 production with upstream supply & transport; A4 package & deliver & A5 construct; B1 use with cleaning, B2 maintain, B3 repair³ 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.



| | 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 | Maintain | Repair | Replace | Refurbish | Demolish | Transport | Process | Waste | Disposal | Reuse | Recovery | Recycling | | | |
| | | | | | | B6 Operating Energy use | | | | | | | | | | | | | | | |
| | | | | | | B7 Operating Water use | | | | | | | | | | | | | | | |
| Cradle to Grave | Mandatory | | | Mandatory for each and every phase | | | | | | | | | | | | | | | Optional | | |
| Cradle to Gate+options | Mandatory | | | Optional for each and every phase | | | | | | | | | | | | | | | Optional | | |
| Cradle to Gate | Mandatory | | | Optional for each and every phase | | | | | | | | | | | | | | | Optional | | |

Figure 3 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 information⁴ for each dataset noted, checked and updated;
- Consistency to Evah guidelines⁵ 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.

³ No activities are assumed to occur in B4, B6 or B7 or C4 waste processing.

⁴ Jones D G (2004) LCI Database for Commercial Building Report 2001-006-B-15 Icon.net, Australia

⁵ 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 4⁶.

Table 4 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.

⁶ 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 5.

Table 5 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 | Clients and suppliers 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 2019 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 | VliegLCA, Evah Institute 2018; Global Green Tag Researchers 2018 |
| 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 |
| Persons 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

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- 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
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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 GreenTag^{Cert™} EPD Program
Environmental Product Declaration
Compliant to ISO 14025

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