Environmental Product Declaration

Global GreenTag^{CertTM} EPD Program

Compliant to ISO 14025

AUTEX

Composition® Acoustic Fabric^{TM}

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

The declared Composition Acoustic Fabric was made by Autex Industries in New Zealand in 2016 for sale with a 10 year warranty for applications in commercial and residential sectors.

Autex Industries, known in Australia as Autex, is a manufacturer of thermal and acoustic insulation and of interior acoustic fabrics and panels.

Their products are made of Polyethylene Terephthalate (PET) commonly called Polyester.

The polyester comes from virgin sources plus post-consumer recyclates and post-industrial 'home' scrap.

The Autex vision is to achieve positive economic, social and ecological outcomes for the benefit of stakeholders and the environment.

Autex is ISO 9001 and ISO 14001 certified with continual improvement programmes in place to reduce their environmental impact.

They offer product stewardship for their thermal and acoustic insulation.

The company plans to publish a GRI G4 sustainability report in 2017.

More information is at http://www.autexindustries.com/

Figure 1 Composition Acoustic Fabric

AUTEX

Composition® Acoustic Fabric™

Table of Contents

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

AUTEX

Composition® Acoustic Fabric™

1. Details of This Declaration

Program Operator	GreenTag Global Pty Ltd hereafter called Global GreenTag noted at www.globalgreentag.com
EPD Number	AUT-010-2017
Date issue	26 October 2017
Validity	26 October 2020
Reference PCR	Compliant with PCR IAC: 2017 Interior Acoustics
Time	Made in and sold from 2016 for 20 years use
Geography	Made in New Zealand. Uses are assumed as for Australasia.
Application	Commercial and residential building interiors
Functional unit	The 20 year use of Composition® Acoustic Fabric™ /m^2 cradle to fate

2. Product Characterisation

Definition	Composition® Acoustic Fabric™ made by Autex Industries for commercial and residential buildings
Standard	AS ISO 9705 Fire tests – Full-scale room test for surface products.

3. Green Star® Certified Credits

Products are relevant to the Green Building Council of Australia's (GBCA) Green Star® scheme. If required this EPD is evidence the declared product meets the following Green Star® credits. It may be used as evidence in Green Star® submissions for those credits.

The product is certified by GBCA recognised Global GreenTag GreenRate to meet the following credits of Green Star®:

- Design and As Built V1.2: Sustainable Product, Indoor Pollutants
- Interiors V1.2 Sustainable Products, Indoor Pollutants
- Performance V1.1: Refurbishment Materials

GBCA Disclaimer

Green Star® is a registered mark of the Green Building Council of Australia (GBCA). Assessments shall not be reproduced in part at any time. Rating Tools and Technical Manuals are subject to change by the GBCA. This EPD provides Technical Opinion and as such is not endorsed by the GBCA or its agents. Green Star® Technical Manuals give technical details of credit requirements.

4. Sustainability Assessment Scores

Table 1 lists Global GreenTag Sustainability Assessment Criteria (SAC) scores prior to weighting and then used to determine the GreenTag EcoPOINT[1].

Table 1 Normalised GreenTag EcoPOINT & SAC Scores

Category Potential	Results (-1 to +1)
Building Synergy	1.00
Health & Ecotoxicity	0.10
Biodiversity	-0.39
LCA Score	0.32
Greenhouse Emission	0.04
Social Responsibility	0.50
GreenTag EcoPOINT	0.17

SAC scores are normalised against business as usual (BAU) product performing comparable functions under the same category rules.

Lower scores show better environmental and social benefits with fewer impacts and damages. Considering sustainability:

- worst case BAU results = 1.0,
- neutral = 0.0 and
- net positive benefit = -1.0

5. Type 1 Ecolabel

The declared product Type 1 Ecolabel achieved

Global GreenTag[CertTM]	Gold PLUS GreenRate Level A

6. Verification of this Declaration

This EPD was approved on 26 10 2017 according to requirements of ISO14025 8.1.3b.

Role	Name	Position	Signature
PCR Review Chair	Murray Jones	Ecquate Pty Ltd CEO	
LCI Developer	Delwyn Jones	The Evah Institute CEO	
LCIA, LCARate & EPD developer	Mathilde Vlieg	Global GreenTag Researcher	
Internal LCA Audit	Shloka Ashar	Global GreenTag Lead Auditor LCI Verifier	14/11/2017
Internal EPD Audit	David Baggs	Global GreenTag CEO & Program Director	

[1] http://www.ecospecifier.com.au/knowledge-green/glossary.aspx#greentagecopoint

7. Packaging, Installation, Use & Disposal

Packaging	Plastic wrap & strapping on reused pallets.
Service life	Residential and commercial refits vary but 60 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. No installation scrap assumed.
Cleaning & Maintenance	No cleaning and maintenance required.
Recycling	Home mill, fabrication and installation scrap is reworked into new product.
Re-use	This study assumes product stays in use for lifetime of the building.
Disposal	It assumes 100% is recycled.

8. 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 light concerns in emissions to water[2].
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® Indoor Pollutants credits for indoor environment[3] quality credits. No other potential in-use impacts on environment or health are known.

9. Base Material Origin and Detail

Table 2 lists key components by function, type, key operation, source and % mass share.

Table 2 Base Material

Function	Component	Production	Origin	%
Recycled Fibre	PC rPET	Collect, Clean, Chip, Spin	Pacific Rim	>60<80
Lo Melt Fibre	CHDM[4]	Drill, Refine, Polymerise, Chip, Spin	Pacific Rim	>15<30
Primary Fibre	PET, virgin	Drill, Refine, Polymerise, Chip, Spin	Pacific Rim	>5<15
White Pigment	Titania	Mine, Digest, Precipitate, Coat	China	<1.0
Colours	Organic Dye	Mine, Digest, Precipitate, Coat	China	<1.0
Stabiliser	Lankromark	Farm, Press, Extract, Refine	China	<0.1
Fire Retard	$Al(OH)_2$	Mine, Crush, Extract, Refine, Mill	China	<0.1
Biocide	Biocide [5]	Farm, Drill, Extract, Press, Refine	Australia	<0.1
Lubricant	Silicone PDMS[6]	Mine, Drill, Refine, Polymerise, Pack	China	<0.1

2 According with national standards in ANZECC Guideline For Fresh & Marine Water Quality (2000)
3 in accordance with national standards and practice
[4] Cyclohexanedimethanol
[5] AOX, CIT and VOC free biocide for wet state protection of products. US EPA Registration No. 67071-29
[6] Polydimethylsiloxane (PDMS)

10. Life Cycle Inventory Results

Table 3 lists resource use per functional unit, with transport as defined in Figure 2, across four phases:

- cradle to gate including supply, manufacture and upstream;
- design and construction from delivery to site and installation;
- use and operation including maintenance, repair, replacement refurbishment and
- end-of-life from deconstruction, reuse, demolition, recycling and disposal.

Table 3 Inventory of Flows/ Functional Unit

Total Input use of	Unit	Results
Product mass	kg/item	1.68
Embodied Water	kl	36.9
Recycled Material	kg	1.19
Fuel + Feedstock	MJ	161

11. Life Cycle Impact Results

Table 4 shows Life Cycle Assessment (LCA) Eco-Indicator 99 results for 60 years of product use.

Table 4 Potential Impact Results/ Functional Unit

Evaluation Category	Unit	Results
EcoIndicator 99	ecopoint	0.56
Greenhouses Gas Emissions[7]	kg CO_{2e}	9.6
Ecosystem Quality Damages	PDF*m^2*yr	6.3E-05
Human Health Damages	DALY	7.6E-04
Ozone Depletion	kg $R11_e$	5.1E-10
Acidification	kg SO_{2e}	0.28
Fossil Fuel Depletion	$MJ_{surplus}$	8.9
Mineral Resource Depletion	$MJ_{surplus}$	7.2E-03

12. Life Cycle Benefit Potential

Manufacturers' details confirm that for each declared unit the product has:

- 71% post consumer scrap that saves resources and avoids climate change and landfill waste;

Design for reuse avoids issues and offers OH&S benefits at demolition as:

- Potential end-of-life recycling and reuse avoids wasted resources, climate change and landfill;
- Recycling benefits supply avoiding health and traffic issues in disposal and landfill.

[7] Stocker et al (eds.) Climate Change 2013: The Physical Science Basis, CH8, IPCC AR5, Cambridge U Press, UK.

13. 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.

These include 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.

A flow chart in Figure 2 shows key product supply chain operations from cradle to fate.

While all known operations are included not all are shown.

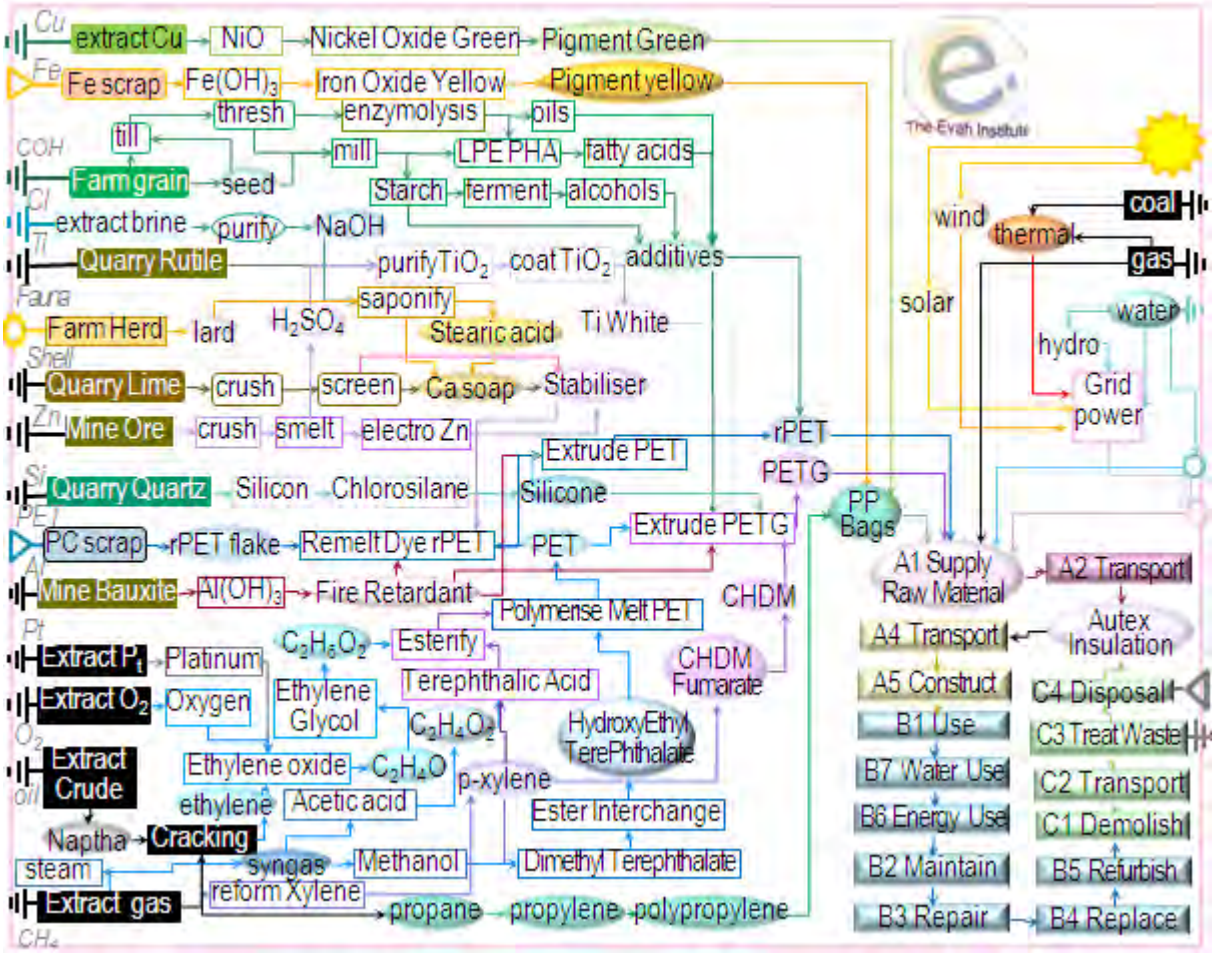

Figure 2 Major Product Operations

14. Life Cycle Assessment Method

LCA Author	The Evah Institute as described at www.evah.com.au
Study Period	Factory data was collected from 2012 to 2014
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	Use is to typical 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 covers all operations in the system boundary depicted in Figure 3.
Processes	All known processes are included from resource acquisition, water, fuel & energy use, power generation & distribution, freight, refining, intermediates, manufacture, scrap re-use, packing and dispatch, installation, use, maintenance and landfill. All significant waste and emission flows from all supply chain operations involved to make, pack and install the product are included.

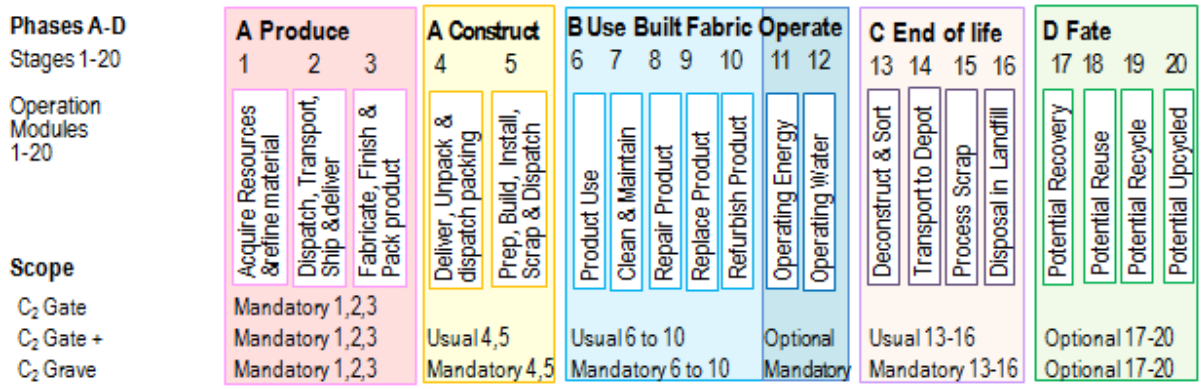

Figure 3 Phases and Stages Cradle to Grave

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. Quality control methods are applied to ensure:

- Coverage of place in time with all information[8] for each dataset noted, checked and updated;
- Consistency to Evah guidelines[9] for all process technology, transport and energy demand;
- Completeness of modelling 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.

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.

[8] Jones D G (2004) LCI Database for Commercial Building Report 2001-006-B-15 Icon.net, Australia
[9] Evah Tools, Databases and Methodology Queensland, Australia at http://www.evah.com.au/tools.html

15. 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 license 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 (σ_g) is used to define quality as in Table 5[10].

Table 5 Data Quality Uncertainty (U) for 2017

Metric σ_g	U ±0.01	U ±0.05	U ±0.10	U ±0.20	U ±0.30
Temporal	Post 2015	Post 2011	Post 2007	Post 2002	Pre 2002
Duration	>3yr	3yr	2yr	1yr	<1yr
Data Source	Process	Line	Plant	Corporate	Sector
Technology	Actual	Comparable	Within Class	Conventional	Within Sector
Reliability on	Site Audit	Expert verify	Region Report	Sector Report	Academic
Precision to	Process	Line	Plant	Company	Industry
Geography	Process	Line	Plant	Nation	Continent
True of the	Process	Mill	Company	Group	Industry
Sites cover of	>50%	>25%	>10%	>5%	<5%
Sample size	>66% trend	>25% trend	>10% batch	>5% batch	Academic
Cut-off mass	0.01%	0.05%	0.1%	0.5%	1%
Consistent to	±0.01	<±0.05	<±0.10	<±0.20	<±0.30
Reproducible	>98%	>95%	>90%	>80%	<70%
Certainty	Very High	High	Typical	Poor	>±0.30

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

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

16. Supply Chain Modelling Assumptions

Australian building sector rules and Evah assumptions applied are defined in Table 6.

Table 6 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 2014 to 2016
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 2014 to 2016
Functional Unit	Typical product usage with cleaning& disposal/m^2 over the set year service life
System Control	Clients and suppliers mills, publications, websites, specifications & manuals
Primary Sources	IEA 2017, GGT 2017, Boustead 2013, Simapro 2016, IBIS 2017, EcoInvent 2016
Other Sources	Power grid and renewable shares updated to latest IEA 2017 reports
Data mix	Company data for process performance, product share, waste and emissions
Operational	Local data is used for power, fuel mix, water supply, logistics share & capacity
Logistics	VliegLCA, Evah Institute 2017; Global Green Tag Researchers 2017
New Data Entry	Manufacturers, Evah Institute 2017; GGT 2017; Meta: IBIS 2017, Other pre 2017
Data Generator	The Evah Institute Pty Ltd to Global GreenTag and designated client only
Data Publisher	All contributors cited in Evah & Global GreenTag records or websites
Persons input	
Data Flow & Mix	Earth's cradle of all resource & emission flows to end of use, fitout or build life
System Boundary	All known from and to air, land, water and community sources & sinks
System flows	Natural stocksΔ, industry stockpilesΔ, capital wear Δ, system losses and use
Capital inclusions	Dry technology adopted, Water use is factored by 0.1 as for e.g. Mining
Arid Practice	Distance >20% than EU; >20% fuel efficient larger vehicles, load & distance
Transportation	Company or industry sector data for manufacturing and minerals involved
Industrial	All raw material extraction is based on Australian or Pacific Rim technology
Mining	Mix is from nearest sources is e.g. UAE, SE Asia, Canada or New Zealand
Imported fuel	Processing inputs with finishing burdens are factored in. If not that is denoted
Finishes	
Validation	Clients and suppliers mills, publications, websites, specifications & manuals
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

17. 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 (2016) 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 (2016) http://www2.ecospecifier.org/services_offered/greentag_certification

GreenTag™ (2016) 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 (2014) 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 (2016) 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 (2016) Life-Cycle Inventory Database https://www.lcacommons.gov/nrel/search, USA

U.S. Geological Survey National Minerals (2016) 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

18. Reviewers Report Conclusions

The independent LCA reviewer's report by Shloka Ashar 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 the given 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. √

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