

# Product Category Rules



## Unreinforced Concrete Mixture

PCR UCM: 2016 v1.0





## **Master Document**

### **Environmental Product Declarations**

#### **Product Category Rules:**

#### **Unreinforced Concrete Mixtures**

**PCR UCM: 2016**

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## 1. Background

This set of product category rules (PCR) is intended for the Evah Institute clients, Global GreenTag<sup>Cert™</sup> and stakeholders developing and or validating an Environmental Product Declaration (EPD) covering all environmental aspects considered across all building products under assessment. The PCR will be valid for all such product according to prevailing AS/NZS performance standards in each product type and exposure. The PCR was developed to comply with requirements and provisions of:

- ISO 21930: 2007 Building construction: Sustainability in building construction, Environmental declaration of building products;
- ISO 14025: 2006 Environmental labelling and declarations Type III environmental declarations, Principles and procedures;
- ISO 14040: 2006 standards, Environmental management, Life Cycle Assessment (LCA);

It is based on building materials:

- Environmental and human health assessment carried out in databases held at The Evah Institute 2008 to 2014 of >4000 products in which manufacturers participated.
- LCA study carried out in Construction Innovation LCADesign development projects 2001 to 2009 in which 28 cross sector building industry Agencies participated.

The EPD shall present key data reported in life cycle phases of acquisition, manufacturing, construction, in-use and disposition plus gross data aggregated across all phases cradle to grave. Where data is lacking it may be based on fewer phases (information modules) as in ISO 21930:2007 clause 5.5. Comparability of EPDs shall be in accordance with ISO 14025, clause 4 and 5.6 needs.

### 1.1. Program Operator

PCR Program Operator: Global GreenTag Pty Ltd, ABN 70155663013, mail to PO Box 311, Cannon Hill QLD 4170, Australia. Tel. + 617 3399 9686, Fax + 617 3399 9294, e-mail: [admin@globalgreentag.com](mailto:admin@globalgreentag.com), web: [www.globalgreentag.com](http://www.globalgreentag.com)

PCR Moderator responsible for the initial master document draft and quality control: Evah Pty Ltd, ABN 54133456407 mail to PO Box123 Thirroul New South Wales Australia 2515. Contact is by email to [delwyn@evah.com.au](mailto:delwyn@evah.com.au). Website is <http://www.evah.com.au>

### 1.2. Program Development Team

These product category rules were prepared by Delwyn Jones, Director Sustainability, The Evah Institute, and Judy Luo, Product Certifier, Global GreenTag, and were reviewed and approved by David Baggs, Program Director, Global GreenTag.

### 1.3. Term of Validity

This document became valid on 03/02/2016 and remains valid until 03/02/2019 (3 years). As new environmental health legislation is enacted the rules shall be revised with file name and revisions clearly marked so that the relevant PCRs are identifiable for those points in time.

## 2. Introduction

Building and construction stakeholders seek information to help them make decisions about addressing environmental impacts. Their decision-making is now supported by initiatives including EPDs and ecolabels. Stakeholders need clear, truthful and unbiased information on typical and best practice. Expressing information with consistent meaning and quality is essential so it is imperative that EPDs and ecolabels be founded on basic life-cycle inventory (LCI) and other key information.

### 2.1. Normative References

Normative references applicable throughout this EPD are listed in Appendix A. International Standards dealing with environmental labelling are:

- General principles: ISO 14020;
- Self-declared environmental claims, type II environmental labelling (ISO 14021), as well as
- Principles and procedures of environmental labels and declarations, types I and III environmental labelling (ISO 14024 and ISO 14025).

The ISO 21930:2007(E) standard covering environmental aspects is one of a suite including ISO:

- 15392 Sustainability in building construction: General principles;
- 21932 Buildings and constructed assets: Sustainability in building construction: Terminology;
- /TS 21929-1 Sustainability in building construction: Sustainability indicators Part 1 Framework;
- 21930 Sustainability in building construction: Environmental declaration of building products &
- /TS 21931-1 Sustainability in building construction: Framework for methods of assessment for environmental performance of construction works: Part 1: Buildings.

### 3. Scope

This document describes principles and framework for product category rules and reference service life over a building's life according to ISO 21930.

It forms a basis for programs leading to type III product environmental product declarations described in ISO 14025.

It also contains specifications and requirements for EPDs that complement ISO 14025 and provides a framework for all basic needs of compliant product category rules (PCR) as defined in ISO 14025 for type III EPDs.

#### 3.1. Goal

The intended application of this PCR is to provide guidelines for developing and delivering EPDs for building products for interior and exterior applications.

Users will be specifiers, manufacturers and other interested parties.

This PCR is valid for all such building products, related material, components, or elements according to standards and technical approvals herein.

#### 3.2. Definitions

Terms and definitions in ISO 21932, 6707-1, 14001, 14025, 14040 and 14050 apply including a:

- a) Complementary ancillary products: that enable the product's purpose e.g. fasteners.
- b) Products, goods or service: used in building or works life cycle, as part, assembly or element.
- c) Characterization factors: used to convert an LCI result into a common impact or damage Unit.
- d) Declared product quantity unit: used as a reference unit e.g. mass (kg), volume (m<sup>3</sup>) where building-level function and reference scenarios for the life cycle cannot be stated.
- e) Functional unit: a reference unit to quantify system performance for an LCA in an EPD.
- f) Gate: point of dispatch before a product is input to another process, distributor, factory or site.
- g) Module of information: is part of a LCI and unit process/es used for a EPD of fewer phases.
- h) Non-renewable resource: that is finite in amount and not replenishable at current rates of use.
- i) Product category rules review process: is where a third party verifies PCRs.
- j) Product category group: is a class of products deemed to perform equivalent functions.
- k) PCRs: are sets of rules and guidelines covering type III EPDs.
- l) Reference service life: a period of product service life for functional and declared units.
- m) Renewable resource: one naturally grown, replenished or cleansed on a human time scale
- n) e.g. trees, grass and fertile soil, lasting indefinitely with proper stewardship but exhaustible.
- o) Secondary fuel: is one derived from primary fuels e.g. petroleum and diesel.
- p) Third party: one recognized as independent of person/body involved with issues in question.
- q) Life cycle assessment (LCA): a compilation and evaluation of inputs, outputs and potential environmental impacts of a product system throughout its life cycle [ISO 14040].
- r) Type III EPD: provides ISO 14040 and 14044 parameter LCA and LCIA results plus other environmental information.



- s) Waste substances: objects that holders intend or must dispose of. Here the primary reference is the 1989 Basel Convention but it is not confined to hazardous waste.
- t) *Système international* (SI) units: energy MegaJoule (MJ) or kiloWatt hour (kWhr); mass in tonne (t), kilogram (kg) or gram (g); surface square metre (m<sup>2</sup>) and volume cubic metre (m<sup>3</sup>).

#### 4. Identifications in Declaration

The EPD shall clearly show the company/organisation's legal name and production site/s.

Corporate governance information on quality, environmental management and stewardship according to ISO14001, EMAS, The Natural Step, GRI, WBCSD, ISO 26000 and other systems shall be declared.

The product's description shall enable users to unambiguously identify it. Characterisation includes product:

- Identification by brand, trade and technical name plus style or colourways;
- Specification of type and or unique production code;
- A true image or technical drawing of the building product;
- Main technical data and properties according to key national standards to be specified;
- Flow diagram of the main production processes according to the declaration's scope.

##### 4.1. Substances for Declaration

The finished product main material components including packaging shall be declared.

Substances officially classified according to national and international regulation as hazardous shall be stated, declared by weight down to 0.1%, CAS Number and Risk Phrases notifying health hazards provided.

According to jurisdiction, chemical declaration requirements such as the EU CLP Regulation shall apply.

##### 4.2. Commercial in Confidence

Confidential product-specific data restricted because of competitive forces, intellectual property rights or similar legal restrictions are not publicly declared.

Where information of content could affect patent or company secrets, a well defined list of their functions, Risk Phrases and weight % is sufficient.

##### 4.3. Product Group Definition

This building product group in this PCR pertains only to unreinforced concrete for interior and exterior applications typically using magnesia, geo-polymer, bio-cements and cement mixes including for:

- Foundations, reservoirs, subway systems, underground vaults, tunnels, secondary containment structures, parking structures, swimming pools, sewage and water treatment plants comprising
- Cement, aggregate, powder, polymers, fibre, formwork, bar chairs, ties, mortar, membranes
- Pozzolans, blends, spraycrete, composites, mixtures etc.

In this PCR such system outcomes and results are defined as in units of 40 MPa product kg/m<sup>3</sup>.

Conformance required is performance to meet International and Australian Standards including:

- ASTM C233/C233M-14 Standard Test Method for Air-Entraining Admixtures for Concrete;
- ASTM C494/C494M-15 Standard Specification for Chemical Admixtures for Concrete;
- ASTM C1622/C1622M-10 Standard Specification for Cold-Weather Admixture System;
- ASTM 1478.2 2005 Chemical admixture for concrete, mortar and grout – Admixture for concrete;
- ASTM C1438-13 Standard Specification for Latex and Powder Polymer Modifiers for use in Hydraulic Cement Concrete and Mortar, and
- ASTM C1315-11 Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.

## 5. General

This building product EPD is for building planning and assessment. It is based on LCI and LCA plus additional environmental information and in addition to ISO 21930:2007(E) specifications and requirements the principles and procedures in ISO 14020, ISO 14025 and ISO 15392 shall apply.

### 5.1. Objectives

The overall goal of EPDs is to encourage demand and supply of lower environmental impact products through communicating true, verifiable and accurate information to stimulate market-driven, continuous improvement. This document aims to ensure transparency in all methods applied to develop a consistent and robust set of PCR's that account for all product environmental impacts.

### 5.2. Stakeholders

The PCR shall include an open, participatory consultation process developed with interested parties including material suppliers, manufacturers, trade associations, purchasers, users, consumers, non-governmental organizations, public agencies plus independent parties and certification bodies. Reasonable efforts to achieve a consensus throughout shall be documented.

### 5.3. Responsibilities

The PCR Program Operator shall ensure consultation in program operation plus credibility and transparency in outcomes. The producer or group of manufacturers that is the data owner takes liability and responsibility for the EPD. Apart from them, no one is authorized to declare the product EPD. The development of type III EPD is voluntary and is based on the type III EPD program.

### 5.4. Communications

The product information is intended for business-to-business communication to provide measurable and verifiable input for buildings environmental performance assessment. However, to communicate business-to-consumer market and users EPDs shall follow ISO 14025:2006 Clause 9 provisions. Users setting up type III EPD programs are both information providers and users.

### 5.5. Phases

By declaring combined material, component and service life-cycle impacts this EPD shall provide information for building environmental performance assessment. Figure 1 shows all phases: production, installation, use and maintenance, replacement, deconstruction and disposition included for cradle to grave LCA per functional unit.

Multi functionality can obscure exact use and disposal and there may be a lack or unknown life cycle phase information. So where justified, impacts may be documented for any life cycle phase e.g. production, cradle to gate, or cradle to site and an EPD is based on information modules of fewer phases. This shall be stated and expressed per declared unit.

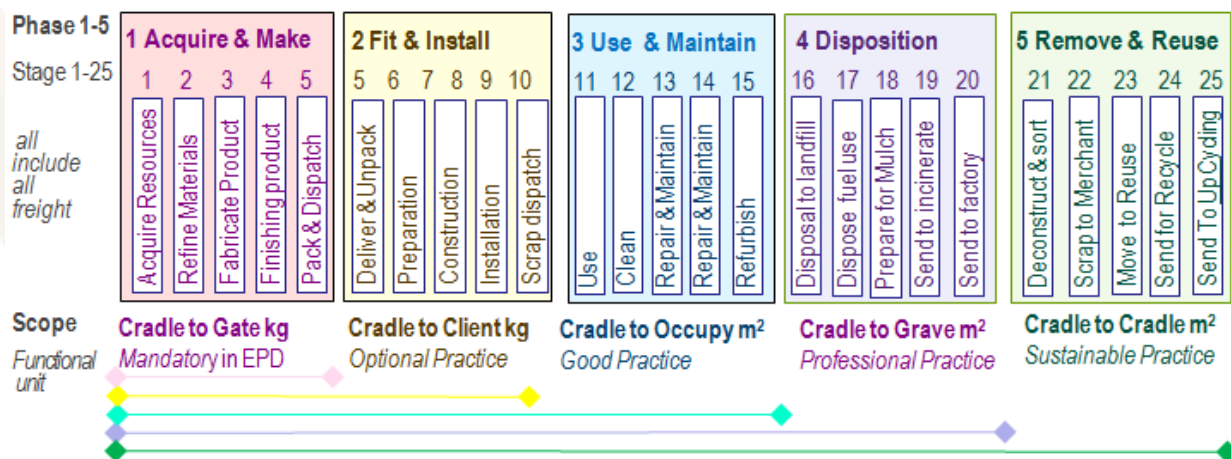


Figure 1 Phases Stages and Functional Units

## 6. Methodology

This PCR building environmental performance assessment framework accords with ISO 14025:2006. It provides guidance, rules and needs governing preparation of EPDs based on LCA, LCI conducted according to ISO 14040 and 14044.

### 6.1. Phases for Inclusion

All significant environmental aspects shall be considered and can form part of the EPD with information of a cradle to grave EPD subdivided into  $\geq 4$  phases including

- Production from raw material supply, transport, manufacture and all inputs from the cradle;
- Design and construction from transport to building site and installation/construction;
- In-use including maintenance, replacement, refurbishment and all transport;
- Disposition including deconstruction, reuse, demolition, recycling disposal and all transport.

### 6.2. Additional Environmental Information

This EPD shall also provide additional information on:

- Issues of biodiversity, human and environmental toxicity and geography at any phase;
- Data significant for building product performance;
- Relevance to Green Building and Operations ratings tools;
- Organizational management systems and where such certification can be viewed;
- Related programs and where such advice and verification can be viewed;
- Activity participation as in recycling or recovery programs and where details can be obtained;
- LCA-derived result not typically communicated in EPD formats;
- Instructions and limits for efficient use;
- Human health plus ecosystem hazards and risk assessment considering:
- Significant absent or present material as described in SO 14021:1999, 5.4 and 5.7r;
- Management of waste preferable options and
- Potential improvements and recovery at disposition i.e. recycled content or recycling rates.

### 6.3. Part Use of Average Data

This PCR permits an EPD partly-based on average data where omissions of significant environmental aspects or phases shall be documented and justified as in ISO 14001 and 14004. Where information is lacking this too shall be declared in the EPD along with the means to deal with such gaps.

### 6.4. Responsibility and Harmonization

The PCR Moderator is responsible for this PCR preparation and implementation of amendments required as a result of stakeholder consultation. The PCR Program Operator is responsible for coordination of consultation with interested parties to enable effective consideration of manufacturers' information on e.g. state-of-the-art, demolition and recycling. This PCR identifies rules for harmonizing LCA goal, scope and data quality with environmental information. It determines phases and parameters for inclusion, collation and reporting.

Rules as in ISO 14025:2006, 6.7.1 shall address:

- a) Guidance for compiling LCA and LCI data plus additional environmental information;
- b) Directions on content and format of the type III environmental declaration;
- c) Product category definition and descriptions for function, technical performance and use;
- d) LCA phases covered or identified when missing where an EPD is not cradle to grave;
- e) Period of validity, which is 3 years, PCR start date, file and revision name.
- f) LCA goal and scope definition in accordance with ISO 14040 and ISO 14044, including:
  - Use of SI units along with functional and declared units plus the system boundary;
  - Description of input and output data quality, source, date, inclusion and exclusion criteria and
  - Uncertainty in cover, representation, age, completion, precision, consistency and reproducibility.



- g) Inventory analysis according to ISO 14044, including methods for:
  - Data collation and calculation processes;
  - Allocation of material and energy flows as well as releases and
  - Actual and forecast rates for post consumer recycling as well as recycled content.
- h) Impact category selection and citing applicable calculation rules;
- i) Predetermined parameters for reporting LCA results as LCI data and LCIA indicators;
- j) Declaration of specific substances affecting human or environment health at each phase, and
- k) Need to provide added hazard and risk information/methods according to ISO 14025:2006, 7.2.3.
- l) Inclusion in the LCA of all applicable significant packaging and fate scenario declarations.

#### 6.5. Categorisation of Product

At the highest level, all building products belong to the same category but subcategories are defined for classes of product with comparable function or specification where the same functional or declared unit applies. During consultation, The PCR Program Operator shall ensure that product categories are transparently defined and any definition of category should be valid over a reasonable period.

#### 6.6. Units of Equivalent Function

The functional or declared unit of a product provides the quantitative normalisation, for comparing products of equivalent function (functional unit) or equivalent specification (declared unit).

#### 6.7. Functional Units

For EPDs covering the complete life cycle, the functional unit is defined by durability of building element performance at reference conditions of strength, wear, temperature and humidity and defined by 14025:2006, 6.7. This unit provides the reference for summing input and output flows and impacts in LCA for each phase and stage defined by ISO 14044:2006, 4.2.3.2 and normalises performance in an EPD. It relates relevant product reference service life and technical performance when integrating overall building performance. When shorter than building design life or part thereof, replacement cycles for overall performance and function are governed as in ISO 15686-1. Cradle to grave functional unit is for example 60 year commercial service standard strength 40 MPa product kg/m<sup>3</sup>.

#### 6.8. Declared Units

For declarations over incomplete life cycles, a declared unit shall be used based on a *declared* value for durability of building element performance from measured conditions of strength, wear, temperature and humidity. It provides the reference for combining flows and mathematically normalising energy and material attributed to the building product and impacts considering phases of a product's incomplete life cycle.

The declared unit shall relate to typical product functions and categories as defined and explained in ISO 14025:2006, 6.7. An incomplete cycle declared unit is, for example, 60 year commercial service standard strength 40 MPa product mass kg/m<sup>3</sup> no cleaning. A minimum to be provided together with declared unit is:

- Intended application and life-cycle phases covered;
- Reference service life for in-use and maintenance;
- To declare and justify where omitted phase performance relates to total performance, and
- A statement that information using a declared unit shall not be used for comparison.

#### 6.9. Phases in System Boundaries

Systems shall be modeled to describe all inputs and outputs at its boundaries. System boundaries and all transport modes, capacity, distances and back/loads according to phase or stage shall be documented in EPD project reports. EPDs shall state if based on a full life cycle or which phases are excluded and which transports are included. Production and construction shall be declared separately from in-use and disposition phase results. Construction and disposition phases based on typical scenarios shall be described in detail.

Product installation impacts from energy and materials used shall be identified and included in the EPD project report. If data is unavailable, this fact shall be stated. Maintenance, replacement and refurbishment activities with impacts in use, operation or maintenance shall be identified. Reuse and recycling shall be treated in

accordance with provisions of ISO 14044:2006, 4.3.4.3. Technical information on energy and water savings etc in-use is taken into account as in ISO/TS 21931-1 when assessing building environmental performance.

The PCR system boundaries encompass the following phase operations as depicted in Figure 2.

### 6.9.1. Production

- Raw material acquisition, processing and transport to manufacturer;
- Recycled and reused material acquisition and processing and transport to manufacturer, and
- Manufacture, fabrication, finishing, packaging and loading ready for dispatch.

### 6.9.2. Construction

- Transport of product from manufacturer to distributor and then to building site;
- Unloading, unpacking and disposition of packaging to a fate scenario, and
- Installation on the building site and testing of successful commissioning.

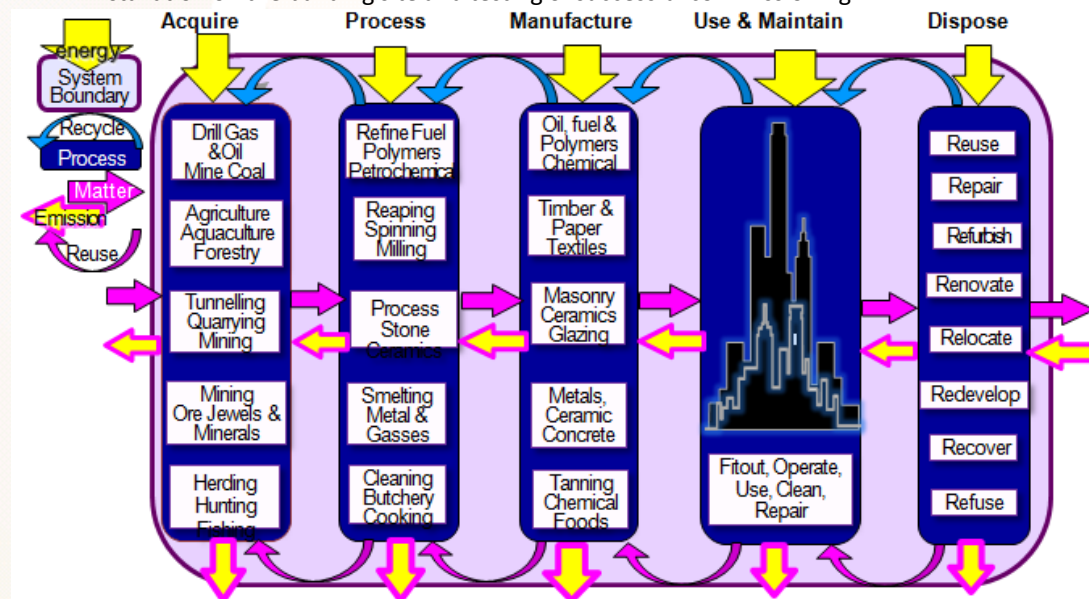


Figure 2 City Operation System Boundaries and Cradle to Grave Phases

### 6.9.3. In-use or Operations

Product comparison shall be carried out only at building level with in-use phase scenario relating:

- Reference service life of the building defined as 60 years;
- Product replacement number declared accordingly;
- Service life for other relevant applications defined;
- Maintenance for normal service life per manufacturers guidelines, including cleaning;
- Performance considering ISO 23045 for Assessing Energy Efficiency of New Buildings;
- Product exposure considering ISO International Classification of Standards ICS 91.140.30: Ventilation and air-conditioning systems;
- Emission of dust, Volatile Organic Compounds, Formaldehyde, toxic or notifiable compounds, as relevant;
- Release to ground or water declared in accordance with national standards and practice, and
- Comparability in accordance with requirements of ISO 14025:2006, Clause 4 and 5.6.

### 6.10. Disposition

The disposition phase is treated as a scenario considering dismantling, demolition; transport from building site to recycling, reuse and landfill. If transport is included in phases other than indicated, or if no transport information exists and assumptions are made, this shall be noted.

### 6.11. Metadata (Data on Data)

Data quality should be characterized by both quantitative and qualitative aspects, as well as by collection and integration methods. Transparency in verification requires that all data sources shall be documented in the project report. This shall document how data quality was formulated and relate its accuracy, precision and representativeness considering reliability of source, completeness across sites, duration in years, temporal age, geography reflected technology modeled and sample size.

Data quality requirements shall be treated according to the provisions of ISO 14025 and ISO 14044:2006, 4.2.3.6. For an EPD based on average data its representativeness shall be justified. For environmental aspects of a product EPD any uses of generic data shall be justified.

### 6.12. Data collection

Data shall be flow-based and representative of temporal, geographical and technological needs with:

- Inputs and outputs of energy in MegaJoules and mass in tonne, kilogram, gram or milligram.
- Manufacturing annual values updated from previous years and background data ≤10year old;
- Geography of production sites in the calculation with representativeness of data documented;
- Data to represent technology in use and if unknown surrogates used must be documented;
- All data cited as to database and year of publication, and
- Transport mode, distance and load and thermal energy production documented.

### 6.13. Data Descriptions

Use of specific or average flow-based data shall be documented and applied to background:

- Raw material acquisition and production denoted as specific or average and if so which;
- Product manufacture denoted as specific or average and if so what that relates to;
- Electricity mix based on National sources or averaged values if lacking site data.
- Hazardous waste in EU may be shown according to EU Directive 91/689/EEC & 75/442/EEC.

Table 1 lists sources that shall be used for generic data in jurisdictional markets.

**Table 1 Example Databases**

Local & Global Scope	Databases and LCI Dataset Reports Relied	Published
Regional Fuel Mix Power	Clean Energy Council <a href="http://www.cleanenergycouncil.org.au">www.cleanenergycouncil.org.au</a>	2012-2014
Power Supply Fuel Mix	International Energy Agency 2012 <a href="http://www.iea.org/">www.iea.org/</a>	2010-2014
EU Fuel & Petrochemicals	Plastic Manufacturers Europe <a href="http://www.plasticseurope.org/">www.plasticseurope.org/</a>	1999-2014
Supply Chain Geography	Google Maps, Local & Boustead Look Up Tables	2000-2014
Minerals Company sites	Corporate & Mineral Resources <a href="http://www.minerals.usgs.gov">www.minerals.usgs.gov</a>	2012-2014
Regional Databases	The Evah Institute <a href="http://www.evah.com.au/tools.html">http://www.evah.com.au/tools.html</a>	2008-2014
Global Market Share	Industry & Company Research <a href="http://www.ibisworld.com/">www.ibisworld.com/</a>	2012-2014
Commodities & Trade	Corporate & Trade Resources <a href="http://www.minerals.usgs.gov">www.minerals.usgs.gov</a>	2012-2014
Industry Sectors	Boustead 6 <a href="http://www.boustead-consulting.co.uk/">www.boustead-consulting.co.uk/</a>	2000-2013
Global Agriculture	Key Evah Institute Projects <a href="http://www.evah.com.au">http://www.evah.com.au</a>	2012-2014
Global Aluminium	European Aluminium Association <a href="http://www.eaa.org/">http://www.eaa.org/</a>	2005-2014
Global Biochemicals	Key Evah Institute Projects <a href="http://www.evah.com.au">http://www.evah.com.au</a>	2010-2014
Global Copper	ICA <a href="http://www.copperinfo.com/environment/index.html">www.copperinfo.com/environment/index.html</a>	2005-2014
Global Fertilisers	Key Evah Institute Projects <a href="http://www.evah.com.au">http://www.evah.com.au</a>	1995-2014
Global Pigment & Dye	Key Evah Institute Projects <a href="http://www.evah.com.au">http://www.evah.com.au</a>	1995-2014
Global Steel	International Iron & Steel Institute <a href="http://worldsteel.org">http://worldsteel.org</a>	2005-2014
American Forest Product	Consortium Renewable Industrial Material <a href="http://www.corrim.org/">www.corrim.org/</a>	1999-2014
US Polymers	Franklin Associates LCI Reports <a href="http://www.fal.com">www.fal.com</a>	1999-2014
US Fuel & Petrochemical	Franklin Associates LCI Reports <a href="http://www.fal.com">www.fal.com</a>	1999-2014
EU Polymers	PlasticsEurope <a href="http://www.plasticseurope.org/">http://www.plasticseurope.org/</a>	1999-2014
USA PC Recycled Feed	Franklin Associates LCI Reports <a href="http://www.fal.com">www.fal.com</a>	2012 -2014
Australian Market Share	Industry & Company Research <a href="http://www.ibisworld.com/">www.ibisworld.com/</a>	2012 -2014
Australian Sectors	Evah Institute Clients <a href="http://www.evah.com.au/clients.html">www.evah.com.au/clients.html</a>	2000-2014



Local & Global Scope	Databases and LCI Dataset Reports Relied	Published
Australian Wood Product	Australian Forest & Wood Product <a href="http://www.fwpa.com.au">www.fwpa.com.au</a>	2005-2014
Australian Forests & Mills	Major Evah Institute Projects <a href="http://www.evah.com.au">http://www.evah.com.au</a>	2005-2014
Australian Steel supply	Key Evah Institute Projects <a href="http://www.evah.com.au">http://www.evah.com.au</a>	1995-2014
Australian Copper supply	All Suppliers Evah Institute <a href="http://www.evah.com.au">http://www.evah.com.au</a>	1995-2014
Australian Aluminium	Key Evah Institute Projects <a href="http://www.evah.com.au">www.evah.com.au</a> or equal	2000-2014
Australian SPVC supply	All Suppliers Evah Institute <a href="http://www.evah.com.au">www.evah.com.au</a> or equal	2010-2014
Ecolabel Building Supply	GlobalGreenTag™ <a href="http://www.globalgreentag.com">www.globalgreentag.com</a> or equal	2010-2014
Generic Building Supply	The Evah Institute <a href="http://www.evah.com.au/tools.html">www.evah.com.au/tools.html</a>	2010-2014
Ecolabel Personal Care	GlobalGreenTag™ <a href="http://www.globalgreentag.com">www.globalgreentag.com</a> or equal	2012-2014
Generic Australian Supply	AusLCI <a href="http://alcas.asn.au/AusLCI/">http://alcas.asn.au/AusLCI/</a> or equal	2011-2014
Generic Personal Care	The Evah Institute <a href="http://www.evah.com.au/tools.html">www.evah.com.au/tools.html</a>	2012-2014
Generic Background Swiss	EcoInvent 2.2 and 3 <a href="http://www.ecoinvent.org/">http://www.ecoinvent.org/</a>	1985-2013

#### 6.14. Calculations

The material used as input of products/functional unit shall include amount of related accessories and auxiliary materials.

##### 6.14.1. Inclusion

All hazardous and toxic substances shall be included in LCI with no cut-off. Surrogates shall be used to fill data gaps  $\leq 5\%$  mass or energy or impact share and justified in sensitivity analysis.

##### 6.14.2. Exclusions

Operations that altogether do not contribute  $\geq 1\%$  of gross mass, energy or impact may be omitted. Such cut-off rules shall be stated, defined for minimum influence on result obtained for material flows by mass, energy or relevancy and justified by sensitivity analysis. All such rules for inputs and outputs expressed by mass, energy or other values shall be based on relevance defined in ISO 14044.

##### 6.14.3. Allocations

Data calculation in LCI employing allocation across multiple product systems shall comply with ISO 14044. Flows and emissions shall be partitioned amongst co-products and phases according to embodied mass, energy or stoichiometry and procedures clearly stated. As a last resort economic allocation may be applied provided the monetisation shall be proven to be  $\leq \pm 10\%$  pro rata in 3 years prior and procedures clearly stated for verification. Allocation associated with transport shall be based on volume/mass and where product volume restricts cargo load factor this in transport.

#### 6.15. Characterisation factors

Factors used to calculate environmental impacts shall be from Table 1 or surrogate documented in the project report as well as the EPD for verification, third party audit and stakeholder information.



## 7. Reporting

EPD documentation involves manufacturers providing data to practitioners for LCA and EPD development, auditing and verification. Together an LCA summary and addendums become the report to meet needs of EPD Contents as in Section 8 and conform to ISO 14044:2006, Clause 6 3<sup>rd</sup> party report requirements and show LCA results such as listed in Table 2 for verification.

**Table 2 Characterisation Factors**

Impact category	Unit	Source
Climate change (GWP)	kg/kg CO <sub>2</sub> 100year e <sup>1</sup>	Latest or recent version of IPCC as denoted
Formation tropospheric ozone (photochemical oxidants)	kg/kg NMVOC	
Depletion Stratospheric atmospheric ozone (ODP)	kg/kg CFC11 <sub>e</sub>	
Depletion of Resources: water, fossil fuel, metals	m <sup>3</sup> /m <sup>3</sup> , kg/kg, MJ/kg	EcoIndicator 99 or RECIPE
Acidification emissions to freshwater, marine or land	kg/kg (P, N, SO <sub>2</sub> ) <sub>e</sub>	
Eutrophication flows to terrestrial, marine & freshwater <sup>2</sup>	kg/kg PO <sub>4</sub> <sub>e</sub>	or AUSLCI version of comparable national ecopoints
Photochemical Ozone Creation (POCP)	kg C <sub>2</sub> H <sub>4</sub> <sub>e</sub>	
Ecotoxicity Damage: land, marine & freshwater Ecosystem	kg/kg 1,4-DB <sub>e</sub>	
Ecotoxicity Human Health Damages	kg/kg 1,4-DB <sub>e</sub>	
Loss of Species, Biodiversity, Ecosystem or Habitat	kg/kg 1,4-DB <sub>e</sub>	
land transformation of site, urban, agricultural and natural	m <sup>2</sup> a/m <sup>2</sup> a	

### 7.1. Project Documentation

Under Confidentiality Deeds project reports shall be made available to the certifier and verifier to ensure it meets ISO 14025:2006, 7.2.2, 7.2.3 and 7.2.4 provisions. LCA data shall be included on:

- Unit process, input and output data used in LCI calculations;
- Key measurements, calculations, estimates, correspondence and references used in the LCA;
- References to literature and databases from which data was extracted;
- Data used to carry out the sensitivity analyses to satisfy ISO 14044:2006, 4.5.3.3;
- Substantiation of percentages or figures used for calculating end of life scenario;
- Information on calculation of averages across different locations to obtain generic data;
- Criteria to determine system boundaries and substantiation of information module consistency;
- Documentation that substantiates the chosen building product life-cycle phases;
- Substantiation of 3 year history of stable market pricing underlying all economic allocation used:

It shall also include additional environmental information on all:

- Specifications or data sheets used to create the manufacturer's building product;
- Data showing information is complete with reference to standards or quality regulations;
- Documentation that the building product can fulfill the intended use;
- Documentation that chosen processes and scenarios satisfy ISO 21930:2007;
- Substantiation of additional environmental information to satisfy ISO 14025:2006, 7.2.4;
- Standard Operating Procedures for data collection, questionnaires, instructions, Deeds etc, and
- Documentation used to substantiate any other key assumptions and choices.

### 7.2. Confidentiality

Most product-specific data is confidential considering protection of competitive advantage and intellectual property rights and binding or legal restrictions. The EPD is not required to publicly release confidential data. The EPD can present only data aggregated over life cycle phases to obscure underlying sensitive information. Commercial data provided for The Evah Institute assessment and independent verification process shall be kept commercial-in-confidence through Deeds of Confidentiality in accordance with these rules and as per ISO 14025:2006, 8.3.

<sup>1</sup> Where e stands for equivalent

<sup>2</sup> The Impact Categories highlighted in bold are those required for GBCA Innovation Challenge Whole Building Life-Cycle Analysis Credit.

## 8. EPD Contents

All EPDs issued under this Program shall follow the format required by this PCR and include all identified parameters. The manufacturer is responsible for providing all key product information.

### 8.1. Declaration of General Information

The following shall be declared:

- a) Manufacture name, address and website;
- b) Description of product use, installation and functional or declared unit to which LCA relates
- c) Product identification by name, production code, image or technical drawing
- d) EPD Program operator name
- e) PCR identification and logo
- f) EPD issue date and period of validity, e.g. 03/02/2016 to 03/02/2019
- g) A general product composition shall be given without compromising confidentiality;
- h) Data from LCA, LCI or information modules derived from the Project Report;
- i) Documentation as per section 8.5 Declaration of Additional Environmental Information;
- j) All content declared shall be given without compromising confidentiality or property rights;
- k) Information on which phases are not considered, if the EPD is does not cover all LCA phases;
- l) Statement that environmental declarations from different programs may not be comparable;
- m) Where an average is declared the EPD shall state this represents the average and  $\pm$  deviations;
- n) Site, manufacturer, group or representatives for which the LCA results are representative, and
- o) Information on where explanatory material can be obtained at [http://www.ecospecifier.com/.....](http://www.ecospecifier.com/)

### 8.2. Verification Demonstration

The EPD shall contain a completed demonstration of verification as in Table 3. The PCR review was conducted and according to ISO 21930.

**Table 3 Demonstration of Verification**

Verification	Name	Affiliation	email address
Internally	Murray Jones	The Evah Institute	murrayjones@internode.on.net
Externally	Shloka Ashar	Global Greentag P/L	certification1@globalgreentag.com
Third party	David Baggs	Global Greentag P/L	david.baggs@globalgreentag.com

### 8.3. Declaration of Aspects

This section describes mandatory and optional inclusions in the EPD.

- a. To illustrate the product system studied it shall contain a:
  - Diagram of system boundaries including phases in the LCA subdivided into production, construction, use/operation and maintenance plus disposition and parts thereof;
  - Description of the nature of processes and ancillary/complementary items required for building product installation and replacements and maintenance according to PCR criteria.
- b. Replacement, maintenance, necessary process and ancillary products shall be included or exclusions defined to show they conform to section 6.13 Calculation Rules.
- c. The comparison shall include whole building performance in accordance with ISO/TS 21931-1 and other normative references so this EPD may not be used to compare building products.

### 8.4. Declaration of Parameters

The following use of resources for all phases should be differentiated in results, tables and charts:

#### 8.4.1. Use of resources including use of:

- Finite and renewable primary resources differentiated into:
  - Consumption of non-renewable fuels, feedstocks and material resources;
  - Use of renewable material and primary energy sources;
  - Consumption of freshwater, ground, marine and surface waters.
- Finite primary fuels differentiated into:
  - Fossil oil; Natural gas; Coal and Uranium and other key fuel and feedstock.

- Renewable primary energy differentiated into:
- Hydro, Wind, Solar power, biomass and other key energy usage;
- Finite and renewable secondary resources differentiated into secondary fuels and recycled materials compliant with ISO 14021:1999, 7.8.1.1.

#### 8.4.2. Emissions to air, land and water:

In accordance with national standards and practice the EPD shall declare all of the most significant:

- Releases to land, ground and surface water, as well as
- Emissions to air outdoors and indoors.

#### 8.4.3. Indoor Environmental Quality:

For evaluation on human health and comfort in the building this EPD is required to declare significant information on human health and comfort due to chemical, biological and physical emissions.

#### 8.4.4. Waste Disposition:

In the EPD, waste generated during the product life cycle shall be classified as hazardous or non-hazardous waste, expressed in percentages or as mass per functional or declared unit.

#### 8.4.5. Results and Environmental Impacts of:

Data expressed as results, impacts and potential damages differentiated into:

- Greenhouse gas emissions including:
- Gross global warming potential in kg CO<sub>2e</sub>, and
- Climate Change Damages.
- Emission of ozone-depleting gases including:
- Formation of tropospheric ozone (photochemical oxidants);
- Depletion of the stratospheric ozone layer, and
- Gross Ozone Depleting Potential in kg CFC<sub>11e</sub>;
- Potential biodiversity and or ecosystem impacts including:
- Environmental and Human health related toxicity, and
- Acidification and eutrophication of water sources and or Acidification of land, and
- Depletion of resources, fuel, land and range of habitat.

#### 8.4.6. Declaration of Additional Environmental Information

The EPD shall include other information where relevant on environmental:

- Geographical aspects relating to any phase e.g. potential versus actual site impact;
- Data significant for building product performance;
- Management systems and where organizational certification can be viewed;
- Programs that are applicable and where certification can be viewed;
- Activity participation as in recycling or recovery programs and where details can be obtained;
- Results derived from the LCA but not typically communicated in such formats;
- Instructions and limits for efficient use;
- And human health hazards and risk assessment;
- Significant material absent/present in certain areas per ISO 14021:1999, 5.4 and 5.7r;
- Management of preferable disposition options to avoid waste;
- Impact potential for incidents including in the:
- Disposition in deconstruction, reuse, demolition, recycling and disposal;
- Energy, water, acoustic and other improvements;
- feedstock energy content energy recovery in re-use or recycling, and
- Recycled content or recycling rates as described in ISO 14021:1999, 7.8.1.1.

## 9. Verification

The review and verification procedure requires that ISO 14025:2006 Clause 8 provisions shall apply:

- PCR review per clause
- 8.1 Declaration of General Information and
- 8.4 Declaration of Parameters.
- 8.5 Additional Environmental Information
- Independent verification per section 8.2 Verification Demonstration.

The independent verifier shall generate a verification report stipulating the conclusion of the verification process, while adhering to the obligations of ISO 14025:2006, 8.3, covering rules for data confidentiality.

This report shall be available to any person upon request. The competence of the:

- 3<sup>rd</sup> party PCR review panel shall be according to provisions in ISO 14025:2006, 8.2.3 and
- Independent EPD verifier shall be according to provisions given in ISO 14025:2006, 8.2.2.

## 10. Appendix A Normative References

ISO 6707-1:2004 Building and civil engineering: Vocabulary Part 1: General terms

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

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

ISO 14020:2000 Environmental labels and declarations (EL&D): General principles

ISO 14021:1999 EL&D: Self-declared environmental claims, Type II environmental labelling

ISO 14024:1999 EL&D: Type I environmental labelling Principles and procedures

ISO 14025:2006 EL&D: Type III environmental declarations Principles and procedures

ISO 14040:2006 Environmental management (EM) LCA: Principles and framework

ISO 14044:2006 EM LCA: Requirements and guidelines

ISO 14050:2009 Environmental management: Vocabulary

ISO 15392:2008 Sustainability in building construction: General principles

ISO 15686-1:2000 Buildings & constructed assets: Service life planning Part 1 General principles

ISO 15686-8:2008 Buildings & constructed assets: Service life planning Part 8: Reference service life & service-life estimation

ISO 21930:2007 Sustainability in building construction -- Environmental declaration of building products, this standard is one of a suite including:

- ISO 15392:2008 Sustainability in building construction: General principles
- ISO/DTR 21932 (Under Development) Buildings and constructed assets

Sustainability in building construction: Terminology and:

- ISO/TS 21929-1:2006 Sustainability in building construction: Sustainability indicators Part 1: Framework for development of indicators for buildings
- ISO 21931-1:2010 Sustainability in building construction
- Framework for methods of assessment for environmental performance of construction works Part 1: Buildings





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