

# ENVIRONMENTAL PRODUCT DECLARATION

## IN ACCORDANCE WITH ISO 14025 AND EN 15804



### CEMENT BACKERBOARD



**Declaration number: S-P-01433**

Issued on 12 April 2019;  
valid until 13 December 2023

The environmental impacts of this product  
have been assessed from cradle to construction site.

This Environmental Product Declaration has  
been verified by an independent third party.



The International EPD® System

# INTRODUCTION

This EPD provides environmental performance indicators for HardieBacker® fibre cement tile backerboard manufactured by James Hardie Building Products Ltd. This is a cradle-to-gate with options EPD in accordance with the requirements of EN 15804, covering modules A1 - A3 and A4 defined in that standard.

The EPD is based on a life cycle assessment (LCA) study which used production data for 2015 - 2016 from James Hardie's manufacturing facilities in Peru IN, USA. Background data were taken from the ecoinvent database (v3.4).

The EPD presents details of the LCA, a description of the product life cycle it covers, values for the environmental indicators specified by EN 15804 and a brief explanation of those results.

The declared unit is 1 square metre (1m<sup>2</sup>) of HardieBacker® fibre cement tile backerboard.

Cement backerboard EPD	
EPD programme	The International EPD® System
EPD programme operator	EPD International AB - Stockholm - Sweden www.environdec.com
EPD owner	James Hardie Building Products Ltd www.jameshardie.co.uk
Product name	HardieBacker® tile backerboard
CPC code	37570
Declared unit	1 square metre (1m <sup>2</sup> )
System boundaries	Cradle to building site
Declaration No	S-P-01433
Date of publication	12 April 2019
EPD valid until	13 December 2023
EPD geographical scope	Europe
EPD based on Product Category Rules	The CEN standard EN 15804 serves as the core PCR
	The International EPD® System's PCR 2012:01 Construction products and Construction services, Version 2.3, 2018-11-15
PCR review conducted by	The Technical Committee of the International EPD® System Chair: Filippo Sessa; contact via info@environdec.com
Verification	Independent verification of this EPD and data, according to ISO 14025/2006: <input type="checkbox"/> internal certification <input checked="" type="checkbox"/> external verification
Third party verifier	Ugo Pretato - Recognized Individual Verifier
Accredited or approved by:	The International EPD® System
LCA conducted by:	EuGeos Limited, UK - +44 (0)1625 434423 www.eugeos.co.uk

EPDs within the same product category but from different programmes may not be comparable.  
EPDs of construction products may not be comparable if they do not comply with EN 15804.

## COMPANY PROFILE

### A SMARTER WAY

James Hardie is a world-leading manufacturer of fibre cement building materials.

Founded in 1888 with an enduring set of values, we have grown to generate a turnover in excess of €1.5bn. Today our name is synonymous with unsurpassed quality, durability and design excellence across the globe.

Inspired by new technology and driven by our passion for design, we are constantly growing our extensive range of products. Our innovative solutions are chosen by many architects and builders to bring their unique visions to life.

James Hardie designs with sustainability in mind and we are committed to sustainable development across all of our activities.

To this end, we aim to implement practices that promote economic security, social betterment and environmental stewardship and strive for continuous improvement of performance in these areas.

We focus on developing innovative products with extended lifespans that require little maintenance and can be used in energy efficient building. We also seek continuous improvement in resource efficiency by working smarter to manage waste, reduce energy consumption in our manufacturing processes and promote environmental practices throughout our supply chain.

The facilities that manufacture the products covered by this EPD operate within a management system that is registered as meeting the requirements of ISO 14001:2015.

## CONTACT

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## PRODUCT INFORMATION

### FIBRE CEMENT BACKERBOARD

This EPD applies to HardieBacker® fibre cement tile backerboard (pictured below). HardieBacker® tile backerboard is a water resistant, strong fibre cement backerboard for tile and stone installations. It provides a dimensionally stable, durable cement bonding surface that is resistant to warping, swelling and rot. It can hold a tiling weight up to 200kg/m<sup>2</sup>, and incorporates patented technology to provide high moisture and mould resistance. HardieBacker® is supplied as panels (boards) of standard dimensions, either 6mm or 12mm thick.



FIGURE 1: HARDIEBACKER® TILE BACKERBOARD

James Hardie fibre cement boards are classified CPC 37570 under the UN CPC classification system v2.1.

### MANUFACTURING

Fibre cement is a mixture of cellulose fibre, Portland cement, sand and water. Small amounts of chemical additives aid production and help the product achieve certain characteristics. In the manufacturing process, the raw materials are blended into a slurry from which raw fibre-cement boards are formed. The raw boards dry and are then cured under pressure to achieve the required strength. A waterproof coating is applied to HardieBacker.

### PACKAGING

Fibre cement boards are packed on wooden pallets for despatch, protected by polyethylene film. This packaging can be reused or recycled from the construction site.

### TRANSPORTATION

Delivery to site involves firstly shipment from the James Hardie factory to the company's Eastleigh depot, by road and sea through the ports of Norfolk VA and Southampton UK. After interim storage at Eastleigh, product is transported to construction sites around Europe by sea and road. These activities are included in Module A4.

### PRODUCT USE AND MAINTENANCE

Common applications for HardieBacker® tile backerboard are fixing onto block work walls, framed walls or floor timber substrates. Installation requires no pre-drilling of the panels, which can be easily cut to size on site. The background or sub-floor must be structurally sound, clean and dry. For masonry walls, the board should be press bonded into position with a high strength gap-filling adhesive first; for floors, the board should be embedded in a non-flexible tile adhesive first. The board can be mechanically fixed to the underlying surface with stainless steel screws. Joints should be sealed with alkaline resistant tape. No further priming or treatment is required before tiling on the boards.

### END-OF-LIFE

At the end of its life HardieBacker® can be removed from the building and will normally be disposed of in landfill. Sheets must not be reused in structural applications. Fibre cement products could be re-used as acoustic panelling, decorative finishes, packing material. It is possible for the product to be recycled into cement or road base. These are not warranted applications; the designer must assess the integrity and condition of the sheets that will be reused, and confirm they are suitable for the reuse application. If reuse is not viable, HardieBacker® should be disposed of in landfill. As wastes removed from a building, fibre cement boards fall under European Waste Catalogue (EWC) code 17 09 04.

### REFERENCE SERVICE LIFE

No reference service life is specified in this cradle-to-gate with options EPD. The products covered by this EPD carry a 10 year limited warranty and have a design life in excess of 50 years.

## FURTHER PRODUCT INFORMATION

Detailed product information and datasheets can be found

- on our website [https:// www.jameshardie.co.uk /products/](https://www.jameshardie.co.uk/products/)
- or by contacting Customer Service by telephone: 0800 068 3103
- or by email: [info@jameshardie.co.uk](mailto:info@jameshardie.co.uk)

## CONTENT DECLARATION

The material composition of HardieBacker® fibre cement boards is shown below:

Material	% of mass per declared functional unit
Crystalline silica	39 - 46
Calcium silicate (hydrate)	40 - 45
Cellulose	4 - 9
Calcium aluminium silicate hydrate	5 - 12
Acrylic polymers	<0.1

HardieBacker® tile backerboard does not contain asbestos, gypsum, glass fibre or formaldehyde. No substance included in the Candidate List of Substances of Very High Concern for authorisation under the REACH Regulations is present in the boards, either above the threshold for registration with the European Chemicals Agency or above 0.1% (wt/wt).

## TECHNICAL DATA

HardieBacker boards are intended for use as a tile substrate. They comply with BS EN 12467:2012, which includes criteria for durability, water tightness and dimensional tolerance.

Key technical properties are shown in the table below; consult the relevant product Technical Data Sheet for a comprehensive specification.

Name (test)	Value	Unit
Dimensions	1200 x 800 x 6 1200 x 800 x 12	mm
Net dry density: HardieBacker 6mm Hardiebacker 12mm	1300 1140	kg/m <sup>3</sup>
Mass per sq.m: HardieBacker 6mm Hardiebacker 12mm	9.0 13.8	kg/m <sup>2</sup>
Compressive Strength (ASTM D2394): HardieBacker 6mm Hardiebacker 12mm	48 45	Mpa
Flexural strength (EN12467: 2012): Equilibrium conditioned, MPa	>10	MPa
Surface Burning Characteristics (EN 13501-1): Fuel Contributed Smoke Development Index Flames Droplets Index Euroclass	A1 s1 d0 A1	-

Combustibility	Suitable where non-combustible materials are specified in accordance with local building regulations	
Thermal conductivity, k (EN12667)	0.19	W/mK
Thermal resistance, R (EN12667)	0.068	m <sup>2</sup> .K/W

## RESIDUAL RISKS AND EMERGENCIES

There are no residual risks associated with the normal day-to-day use of HardieBacker boards. Care must be taken to install the product in accordance with James Hardie guidance.

# ENVIRONMENTAL PERFORMANCE-RELATED INFORMATION

## LCA INFORMATION

This section of the EPD records key features of the LCA on which it is based.

### SCOPE

This cradle-to-gate with options EPD covers the production stage (modules A1-A3, A4; see below), as permitted by EN 15804; modules A1-A3 are declared in aggregated form.

Product stage			Construction process stage		Use stage							End of life stage				Benefits & loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste disposal	Disposal	Reuse- recovery- recycling- potential
A 1	A 2	A 3	A 4	A 5	B1	B2	B3	B4	B5	B 6	B 7	C 1	C 2	C 3	C 4	D
X	X	X	X	MND	M N D	M N D	M N D	M N D	M N D	M N D	M N D	M N D	M N D	M N D	M N D	MND

X: included in LCA; MND: module not declared; NR: module not relevant

### DECLARED UNIT

The declared unit is 1 square metre of cement backerboard

### SYSTEM BOUNDARIES

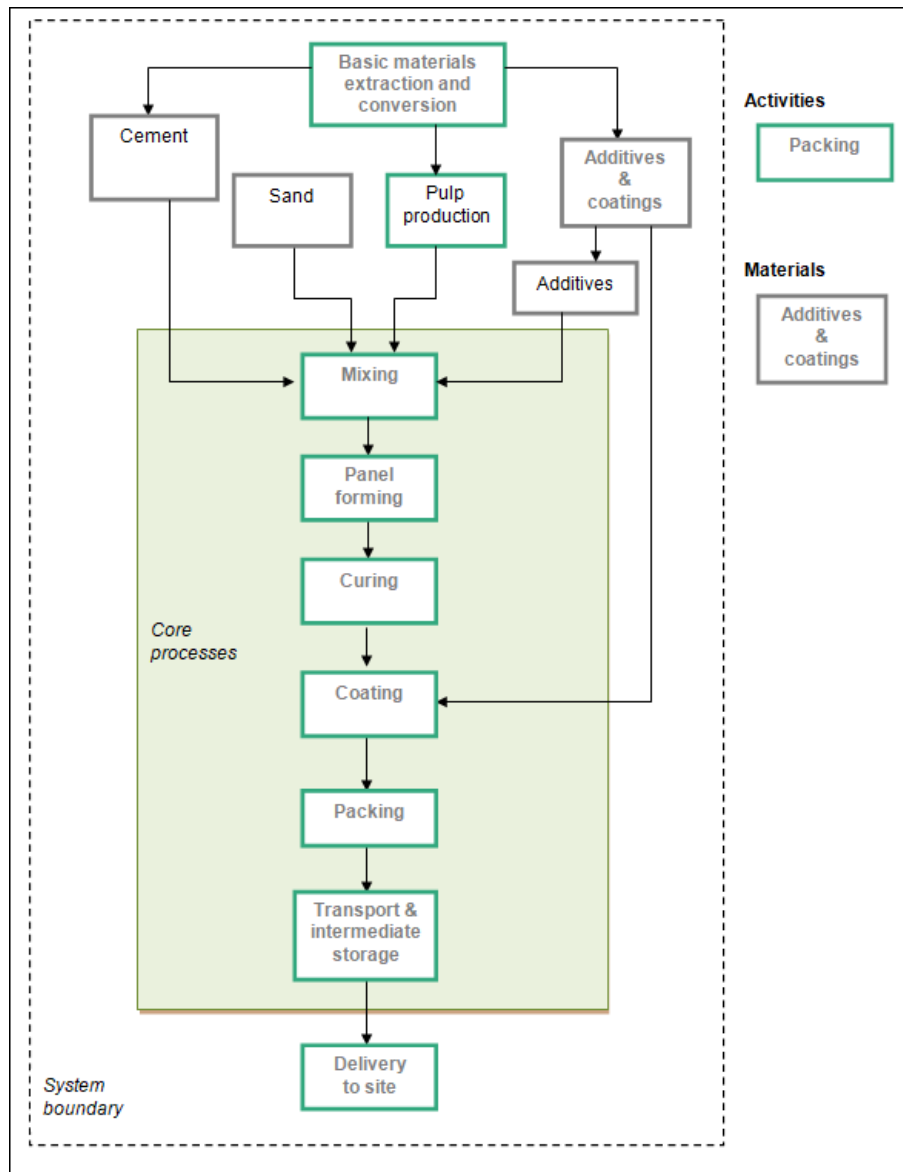
The system boundary of the EPD is defined using the modular approach set out in EN 15804.

As well as the core processes which cover manufacture of the boards at James Hardie's sites, the system therefore includes production of all raw materials and components from basic resources; transport of those materials at all stages up to James Hardie's sites; the production of fuels and energy carriers and their delivery to manufacturing sites; the treatment of all wastes.

Module A4 encompasses transport of product from the manufacturing facility to James Hardie's Eastleigh depot, storage at this depot and onward transport to the building site, which is characterised using a scenario.

The upstream processing of recycled material inputs that have passed the end-of-waste state is outside the system boundary.

The product life cycle covered by this EPD is illustrated below.



**FIBRE CEMENT BOARD LIFE- CYCLE (CRADLE-TO-SITE)**

## CUT-OFF CRITERIA

The collected data covered all raw materials, consumables and packaging materials; associated transport to the manufacturing site; process energy and water use; direct production wastes; emissions to air and water.

According to EN 15804 and the PCR, flows can be omitted (cut off) from a core process in the LCA up to a maximum of 1% of the total mass of material inputs or 1% of the total energy content of fuels and energy carriers; various functional additives amounting, in combination, to <0.1% of total input materials were omitted from the LCA underpinning this EPD.

## DATA SOURCES AND DATA QUALITY

Data characterising the core processes (panel manufacturing and painting) were collected for periods between August 2015 and December 2016. For each factory producing the product, data were collected for a contiguous 12-month period. Company statistics were used to ensure that the producer-specific data used in LCA calculations are based on 1 year averaged data representing supply to the European market. The data have been updated within the last 5 years. These data were checked to ensure that sufficient materials and water are included within the inputs to account for all products, wastes and emissions.

### BACKGROUND DATA

Background (generic) data were taken from the ecoinvent database (v3.4); this fulfils the EN 15804 requirement that generic data used in the LCA have been updated within the last 10 years.

Data quality has been reviewed for processes that contribute significantly to the overall LCA.

Other data were judged fit for purpose. No environmental impact potential stemming from proxy data exceeds 10% for any impact category.

## ALLOCATION

In the background data, the ecoinvent default allocation is applied to all processes except those in which secondary materials are used, where the "cut-off" allocation is applied. This ensures that secondary materials are free of upstream burdens that arise prior to their reaching the "end of waste" state, in accordance with Section 6.3.4.2 of EN 15804.

## ASSUMPTIONS AND ESTIMATES

Inputs to and outputs from the system are accounted for over a 100-year time period; long-term emissions are therefore omitted from the impact assessment part of the LCA.

The "primary energy used as material" indicators (PERM; PENRM) are calculated using - as characterisation factors - published values for constituent materials which can yield energy on combustion, where available, and from published calorific values where PEM values are not available. Calculations of PERM are based on NCV of 17.5MJ/kg for cellulose and exclude the energy content of wood used in product packaging. Coating materials were omitted from the PERM and PENRM calculations.

"Primary energy as fuel" indicators (PENRE, PERE) are calculated as the total primary energy demand minus primary energy used as material.

Output flows are calculated for module A3 only.

Delivery of the product to site from James Hardie's UK warehouse is characterised using a scenario. The relevant parameters are shown in the table below.

Scenario Parameters - Transport to site <sup>1</sup>	
Parameter	Quantity (unit)
Vehicle type	long distance truck; cargo ship
Vehicle load capacity	16; 50000 (t)
Fuel type and consumption	diesel, 0.1 (l/km); HFO, 2.5 (g/tkm)
Volume capacity utilisation factor	1
Capacity utilisation (including empty returns)	36%; n/a
Distance to site	500; 200 (km)
Bulk density of transported products	1400 (kg/m <sup>3</sup> )

<sup>1</sup> Transport to James Hardie's European warehouse is characterised using actual distances.



## ENVIRONMENTAL INDICATORS AND INTERPRETATION

This EPD contains environmental information about the specified products, in the form of quantitative indicator values for a number of parameters, which encompass calculated environmental impact potentials, resource and energy use, and waste generation.

The parameters are listed below along with the abbreviations used for them in the tables of indicator values that follow.

Parameter	Abbreviation	Units
Climate change - GWP100	GWP	kg CO <sub>2</sub> eq
Ozone layer depletion - ODP steady state	ODP	kg CFC-11 eq
Acidification potential - average Europe	AP	kg SO <sub>2</sub> eq
Eutrophication - generic	EP	kg PO <sub>4</sub> <sup>3-</sup> eq
Photochemical oxidant creation potential	POCP	kg ethylene eq
Depletion of abiotic resources - elements, ultimate reserves	ADPE	kg Sb eq
Renewable primary energy as energy carrier	PERE	MJ
Renewable primary energy resources as material utilisation	PERM	MJ
Total renewable primary energy use (sum of the two parameters above)	PERT	MJ
Non-renewable primary energy as energy carrier	PENRE	MJ
Non-renewable primary energy resources as material utilisation	PENRM	MJ
Total non-renewable primary energy use (sum of the two parameters above)	PENRT	MJ
Use of secondary material	SM	kg
Use of renewable secondary fuels	RSF	MJ
Use of non-renewable secondary fuels	NRSF	MJ
Net use of fresh water	FW	m <sup>3</sup>
Hazardous waste disposed	HWD	kg
Non-hazardous waste disposed	NHWD	kg
Radioactive waste disposed	TRWD	kg
Components for re-use	CFR	kg
Materials for recycling	MFR	kg
Materials for energy recovery	MER	kg
Exported energy	EE	MJ

Environmental indicator results for the A1 - A3 modules on an aggregated basis and the A4 module are shown in the 4 following tables for the declared unit of 1m<sup>2</sup> of fibre cement board.

Parameter: Environmental Impacts	Unit	Modules A1 - A3		Module A4	
		HardieBacker 6mm	HardieBacker 12mm	HardieBacker 6mm	HardieBacker 12mm
GWP	kg CO <sub>2</sub> -eq	7.36E+00	1.16E+01	1.23E+00	1.68E+00
ODP	kg CFC11-eq	4.09E-07	6.45E-07	2.09E-07	2.86E-07
AP	kg SO <sub>2</sub> -eq	2.07E-02	3.27E-02	1.66E-02	2.31E-02
EP	kg PO <sub>4</sub> <sup>3-</sup> -eq	3.30E-03	5.21E-03	1.68E-03	2.28E-03
POCP	kg ethene-eq	9.40E-04	1.48E-03	5.50E-04	7.70E-04
ADPE	kg Sb-eq	1.83E-05	2.89E-05	4.40E-06	6.19E-06
ADPFF	MJ	6.87E+01	1.08E+02	1.80E+01	2.46E+01

Parameter: Resource Use	Unit	Modules A1 - A3		Module A4	
		HardieBacker 6mm	HardieBacker 12mm	HardieBacker 6mm	HardieBacker 12mm
PERE	MJ	3.28E+01	5.38E+01	3.33E-01	4.66E-01
PERM	MJ	1.23E+01	1.75E+01	0.00E+00	0.00E+00
PERT	MJ	4.51E+01	7.13E+01	3.33E-01	4.66E-01
PENRE	MJ	7.99E+01	1.26E+02	1.86E+01	2.55E+01
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	7.99E+01	1.26E+02	1.86E+01	2.55E+01
SM	kg	9.54E-02	1.51E-01	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	4.70E-02	7.42E-02	3.48E-03	4.82E-03

Parameter: Wastes	Unit	Modules A1 - A3		Module A4	
		HardieBacker 6mm	HardieBacker 12mm	HardieBacker 6mm	HardieBacker 12mm
HWD	kg	9.10E-04	1.43E-03	1.07E-03	1.50E-03
NHWD	kg	2.14E+00	3.38E+00	3.06E-01	4.33E-01
TRWD	kg	2.50E-04	4.00E-04	1.20E-04	1.70E-04

Parameter: Output Flows	Unit	Modules A1 - A3		Module A4	
		HardieBacker 6mm	HardieBacker 12mm	HardieBacker 6mm	HardieBacker 12mm
CFR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00

## INTERPRETATION

Cement production makes the largest contribution to most indicator values reported for modules A1 - A3. Direct emissions from James Hardie processes are of relatively low significance in all environmental impact categories.

Values for the ODP indicator are largely driven by emissions of CFCs in data characterising upstream processes in fuel chains. Because use of CFCs has been reduced continually by Montreal Protocol measures, the ODP indicator values should be used with caution.

James Hardie fibre cement panels are made from common mineral raw materials and cellulose pulp. ADPE indicator values are driven to a large extent by use of non-ferrous metals in background datasets characterising activities in materials supply, energy generation and transport. The quality of these data is low and ADPE indicator values should be used with caution.

## ADDITIONAL ENVIRONMENTAL INFORMATION

James Hardie is committed to sustainable development across all of our activities. We implement practices that aim to benefit the building environment, the communities in which we work and the wider economy.

### DESIGNED FOR SUSTAINABLE BUILDING

James Hardie design with sustainability in mind. We focus on developing innovative products that have an extended lifespan, require little maintenance and can be used in energy efficient buildings. We undertake a systematic assessment of environmental performance based on life cycle assessment. This is audited and continuously improved through our ISO 140001 certification. All pulp used in James Hardie products is obtained from sources certified under either the PEFC or FSC sustainable forestry schemes.

### ENGINEERED FOR DURABILITY

Our fibre cement is a robust, durable material that has a typical service life in excess of 50 years. We are pioneers, leading the way in developing new technologies. We place strong emphasis on R&D and invest significantly in process improvement and product evolution. This has yielded many advances with benefits for sustainability, such as ColourPlus™ Technology to create longer lasting facades, and HardieZone™ Technology to ensure advanced climate protection.

## IMPROVED RESOURCE EFFICIENCY

We seek continuous improvement in resource efficiency, drawing on life cycle assessment to reduce the environmental impacts at key stages of the product lifecycle. For example:

- we have an ambitious "zero to landfill" program in our manufacturing facilities, aimed at creating a company culture focused on continued improvement in material utilisation
- we have instigated energy-saving measures across our manufacturing sites and have invested heavily in plant upgrades, including energy efficient boilers and lighting systems
- we are developing water recycling technologies to improve non potable water consumption
- we use suppliers with robust environmental credentials where possible

## REFERENCES

ASTM D2394 - 17 Standard Test Methods for Simulated Service Testing of Wood and Wood-Based Finish Flooring

BS EN 12467:2012+A1:2016 Fibre-cement flat sheets - product specification and test methods

BS EN 12667:2001 Thermal performance of building materials and products. Determination of thermal resistance by means of guarded hot plate and heat flow meter methods. Products of high and medium thermal resistance

BS EN 13501-1:2007+A1:2009 Fire classification of construction products and building elements. Classification using test data from reaction to fire tests

ecoinvent database (v3.4) - [www.ecoinvent.ch](http://www.ecoinvent.ch)

EN 15804:2012 + A1:2013 - Sustainability of construction works-Environmental Product Declarations - Core rules for the product category of construction products

Fibre cement board LCA (2018) - Report for James Hardie Building Products Limited - EuGeos Limited

General Program Instructions, Version 3.0, 2017-12-11 - The International EPD® System - EPD International AB

ISO 14001:2015 - Environmental management systems – Requirements with guidance for use

ISO 14025:2009-11: Environmental labels and declarations - Type III environmental declarations - Principles and procedures

PCR 2012:01 Construction products and Construction services, Version 2.3, 2018-11-15 - The International EPD® System - EPD International AB 2018-11-15

## GLOSSARY

The International EPD® System: a programme for Type III environmental declarations, maintaining a system to verify and register EPDs as well as keeping a library of EPDs and PCRs in accordance with ISO 14025. ([www.environdec.com](http://www.environdec.com))

Life cycle assessment (LCA): LCA studies the environmental aspects and quantifies the potential impacts (positive or negative) of a product (or service) throughout its entire life. ISO standards ISO 14040 and ISO 14044 set out conventions for conducting LCA.

REACH Regulation: REACH is the European Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals. It entered into force in 2007, replacing the former legislative framework for chemicals in the EU.

## FIBRE CEMENT BACKERBOARD - EPD SUMMARY

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EPD programme operator	EPD International AB - Stockholm - Sweden www.environdec.com
EPD owner	James Hardie Building Products Ltd www.jameshardie.co.uk
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PCR review conducted by	The Technical Committee of the International EPD® System Chair: Filippo Sessa; contact via info@environdec.com
Verification	Independent verification of this EPD and data, according to ISO 14025/2006: <input type="checkbox"/> internal certification <input checked="" type="checkbox"/> external verification
Third party verifier	Ugo Pretato - Recognized Individual Verifier
Accredited or approved by:	The International EPD® System
LCA conducted by:	EuGeos Limited, UK - +44 (0)1625 434423 www.eugeos.co.uk



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EPDs of construction products may not be comparable if they do not comply with EN 15804