

COLORBOND® steel
Environmental Product Declaration
In accordance with ISO 14025 and EN 15804



AUSTRALASIA **EPD**®
ENVIRONMENTAL PRODUCT DECLARATION

epd



COLORBOND® steel

Environmental Product Declaration

Key Insights

This EPD provides data for COLORBOND® steel at Base Metal Thickness (BMT) 0.42 and 0.48mm.

EPD Compliance

page
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- As per EN 15804
- Independently verified
- Cradle-to-gate scope with recycling
- Product specific

Recycled Content

page
6

- 25% average recovered content including:
- Post-consumer recycled content: 8.5%
 - Pre-consumer recycled content: 6.5%

Product Content

page
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The typical composition¹ of COLORBOND® steel is:

Steel Base	Carbon Steel	>95%
Metal Coating	Aluminium	<1.8%
	Magnesium	<0.1%
	Zinc	<1.3%
	Silicon	<0.1%
Paint Coatings	Topcoat ²	<1.4%
	Reverse Coat ²	<0.6%

¹ All values quoted as weight % and are calculated for 0.42mm COLORBOND® steel.

² Proprietary coatings (pretreatment, primer and finish coat).

Recycling

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- Recycling steel can reduce project costs
- Steel is 100% recyclable

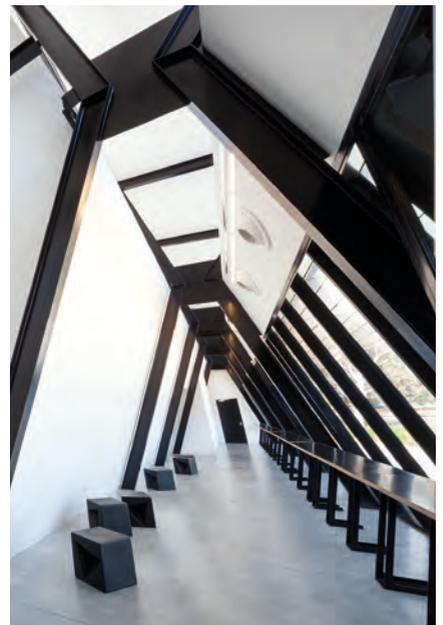




COLORBOND® steel

Below are examples of case studies that showcase the versatility of COLORBOND® steel.

The Canberra College Performing Art Centre, made from COLORBOND® steel in the colour Monument®, has a lightweight and dynamic quality which feels fit-for-purpose.





COLORBOND® steel

Over fifty years of Australian research and development has created a range of technologies that give genuine COLORBOND® steel its long lasting performance when subjected to some of the harshest Australian conditions.

Whatever you are building with COLORBOND® steel, it pays to check that you are getting what you've paid for and that the materials used are going to live up to the task.

You can make sure you're getting the genuine article by looking out for the COLORBOND® steel branding on the product, or its packaging.

For roofing and walling, check for the ink branding on the reverse side of the sheet.



Victoria's Deakin University REACH building reprises the traditional college with cladding made from COLORBOND® steel in the colour Shale Grey™.



Image by Sarah Louise Jackson for Cockram

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The Versatility of COLORBOND® steel

COLORBOND® steel is manufactured in Australia by BlueScope. COLORBOND® steel is tried and tested in Australian conditions and designed to look beautiful and deliver outstanding, long life performance.

With 22 standard colours in the range, you can choose a colour that sets the theme for your whole building, or complements your other building material choices.

Adapting to the demands of the building segment, COLORBOND® steel has changed a great deal since its introduction in Australia in 1966. Not only has the colour range evolved, so too has the technology involved in COLORBOND® steel's production. Activate® technology¹ was introduced in 2013 and BlueScope holds numerous patents on the technology, both in Australia and around the world. COLORBOND® steel is being used on roofs for anything from homes all around Australia, to large commercial buildings like the Adelaide Velodrome and the Margaret Court Arena. To be sure you

are getting genuine COLORBOND® steel from BlueScope, make sure you ask for it by name, and check for the brand mark on the material.

Designed for the hot Australian sun

COLORBOND® steel incorporates our unique Thermatech® solar reflectance technology, designed to reflect more of the sun's heat on hot sunny days². It also benefits from our industry-leading metallic coating incorporating Activate® technology to provide enhanced corrosion resistance.

Warranties for peace of mind

When you purchase COLORBOND® steel you are buying products made and backed by BlueScope, one of Australia's largest manufacturers. BlueScope offers a variety

of warranties of up to 36 years for roofing for peace of mind.³

Supporting a sustainable future

COLORBOND® steel is durable and resilient in Australia's harsh climate and its long life helps conserve resources and energy that may otherwise be invested in products with a shorter life span.

COLORBOND® steel is
lightweight and durable



¹ Activate® technology is not available in COLORBOND® Stainless steel, COLORBOND® Permagard® steel, and COLORBOND® steel products with a galvanised steel substrate.

² Thermatech® solar reflectance technology is not available in Night Sky®, Home Improvements or non-standard colours, and is not available in COLORBOND® Stainless steel, COLORBOND® Metallic steel, COLORBOND® Coolmax® steel or COLORBOND® Permagard® steel. Results will depend on roof colour, level and location of insulation, type and location of building shape and function.

³ Warranties subject to exclusions, application and eligibility criteria. For full terms and conditions visit bluescopesteel.com.au/warranties.

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COLORBOND® steel

This EPD sets out information on the average COLORBOND® steel standard colour range product manufactured by BlueScope Australia at its facilities at Port Kembla and Erskine Park (NSW), Western Port (VIC) and Acacia Ridge (QLD). The declared unit presented is one flat square metre (1m²) of COLORBOND® steel at 0.42mm and 0.48mm base metal (steel) thickness (BMT), in coil form at the outbound gate of the manufacturing site.

The product range represented by this EPD is the COLORBOND® steel standard colour range. It excludes other paint finishes such

as COLORBOND® steel Matt, COLORBOND® Stainless steel, COLORBOND® Metallic steel, COLORBOND® Coolmax® steel, COLORBOND® Permagard® steel, double sided COLORBOND® steel (for fencing and home improvements) and other non standard colours.

This EPD is only relevant to COLORBOND® steel products using a steel base coated in BlueScope’s aluminium/zinc/magnesium alloy incorporating Activate® technology, at a coating mass of 100g/m² (AM100), which is BlueScope’s industry-leading metallic coating that enhances corrosion performance.

Activate® technology is not available for COLORBOND® Stainless steel, COLORBOND® Permagard® steel, and COLORBOND® steel products with galvanised (zinc-coated) steel substrate and therefore this EPD is not applicable for those materials. Also, this EPD is not applicable to COLORBOND® Ultra steel as it is on an AM150 substrate.

This is a “cradle-to-gate with recycling” EPD. Other life cycle stages are dependent on how the product is used, and should be developed and included as part of holistic assessment of specific construction works.

Rating Tool

EPD Compliance

- As per EN 15804
- Independently verified
- Cradle-to-gate scope with recycling
- Product specific

Programme:	The Australasian EPD® Programme www.epd-australasia.com
Programme Operator:	Australasian EPD Programme Ltd
Technical Rules:	Australasian General Programme Instructions
Product Category Rules (PCR):	Construction Products and Construction Services 2012:01, Version 2.01, 2016-03-09 (valid until 2019-03-03)
EPD Registration Number:	S-P-00999
Approval Date:	2017-03-27
Valid Until:	2022-03-27
Revision Date:	2019-01-15
Geographical Scope:	Scope of EPD: Produced using Australian data Application scope: International



The West Kimberley Regional Prison project made from COLORBOND® steel in the colour Evening Haze®

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“Declared Unit – This EPD is valid for a declared unit of 1m² of COLORBOND® steel with a BMT of 0.42mm and 0.48mm”

COLORBOND® steel Manufacturing

BlueScope manufactures COLORBOND® steel from hot rolled coil steel in a three-phase process.

The hot rolled coil is cold reduced. Cold reduction involves pickling (acid cleaning) the coil, followed by cold rolling, where the steel coil is compressed and elongated through rolls to reduce its thickness and increase the strength of the steel. Following cold reduction, the coil

is coated with BlueScope’s industry-leading aluminium/zinc/magnesium alloy incorporating Activate® technology. The metal coated coil is then transferred to a paint line, where it is coated with a pre-treatment to improve paint adhesion, followed by a primer and topcoat

and backing coat, prior to packaging ready for shipment. See the hot rolled coil EPD at www.steel.com.au/articles/environmental-product-declarations for more information on the hot rolling process.

Product Content

The typical composition¹ of COLORBOND® steel is:

Steel Base	Carbon Steel	>95%
Metal Coating	Aluminium	<1.8%
	Magnesium	<0.1%
	Zinc	<1.3%
	Silicon	<0.1%
Paint Coatings	Topcoat ²	<1.4%
	Reverse Coat ²	<0.6%

Steel by BlueScope – Recycled Content

- 25% average recovered content, including
- Post-consumer recycled content: 8.5%
- Pre-consumer recycled content: 6.5%

The above data complies with the ISO14021 definitions of recycled content.

COLORBOND® steel is compliant with the European REACH regulation³ (EC) 1907/2006. For safe use and maintenance, refer to the product Safety Data Sheet (SDS) at steel.com.au/safetydatasheet.

What is an SDS?

A Safety Data Sheet (SDS) is a document that describes the chemical and physical properties of a product or material and provides safe handling and use information.

¹ All values quoted as weight % and are calculated for 0.42mm COLORBOND® steel.

² Proprietary coatings (pretreatment, primer and finish coat).

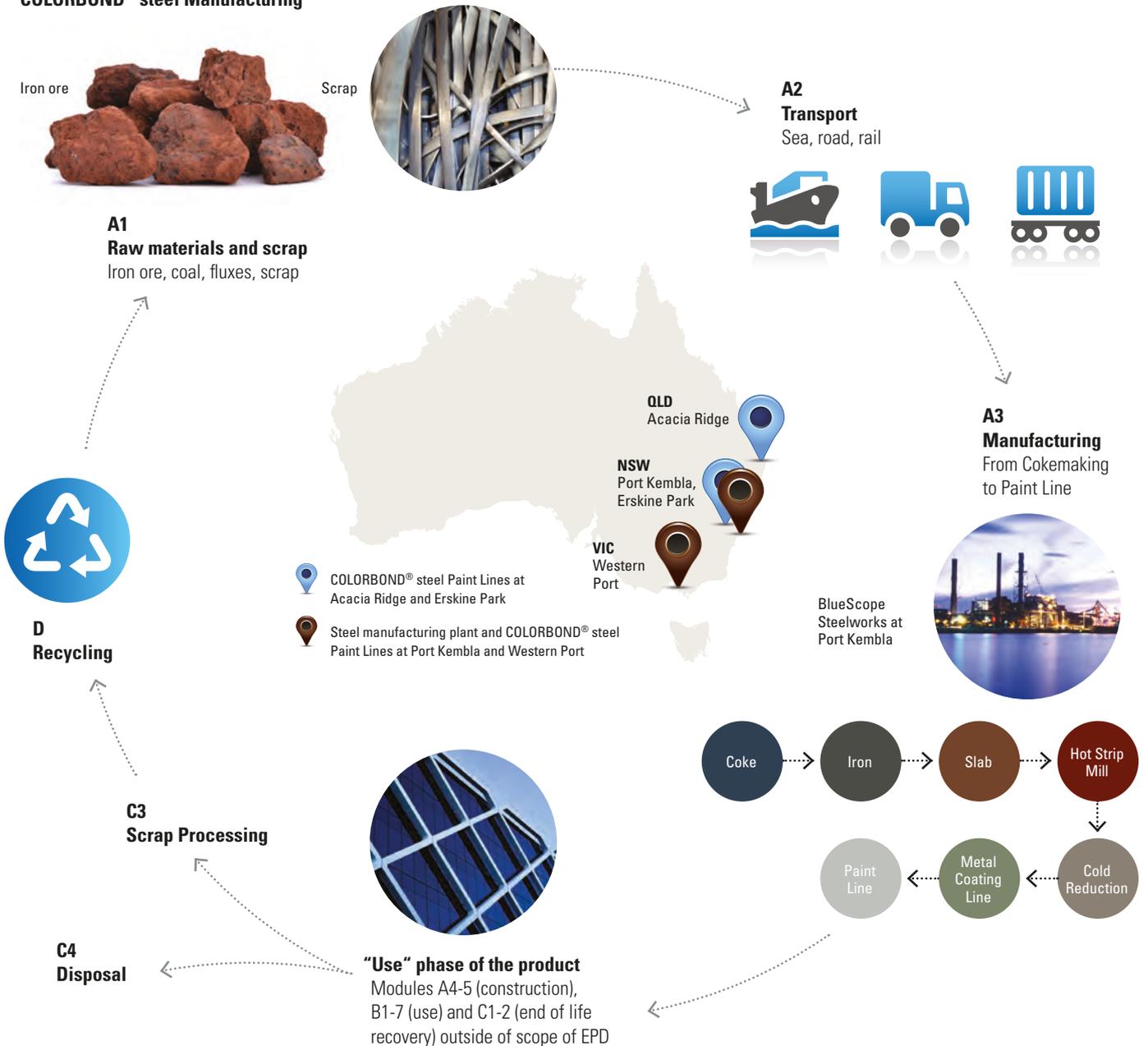
³ Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals.

This EPD is not applicable for COLORBOND® steel Matt, COLORBOND® Ultra steel, COLORBOND® Stainless steel, COLORBOND® Metallic steel, COLORBOND® Coolmax® steel, COLORBOND® Permagard® steel, COLORBOND® steel products with galvanised (zinc-coated) steel substrate, double sided COLORBOND® steel (for fencing and home improvements) and other non standard colours.



Outpost 7427139 made from COLORBOND® steel in the colour Ironstone®

COLORBOND® steel Manufacturing



COLORBOND® steel

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The Strength Behind the Beauty

Manufactured in Australia to Australian Standards (AS 1397 and AS/NZS 2728), COLORBOND® steel has been tested by leading scientists and engineers in laboratories and exposure testing sites throughout Australia, meaning it is far more than just “paint on steel”.

Five Layers of Protection

The performance of COLORBOND® steel comes from the specifically designed layers in the finished material:

1. The steel base is manufactured to meet relevant Australian Standards, ensuring strict adherence to the required grade and strength.
2. The base is then coated in BlueScope’s industry leading metallic coating incorporating Activate® technology¹, to provide enhanced corrosion resistance.
3. A thin pretreatment layer is applied to optimise the adhesion of further coatings.

4. A corrosion inhibitive primer is baked onto the surface.
5. A topcoat of specially developed, exterior grade paint is baked on to provide resistance to chipping, flaking and blistering to ensure the finish retains its look for longer. This topcoat contains Thermatech® solar reflectance technology² designed to reflect more of the sun’s heat on hot, sunny days.

Activate® Technology for Corrosion Resistance

An industry leading coating technology, enhancing the protective coating of COLORBOND® steel’s substrate, making

COLORBOND® steel one of the world’s toughest, most advanced building materials.

The unique composition and microstructure of COLORBOND® steel with Activate® technology acts in three ways:

1. Magnesium, aluminium and zinc compounds are strategically positioned in the coating to provide sacrificial protection.
2. Magnesium compounds encourage the formation of a more robust barrier, slowing the rate of subsequent corrosion.
3. Magnesium compounds also ‘activate’ the metal coating resulting in more effective, longer-lasting sacrificial protection.



1 Activate® technology is not available in COLORBOND® Stainless steel, COLORBOND® Permagard® steel, and COLORBOND® steel products with a galvanised steel substrate.

2 Thermatech® solar reflectance technology is not available in Night Sky®, Home Improvements or non-standard colours, and is not available in COLORBOND® Stainless steel, COLORBOND® Metallic steel, COLORBOND® Coolmax® steel or COLORBOND® Permagard® steel. Results will depend on roof colour, level and location of insulation, type and location of building shape and function.



Scope of Declaration

The scope of this declaration is for 1 flat square metre of COLORBOND® steel from cradle to the mill gate, including end-of-life processing and recycling: Modules A1-A3, C3-C4 and D (according to EN 15804). Modules A4-A5, B1-B7 and C1-C2 have not been included due to the inability to predict how the material will be used following manufacture.

The system boundary applied in this study extends from mining of raw materials such as iron ore and coal; transport to and within the manufacturing site; coke, sinter, iron and steel manufacture; ancillary service operations; hot rolling of steel products, cold reduction, metallic coating and coil painting and packaging for

dispatch to customers at the exit gate of the manufacturing site.

The system boundary also includes manufacture of other required input materials, transport between processing operations, the production of external services such as electricity, natural

gas and water, and the production of co-product materials within the steelmaking process, which have been removed by the use of allocation techniques. Wastes and emissions to air, land and water are also included, as are Modules C3 scrap processing, C4 disposal to landfill and D recovery for recycling.

Table 1. Scope of Declaration in EPD

Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
Raw materials	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse – recovery – recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X

X = Module declared; MND = Module Not Declared (such a declaration shall not be regarded as an indicator of a zero result).

COLORBOND® steel

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Results of Assessment

Table 2. Life Cycle Impact Assessment Indicators

Base Metal (Steel) Thickness (BMT)		COLORBOND® steel AM100							
		0.42mm				0.48mm			
		1m ²				1m ²			
EN 15804 INDICATORS	units	A1-A3	C3	C4	D	A1-A3	C3	C4	D
Global warming potential	kg CO ₂ -eq.	11.4	0.131	0.0182	-3.72	12.7	0.149	0.0207	-4.27
Depletion potential of the stratospheric ozone layer	kg CFC11-eq.	1.18E-11	6.92E-16	4.83E-15	2.27E-08	1.26E-11	7.83E-16	5.49E-15	2.59E-08
Acidification potential of land and water	kg SO ₂ -eq.	0.0350	5.60E-04	5.07E-05	-0.00355	0.0386	6.34E-04	5.761E-05	-0.00409
Eutrophication potential	kg PO ₄ ³⁻ -eq.	0.00365	4.79E-05	6.38E-06	-0.000125	0.00403	5.42E-05	7.25E-06	-0.000147
Photochemical ozone creation potential	kg C ₂ H ₄ -eq.	0.00580	2.98E-05	4.56E-06	-0.00167	0.00645	3.37E-05	5.18E-06	-0.00191
Abiotic depletion potential for non fossil resources	kg Sb-eq.	2.99E-05	1.44E-08	1.97E-09	-3.52E-06	3.00E-05	1.63E-08	2.24E-09	-4.01E-06
Abiotic depletion potential for fossil resources	MJ	131	1.51	0.264	-37.3	144	1.71	0.300	-42.5

Table 3. Resource Indicators

Base Metal (Steel) Thickness (BMT)		COLORBOND® steel AM100							
		0.42mm				0.48mm			
		1m ²				1m ²			
EN 15804 INDICATORS	units	A1-A3	C3	C4	D	A1-A3	C3	C4	D
Renewable primary energy as energy carrier	MJ	5.40	0.219	0.0203	2.67	5.58	0.248	0.0230	3.04
Renewable primary energy resources as material utilisation	MJ	0	0	0	0	0	0	0	0
Total use of renewable primary energy resources	MJ	5.40	0.219	0.0203	2.67	5.58	0.248	0.0230	3.04
Non-renewable primary energy as energy carrier	MJ	132	1.51	0.274	-35.8	146	1.71	0.311	-40.9
Non-renewable primary energy as material utilisation	MJ	0.00226	0	0	0	0.00226	0	0	0
Total use of non-renewable primary energy resources	MJ	132	1.51	0.274	-35.8	146	1.71	0.311	-40.9
Use of secondary material	kg	0.402	0	0	0	0.467	0	0	0
Use of renewable secondary fuels	MJ	0	0	0	0	0	0	0	0
Use of non-renewable secondary fuels	MJ	0.00109	0	1.82E-23	5.55E-23	0.00124	0	2.07E-23	5.55E-23
Use of net fresh water	m ³	0.0222	0.000808	2.90E-05	0.00597	0.0233	0.000915	3.29E-05	0.00675

Table 4. Wastes and Other Outputs

		COLORBOND® steel AM100							
Base Metal (Steel) Thickness (BMT)		0.42mm				0.48mm			
Declared Unit		1m ²				1m ²			
EN 15804 INDICATORS	units	A1-A3	C3	C4	D	A1-A3	C3	C4	D
Hazardous waste disposed	kg	2.73E-07	2.77E-10	1.46E-09	-2.65E-06	2.90E-07	3.14E-10	1.66E-09	-3.02E-06
Non hazardous waste disposed	kg	0.218	0.000428	0.382	0.519	0.223	0.000485	0.434	0.581
Radioactive waste disposed	kg	6.55E-04	2.55E-07	3.82E-06	5.83E-06	6.70E-04	2.89E-07	4.34E-06	6.30E-06
Components for re-use	kg	0	0	0	0	0	0	0	0
Materials for recycling	kg	0	2.68	0	0	0	3.04	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0
Exported electrical energy	MJ	0	0	0	0	0	0	0	0
Exported thermal energy	MJ	0	0	0	0	0	0	0	0

Table 5. Green Star Indicators

		COLORBOND® steel AM100							
Base Metal (Steel) Thickness (BMT)		0.42mm				0.48mm			
Declared Unit		1m ²				1m ²			
INDICATORS	units	A1-A3	C3	C4	D	A1-A3	C3	C4	D
Human toxicity cancer effects	kg 1,4 DB eq	1.70E-10				1.79E-10			
Human toxicity non-cancer effects	kg 1,4 DB eq	1.46E-11				1.58E-11			
Ionising radiation	kg U-235 eq	0.109				0.111			
Particulate matter	kg PM2.5 eq	0.00281				0.00310			
Resource depletion – water	m ³	0.0109				0.0115			
Land use midpoint	kg C deficit eq	1.30				1.41			

Additional Green Star Environmental Impact Categories

Table 6. End of Life for 1m² COLORBOND® steel

End of life			
Parameter	Unit	0.42mm	0.48mm
Steel collected separately	kg	3.08	3.49
Steel collected with mixed construction waste	kg	0	0
Recovery for re-use	kg	0	0
Recovery for recycling	kg	3.08	3.49
Recovery for energy recovery	kg	0	0
Disposal to landfill	kg	0.381	0.432
Assumptions for scenario		N/A	N/A

Take Care When Comparing

Issues to consider when comparing EPD data include:

- Both EPDs must comply with the comparability requirements in EN 15804, eg using equivalent methodology and assumptions such as utilising the same PCR.
- LCA provides high-level scientific guidance and differences in data should be substantial to be material.
- Understanding the detail is important in comparisons. Expert analysis is required to ensure data is truly comparable, to avoid unintended distortions.
- The best way to compare products and materiality of differences is to place them into the context of a structure across the whole life cycle.

This EPD is compliant with PCR 2012:01 Construction Products and Construction Services, Version 2.01, 2016-03-09 (valid until 2019-03-03).

For Tables 1 to 6: – All numbers are to three significant figures.
 – Weight per 1m² of COLORBOND® steel: 0.42mm = 3.46kg; 0.48mm = 3.93kg.

COLORBOND® steel

Environmental Product Declaration

Recycling

The steel in COLORBOND® steel is 100% recyclable into equivalent or higher quality products.



COLORBOND® steel's magnetic properties mean that it can be easily separated for recycling. The intrinsic economic value of steel results in a high recovery rate of all steel waste. Recycling saves money for construction projects – ensure that all steel is separated and recycled.

Scrap merchants are available in all major cities. The actual recycling rate of steel at End of Life has a significant impact on the cradle to grave results – note that for steel construction products, the End of Life recycling rate is likely to be significantly higher than the 89% used

here – but in specific construction projects may range from 0-100%.

A focus on design to maximise recycling is important to minimise the whole of life impact of any construction project.

Life Cycle Assessment (LCA) Methodology

This EPD has been produced in conformance with the requirements of The Australasian EPD® Programme General Programme Instructions v1.0 (GPI), PCR 2012:01 v2.01 Construction Products and Construction Services and the Australian Green Star Sustainable Products and Life Cycle Impacts credits.

The Life Cycle Inventory (LCI) data which forms the basis of this EPD relates to the Australian financial year of 1st July 2014 to 30th June 2015. Any individual items of data collected outside of this time frame, which were very few, were assessed carefully for relevance to this time period. All relevant and available data were collected. While cut-off criteria according to the PCR section 6.6 were employed, much data which would have fallen within that scope were included regardless, if available. Use of secondary data was not required within the gate-to-gate (A3) scope. No carbon dioxide offsetting is included in the LCI.

Upstream hot rolled steel manufacturing data was obtained from the previous report titled "BlueScope EPD Background Report Hot Rolled Steel Products – Final" and the BlueScope Hot Rolled Coil EPD S-P-00557.

The EPD was updated in 2019 to clarify and correct certain matters. Background data were also updated and all secondary datasets are now from GaBi Databases 2018 and are less than five years old. The electricity supply was based on GaBi's state-specific grid mix datasets for NSW, Victoria and Queensland. Green Star's 'Resource depletion – water' indicator requires water scarcity data for the production areas. In the absence of local scarcity data in GaBi, Australian data was used as a conservative proxy, and is likely to overstate the calculated result.

Allocation was carried out in accordance with the PCR section 6.7, where subdivision of processes was not possible. Economic allocation was not utilised in this study, as the revenue from sold by-products is insignificant compared to revenue from prime products.

The recycling scenario was based on Hyder Consulting Reports¹ which indicate that the average metals recycling rate in Australia is 89%. This is considered to be a conservative estimate for flat steel construction products, but was used in the absence of verified higher recycling rates.

Key assumptions made during the study were:

- Accuracy of data measurement falls within normal industrial weighing systems accuracy limits of +/-5%.
- Transport of minor materials is insignificant to the overall impacts.
- Proprietary chemicals and paints can be sufficiently modelled using guidance from Safety Data Sheets and conservative assumptions on that basis.
- "Average product" data is presented – any differences in the composition of similar products, with the exception of any change in Base Metal Thickness, is insignificant compared to the outcomes of the LCA.
- The Module D recovery stage assumes that paint coatings are incinerated and metal coatings are lost as slag during the steel recycling process. This is a conservative assumption for metal coatings as they are likely to make up parts of future steel alloys.

Assumptions were sensitivity tested and significant findings are included on the following page.

¹ See recycling references section on page 19.



Interpretation of Results

COLORBOND® steel is designed to be durable and resilient in Australia's harsh climate.

To maximise the invested environmental value of the product, BlueScope recommend it should be used in structures which are designed for long life, resilience and flexibility, with a view to optimising the whole-of-life energy efficiency of the building.

Impact Category Results

The impacts of COLORBOND® steel across all reported impact categories follow predictable patterns based on the composition and processing of the product. The Base Metal (steel) Thickness (BMT) is influential in the areas of Global Warming Potential (GWP), Acidification Potential (AP), Eutrophication Potential (EP), Photochemical Ozone Creation Potential (POCP) and Abiotic Depletion of Fossil resources (ADPF). This illustrates the dominance of the manufacturing of steel for the substrate.

In order to control the impacts for these categories, the selection of an appropriate BMT is required. Where a thicker steel sheet does not contribute to structural integrity, the lighter-weight version of COLORBOND® steel should be selected.

Abiotic Depletion of Elements (ADPE), or mineral resource depletion, is heavily impacted by the use of metallic coating. A combination of aluminium, zinc and magnesium for corrosion protection of the steel under the visible paint layer is necessary for longevity of the product; however this result shows the need to ensure that the metallic coating is limited to as much as necessary to ensure product durability.

The 2018 update resulted in reductions across all reported impact categories for the manufacture of COLORBOND® steel, caused by a range of changes including the background data update. Reductions are similar for both thicknesses declared in this EPD and are provided for 0.42 BMT, with the most significant changes highlighted for each indicator: GWP -10%, ADPF -10%, AP -30%, EP -29% and POCP -18% (sea freight transport of iron ore, change of aluminium dataset); ADPE -86% (correction to zinc dataset); and ODP 99.9% (change of titanium dioxide

dataset to match GaBi's default assumptions for ozone-depleting substances in the supply chain).

The update also affected the end-of-life modules, with increased impacts across all reported impact categories for scrap processing (C3), due to improved modelling, and slight reductions for disposal (C4). More complete modelling of the recycling potential (Module D), including the removal of paint and alloys in the recycling process, has slightly reduced the credits for GWP, AP, EP, POCP and ADPF. The ODP burden for module D is significantly greater than for the production phase, which is a surprising outcome resulting from the updated worldsteel value of scrap dataset, as well as significant reductions of ODP in the production module. The credit for ADPE has increased due improved reflection of the alloy mix used in BlueScope's Hot Rolled Coil.

While this EPD comprehensively covers the requirements for reporting in the PCR section 8 and Green Star criteria, it is important to recognise that any LCA is not a complete assessment of all environmental or sustainability issues of the product system under study.

Methodology

This product-specific EPD validly represents the production process described. The cut-off criterion of 1%, in mass, energy and environmental relevance, (conforming with PCR 2012:01 section 6.6) has resulted in a data set which is robust and all significant contributors to the LCA results have been captured in this study. Where available, data which fell within the cut-off criteria were included in the data set.

Upstream data taken from the GaBi database reflects average or generic production and therefore does not correspond to BlueScope's actual suppliers.

Allocation of co-products was made using physical allocation: predominantly mass of throughput (eg steel coil) or surface area of the coil (eg surface coatings). No use of system

expansion was made (excepting Module D) as per Australasian EPD requirements. Allocation was performed according to the PCR section 6.7, and hence conforms with the comparability requirements therein. Choice of allocation methodology can change the final results.

Average Product Assumption – Sensitivity of Results

The LCI model was based on measured throughput, generally by mass. Hence, the initial data output of the model was also on a mass (per kg) basis. However, sensitivity testing showed that for coated steel products such as COLORBOND® steel, a change in the BMT of the product made a significant difference to the impacts. This is due to changes in the fraction of steel versus coatings in the results. Hence, for comparability between products, it was determined that coated products must have impacts reported on an area (per m²) basis. Once those area-based impacts are known for a specific BMT, the results can be converted to a mass basis if required.

Other Sensitivity Analysis Results

When similar products are manufactured on different production lines, there is sometimes diversity in results. Should production scheduling change significantly, this may be reflected in changes in the calculated impacts. The reason for these differences is the different mix of production routes that contribute to each product. Where products are preferentially made at different locations, the differences are most evident. Should production scheduling change significantly, this may be reflected in changes in the calculated impacts.

Due to sensitivity analysis indicating material difference of sufficient impact in at least one category exceeding the 10% threshold for increase in impacts, only COLORBOND® steel standard colour range, on AM100 metallic coated substrate was used to generate this EPD. This EPD also excludes removable films that may be applied to COLORBOND® steel for protection during transport and installation.

COLORBOND® steel

Environmental Product Declaration

Durability and Resilience

Sustainable Performance: COLORBOND® steel is durable and resilient to Australia's harsh climate and its long life helps conserve resources and energy that may otherwise be invested in products with a shorter life span.

All COLORBOND® steel contains recycled content and is 100% recyclable. In some cases it can be reused without reprocessing, saving on energy and resource use. COLORBOND® steel is a lightweight material which can mean a lower cost to transport to site and a lighter roof structure. And its strength can help protect a building in stormy weather. Together, COLORBOND® steel's beauty, strength and environmental performance combine to make it a responsible choice for your project, and the environment.

Steel has special capabilities that enable design for resilience and adaptability.

As steel doesn't burn it can be used to increase bushfire resistance of structures.

COLORBOND® steel roofing, walling, gutters and downpipes are compliant for use in bushfire zones, including the most extreme, BAL-FZ (Bushfire Attack Level – Flame Zone) specified in AS 3959-2009.

Cool Roofing

Many people know that the colour of your roof can make a difference to your cooling bill and no less than five of the standard colours in

the COLORBOND® steel range qualify as solar reflective (light coloured) roofing under the Green Star Design and As Built and Communities tools. But there's another way that COLORBOND® steel can help make your building more energy efficient. Every standard colour (except Night Sky®) in the COLORBOND® steel range features Thermatech® solar reflectance technology. Thermatech® technology is designed to reflect more of the sun's heat on hot sunny days, which can mean less dependence on air-conditioning, plus reduced heat stress for your roof. This makes COLORBOND® steel a good choice for your building, your wallet and our planet.



All COLORBOND® steel contains recycled content and its steel is 100% recyclable



Health, Safety, Environment and Community at BlueScope

COLORBOND® steel is manufactured at BlueScope’s Australian facilities at Port Kembla and Erskine Park (NSW), Western Port (VIC) and Acacia Ridge (QLD). The manufacturing facilities are accredited to both ISO 9001 (Quality Systems) and ISO 14001 (Environmental Management Systems). BlueScope is a member of the World Steel Association Climate Action Programme, which measures and monitors carbon dioxide emissions. The data collection programme is at the core of the steel industry’s global steel sectoral approach to climate change.

At BlueScope, we pride ourselves on our role as a good corporate citizen. We recognise our social responsibilities and strive to continuously

improve our performance in the areas of health, safety, environment and community.

“We care for the environment” is a cornerstone statement in “Our Bond”, which guides the decisions we make at BlueScope each day. We consider the potential impacts that we could make to land, air, water, waste, noise and energy/greenhouse gas emissions as part of our normal business processes.

The safety of our people is our number one priority at BlueScope. Across the company, from our manufacturing and distribution sites to our offices, our focus is on Zero Harm. The results are very evident – we have now reached a point

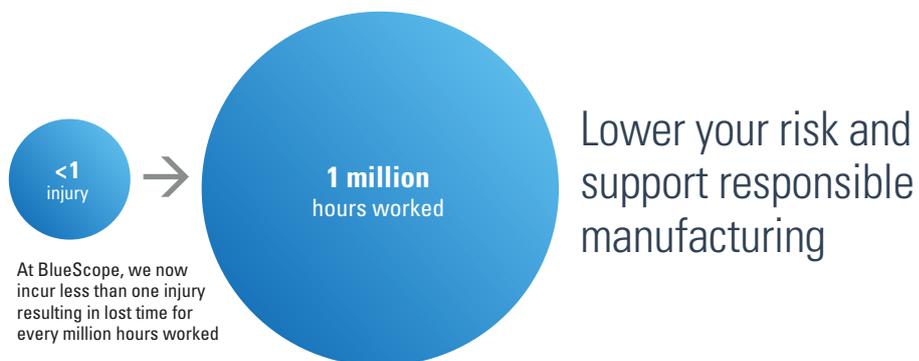
where we incur less than one injury resulting in lost time for every million hours worked, and our efforts have lowered the likelihood of injury across BlueScope’s workforce.

As an Australian manufacturer, we are proud to contribute to local employment and economic growth, and to contribute to the wellbeing and prosperity of our community.

See Our Bond at <http://bluescope.com/about-us/our-bond>

Find Out More

Refer to CSE Report at <http://bluescope.com/sustainability>



COLORBOND® steel

Environmental Product Declaration

LCA Terminology

Cradle to gate	Scope of study extends from mining of natural resources to the completed product ready for shipping from the manufacturing dispatch "gate", known as Modules A1-A3.
Cradle to grave	Scope of study extends from mining of natural resources to manufacture, use and disposal of products at End of Life, including all Modules A-D.
End of life	Post-use phase life cycle stages involving collection and processing of materials (eg scrap) and recycling or disposal, known as Modules C and D.
BMT	Base metal thickness of steel substrate.

Glossary of Terms

Impact Category	Units	Description	Characterisation Method
Global warming (climate change) potential	kgCO ₂ equiv	Contribution to the greenhouse effect, referred to as CO ₂ e (carbon dioxide equivalent)	IPCC AR4
Stratospheric ozone depletion potential	kg CFC-11 equiv	Impact on the ozone layer	WMO 1999
Acidification potential of land and water	kg SO ₂ equiv	Emissions which increase the acidity of the environment	CML
Eutrophication potential	kg PO ₄ ³⁻ equiv	Addition of nutrients to a water system resulting in reduction of the oxygen available to support aquatic life	CML
Photochemical (tropospheric) ozone creation potential	kg C ₂ H ₄ equiv	Contribution to air pollution in the form of smog	CML
Depletion of abiotic resources (elements/minerals)	kg Sb equiv	Impact of consuming non-renewable mineral resources	CML
Depletion of abiotic resources (fossil)	MJ net calorific value	Impact of consuming non-renewable fossil fuel resources	CML
Human toxicity ¹	kg 1,4DB equiv	Human health impact of chemical emissions	USEtox
Land use ¹	kg C deficit eq. (SOM)	Use of land that could be used or preserved for other purposes	Soil Organic Matter (SOM) method (Mila Canals et al 2007)
Resource depletion – water ¹	m ³ water use related to local scarcity of water	Use of fresh water	Water Stress Indicator
Ionising radiation ¹	kg U-235 equivalent to air	Radioactive substances released to the environment	Human Health Effect Model
Particulate matter ¹	kg PM2.5 equivalent	Contribution to air pollution which can have respiratory effects	RiskPoll

¹ Green Star additional impact categories.

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Programme-related Information and Verification

Programme:	The Australasian EPD® Programme c/o Enviro-Mark Solutions Level 14 / Prime Property Tower 86-90 Lambton Quay, Wellington 6011, New Zealand info@epd-australasia.com New Zealand Phone: 0800 366 733 Australia Phone: 1800 733 560 http://www.epd-australasia.com
EPD Registration Number:	S-P-00999
Published:	2017-03-27
Valid Until:	2022-03-27
Revision Date:	2019-01-15
Product Category Rules:	PCR 2012:01 Construction Products and CPC 54 Construction Services, v2.01
Product Group Classification:	UN CPC 41121 – Flat-rolled products of non alloy steel, not further worked than hot rolled, of a width of 600mm or more ANZSIC 2711 – Iron and Steel Manufacturing
Reference Year for Data:	2014-7-1 – 2015-6-30 (majority of data)
Geographical Scope:	Scope of EPD: Produced using Australian data. Application scope: International
CEN standard EN 15804 served as the core PCR	
PCR:	PCR 2012:01 Construction Products and CPC 54 Construction Services, v2.01
PCR review was conducted by:	The Technical Committee of the International EPD® System. Chair: Massimo Marino. Contact via info@environdec.com
Independent Verification of the Declaration and Data, according to ISO 14025:	<input type="checkbox"/> EPD process certification (Internal) <input checked="" type="checkbox"/> EPD verification (External)
Third Party Verifier, Approved by The International EPD® System	 Rob Rouwette , start2see Pty Ltd, Rob.Rouwette@start2see.com.au
Accredited or approved by:	The Australasian EPD® Programme
Version History	v1.0 Initial release v1.1 Correction of Product Content and minor text changes; update of background data to GaBi Databases 2018; update of Green Star Additional Indicators for Land use and Resource depletion – water.

COLORBOND® steel

Environmental Product Declaration

Mandatory Statements

- This EPD covers life cycle stages A1-A3 plus C3, C4 and D. All other stages are dependent on the specific application of the product and should be included in a whole-of-life model.
 - This EPD is verified to be compliant with EN 15804.
 - EPD of construction products may not be comparable if they do not comply with EN 15804.
 - EPDs within the same product category but from different programmes or utilising different PCRs may not be comparable.
-

Contact Information

**For further information, contact BlueScope Steel Direct
1800 800 789
www.steel.com.au**

BlueScope Steel Limited	Level 11, 120 Collins St, Melbourne Vic 3000 Australia ABN 16 000 011 058 Responsible person: David Mawby, Marketing Manager, BlueScope.
EPD Owner	David Mawby, BlueScope david.mawby@bluescopesteel.com
LCA Author	Nicole Sullivan, BlueScope [Note: has left the business] Jeff Vickers, thinkstep jeff.vickers@thinkstep.com Gayathri Gamage, thinkstep gayathri.gamage@thinkstep.com
Programme Operator	The Australasian EPD® Programme info@epd-australasia.com
Product Website	http://www.colorbond.com
BlueScope Manufacturing ISO 14001 Certificate	http://steel.com.au/articles/article-25-using-bluescope-products-in-sustainable-building/article-38--green-tools--schemes
Worldsteel Climate Action Programme Membership	http://www.worldsteel.org/steel-by-topic/climate-change/members.html
BlueScope Sustainability Report	https://www.bluescope.com/sustainability/reports/
BlueScope Community Website	http://www.bluescopeillawarra.com.au

COLORBOND® steel

Environmental Product Declaration

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Version 1.0.

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September 2016

The 2015 Community, Safety and Environment (CSE)

<https://www.bluescope.com/sustainability/reports/>

steel.com.au/epd
To learn more about COLORBOND® steel

1800 064 384
For more information

