XLERPLATE® steel

Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2:2019

BLUESCOPE

AUSTRALASIA EPD®
ENVIRONMENTAL PRODUCT DECLARATION

epd

Programme: EPD Australasia | https://epd-australasia.com
Programme Operator: EPD Australasia Limited
EPD Registration number: S-P-00558
Version 2.0
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Valid until: 27-11-2025

BlueScope Steel Products
Designed for sustainability.

Anna Meares Velodrome, Queensland.
Architect: Cox Architecture

This covered velodrome in Queensland – built for the 2018 Commonwealth Games – displays a sophisticated engineering solution in its saddle-shaped roof structure made from steel, which imparts a graceful elegance to the building.

The finely crafted structure – made from 300 tonnes of steel plate including custom-welded tapering pin joints made from XLERPLATE® steel and 900 tonnes of Circular Hollow Section (CHS) – that supports the fabric roof is carefully resolved to tread the fine line between efficiency and aesthetics.

Elements of the Green Star Public Building Pilot tool and the Living Building Challenge were incorporated into the design. The structure provides a quiet backdrop for the high-intensity theatrical action of the sport.

Key Insights

This EPD provides data for 1 kg of XLERPLATE® steel, manufactured by BlueScope in Australia.

Changes from Previous EPD:

- Published in line with EN 15804:2012+A2:2019: page 4
- Results split by steel grade groups providing more specific and accurate information: pages 14-19
- The global warming potential of XLERPLATE® steel products has decreased over the last 5 years: page 20

Green Star and IS Rating: page 4

This EPD contributes to the achievement of credits under green building rating schemes.

- Independently verified
- Cradle-to-gate with modules C1-C4 and module D
- Product specific
- Additional Green Star indicators

Recycled Content: page 7

Across the range of steel products manufactured by BlueScope in Australia, including XLERPLATE® steel and all other steel products, the average recycled content[1] in the steel is **17.4%**, which includes pre- and post-consumer recycled materials. Materials reclaimed within the steelmaking, coating and painting operations represent an additional 6.8% average recovered content.

Product Content: page 8

The average composition of 1 kg of XLERPLATE® steel is:

Product content	Low carbon steel (kg)	Medium carbon steel (kg)	Alloyed steel (kg)
Steel	1.000	1.000	1.000
Chemical composition			
Iron	>0.990	>0.985	>0.975
Manganese	<0.005	<0.010	<0.015
Silicon	<0.001	<0.001	<0.003
Chromium	<0.001	<0.001	<0.002
Carbon	<0.001	<0.002	<0.002
Other	<0.003	<0.002	<0.003

Notes: the terms 'Low carbon' and 'Medium carbon' steel refer to the carbon content in the metal alloy and not to the carbon dioxide (CO_2) emissions associated with the product. The most common products under each product group are listed on page 9.

1. According to recycled content categories defined in ISO 14021:2016. Scrap and iron-bearing materials generated and reclaimed from BlueScope's steelmaking, coating and painting operations represent 6.8% of the product mass, which is not reported as recycled content. Scrap from rollforming and fabrication processes are included as pre-consumer recycled content.

XLERPLATE® steel

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This EPD sets out information on XLERPLATE® steel plate manufactured at the Plate Mill at the BlueScope Port Kembla Steelworks. As the declared unit of 1 kilogram of steel is in mass and the steel product is consistent in composition, any variability in thickness or length has no bearing on the final assessment.

Results for XLERPLATE® steel products have been grouped based on their carbon and alloy content (i.e. Low carbon, Medium carbon and Alloyed steel)[2]. Each grade group represents the production-weighted average of a number of similar specific grades of steel, and is representative for those grades. Any differences in composition of steel grades within these grade groups is considered insignificant in relation to the overall results. The steel grade groups covered by this EPD and the most common products under each group are presented on page 9.

This EPD is of the type 'cradle-to-gate with modules C1-C4 (end of life) and module D (reuse, recovery and/or recycling potential)'. Other life cycle stages are dependent on how the product is used, and should be developed and included as part of a holistic assessment of specific construction works.

Green Star and IS Rating

This EPD contributes to the achievement of credits under green building rating schemes.

- Published in line with EN 15804:2012+A2:2019
- Independently verified
- Cradle-to-gate with modules C1-C4 and module D
- Product specific
- Additional Green Star indicators

Programme:	EPD Australasia www.epd-australasia.com
Programme Operator:	EPD Australasia Limited
Product Category Rules (PCR):	PCR 2019:14 Construction Products, Version 1.0, 2019-12-20 (valid until 2024-12-20)
EPD Registration Number:	S-P-00558
Version:	2.0
Publication date:	09-07-2015
Version date:	27-11-2020
Valid until:	27-11-2025
Geographical Scope:	Australia

2. Note that the terms 'Low carbon' and 'Medium carbon' steel refer to the carbon content in the metal alloy and not to the carbon dioxide (CO_2) emissions associated with the product.

XLERPLATE® steel
Environmental Product Declaration

Steel by BlueScope

We create and inspire smart solutions in steel, to strengthen our communities for the future.

In Australia, BlueScope manufactures steel from raw and recycled materials using an 'integrated steelmaking' method. This involves the use of iron ore, coal, steel scrap, fluxes (limestone and dolomite) and alloying materials to produce steel slab via the major processes of sintering, cokemaking, Blast Furnace/Basic Oxygen Furnace (BF-BOF) steelmaking and continuous slab casting, prior to hot rolling into the final XLERPLATE® steel plate product.

XLERPLATE® steel is manufactured at Port Kembla, NSW. 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.

BlueScope is also a founding member of ResponsibleSteel™, the first global multi-stakeholder standard and certification initiative for the steel industry, which supports the responsible sourcing and production of steel.

BlueScope's commitment to sustainability is a fundamental theme in Our Purpose: We create and inspire smart solutions in steel, to strengthen our communities for the future.

Our Purpose speaks to why we operate and where we want to be. Our Bond is an expression of our values which recognises our customers as our partners, our people as our strength and communities as our homes. Our Corporate Strategy aims to transform and grow BlueScope, while continuing to deliver on core expectations for our stakeholders.

We are resolute in upholding our social duties to ensure that BlueScope is a safe and environmentally responsible place to work. Our care and commitment to health, safety, environment and community (HSEC) is articulated by our HSEC Policy and is integral to the way we do business.

Our aim is to actively protect the safety and wellbeing of people and minimise the impact of our operations on the local environment and the communities in which we operate.

Our progress and case studies are shared, and can be found in our annual Sustainability Report.

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.

Find Out More
Read more about Our Purpose, Our Bond and commitment to sustainability and HSEC at: https://www.bluescope.com

The Future of Steel

At BlueScope, we see a strong future for steel.

Steel is an enabler of the achievement of the United Nations Sustainable Development Goals (SDGs), including SDG 8 Decent work and economic growth, SDG 9 Industry, innovation and infrastructure and SDG 12 Responsible consumption and production and, supported by continued demand, presents a strong opportunity to transition to a low-carbon, circular economy.

Steel's strength, durability and adaptability make it a material of choice for many different applications in many industries, from buildings to bridges, vehicles to appliances. Steel is also a critical input for the transition to a clean energy future, being a key material for wind turbines, hydropower and solar power, as well as transmission and distribution infrastructure, among other key assets. However, despite steel products being an important facilitator of the clean energy transition, the production of steel is energy and emissions-intensive.

For the steel sector to contribute to the achievement of the goals of the Paris Agreement, the future of iron and steelmaking will need to be centred around breakthrough steelmaking technology, and whilst there are promising initiatives at various stages of development and commercialisation, a wholesale shift to near-zero greenhouse gas emission technologies is not anticipated to occur in the near term.

BlueScope has a strong history of innovation, including in environmental impact reduction. We are committed to climate change action, reflected in our corporate strategy and emission reduction targets.

More information on the future of steel and BlueScope's approach to the climate challenge, can be found in our Sustainability Report: https://www.bluescope.com/sustainable-steel/reports/

Steel can be reused, remanufactured or recycled, supporting the shift towards a circular economy.

Steel and the Circular Economy

Steel is well placed to lead in a circular materials economy – one where resources and materials are kept in use for as long as possible and then repaired, reused, returned or recycled. Steel's recyclability is unmatched by most other material groups, being easily recovered and retaining its valuable properties when transformed into new products.

BlueScope's manufacturing processes are optimised to minimise the use of resources, reduce waste and reuse or convert waste materials into other valuable products.

Along with commercial benefits, maximising resource efficiency prevents resources from going to waste and supports their use in sectors beyond the iron and steel industry.

Slag is a by-product of steelmaking which, over the years, has transitioned from a waste to a sought-after product. There are two types of slag produced at BlueScope's Port Kembla Steelworks; Blast Furnace Slag and Steel Furnace Slag.

Blast Furnace Slag is a vital input to the cement industry, where it can be used as a substitute for the emissions-intensive active ingredient, clinker. Ground Granulated Blast Furnace Slag can also be used as a partial cement replacement.

Additionally, both Blast Furnace Slag and Steel Furnace Slag are also used as road base material. These applications directly offset the use of quarried materials.

Water is integral to our operations, and water stewardship is a key part of our ongoing licence to operate. BlueScope has a recycled water supply agreement in place with the local authority Sydney Water, significantly reducing demand on local fresh water sources. Port Kembla Steelworks averages over 90% recycled water use (tertiary treated effluent).

Steel and Embodied Carbon

BlueScope supports the Paris Agreement on climate change which states that the global economy must transition to net zero by the middle of this century to limit global increases in temperature well below 2 degrees Celsius.

The achievement of the Paris Agreement requires a transformation in the way steel is produced. While global demand for scrap continues to outstrip supply, the development and deployment of new low emissions technologies for primary steel production (BF-BOF) while increasing the role of secondary steelmaking (Electric Arc Furnace or EAF), will be key. There is a need to develop a mechanism that identifies and rewards low carbon emissions steelmaking, irrespective of the proportion of scrap or iron ore used as the primary input material.

Such mechanisms would enable users to identify and reward reductions in embodied carbon and efficiencies in manufacturing practices for the steel sector, rather than simply identifying products that use more or less scrap steel. This would create the basis for downstream users of steel to contribute to the achievement of the Paris Agreement through their steel specifying and purchasing decisions, and to reward responsible steelmakers for their own commitment.

BlueScope is a founding member of ResponsibleSteel™, our sector's first global multi-stakeholder standard and certification programme. Initiatives, such as ResponsibleSteel™, are incorporating new methodologies to ensure that the carbon emissions of steel products are calculated on a like-for-like basis, irrespective of the raw materials used and the steel production technology.

Responsible™ Steel | standards & certification


Steel is 100% recyclable without loss of quality

Specifying Steel – Recycled Content and Recyclability

Recycled Content
Across the range of steel products manufactured by BlueScope in Australia, including XLERPLATE® steel and all other steel products, the average recycled content[3] in the steel is 17.4%, which includes pre- and post-consumer recycled materials. Materials reclaimed within the steelmaking, coating and painting operations represent an additional 6.8% average recovered content.

While specifying high recycled content can be an effective way of minimising the environmental impact of many materials, especially those likely to be disposed of at end of life, recycled content is not necessarily a useful metric for steel. This is because the inherent value of scrap steel drives its recovery. In Australia, this is evidenced by a recycling rate for metals of 90%[4].

In a global context, where steel demand exceeds scrap supply, the specification of steel products with higher recycled content or produced from a specific manufacturing method, is therefore unlikely to provide a net environmental benefit, as it does not cause more steel to be recycled.

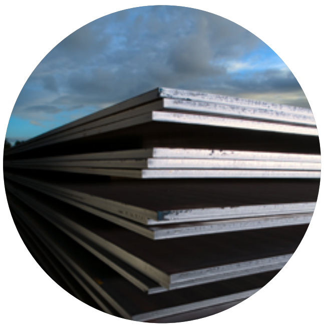
Focusing on end of life, including ease of recovery e.g. designing for disassembly, is a more effective way of achieving sustainable outcomes with steel products.

Recyclability
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. Scrap merchants are available in all major cities in Australia.

The actual recycling rate of steel at end of life has a significant impact on the cradle-to-grave results. For steel used in construction products, the end of life recycling rate is likely to be higher than the 90%[4] used in this assessment, but in specific construction projects may range from 0-100%, depending on individual site circumstances.

Design Considerations
A focus on design is important to minimise the whole of life impact of any construction project. Steel is a strong, durable and versatile material. It lends itself well to structures that are designed for long life, resilience and flexibility to accommodate multiple future reuse options without reinvestment in structural alteration and refurbishment.

BlueScope manufactures a range of standard and high strength steel grades in plate and coil form. High strength steel grades enhance the strength to weight performance in structural steel applications when the design is governed by strength; by maximising the strength grade, a reduced volume of steel would be required in these applications, e.g. columns and primary members. This in turn can result in embodied carbon savings relative to a reference building design that utilises standard steel grades.



Across the range of steel products manufactured by BlueScope in Australia, including XLERPLATE® steel and all other steel products, the average recycled content in the steel is **17.4%**, which includes pre- and post-consumer recycled materials.

3. According to recycled content categories defined in ISO 14021:2016. Scrap and iron-bearing materials generated and reclaimed from BlueScope's steelmaking, coating and painting operations represent 6.8% of the product mass, which is not reported as recycled content. Scrap from rollforming and fabrication processes are included as pre-consumer recycled content.
4. Pickin J et al., National Waste Report 2018, Prepared for the Department of the Environment and Energy; 2018, p. 31.

Declared Unit: This EPD is valid for 1 kg of XLERPLATE® steel from BlueScope's Port Kembla Steelworks.

Product Description

XLERPLATE® steel hot rolled plate products are manufactured to relevant Australian standards to ensure quality and consistency. Categorised into structural, boiler and pressure vessels and analysis products, XLERPLATE® steel is typically used to manufacture structural sections for buildings, bridges and stadiums and for other heavy industrial applications such as wind towers, pipelines and storage tanks.

Produced to the Australian Standards AS/NZS 3678:2016 (certified by the Australasian Certification Authority for Reinforcing and Structural Steels (ACRS)), and AS 1548-2008, the XLERPLATE® steel hot rolled plate range provides the flexibility to select from our standard range or customised grades, width, thickness and length to suit your specific design criteria.

XLERPLATE® steel products form part of the following standard classifications: ANZSIC 2711 – Iron and Steel Manufacturing and UN CPC 41211 – Flat-rolled products of non alloy steel, not further worked than hot rolled, of a width of 600mm or more.

Product Content

The average composition of 1 kg of XLERPLATE® steel is:

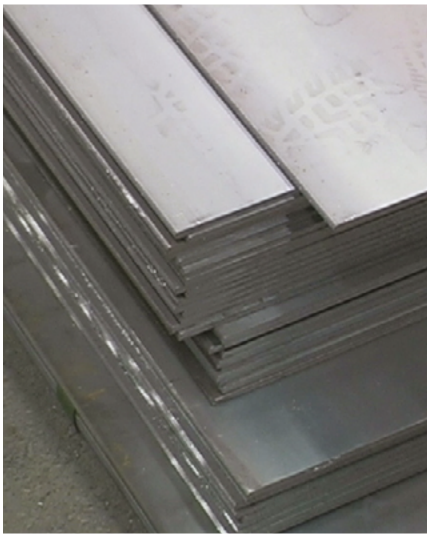
Product content	Low carbon steel (kg)	Medium carbon steel (kg)	Alloyed steel (kg)	Recycled material (pre- and post-consumer)[5]
Steel	1.000	1.000	1.000	17.4%, average across the range of steel products manufactured by BlueScope in Australia, including XLERPLATE® steel and all other steel products.
Chemical composition				
Iron	>0.990	>0.985	>0.975	–
Manganese	<0.005	<0.010	<0.015	–
Silicon	<0.001	<0.001	<0.003	–
Chromium	<0.001	<0.001	<0.002	–
Carbon	<0.001	<0.002	<0.002	–
Other	<0.003	<0.002	<0.003	–
Packaging materials	**Mass (kg)**			**Packaging mass (% of product mass)**
Steel	0.0033			0.33%
Plastic (LDPE)	0.0014			0.14%
Timber	0.0146			1.46%

XLERPLATE® steel is compliant with the European REACH regulation[6] (EC) 1907/2006 and does not release any hazardous substances when used as recommended. For safe use and maintenance, refer to the product Safety Data Sheet (SDS) available under Technical Documentation at http://www.steel.com.au/library

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.

Note: the terms 'Low carbon' and 'Medium carbon' steel refer to the carbon content in the metal alloy and not to the carbon dioxide (CO_2) emissions associated with the product. The most common products under each product group are listed on page 9.

5. According to recycled content categories defined in ISO 14021:2016. The value 17.4% represents the average recycled content across the range of steel products manufactured by BlueScope in Australia, including XLERPLATE® steel and all other steel products. Scrap and iron-bearing materials generated and reclaimed from BlueScope's steelmaking, coating and painting operations represent 6.8% of the product mass, which is not reported as recycled content. Scrap from rollforming and fabrication processes are included as pre-consumer recycled content.
6. Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals.



A summary of the XLERPLATE® steel product range

Thickness	Between 5mm and 150mm (depending on product)
Grade	A range of grades available for structural, pressure vessel and analysis application. For more details on the range of grades visit http://www.steel.com.au/products/uncoated-steel/xlerplate-steel
Width	Between 1250mm and 3200mm (depending on product)
Mass	Available from 5t
Edge Condition	– Mill edge/untrimmed edge is where the plate is supplied with an edge in the 'as rolled' condition – Trimmed edge is where the plate is supplied with a sheared or thermal cut edge

Product Groups

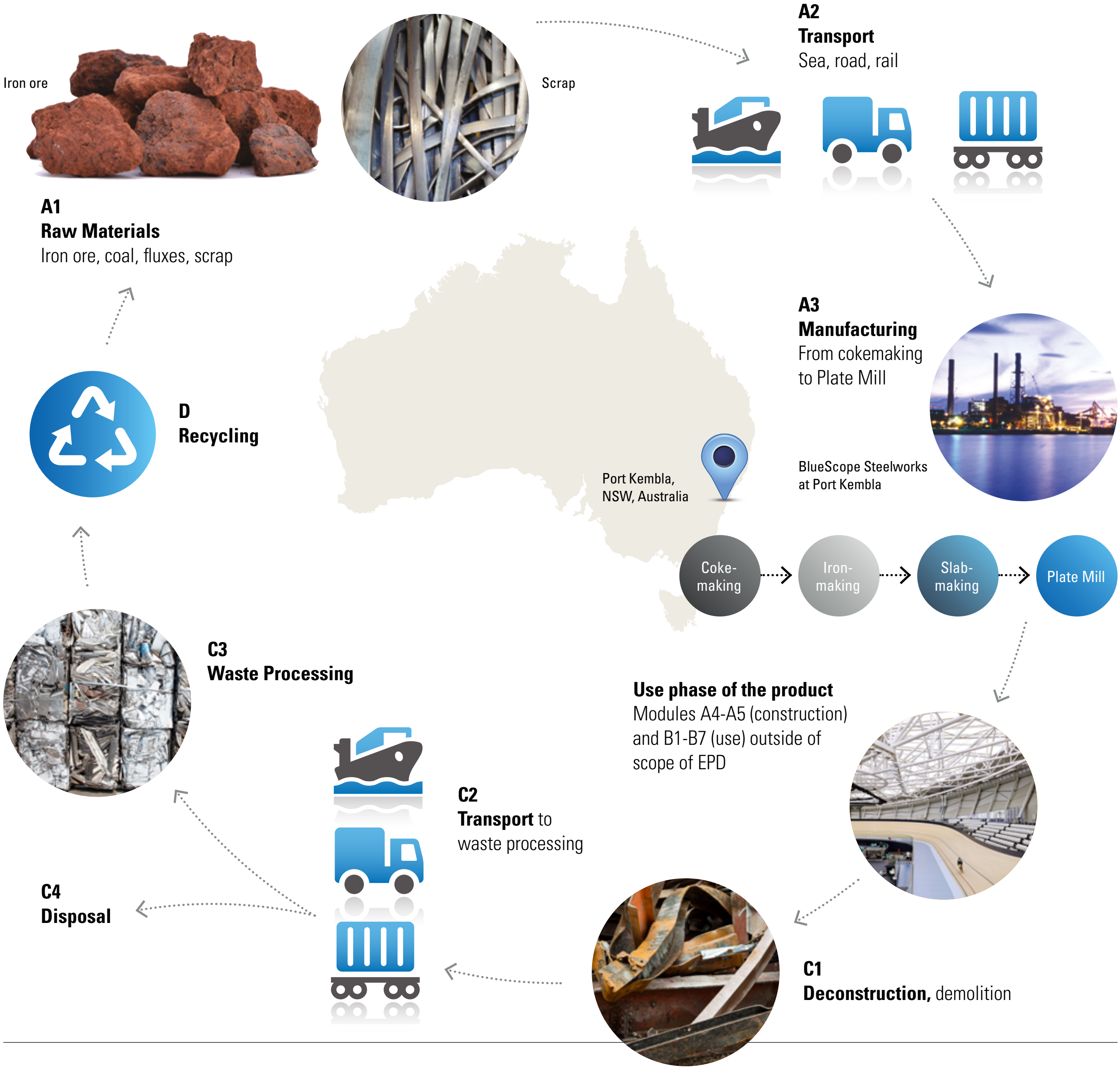
This EPD covers BlueScope's range of XLERPLATE® steel products manufactured in Australia, which have been grouped based on their carbon and alloy content. Note that the terms 'Low carbon' and 'Medium carbon' steel refer to the carbon content in the metal alloy and not to the carbon dioxide (CO_2) emissions associated with the product. The different steel grade groups covered by this EPD are presented below with the most common products under each group. This list is not intended to be exhaustive. If clarification on a particular product is required, please get in touch by contacting BlueScope Steel Direct on 1800 024 402.

Low Carbon Steel
Steel typically used for pre-painted and metallic-coated applications. Also used as light structural steel and some tubing steel.
- AS/NZS 3678-A1006 (analysis grade)

Medium Carbon Steel
Typically structural steels. Also gas cylinders, tubing and piping steels.
- AS/NZS 3678-8300MOD5
- AS/NZS 3678-Lasercut 250
- AS/NZS 3678-Lasercut 350

Alloyed Steel
Heavy structural steel plates, also manufactured into welded beams and columns, used in buildings and bridges, shipbuilding steels, large pressure vessel steels, military steels.
- AS/NZS 3678-250, 300, 350, 400, 450, WR350 (variants with impact testing, through thickness testing, customer specific variants)
- AS 1548-430, 460, 490 (supply condition variants, T, NR, NRA, N) (variants with impact testing, through thickness testing, high temperature tensile tests)
- AS/NZS 3678-K1042 (analysis grade)
- AB0126, AB3501, AB4501 (customer specific grades)
- EN 10025-2-S355 (variants with impact testing, through thickness testing, customer specific variants)
- VLAOPV, VLD36OPV, LLA, LLD, LLAH36, LLDH36, LLDH36Z35, LLEH36, AMECON D36 (shipbuilding grades)
- ASTM A516M GR70, A572 GR50, A36

XLERPLATE® steel Manufacturing in Australia



XLERPLATE® steel
Environmental Product Declaration

Scope of Declaration

The scope of this declaration is according to EN 15804:2012+A2:2019 and is for 1 kg of XLERPLATE® steel from cradle-to-gate with modules C1-C4 and module D. Modules A4-A5 and B1-B7 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 and preparation for dispatch to customers at the exit gate of the manufacturing site.

The system boundary also includes manufacture of other required input materials, 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 C1-C4 (end of life stage), and module D (reuse, recovery and/or recycling potential).

Scope of Declaration in EPD

	Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundary
	Raw material supply	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
Modules	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	AU	AU	AU	–	–	–	–	–	–	–	–	–	AU	AU	AU	AU	AU
Specific data	>90%			–	–	–	–	–	–	–	–	–	–	–	–	–	–
Variation – products	<10%			–	–	–	–	–	–	–	–	–	–	–	–	–	–
Variation – sites	Not relevant			–	–	–	–	–	–	–	–	–	–	–	–	–	–

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

Life Cycle Assessment (LCA) Methodology

This EPD has been produced in conformance with the requirements of PCR 2019:14 v1.0 Construction Products, the Instructions of the Australasian EPD Programme v3.0, The International EPD® System General Programme Instructions (GPI) v3.01, and the Australian Green Star Life Cycle Impacts credit.

Primary data were collected for all relevant BlueScope sites in Australia and for all inputs and outputs in the production stage (A1-A3). The original study was based on an annual average for the time period July 2012 to June 2013. This update is based on an annual average for the time period July 2018 to June 2019, for all LCA hotspots covering all inputs with a combined contribution of more than 95% of all main EN15804+A1 impact categories. All direct emissions data was also updated using the average results reported to the National Pollution Inventory over the 3 year period 2016 to 2019. The original data is used for the remaining processes.

All relevant and available data were collected. While cut-off criteria according to the PCR section 4.4 were employed, much data which would have fallen within that scope were included regardless, if available, resulting in a data set which is robust and captures all significant contributors to the LCA results. Use of secondary data (i.e. non process-specific data) was not required within the manufacturing (A3) scope. No carbon dioxide offsetting is included in the EPD.

The secondary data used were procured from the GaBi LCA databases 2020 and hence are less than 5 years old. The electricity supply mix was based on GaBi's state-specific grid mix dataset for NSW (2016-17), which is highly reliant on hard coal (77%), with imports from VIC (6.5%), and QLD (5.6%), and generation from hydro (4.1%), natural gas (3.3%), wind (2.5%), and photovoltaics (<1%). The GWP-total is 1.03 kg CO_2-eq./kWh.

The 'Resource depletion – water' (RDW) indicator requires water scarcity data for the production areas, and these were modelled using the specific watershed scarcity data for the Port Kembla Steelworks.

Where subdivision of processes was not possible, allocation was carried out using the most relevant physical quantity (mass, volume or energy). Economic allocation was applied, using annual average prices for the Australian financial year of 1 July 2018 to 30 June 2019, where the difference in the price of the co-products was large (>25%), including for Gypsum (co-product of sinter), Blast Furnace Slag (co-product of pig iron), and BOS Slag (co-product of BOS steel).

The recycling scenario was based on the National Waste Report 2018[7] which indicates that the average metals recycling rate in Australia is 90%. 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 in the study were:

- Accuracy of data measurement falls within normal industrial weighing systems accuracy limits of +/-5%.
- Transport of all materials other than major raw materials is insignificant to the overall impacts of hot rolled steel products.
- Upstream data taken from the GaBi LCA database reflects average or generic production and therefore does not correspond to BlueScope's actual suppliers.
- Each grade group (i.e. Low carbon, Medium carbon and Alloyed steel) is the production-weighted average of a number of similar specific grades of steel, and is representative for those grades. Any differences in composition of steel grades within these grade groups is generally considered insignificant compared to the overall results.

Take care when comparing
Issues to consider when comparing EPD data include:

- Both EPDs must comply with the comparability requirements in EN 15804, e.g. using equivalent methodology and assumptions such as utilising the same Product Category Rules (PCR).
- The results for EN 15804:2012+A1:2013 compliant EPDs are not comparable with EN 15804:2012+A2:2019 compliant studies as the methodologies are different. EN 15804:2012+A1:2013 compliant results are given in this document to assist comparability across EPDs and support use in tools such as Green Star.
- 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.

7. Pickin J et al., National Waste Report 2018, Prepared for the Department of the Environment and Energy; 2018, p. 31.

Environmental Performance

The potential environmental impact indicators included in this EPD are described in the table below. See the References section for full details on Characterisation Methods. All the result tables from this point will contain the abbreviations only. All results reported in MJ are in net calorific value.

Indicator	Abbreviation	Units	Characterisation Method
Potential Environmental Impact indicators, in accordance to EN 15804:2012+A2:2019			
Global Warming Potential – total	GWP-total	kg CO_2-eq.	IPCC 2013 (AR5)
Global Warming Potential – fossil fuels	GWP-fossil	kg CO_2-eq.	IPCC 2013 (AR5)
Global Warming Potential – biogenic	GWP-biogenic	kg CO_2-eq.	IPCC 2013 (AR5)
Global Warming Potential – land use and land use change	GWP-luluc	kg CO_2-eq.	IPCC 2013 (AR5)
Depletion Potential of the Stratospheric Ozone Layer	ODP	kg CFC-11-eq.	WMO 2014
Acidification potential	AP	mol H^+-eq.	Accumulated Exceedance
Eutrophication potential – freshwater	EP-freshwater	kg P-eq.	EUTREND model (ReCiPe)
Eutrophication potential – marine	EP-marine	kg N-eq.	EUTREND model (ReCiPe)
Eutrophication potential – terrestrial	EP-terrestrial	mol N-eq.	Accumulated Exceedance
Formation potential of tropospheric ozone	POCP	kg NMVOC-eq.	LOTOS-EUROS
Abiotic depletion potential for non-fossil resources	ADP-minerals & metals	kg Sb-eq.	CML 2002a
Abiotic depletion potential for fossil resources	ADP-fossil	MJ	CML 2002a
Water (user) deprivation potential	WDP	m^3 world-eq. deprived	AWARE
Additional Environmental Impact indicators, in accordance to EN 15804:2012+A2:2019			
Particulate Matter emissions	PM	Disease incidence	SETAC-UNEP, Fantke et al. 2016
Ionising Radiation – human health	IRP	kBq U-235-eq.	Human Health Effect model
Eco-toxicity – freshwater	ETP-fw	CTUe	USEtox
Human toxicity potential – cancer effects	HTP-c	CTUh	USEtox
Human toxicity potential – non-cancer effects	HTP-nc	CTUh	USEtox
Land use related impacts / soil quality	SQP	dimensionless	Soil quality index (LANCA®)
Resource use parameters			
Use of renewable primary energy excluding renewable primary energy	PERE	MJ	n/a
Use of renewable primary energy resources used as raw materials	PERM	MJ	n/a
Total use of renewable primary energy resources	PERT	MJ	n/a
Use of non-renewable primary energy excluding non-renewable primary	PENRE	MJ	n/a
Use of non-renewable primary energy resources used as raw materials	PENRM	MJ	n/a
Total use of non-renewable primary energy resources	PENRT	MJ	n/a
Use of secondary material	SM	kg	n/a
Use of renewable secondary fuels	RSF	MJ	n/a
Use of non-renewable secondary fuels	NRSF	MJ	n/a
Net use of fresh water	FW	m^3	n/a
Waste Categories and Output Flows			
Hazardous waste disposed	HWD	kg	n/a
Non-hazardous waste disposed	NHWD	kg	n/a
Radioactive waste disposed	RWD	kg	n/a
Components for re-use	CRU	kg	n/a
Materials for recycling	MFR	kg	n/a
Materials for energy recovery	MER	kg	n/a
Exported energy – electrical	EEE	MJ	n/a
Exported energy – thermal	EET	MJ	n/a
Additional Potential Environmental Impact indicators, in accordance to EN 15804:2012+A1:2013			
Global warming potential	GWP	kg CO_2-eq.	IPCC 2007 (AR4)
Ozone depletion potential	ODP	kg CFC-11-eq.	WMO 2003
Acidification potential	AP	kg SO_2-eq.	CML 2002b
Eutrophication potential	EP	kg PO_4^{3-}-eq.	CML 2002b
Photochemical ozone creation potential	POCP	kg C_2H_4-eq.	CML 2002b
Abiotic depletion potential for non-fossil resources	ADPE	kg Sb-eq.	CML 2002b
Abiotic depletion potential for fossil resources	ADPF	MJ	CML 2002b
Additional Green Star v1.3 indicators			
Land Use	LU	kg C deficit-eq.	Soil Organic Matter method
Resource depletion – water	RDW	m^3	Water Stress Indicator
Particulate Matter	PM	kg PM2.5-eq.	RiskPoll

Results for 1 kg of XLERPLATE® steel – Low Carbon Steel

In accordance to EN 15804:2012+A2:2019

Potential Environmental Impacts							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2-eq.	2.57	6.37E-04	0.00470	0.0471	0.00479	-1.23
GWP-fossil	kg CO_2-eq.	2.59	6.39E-04	0.00451	0.0471	0.00493	-1.23
GWP-biogenic	kg CO_2-eq.	-0.0226	-2.01E-06	1.86E-04	4.23E-05	-1.47E-04	-0.00155
GWP-luluc	kg CO_2-eq.	6.10E-05	1.14E-08	8.37E-08	1.13E-05	4.80E-06	3.83E-05
ODP	kg CFC-11-eq.	9.10E-15	8.50E-20	6.26E-19	2.15E-16	1.09E-17	2.81E-15
AP	mol H^+-eq.	0.00874	3.27E-06	1.25E-05	2.26E-04	1.58E-05	-0.00135
EP-freshwater	kg P-eq.	3.29E-07	1.08E-10	7.96E-10	2.19E-08	3.78E-09	-7.11E-07
EP-marine	kg N-eq.	0.00189	1.53E-06	5.46E-06	4.84E-05	3.85E-06	-1.32E-04
EP-terrestrial	mol N-eq.	0.0213	1.67E-05	6.01E-05	5.28E-04	4.23E-05	-0.00101
POCP	kg NMVOC-eq.	0.00654	4.27E-06	1.16E-05	1.34E-04	1.22E-05	-0.00107
ADP-minerals & metals[8]	kg Sb-eq.	9.73E-08	7.85E-12	5.78E-11	3.15E-09	3.33E-10	-9.55E-08
ADP-fossil[8]	MJ	24.1	0.00849	0.0625	0.521	0.0706	-10.4
WDP[8]	m^3 world-eq. deprived	0.103	4.07E-06	3.00E-05	0.0179	-5.31E-05	-0.0945

Additional Potential Environmental Impacts							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PM	Disease incidence	1.13E-07	3.73E-11	8.14E-11	2.30E-09	1.71E-10	-1.84E-08
IRP[9]	kBq U-235-eq.	0.00349	1.09E-07	8.03E-07	1.26E-05	1.19E-04	0.0237
ETP-fw[8]	CTUe	2.71	0.00301	0.0222	0.0717	0.0210	0.281
HTP-c[8]	CTUh	2.01E-10	5.16E-14	3.81E-13	4.20E-12	2.42E-12	3.98E-10
HTP-nc[8]	CTUh	5.31E-08	2.77E-12	1.60E-11	1.54E-10	2.43E-10	-1.29E-08
SQP[8]	dimensionless	0.328	1.98E-05	1.46E-04	0.0487	0.00534	0.301

Resource use							
Parameter	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	0.445	5.55E-05	4.09E-04	0.0792	0.00494	0.860
PERM	MJ	0	0	0	0	0	0
PERT	MJ	0.445	5.55E-05	4.09E-04	0.0792	0.00494	0.860
PENRE	MJ	24.1	0.00849	0.0625	0.521	0.0706	-10.4
PENRM	MJ	0	0	0	0	0	0
PENRT	MJ	24.1	0.00849	0.0625	0.521	0.0706	-10.4
SM	kg	0.168	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m^3	0.00198	7.93E-08	5.84E-07	2.50E-04	9.43E-07	-0.00223

8. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.
9. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and some construction materials, is also not measured by this indicator.

Waste Categories and Output Flows							
Parameter	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	kg	3.04E-09	5.17E-13	3.80E-12	8.43E-11	3.20E-10	-1.41E-06
NHWD	kg	0.00870	1.97E-07	1.45E-06	1.34E-04	0.100	0.131
RWD	kg	1.95E-05	9.00E-10	6.63E-09	8.90E-08	8.36E-07	9.06E-07
CRU	kg	0	0	0	0	0	0
MFR	kg	0.412	0	0	0.900	0	0
MER	kg	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0

End of Life		
Parameter	**Unit**	**Total**
Steel collected separately	kg	0.90
Steel collected with mixed construction waste	kg	0
Recovery for re-use	kg	0
Recovery for recycling	kg	0.90
Recovery for energy recovery	kg	0
Disposal to landfill	kg	0.10
Assumptions for scenario	–	N/A

Biogenic Carbon Content	**Unit**	**Quantity**
Biogenic carbon content in product	kg C	0
Biogenic carbon content in packaging	kg C	0.00651
Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2		

Additional Results for 1 kg of XLERPLATE® steel – Low Carbon Steel

In accordance to EN 15804:2012+A1:2013 and Green Star

Potential Environmental Impacts							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP	kg CO_2-eq.	2.49	6.29E-04	0.00464	0.0464	0.00451	-1.17
ODP	kg CFC11-eq.	1.24E-14	1.13E-19	8.35E-19	2.87E-16	1.46E-17	3.74E-15
AP	kg SO_2-eq.	0.00705	2.30E-06	8.91E-06	1.85E-04	1.27E-05	-0.00119
EP	kg PO_4^{3}-eq.	6.84E-04	5.12E-07	1.85E-06	1.66E-05	1.35E-06	-3.31E-05
POCP	kg ethene-eq.	0.00120	2.11E-07	-2.29E-06	9.95E-06	1.18E-06	-5.16E-04
ADPE	kg Sb-eq.	9.74E-08	7.85E-12	5.78E-11	3.15E-09	3.39E-10	-9.44E-08
ADPF	MJ	24.0	0.00849	0.0625	0.520	0.0685	-10.8

Additional Green Star v1.3 Indicators							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
HTPc	CTUh	1.55E-11	1.54E-15	1.18E-14	1.50E-12	2.11E-13	4.54E-10
HTPnc	CTUh	9.70E-11	5.31E-16	2.61E-15	4.97E-14	5.71E-15	-5.10E-13
LU	kg C deficit-eq.	0.0879	1.41E-06	1.04E-05	0.00420	4.70E-04	0.0344
RDW	m^3	0.00119	5.02E-08	3.70E-07	1.67E-04	-1.27E-07	-8.94E-04
IR	kBq U-235-eq.	0.00349	1.09E-07	8.03E-07	1.26E-05	1.19E-04	0.0237
PM	kg PM2.5-eq.	5.87E-04	1.66E-07	4.17E-07	1.25E-05	9.02E-07	-1.07E-04

Results for 1 kg of XLERPLATE® steel – Medium Carbon Steel

In accordance to EN 15804:2012+A2:2019

Potential Environmental Impacts							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2-eq.	2.62	6.37E-04	0.00470	0.0471	0.00479	-1.21
GWP-fossil	kg CO_2-eq.	2.64	6.39E-04	0.00451	0.0471	0.00493	-1.21
GWP-biogenic	kg CO_2-eq.	-0.0226	-2.01E-06	1.86E-04	4.23E-05	-1.47E-04	-0.00153
GWP-luluc	kg CO_2-eq.	6.72E-05	1.14E-08	8.37E-08	1.13E-05	4.80E-06	3.77E-05
ODP	kg CFC-11-eq.	8.79E-15	8.50E-20	6.26E-19	2.15E-16	1.09E-17	2.77E-15
AP	mol H^+-eq.	0.00915	3.27E-06	1.25E-05	2.26E-04	1.58E-05	-0.00133
EP-freshwater	kg P-eq.	3.34E-07	1.08E-10	7.96E-10	2.19E-08	3.78E-09	-7.01E-07
EP-marine	kg N-eq.	0.00195	1.53E-06	5.46E-06	4.84E-05	3.85E-06	-1.30E-04
EP-terrestrial	mol N-eq.	0.0219	1.67E-05	6.01E-05	5.28E-04	4.23E-05	-9.99E-04
POCP	kg NMVOC-eq.	0.00670	4.27E-06	1.16E-05	1.34E-04	1.22E-05	-0.00105
ADP-minerals & metals[10]	kg Sb-eq.	1.27E-07	7.85E-12	5.78E-11	3.15E-09	3.33E-10	-1.13E-07
ADP-fossil[10]	MJ	24.6	0.00849	0.0625	0.521	0.0706	-10.2
WDP[10]	m^3 world-eq. deprived	0.111	4.07E-06	3.00E-05	0.0179	-5.31E-05	-0.0931

Additional Potential Environmental Impacts							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PM	Disease incidence	1.16E-07	3.73E-11	8.14E-11	2.30E-09	1.71E-10	-1.81E-08
IRP[11]	kBq U-235-eq.	0.00378	1.09E-07	8.03E-07	1.26E-05	1.19E-04	0.0234
ETP-fw[10]	CTUe	2.78	0.00301	0.0222	0.0717	0.0210	0.277
HTP-c[10]	CTUh	2.03E-10	5.16E-14	3.81E-13	4.20E-12	2.42E-12	3.92E-10
HTP-nc[10]	CTUh	5.33E-08	2.77E-12	1.60E-11	1.54E-10	2.43E-10	-1.27E-08
SQP[10]	dimensionless	0.554	1.98E-05	1.46E-04	0.0487	0.00534	0.297

Resource use							
Parameter	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	0.455	5.55E-05	4.09E-04	0.0792	0.00494	0.847
PERM	MJ	0	0	0	0	0	0
PERT	MJ	0.455	5.55E-05	4.09E-04	0.0792	0.00494	0.847
PENRE	MJ	24.6	0.00849	0.0625	0.521	0.0706	-10.3
PENRM	MJ	0	0	0	0	0	0
PENRT	MJ	24.6	0.00849	0.0625	0.521	0.0706	-10.3
SM	kg	0.179	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m^3	0.00218	7.93E-08	5.84E-07	2.50E-04	9.43E-07	-0.00219

10. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.
11. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and some construction materials, is also not measured by this indicator.

Waste Categories and Output Flows							
Parameter	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	kg	3.46E-09	5.17E-13	3.80E-12	8.43E-11	3.20E-10	-1.39E-06
NHWD	kg	0.00838	1.97E-07	1.45E-06	1.34E-04	0.100	0.129
RWD	kg	2.51E-05	9.00E-10	6.63E-09	8.90E-08	8.36E-07	8.93E-07
CRU	kg	0	0	0	0	0	0
MFR	kg	0.363	0	0	0.900	0	0
MER	kg	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0

End of Life		
Parameter	**Unit**	**Total**
Steel collected separately	kg	0.90
Steel collected with mixed construction waste	kg	0
Recovery for re-use	kg	0
Recovery for recycling	kg	0.90
Recovery for energy recovery	kg	0
Disposal to landfill	kg	0.10
Assumptions for scenario	–	N/A

Biogenic Carbon Content	Unit	Quantity
Biogenic carbon content in product	kg C	0
Biogenic carbon content in packaging	kg C	0.00651
Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2		

Additional Results for 1 kg of XLERPLATE® steel – Medium Carbon Steel

In accordance to EN 15804:2012+A1:2013 and Green Star

Potential Environmental Impacts							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP	kg CO_2-eq.	2.54	6.29E-04	0.00464	0.0464	0.00451	-1.15
ODP	kg CFC11-eq.	1.20E-14	1.13E-19	8.35E-19	2.87E-16	1.46E-17	3.69E-15
AP	kg SO_2-eq.	0.00741	2.30E-06	8.91E-06	1.85E-04	1.27E-05	-0.00118
EP	kg PO_4^{3}-eq.	7.03E-04	5.12E-07	1.85E-06	1.66E-05	1.35E-06	-3.26E-05
POCP	kg ethene-eq.	0.00122	2.11E-07	-2.29E-06	9.95E-06	1.18E-06	-5.08E-04
ADPE	kg Sb-eq.	1.27E-07	7.85E-12	5.78E-11	3.15E-09	3.39E-10	-1.12E-07
ADPF	MJ	24.5	0.00849	0.0625	0.520	0.0685	-10.7

Additional Green Star v1.3 Indicators							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
HTPc	CTUh	1.62E-11	1.54E-15	1.18E-14	1.50E-12	2.11E-13	4.48E-10
HTPnc	CTUh	9.71E-11	5.31E-16	2.61E-15	4.97E-14	5.71E-15	-5.02E-13
LU	kg C deficit-eq.	0.109	1.41E-06	1.04E-05	0.00420	4.70E-04	0.0339
RDW	m^3	0.00136	5.02E-08	3.70E-07	1.67E-04	-1.27E-07	-8.81E-04
IR	kBq U-235-eq.	0.00378	1.09E-07	8.03E-07	1.26E-05	1.19E-04	0.0234
PM	kg PM2.5-eq.	6.07E-04	1.66E-07	4.17E-07	1.25E-05	9.02E-07	-1.05E-04

Results for 1 kg of XLERPLATE® steel – Alloyed Steel

In accordance to EN 15804:2012+A2:2019

Potential Environmental Impacts							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2-eq.	2.73	6.37E-04	0.00470	0.0471	0.00479	-1.23
GWP-fossil	kg CO_2-eq.	2.76	6.39E-04	0.00451	0.0471	0.00493	-1.23
GWP-biogenic	kg CO_2-eq.	-0.0227	-2.01E-06	1.86E-04	4.23E-05	-1.47E-04	-0.00155
GWP-luluc	kg CO_2-eq.	9.40E-05	1.14E-08	8.37E-08	1.13E-05	4.80E-06	3.83E-05
ODP	kg CFC-11-eq.	4.10E-13	8.50E-20	6.26E-19	2.15E-16	1.09E-17	2.81E-15
AP	mol H^+-eq.	0.00986	3.27E-06	1.25E-05	2.26E-04	1.58E-05	-0.00135
EP-freshwater	kg P-eq.	3.53E-07	1.08E-10	7.96E-10	2.19E-08	3.78E-09	-7.13E-07
EP-marine	kg N-eq.	0.00204	1.53E-06	5.46E-06	4.84E-05	3.85E-06	-1.32E-04
EP-terrestrial	mol N-eq.	0.0230	1.67E-05	6.01E-05	5.28E-04	4.23E-05	-0.00102
POCP	kg NMVOC-eq.	0.00700	4.27E-06	1.16E-05	1.34E-04	1.22E-05	-0.00107
ADP-minerals & metals[12]	kg Sb-eq.	5.58E-06	7.85E-12	5.78E-11	3.15E-09	3.33E-10	-3.78E-06
ADP-fossil[12]	MJ	25.6	0.00849	0.0625	0.521	0.0706	-10.4
WDP[12]	m3 world-eq. deprived	0.128	4.07E-06	3.00E-05	0.0179	-5.31E-05	-0.0947

Additional Potential Environmental Impacts							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PM	Disease incidence	1.23E-07	3.73E-11	8.14E-11	2.30E-09	1.71E-10	-1.84E-08
IRP[13]	kBq U-235-eq.	0.00399	1.09E-07	8.03E-07	1.26E-05	1.19E-04	0.0238
ETP-fw[12]	CTUe	2.96	0.00301	0.0222	0.0717	0.0210	0.282
HTP-c[12]	CTUh	2.14E-10	5.16E-14	3.81E-13	4.20E-12	2.42E-12	3.99E-10
HTP-nc[12]	CTUh	5.41E-08	2.77E-12	1.60E-11	1.54E-10	2.43E-10	-1.29E-08
SQP[12]	dimensionless	0.925	1.98E-05	1.46E-04	0.0487	0.00534	0.302

Resource use							
Parameter	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	0.509	5.55E-05	4.09E-04	0.0792	0.00494	0.861
PERM	MJ	0	0	0	0	0	0
PERT	MJ	0.509	5.55E-05	4.09E-04	0.0792	0.00494	0.861
PENRE	MJ	25.6	0.00849	0.0625	0.521	0.0706	-10.4
PENRM	MJ	0	0	0	0	0	0
PENRT	MJ	25.6	0.00849	0.0625	0.521	0.0706	-10.4
SM	kg	0.167	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m^3	0.00255	7.93E-08	5.84E-07	2.50E-04	9.43E-07	-0.00223

12. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.
13. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and some construction materials, is also not measured by this indicator.

Waste Categories and Output Flows							
Parameter	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	kg	4.42E-09	5.17E-13	3.80E-12	8.43E-11	3.20E-10	-1.41E-06
NHWD	kg	0.0102	1.97E-07	1.45E-06	1.34E-04	0.100	0.131
RWD	kg	3.70E-05	9.00E-10	6.63E-09	8.90E-08	8.36E-07	9.08E-07
CRU	kg	0	0	0	0	0	0
MFR	kg	0.355	0	0	0.900	0	0
MER	kg	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0

End of Life		
Parameter	**Unit**	**Total**
Steel collected separately	kg	0.90
Steel collected with mixed construction waste	kg	0
Recovery for re-use	kg	0
Recovery for recycling	kg	0.90
Recovery for energy recovery	kg	0
Disposal to landfill	kg	0.10
Assumptions for scenario	–	N/A

Biogenic Carbon Content	Unit	Quantity
Biogenic carbon content in product	kg C	0
Biogenic carbon content in packaging	kg C	0.00651
Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2		

Additional Results for 1 kg of XLERPLATE® steel – Alloyed Steel

In accordance to EN 15804:2012+A1:2013 and Green Star

Potential Environmental Impacts							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP	kg CO_2-eq.	2.65	6.29E-04	0.00464	0.0464	0.00451	-1.17
ODP	kg CFC11-eq.	5.23E-13	1.13E-19	8.35E-19	2.87E-16	1.46E-17	3.75E-15
AP	kg SO_2-eq.	0.00800	2.30E-06	8.91E-06	1.85E-04	1.27E-05	-0.00120
EP	kg PO_4^{3}-eq.	7.36E-04	5.12E-07	1.85E-06	1.66E-05	1.35E-06	-3.31E-05
POCP	kg ethene-eq.	0.00126	2.11E-07	-2.29E-06	9.95E-06	1.18E-06	-5.17E-04
ADPE	kg Sb-eq.	5.57E-06	7.85E-12	5.78E-11	3.15E-09	3.39E-10	-3.78E-06
ADPF	MJ	25.5	0.00849	0.0625	0.520	0.0685	-10.9

Additional Green Star v1.3 Indicators							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
HTPc	CTUh	2.03E-11	1.54E-15	1.18E-14	1.50E-12	2.11E-13	4.55E-10
HTPnc	CTUh	9.76E-11	5.31E-16	2.61E-15	4.97E-14	5.71E-15	-5.11E-13
LU	kg C deficit-eq.	0.125	1.41E-06	1.04E-05	0.00420	4.70E-04	0.0345
RDW	m^3	0.00168	5.02E-08	3.70E-07	1.67E-04	-1.27E-07	-8.96E-04
IR	kBq U-235-eq.	0.00399	1.09E-07	8.03E-07	1.26E-05	1.19E-04	0.0238
PM	kg PM2.5-eq.	6.49E-04	1.66E-07	4.17E-07	1.25E-05	9.02E-07	-1.07E-04

Interpretation of Results

The LCA results show that the global warming potential of BlueScope's XLERPLATE® steel products has decreased over the last 5 years, due to process improvements and increased efficiencies of scale.

Impact Category Results
The LCA results for global warming (total) are driven by the combustion of energy sources at the steelworks, and the CO_2 emissions resulting from this combustion. The choice of energy sources used in the production process is significant, including the use of the NSW electricity grid. GWP-biogenic and GWP-luluc impacts are negligible compared to GWP-fossil.

Acidification is also driven by combustion of fossil fuels onsite and in upstream generation of electricity, through the release of SOx, NOx and other emissions in the combustion processes. Upstream production and transport of raw materials were also important contributors.

The combustion of fossil fuels also drives photochemical ozone formation through the release of nitrogen oxides and carbon monoxide due to incomplete combustion, and eutrophication aquatic marine and eutrophication terrestrial through the release of nitrogen oxides to air.

Eutrophication freshwater was driven by the upstream production of iron ore, and the wastewater emissions from the boilers, through the release of phosphorus and phosphates.

The depletion of abiotic resources – minerals and metals varies significantly between grade groups. The 'Low carbon' and 'Medium carbon' grade groups are dominated by the input of iron ore with significant contributions from alloying materials, particularly aluminium and ferro manganese. The 'Alloyed' grade group is dominated by the use of molybdenum oxide (MolyOx) and ferro chrome.

The use of hard coal is the main contributor to the depletion of abiotic resources – fossil fuels, both on-site and in the upstream generation of electricity.

Water use impacts were dominated by the upstream generation of electricity, with significant contributions from the extraction and processing of coal.

Ozone depletion impacts are highly sensitive and were dominated by the release of refrigerants and halons in upstream processes (i.e. secondary data).

The Low carbon steels generally have the lowest impacts, followed by the Medium carbon steels, while the Alloyed steels have higher impacts.

While this EPD comprehensively covers the requirements for reporting in the PCR section 5 and Green Star criteria, it is important to recognise that any LCA is not a complete assessment of all environmental or sustainability aspects of the product system under study.

Comparison of the EN15804+A1 Results to Previous EPD
BlueScope has seen increased efficiencies due to process improvements and higher throughputs.

The EN 15804+A1 environmental impact indicator results have been included to enable comparison to the previously published EPD, as well as backwards comparability for sustainability rating tools. The previous EPD for XLERPLATE® steel, published in 2015, included only a single result for the 'average' steel composition (across all steel grades produced). In this EPD, the results have been split by steel grade group to provide more specific and accurate information. Each grade group (i.e. Low carbon, Medium carbon and Alloyed steel), represents the production-weighted average of a number of similar specific grades of steel, and is representative for those grades.

When comparing the results for the new representative steel grade groups with the previous EPD results for 'average' steel, the Low carbon steel shows global warming potential reduction of 9.5%, while the Medium carbon steel has decreased by 7.7% and the Alloyed steels have reduced by 3.7%. When comparing the current average steel composition, across all steel grades, with the previous average steel results from 2015, it shows a reduction of 7.9%. All indicators show the same trend with the Low carbon steels having the greatest reductions followed by Medium carbon steels.

Significant decreases were seen for all steel grade groups for acidification (Alloyed 27%, Medium carbon 32%, Low carbon 35%), eutrophication (Alloyed 35%, Medium carbon 38%, Low carbon 40%), photochemical oxidation creation (Alloyed 26%, Medium carbon 29%, Low carbon 30%), and abiotic depletion of fossil fuels (Alloyed 16%, Medium carbon 19%, Low carbon 21%). The decreases for acidification, eutrophication and photochemical oxidation creation are largely due to a change in modelling of the transport of raw materials to better reflect the mode of transport actually used.

The ADPE impacts showed significant reductions for the Low carbon steels (53%) and Medium carbon steels (38%). The Alloyed steels results are over two times higher than the original EPD. This is expected since the alloys that have greatest contribution to this indicator are predominantly used in the Alloyed steels.

ODP results decreased by >99% for all steel grade groups due to updates to the background datasets.

Average Product Assumption – Sensitivity of Results
The life cycle inventory (LCI) gathered, and hence the results in this EPD, are for an annual production-weighted average of a number of similar specific grades of steel, and is representative for those grades. Any differences in composition of steel grades within these grade groups is generally considered insignificant compared to the overall results.

The results show that depletion of abiotic resources – minerals and metals, and to a lesser extent acidification, is sensitive to alloy content. While the 'Alloyed' grade group is representative for most common alloyed grades, it may not be fully representative for grades with extremely high alloy content. The customer is advised to seek advice from BlueScope if clarification on a particular product is needed by contacting BlueScope Steel Direct on 1800 024 402.

Programme-Related Information and Verification

Programme Operator:	EPD Australasia Limited 315a Hardy Street, Nelson 7010, New Zealand info@epd-australasia.com New Zealand Phone: 09 889 2909 Australia Phone: 02 8005 8206 http://www.epd-australasia.com
EPD Registration Number:	S-P-00558
Publication date:	09-07-2015
Version date:	27-11-2020
Valid until:	27-11-2025
Product Group Classification:	UN CPC 41211 – 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:	Original study based on 2012-2013 data. Updated to 2018-2019 data for all hotspot processes.
Geographical Scope:	Australia
Standard:	EN 15804:2012+A2:2019 served as the core Product Category Rules (PCR)
PCR:	PCR 2019:14 Construction Products, Version 1.0, 2019-12-20 (valid until 2024-12-20)
PCR review conducted by:	The Technical Committee of the International EPD® System. Chair: Claudia A. Peña Contact via info@environdec.com
Independent Verification of the Declaration and Data, according to ISO 14025:2006:	☐ EPD process certification ☒ EPD verification
Third Party Verifier, approved by EPD Australasia:	**Rob Rouwette**, start2see Pty Ltd Rob.Rouwette@start2see.com.au
Procedure for follow-up during EPD validity involves third party verifier:	☐ Yes ☒ No
Version History:	v1.0 Initial release. v2.0 Updated in line with 5-year validity, including updated hotspot data covering over 95% of all impacts.

Mandatory Statements

- This EPD covers life cycle stages A1-A3, plus C1-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 15804:2012+A2:2019.
- EPDs of construction products may not be comparable if they do not comply with EN 15804:2012+A2:2019.
- EPDs within the same product category but from different programmes or utilising different PCRs may not be comparable.
- BlueScope Steel Limited has sole ownership, liability and responsibility for this EPD.

Contact Information

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Programme Operator	EPD Australasia Limited info@epd-australasia.com
Product Website	http://www.steel.com.au/products/uncoated-steel/xlerplate-steel
BlueScope Manufacturing ISO 14001 Certificate	http://steel.com.au/greentools
Worldsteel Climate Action Programme Membership	http://www.worldsteel.org/steel-by-topic/environment-climate-change/climate-change/Members.html
ResponsibleSteel™ Membership	https://www.responsiblesteel.org/membership/members-and-associates
BlueScope Sustainability Report	http://www.bluescope.com/sustainable-steel/reports
BlueScope Modern Slavery Statement	http://www.bluescope.com/sustainable-steel/reports
BlueScope Community Website	http://www.bluescopeillawarra.com.au

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