

Statement of Verification

BREG EN EPD No.: 000187
ECO EPD Ref. No. 00000674

Issue 01

This is to verify that the

Environmental Product Declaration

provided by:

Celsa Steel UK



is in accordance with the requirements of:

EN 15804:2012+A1:2013

and

BRE Global Scheme Document SD207

This declaration is for:

Steel Products manufactured at the Rod and Bar Mill

Company Address

Castle Works
East Moor Road
Cardiff
CF24 5NN
United Kingdom



**CELSA
STEEL UK**

Signed for BRE Global Ltd

Emma Baker
Operator

05 April 2018
Date of this Issue

05 April 2018
Date of First Issue

04 April 2023
Expiry Date



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Environmental Product Declaration

EPD Number: 000187

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE Environmental Profiles 2013 Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2012+A1:2013
Commissioner of LCA study	LCA consultant/Tool
Celsa Steel UK Ltd Castle Works East Moors Road Cardiff CF24 5NN United Kingdom	Roger Connick BRE Bucknalls Lane WD25 9XX United Kingdom www.bre.co.uk
Declared/Functional Unit	Applicability/Coverage
1 tonne of Steel Products manufactured at the Rod & Bar Mill	Product Average
EPD Type	Background database
Cradle to gate	ecoinvent

Demonstration of Verification

CEN standard EN 15804 serves as the core PCR ^a

Independent verification of the declaration and data according to EN ISO 14025:2010

Internal External

(Where appropriate ^b)Third party verifier:
Julia Barnard

a: Product category rules

b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)

Comparability

Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A1:2013. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See Clause 5.3 of EN 15804:2012+A1:2013 for further guidance

Information modules covered

Product			Construction		Use stage							End-of-life				Benefits and loads beyond the system boundary
					Related to the building fabric					Related to the building						
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw materials supply	Transport	Manufacturing	Transport to site	Construction – Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse, Recovery and/or Recycling potential
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: Ticks indicate the Information Modules declared.

Manufacturing sites

Rod & Bar Mill
Castle Works
East Moors Road
Cardiff
CF24 5NN

Melt Shop
Tremorfa Works
Seawall Road
Cardiff
CF24 5TH

Construction Product

Product Description

Celsa produce Grade B500C high ductility hot rolled, ribbed steel reinforcement bar at the Rod & Bar Mill, for use in the reinforcement of concrete. This can also be supplied in spooled coils, known as High Yield Coil. The Rod & Bar Mill also manufactures mild steel coil (known as Wire Rod for Mesh) used by fabricators in the production of reinforcing mesh for concrete; low carbon steel coil known as ‘Other Wire Rod’ which can be used for a variety of different applications including fencing, general wire, nails and supermarket trolleys.

Technical Information

Property	Value, Unit
Size (diameter options)	10, 12, 16, 20, 25, 32, 40 & 50 mm
Size (length options)	Standard lengths of 6, 12, 14 & 16 m (dependent on diameter) Special lengths of between 6 – 18m are also available by prior order.
Length tolerance	-0 + 100mm
Linear mass density	0.616 kg (10 mm), 0.888 kg (12 mm), 1.579 kg (16 mm), 2.466 kg (20 mm), 3.854 kg (25 mm), 6.313 kg (32 mm), 9.864 kg (40 mm) & 15.413 kg (50 mm)
Yield strength	500 MPa
Bend requirements	BS 4449:2005 + A3:2016

Property	Value, Unit
Fatigue requirements	BS 4449:2005 + A3:2016
Bond requirements	BS 4449:2005 + A3:2016 BS 5400-4:1990 BS EN 1992-1-1:2004 BS EN 10080:2005 Eurocode 2 (EC2)
Welding requirements	BS 4449:2005 + A3:2016 BS EN 10080:2005 BS 7123:1989
Stress ratio: Ultimate tensile strength/Yield strength (fs/fy)	1.15 to 1.35
Uniform elongation (Agt)	≥7.5%

Main Product Contents

Material/Chemical Input	%
Fe	95
FeSi, SiMn, CuSi, FeB, Al, FeV, C and other charge additives	5

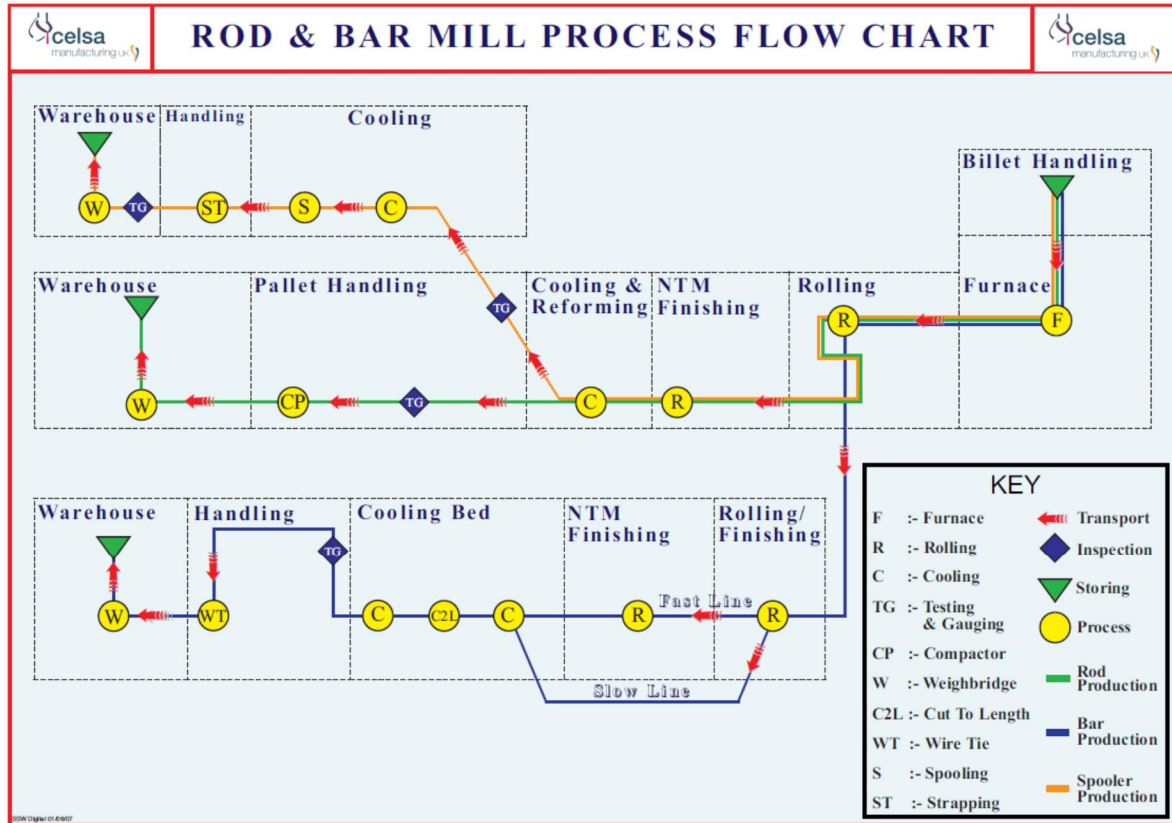
Manufacturing Process

Steel Billets from the Melt Shop are reheated to around 1150 °C in a gas-fired furnace. Reheating makes the steel softer and more deformable so that the final shape can be produced more economically and by using less energy. Once up to temperature the billets are pushed into the rolling stands, each of which has a pair of grooved cylindrical steel rolls. As the steel is forced through the grooves, the area of the cross section is reduced. This process is repeated continually over several stands, with the cross section reducing each time until the required dimensions are achieved. In the case of reinforcing steel, notches are cut into the grooves of the final rolling stand and the steel that fills these notches forms the ribs on the bar surface.

In order to achieve the strength and ductility required, the steel is cooled by high pressure water jets. This results in a hard, strong surface with a soft ductile central core. This process is known as quench and self-temper. Once cooled the bars are sheared to a length of around 70 m and transferred to a cooling bed where they cool further in still air.

The bars are then sheared to the required customer lengths, bundled, labelled and moved into storage awaiting dispatch.

Process flow diagram



Life Cycle Assessment Calculation Rules

Declared / Functional unit description

1 tonne of Steel Products manufactured at the Rod & Bar Mill

System boundary

In accordance with the modular approach as defined in EN 15804:2012, this cradle to gate EPD includes the processes covered in the manufacturing site and product stage A1 to A3.

Data sources, quality and allocation

Specific primary data derived from the Celsa Steel UK Ltd production process in Cardiff have been modelled using Simapro v8.2 LCA software. In accordance with the requirements of EN15804, the most current available data has been used. The manufacturer-specific data from Celsa Steel UK Ltd covers a period of 1 year (01/01/16 – 31/12/16). Secondary data has been obtained for all other upstream and downstream processes that are beyond the control of the manufacturer (i.e. raw material production) from the ecoinvent 3.2 database. All ecoinvent datasets are complete within the context used and confirm to the system boundary and the criteria for the exclusion of inputs and outputs according to the requirements specified in EN 15804. Calculations were performed to enable allocation of processes to the steel products. Allocation procedures were by physical allocation and are according to EN 15804 and are based on ISO 14044 guidance.

Cut-off criteria

No inputs or outputs have been excluded. All raw materials, ancillary materials, packaging materials and associated transport to the plants, process energy and water use, direct production waste, and emissions are included.

LCA Results

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts

			GWP	ODP	AP	EP	POCP	ADPE	ADPF
			kg CO ₂ equiv.	kg CFC 11 equiv.	kg SO ₂ equiv.	kg (PO ₄) ³⁻ equiv.	kg C ₂ H ₄ equiv.	kg Sb equiv.	MJ, net calorific value.
Product stage	Raw material supply	A1	485	3.69E-05	2.68	0.691	0.241	0.000846	7020
	Transport	A2	0.125	1.69E-08	0.000678	0.000274	9.17E-05	2.8E-07	1.81
	Manufacturing	A3	162	8.55E-06	0.423	0.097	0.0392	7.86E-05	1520
	Total (of product stage)	A1-3	647	4.55E-05	3.11	0.789	0.28	0.000925	8540

GWP = Global Warming Potential;
 ODP = Ozone Depletion Potential;
 AP = Acidification Potential for Soil and Water;
 EP = Eutrophication Potential;

POCP = Formation potential of tropospheric Ozone;
 ADPE = Abiotic Depletion Potential – Elements;
 ADPF = Abiotic Depletion Potential – Fossil Fuels;

Parameters describing resource use, primary energy

			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	585	0.0009	585	8820	0.00	8820
	Transport	A2	0.145	1.66E-07	0.145	2.13	0.00	2.13
	Manufacturing	A3	82.8	0.000152	82.8	1780	0.00	1780
	Total (of product stage)	A1-3	668	0.00105	668	10600	0.00	10600

PERE = Use of renewable primary energy excluding renewable primary energy used as raw materials;
 PERM = Use of renewable primary energy resources used as raw materials;
 PERT = Total use of renewable primary energy resources;

PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials;
 PENRM = Use of non-renewable primary energy resources used as raw materials;
 PENRT = Total use of non-renewable primary energy resource

Parameters describing resource use, secondary materials and fuels, use of water

			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m ³
Product stage	Raw material supply	A1	1150	0.00	0.00	17
	Transport	A2	0.00	0.00	0.00	0.00103
	Manufacturing	A3	0.00	0.00	0.00	0.346
	Total (of product stage)	A1-3	1150	0.00	0.00	17.4

SM = Use of secondary material;
 RSF = Use of renewable secondary fuels;

NRSF = Use of non-renewable secondary fuels;
 FW = Net use of fresh water

LCA Results (continued)

Other environmental information describing waste categories					
			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	16	41.9	0.000472
	Transport	A2	0.00267	0.0306	1.16E-07
	Manufacturing	A3	0.303	1.81	0.0000775
	Total (of product stage)	A1-3	16.3	43.8	0.00055

HWD = Hazardous waste disposed;
 NHWD = Non-hazardous waste disposed;
 RWD = Radioactive waste disposed

Other environmental information describing output flows – at end of life						
			CRU	MFR	MER	EE
			kg	kg	kg	MJ per energy carrier
Product stage	Raw material supply	A1	149	21.1	0.00	0.00
	Transport	A2	0.00	0.00	0.00	0.00
	Manufacturing	A3	17.5	16.3	0.00	0.00
	Total (of product stage)	A1-3	166	37.4	0.00	0.00

CRU = Components for reuse;
 MFR = Materials for recycling

MER = Materials for energy recovery;
 EE = Exported Energy

Summary, comments and additional information

Interpretation

The steel billet input is responsible for the majority of environmental impact associated with the manufacture of the steel products, with impacts also arising from fuel use and emissions to air from the rolling and cutting processes.

This is illustrated by Figure 1 below which highlights that in the product stage, across the impact categories raw material supply (A1) is responsible for the greatest percentage of overall impact. Manufacturing (A3) is responsible for the second highest proportion of total impact across the impact categories.

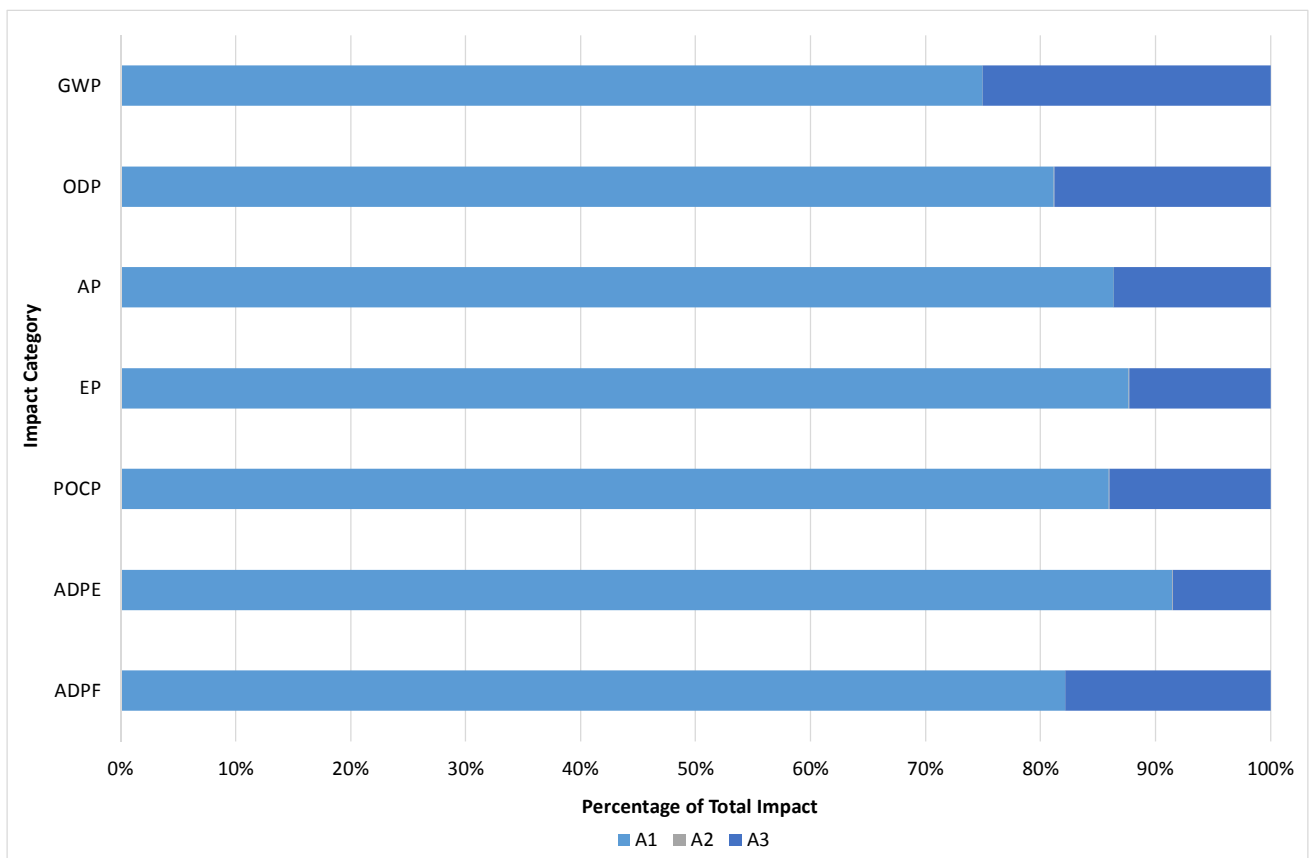


Figure 1: Percentage of Total Impact for Information Modules A1-A3 in GWP, ODP, AP, EP, POCP, ADPE and ADPF Impact Categories for steel products manufactured at the Rod & Bar Mill.

References

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