

Statement of Verification

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Issue 03

ECO EPD Ref. No. 000456

This is to verify that the

Environmental Product Declaration

provided by:

ArcelorMittal Hamburg GmbH
(member of UK CARES)



is in accordance with the requirements of:

EN 15804:2012+A1:2013

and

BRE Global Scheme Document SD207

This declaration is for:

Carbon Steel Feedstock for further processing (secondary production route – scrap)

Company Address

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Germany



ArcelorMittal

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Operator

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Expiry Date



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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 checked="" type="checkbox"/>

Note: Ticks indicate the Information Modules declared.

Manufacturing site(s)

ArceloMittal Hamburg GmbH (member of UK CARES)

Dradenaustrasse 33 D-21129 Hamburg Germany	
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Construction Product:

Product Description

Carbon Steel Feedstock in coils is non-alloy or low-alloy steel product. Feedstock Coil (according to product standards listed in Sources of Additional Information) that is obtained from scrap, melted in an Electric Arc Furnace (EAF) followed by hot rolling.

Steel feedstock coil is produced as a feedstock for further processing into carbon steel bar, coil or rod for the reinforcement of concrete for direct use as reinforcing steel and wire for further processing including BS 4449 or BS 4482 and/or other reinforcing steel standards.

The declared unit is 1 tonne of carbon steel feedstock coil as used in a variety of industrial applications.

Technical Information

Property	Value, Unit
Production route	EAF
Density	7850 kg/m ³
Modulus of elasticity	200000 N/mm ²
Weldability (Ceq)	max 0.42 %
Yield strength (as per BS 4482:2005)	min 250 N/mm ²
Tensile strength (as per BS 4482:2005)	min 287.5 N/mm ² (Tensile strength/Yield Strength \geq 1.15)
Agt (% total elongation at maximum force as per BS 4482:2005)	min 5 %
Re-bend test (as per BS 4482:2005)	Pass
Recycled content (as per ISO 14021:2016)	80.2 %

Main Product Contents

Material/Chemical Input	%
Fe	97
C, Mn, Si, V, Ni, Cu, Cr, Mo and others	3

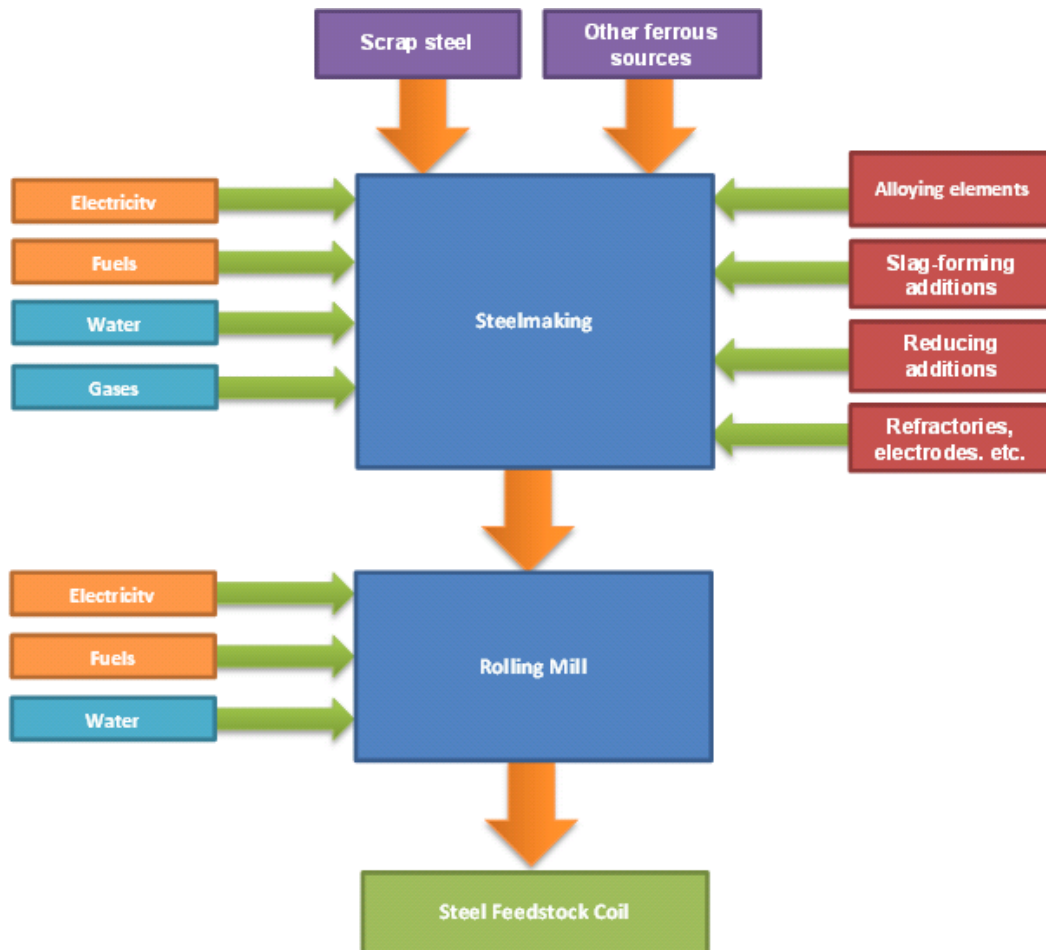
Manufacturing Process

Scrap metal is melted in an electric arc furnace to obtain liquid steel. This is then refined to remove impurities and alloying additions can be added to give the required properties.

Hot metal (molten steel) from the EAF is then cast into steel billets before being sent to the rolling mill where they are rolled and shaped to the required dimensions for the finished coils of steel feedstock.

Quality assurance and quality control of steel feedstock coil is maintained according to the requirements of ISO 9001 and product standards listed in Sources of Additional Information.

Process flow diagram



Construction Installation

Processing and proper use of steel feedstock coil depends on the application and should be made in accordance with generally accepted practices, standards and manufacturing recommendations.

During transport and storage of steel feedstock coil products the usual requirements for securing loads is to be observed.

Use Information

The composition of the reinforcing steel products does not change during use.

Reinforcing steel products do not cause adverse health effects under normal conditions of use.

No risks to the environment and living organisms are known to result from the mechanical destruction of the reinforcing steel bar product itself.

End of Life

Reinforcing steel products that are produced from steel feedstock coil are not reused at end of life but can be recycled to the same (or higher/lower) quality of steel depending upon the metallurgy and processing of the recycling route.

It is a high value resource, so efforts are made to recycle steel scrap rather than disposing of it at EoL. A recycling rate of 92% is typical for reinforcing steel bar products.

Life Cycle Assessment Calculation Rules

Declared unit description

The declared unit is 1 tonne of carbon steel feedstock manufactured by the secondary (scrap-based) production route.

System boundary

The system boundary of the EPD follows the modular design defined by EN 15804. This is a cradle to gate – with options EPD and thus covers modules from A1 to A3 and includes module D as well.

Once steel scrap has been collected for recycling it is considered to have reached the end of waste state.

Data sources, quality and allocation

Data Sources: Manufacturing data of the period 01/01/2018-31/12/2018 has been provided by ArcelorMittal Hamburg GmbH (member of UK CARES).

Data Quality: Data quality can be described as good. Background data are consistently sourced from thinkstep databases. The primary data collection was thorough, considering all relevant flows and these data have been verified by UK CARES.

Allocation: EAF slag and mill scale are produced as co-products from the steel manufacturing process. Impacts are allocated between the steel, the slag and the mill scale based on economic value.

Production losses of steel during the production process are recycled in a closed loop offsetting the requirement for external scrap. Specific information on allocation within the background data is given in the GaBi datasets documentation (/GaBi 8 2019/).

Cut-off criteria

On the input side all flows entering the system and comprising more than 1% in total mass or contributing more than 1% to primary energy consumption are considered. All inputs used as well as all process-specific waste and process emissions were assessed. For this reason, material streams which were below 1% (by mass) were captured as well. In this manner the cut-off criteria according to the BRE guidelines are fulfilled.

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	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	524	1.65E-09	2.16	0.242	0.127	1.00E-04	5.69E+03
Construction process stage	Transport	A4	MND	MND	MND	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	MND	MND	MND	MND	MND	MND	MND
	Transport	C2	MND	MND	MND	MND	MND	MND	MND
	Waste processing	C3	MND	MND	MND	MND	MND	MND	MND
	Disposal	C4	MND	MND	MND	MND	MND	MND	MND
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	65.0	-4.07E-13	0.153	0.014	0.020	-4.01E-06	517

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;

LCA Results (continued)

Parameters describing resource use, primary energy			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	464	0	464	5.86E+03	0	5.86E+03
Construction process stage	Transport	A4	MND	MND	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	MND	MND	MND	MND	MND	MND
	Transport	C2	MND	MND	MND	MND	MND	MND
	Waste processing	C3	MND	MND	MND	MND	MND	MND
	Disposal	C4	MND	MND	MND	MND	MND	MND
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-53.9	0	-53.9	490	0	490

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

LCA Results (continued)

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	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	968	0.049	0.507	2.09
Construction process stage	Transport	A4	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	MND	MND	MND	MND
	Transport	C2	MND	MND	MND	MND
	Waste processing	C3	MND	MND	MND	MND
	Disposal	C4	MND	MND	MND	MND
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0	0	0	0.051

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	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG
	Total (of product stage)	A1-3	0.548	46.9	0.064
Construction process stage	Transport	A4	MND	MND	MND
	Construction	A5	MND	MND	MND
Use stage	Use	B1	MND	MND	MND
	Maintenance	B2	MND	MND	MND
	Repair	B3	MND	MND	MND
	Replacement	B4	MND	MND	MND
	Refurbishment	B5	MND	MND	MND
	Operational energy use	B6	MND	MND	MND
	Operational water use	B7	MND	MND	MND
End of life	Deconstruction, demolition	C1	MND	MND	MND
	Transport	C2	MND	MND	MND
	Waste processing	C3	MND	MND	MND
	Disposal	C4	MND	MND	MND
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	3.25E-07	1.02	-1.05E-02

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

LCA Results (continued)

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	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	0	0	0	0
Construction process stage	Transport	A4	MND	MND	MND	MND
	Construction	A5	MND	MND	MND	MND
Use stage	Use	B1	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	MND	MND	MND	MND
	Transport	C2	MND	MND	MND	MND
	Waste processing	C3	MND	MND	MND	MND
	Disposal	C4	MND	MND	MND	MND
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0	0	0	0

CRU = Components for reuse;
MFR = Materials for recycling

MER = Materials for energy recovery;
EE = Exported Energy

Scenarios and additional technical information

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
Module D	<p>It is assumed that 92% of the steel used in the structure is recovered for recycling, while the remainder is landfilled.</p> <p>“Benefits and loads beyond the system boundary” (module D) accounts for the environmental benefits and loads resulting from net steel scrap that is used as raw material in the EAF and that is collected for recycling at end of life.</p> <p>The resulting scrap credit/burden is calculated based on the global “value of scrap” approach (/worldsteel 2011).</p>		

Summary, comments and additional information

Interpretation

Scrap-based carbon steel feedstock of ArcelorMittal Hamburg GmbH (member of UK CARES) is made via the EAF route. The bulk of the environmental impacts and primary energy demand are attributed to the manufacturing phase, covered by information modules A1-A3 of EN 15804.

References

BRE Global. BRE Environmental Profiles 2013: Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2012+A1:2013. PN 514. Watford, BRE, 2014.

BSI. Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products. BS EN 15804:2012+A1:2013. London, BSI, 2013.

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London Metal Exchange, Steel Rebar Prices, January 2019. <https://www.lme.com/en-gb/metals/ferrous/>

REGULATION (EU) No 305/2011 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC.

CARES SCS Sustainable Constructional Steel Scheme. Appendix 1 – Operational assessment schedule for the sustainable production of steel billets, steel bars/coils and wire rod for further processing into carbon steel bar, coil or rod for the reinforcement of concrete.

CARES SRC Steel for the Reinforcement of Concrete Scheme. Appendix 5 – Quality and operations assessment schedule for the production of billets and wire rod for further processing into carbon steel bar, coil or rod for the reinforcement of concrete, including inspection and testing requirements -
<http://www.ukcares.com/approved-companies> - Certificate number of conformance to BS 4482 Grade 250 Plain round coil feedstock for BS 4449 and BS 4482 and Ribbed coil feedstock for the production of BS 4449 at the time of LCA study – 910902

BS 4482:2005+A1 - Steel Wire for the Reinforcement of Concrete Products – Specification

BS 4449:2005+A3:2016 Steel for the reinforcement of concrete. Weldable reinforcing steel. Bar, coil and decoiled product. Specification.