

Green steel certificate



Presented to:

Smart Center Comércio de Materiais de Construção Ltda.

Customer address

Av. Visconde de Mauá, 3460 - Colônia Dona Luiza, Ponta Grossa - PR

This certificate attests that ArcelorMittal Brasil - Flat Products has saved 161,49 metric tonnes of CO_{2e} and that Smart Center Comércio de Materiais de Construção Ltda. has purchased 78,66 metric tonnes of XCarb® green steel certificates from ArcelorMittal Brasil - Flat Products Industry and Export Sales Directorate (CDV). This will enable Smart Center Comércio de Materiais de Construção Ltda. to report an equivalent reduction in their Scope 3 emissions in accordance with the Greenhouse Gas Protocol Corporate Accounting and Reporting Standard. DNV GL Business Assurance Services UK Limited has verified the CO_{2e} savings and corresponding purchase of XCarb® green steel certificates.

Certificate number	CO _{2e} savings	Certificate quantity	Issue date
0000004-0	161,49 tonnes	78,66 tonnes	17 January 2024

Independent Assurance

We commissioned DNV to provide assurance over the CO_{2e} savings used by ArcelorMittal as the basis for issuing XCarb® green steel certificates.

For DNV's assurance statement, visit:

<https://brasil.arcelormittal.com/certificados-politicas/tubarao/xcarb/dnv-assurance-statement-xcarb-arcelormittal>

For the issuing office:

ArcelorMittal Brasil - Flat Products
Bairro Polo Industrial, Av. Brg. Eduardo Gomes,
nº 526
Tubarão, Serra/ES - Brazil



Eduardo Zanotti
Commercial Vice-President
ArcelorMittal Brasil - Flat Products



Guilherme Correa Abreu
Sustainability General Manager
ArcelorMittal Brasil

XCarb®
Green steel certificate

Green steel certificate



This certificate corresponds to the following order reference numbers:

SFC+C Customer (Text)	Order Number	Order Item Number	Customer PO Number (Item)	Customer PO Item	Customer Material Number	Steel Grade (Text)	Thickness (mm)	Width (mm)	inv weight (tonnes)
SMART CENTER COMERCIO DE MATERIAIS DE CONSTRUCAO LTDA	199533030	1	PC 199557 - 506809 - DEZ/23	478959 - BZ-GS	20309885000 003	NBR 7008- 3:2012 - ZAR 230	0,8	1.100	23,64
SMART CENTER COMERCIO DE MATERIAIS DE CONSTRUCAO LTDA	199533030	2	PC 199557 - 506810 - DEZ/23	478960 - BZ-GS	20309885000 006	NBR 7008- 3:2012 - ZAR 230	1	1.100	33,18
SMART CENTER COMERCIO DE MATERIAIS DE CONSTRUCAO LTDA	199533030	3	PC 199557 - 506811 - DEZ/23	478961 - BZ-GS	20309885000 017	NBR 7008- 3:2012 - ZAR 230	1	1.200	12,24
SMART CENTER COMERCIO DE MATERIAIS DE CONSTRUCAO LTDA	199533030	4	PC 199557 - 506812 - DEZ/23	478962 - BZ-GS	20436566000 002	NBR 7008- 3:2012 - ZAR 230	2	1.200	9,61

XCarb[®]

Towards carbon neutral steel

XCarb™ is ArcelorMittal's 'towards carbon neutral steel' transformation programme. It brings together all of the company's reduced, low and zero-carbon steel products, processes and technologies, innovation projects, initiatives and alliances in one single-minded effort to make the changes needed to get our organisation and industry to carbon neutrality by 2050.

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ArcelorMittal Europe – Flat Products
24-26, boulevard d'Avranches L-1160 Luxembourg

Independent Limited Assurance Report

to the Management of ArcelorMittal Brazil S.A.

ArcelorMittal Brazil S.A. ("ArcelorMittal Brazil") commissioned DNV Business Assurance Services UK Limited ("DNV", "us" or "we") to provide limited assurance to ArcelorMittal Brazil over Selected Information used by ArcelorMittal Brazil as the basis for issuing XCarb™ green steel certificates for CO₂e savings made during the reporting period.



Our Conclusion: Based on the procedures we have performed and the evidence we have obtained, nothing has come to our attention that causes us to believe that the Selected Information is not fairly stated and has not been prepared, in all material respects, in accordance with the Criteria. In our opinion the stated CO₂e savings have been prepared in general alignment with the WRI/WBCSD GHG Protocol for Project Accounting. ArcelorMittal Brazil's customers that purchase XCarb™ green steel certificates can report an equivalent reduction in their Scope 3 emissions in accordance with the GHG Protocol Corporate Accounting and Reporting Standard. This conclusion relates only to the Selected Information, and is to be read in the context of this Assurance Report, in particular the inherent limitations explained overleaf.

Selected Information

The scope and boundary of our work is restricted to the **data** described below (the "Selected Information"):

- **CO₂e savings:** The amount of CO₂e savings covered by this reporting period at a specific ArcelorMittal Brazil's Tubarao site, which is 33,836 tonnes CO₂e; and
- **XCarb™ green steel certificates:** The volume of XCarb™ green steel certificates corresponding to the above CO₂e savings, which is 16,483 metric tonnes.

Criteria

We assessed ArcelorMittal Brazil's methodology for calculating CO₂e savings against the following **Criteria** (the "Criteria"):

- The publicly available Greenhouse Gas Protocol for Project Accounting, as issued by WRI/WBCSD;
- ArcelorMittal Brazil's methodology as described within an internal Standard document ('Green Steel simplified CO₂e calculation methodology for gas injection projects'), as prepared by ArcelorMittal Brazil in consultation with the ArcelorMittal Flat Carbon Europe CTO Office;
- ArcelorMittal Brazil's internal procedure for issuing XCarb™ green steel certificates and tracking customer transactions; and
- ArcelorMittal Brazil's report [available on request from ArcelorMittal] on the CO₂e savings achieved at the specific site (the "Entity"), including their following definitions and programme rules:
 - **XCarb™ green steel certificates:** CO₂e savings achieved under the XCarb™ green steel certificates programme are registered by ArcelorMittal Brazil in a centrally held record. DNV performs quarterly checks on the central record to review the amount of XCarb™ green steel certificate purchases and the corresponding certificates issued. Under the programme rules, ArcelorMittal Brazil may issue certificates up to a maximum of 95% of the volume of XCarb™ green steel certificates covered by the Assurance Report for each Reporting Period. To ensure an excess of certificates is not issued, the remaining 5% shall be reserved in case of any adjustments to the methodology for calculating CO₂e savings in the subsequent Reporting Period. The remaining 5% may be issued in future once the factor used to calculate CO₂e savings is confirmed as sufficiently robust.
 - **CO₂e savings:** The amount in metric tonnes of CO₂e saved compared to a **baseline scenario** by injection of natural gas inside the tuyeres of a blast furnace in replacement of hard coal at tuyere level. The CO₂e savings calculation is conducted in alignment with the Greenhouse Gas Protocol for Project Accounting. CO₂e savings is as per ArcelorMittal's [Basis of Reporting](#) document.
 - **Conversion into XCarb™ green steel certificates:** The aforementioned CO₂e savings have been converted into an equivalent volume of XCarb™ green steel certificates using a conversion factor of 2.053 tonnes of CO₂e per tonne of crude steel. The conversion factor used is calculated using the average CO₂e emissions of primary steelmaking from ArcelorMittal Brazil's average Scope 1, 2 and 3 site CO₂e emission profiles during 2022.
 - **Baseline scenario:** The baseline scenario calculates the likely CO₂e emissions corresponding to the **reporting period** that would have been emitted in relation to an identical amount of steel production from the **entity**, based on the 'continuation of current activities' had the gas injection project not have been implemented.
 - **Entity:** The specific entity where the carbon savings have been achieved, which in this case is at ArcelorMittal Brazil's Tubarao site, where natural gas injection in the blast furnace has taken place since September 2022. The methodology also takes into account indirect carbon savings linked to the change of blast furnace top gas characteristics and how this gas is used for heating purposes, and changes to scope 3 upstream emissions.
 - **Reporting period:** The CO₂e savings have been calculated as having been achieved over the time period 12th September 2022 to 31st January 2023.



Standard and level of assurance

We performed a **limited** assurance engagement in accordance with the International Standard on Assurance Engagements (ISAE) 3000 revised – ‘Assurance Engagements other than Audits and Reviews of Historical Financial Information’ (revised), issued by the International Auditing and Assurance Standards Board. This standard requires that we comply with ethical requirements and plan and perform the assurance engagement to obtain limited assurance.

DNV applies its own management standards and compliance policies for quality control, in accordance with ISO/IEC 17021:2011 – Conformity Assessment Requirements for bodies providing audit and certification of management systems, and accordingly maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

The procedures performed in a limited assurance engagement vary in nature and timing from, and are less in extent than for, a reasonable assurance engagement; and the level of assurance obtained is substantially lower than the assurance that would have been obtained had a reasonable assurance engagement been performed. We planned and performed our work to obtain the evidence we considered sufficient to provide a basis for our opinion, so that the risk of this conclusion being in error is reduced but not reduced to very low.

Our competence, independence and quality control

DNV established policies and procedures are designed to ensure that DNV, its personnel and, where applicable, others are subject to independence requirements (including personnel of other entities of DNV) and maintain independence where required by relevant ethical requirements. This engagement work was carried out by an independent team of sustainability assurance professionals. Our multi-disciplinary team consisted of professionals with a combination of environmental and sustainability assurance experience.

Inherent limitations

All assurance engagements are subject to inherent limitations as selective testing (sampling) may not detect errors, fraud or other irregularities. Non-financial data may be subject to greater inherent uncertainty than financial data, given the nature and methods used for calculating, estimating and determining such data. The selection of different, but acceptable, measurement techniques may result in different quantifications between different entities. Our assurance relies on the premise that the data and information provided to us by ArcelorMittal have been provided in good faith. DNV expressly disclaims any liability or co-responsibility for any decision a person or an entity may make based on this Independent Limited Assurance Report.

Basis of our conclusion

We are required to plan and perform our work in order to consider the risk of material misstatement of the Selected Information; our work included, but was not restricted to:

- Assessing the appropriateness of the Criteria for the Selected Information;
- Conducting interviews with ArcelorMittal Brazil’s key personnel to obtain an understanding of the key processes, systems and controls in place to generate, aggregate and report the Selected Information;
- Conducting an in person visit to the specific site to review data and systems for preparing site level data consolidated for use by the project. We were free to request interviews, data and information to support the process;
- Performing limited substantive testing on a selective basis of the Selected Information to check that data had been appropriately measured, recorded, collated and reported; and
- Reviewing that the evidence, measurements and their scope provided to us by ArcelorMittal Brazil for the Selected Information is prepared in line with the Criteria.

Responsibilities of the Management of ArcelorMittal Brazil and DNV

The Management of ArcelorMittal Brazil have sole responsibility for:

- Preparing and presenting the Selected information in accordance with the Criteria;
- Designing, implementing and maintaining effective internal controls over the information and data, resulting in the preparation of the Selected Information that is free from material misstatements;
- Measuring and reporting the Selected Information based on their established Criteria; and
- Contents and statements contained within XCarb™ green steel certificates.

Our responsibility is to plan and perform our work to obtain limited assurance about whether the Selected Information has been prepared in accordance with the Criteria and to report to ArcelorMittal Brazil in the form of an independent limited assurance conclusion, based on the work performed and the evidence obtained. We have not been responsible for the preparation of the XCarb™ green steel certificates. We have not reviewed whether or how ArcelorMittal Brazil’s customers have used the reported CO₂e savings in their Scope 3 reporting.

DNV Business Assurance Services UK Limited

London, UK
22nd May 2023



DNV Business Assurance Services UK Limited is part of DNV – Business Assurance, a global provider of certification, verification, assessment and training services, helping customers to build sustainable business performance. www.dnvgl.co.uk/BetterAssurance

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A1

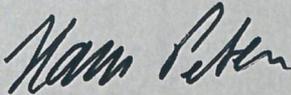
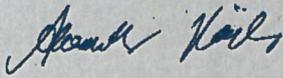
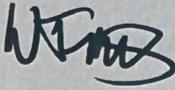
Owner of the Declaration	ArcelorMittal Brasil
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-ARC-20190176-CBC2-EN
Issue date	09/03/2020
Valid to	08/03/2025

Hot-Rolled Coil
ArcelorMittal Brasil

www.ibu-epd.com | <https://epd-online.com>



General Information

<p>ArcelorMittal Brasil</p> <hr/> <p>Programme holder IBU – Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany</p> <hr/> <p>Declaration number EPD-ARC-20190176-CBC2-EN</p> <hr/> <p>This declaration is based on the product category rules: Structural steels, 07.2014 (PCR checked and approved by the SVR)</p> <hr/> <p>Issue date 09/03/2020</p> <hr/> <p>Valid to 08/03/2025</p> <hr/> <p></p> <hr/> <p>Dipl. Ing. Hans Peters (chairman of Institut Bauen und Umwelt e.V.)</p> <hr/> <p></p> <hr/> <p>Dr. Alexander Röder (Managing Director Institut Bauen und Umwelt e.V.)</p>	<p>Hot-Rolled Coil</p> <hr/> <p>Owner of the declaration ArcelorMittal Brasil Av. Carandá, 1115 30130-915 - Belo Horizonte - MG Brazil</p> <hr/> <p>Declared product / declared unit 1 metric ton Hot-Rolled Coil produced by ArcelorMittal in Brazil</p> <hr/> <p>Scope: This declaration and its LCA study are relevant to 1 metric ton of Hot Rolled Coil steel manufactured by ArcelorMittal Brasil, representing 100% of the production in 2017.</p> <p>The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.</p> <p>The EPD was created according to the specifications of <i>EN 15804+A1</i>. In the following, the standard will be simplified as <i>EN 15804</i>.</p> <hr/> <p>Verification</p> <p>The standard <i>EN 15804</i> serves as the core PCR</p> <p>Independent verification of the declaration and data according to <i>ISO 14025:2010</i></p> <p><input type="checkbox"/> internally <input checked="" type="checkbox"/> externally</p> <hr/> <p></p> <hr/> <p>Dr.-Ing. Wolfram Trinius (Independent verifier appointed by SVR)</p>
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Product

Product description/Product definition

The Hot Rolled Coils (HRC) are produced at ArcelorMittal Brasil in thickness up to 19mm and width up to 1,880mm which can be produced in different steel grades to meet a variety of applications, such as, structural quality steel with chemical composition and mechanical properties guarantee; good toughness and weldability; high resistance to atmospheric corrosion. HRC may or may not contain micro-alloying elements. It is ideal for structural components which need mechanical performance allied with good weldability characteristics.

For the use and application of the product the respective national provisions at the place of use apply.

Application

Metal structures for civil construction, bridge structures, machine structures, large and small diameter pipes, agricultural and road implements, pressure vessels, shipbuilding, containers, rail cars, etc.

Other applications are also possible in other market segments.

Technical Data

Name	Value	Unit
Density	7850	kg/m ³
Thermal conductivity	12	W/(mK)
Modulus of elasticity	48	N/mm ²
Melting point	1536	°C

Performance data of the product with respect to its characteristics in accordance with the relevant technical provision (no CE-marking).

Base materials/Ancillary materials

Iron is the main component of Hot Rolled Coil. Alloying elements may be added in order to reach some specific characteristics such as toughness, strength and weldability. The composition of these elements depends on the steel designation/grade.

Reference service life

Reference service life is not relevant due to cradle-to-gate with options (C3 and D) boundary conditions

LCA: Calculation rules

Declared Unit

Name	Value	Unit
Declared unit	1000	kg
Density	7850	kg/m ³
Conversion factor to 1 kg	0.001	-

System boundary

The study is performed from 'cradle-to-gate' + module C3 and module D (cradle to gate – with Options). The following life cycle stages are considered:

- Product stage
- End-of-life through Waste processing
- Benefits and loads beyond the product system boundary

Modules A1-A3 include the following:

- The provision of resources, additives and energy;
- Transport of resources additives to the production site
- Production processes on site including energy, production of additives, disposal of production residues, and consideration of related emissions;
- Recycling of production/manufacturing scrap. Steel scrap is assumed to reach the end-of-waste status once is shredded and sorted,

thus becomes input to the product system in the inventory.

Module C3 takes into account the sorting and shredding of after-use steel, as well as the non-recovered scrap due to sorting efficiency which is landfilled. A conservative value of 2% landfill is considered.

Module D refers to the net benefits and loads of the net flow leaving the product system.

Data Quality

The life cycle inventory data used in this study comply with the quality requirements set out in *ISO 14044*.

All relevant background datasets are taken from *GaBI ts Software* database - Service Pack 37 and comprise the year 2018. Such database contains consistent and documented datasets which can be viewed in the online *GaBI ts documentation*.

Regarding foreground data, this study is based on a high quality of primary data for the year 2017, collected by ArcelorMittal.

Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account.

LCA: Scenarios and additional technical information

End of life (C3)

Due to the absence of official national references and recommendation of the Brazilian context, Recycling and Reuse rates adopted for this EPD were defined according to the recommendations of *European Commission Technical Steel Research* for "Other steel": 99% (Recycling and Reuse) and 1% (Landfill). Such assumptions are similar to current practices and rates in the Brazilian market, which would not result in visible changes of the EPD results.

Name	Value	Unit
Landfilling	10	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information

18,2 kg scrap is used in the manufacturing of 1 ton of Hot Rolled Coil steel. After use, 990 kg steel is recycled.

The potential environmental benefit calculated for the end-of-life stage (module D) is based on the net amount of scrap in the system: 990 – 18,2 = **971,8 kg**. The system net output carries a potential credit, thus module D shows an environmental benefit.

Name	Value	Unit
Reuse	11	%
Recycling	88	%
Landfill	1	%

LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED; MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE								END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	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	MNR	MNR	MNR	MND	MND	MND	MND	X	MND	X	

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A1: 1 t Hot Rolled Coil

Parameter	Unit	A1-A3	C3	D
Global warming potential	[kg CO ₂ -Eq.]	2.50E+3	2.54E+1	-1.56E+3
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	2.25E-5	3.14E-6	8.71E-6
Acidification potential of land and water	[kg SO ₂ -Eq.]	1.13E+1	2.30E-1	-3.08E+0
Eutrophication potential	[kg (PO ₄) ³ -Eq.]	1.60E+0	1.04E-1	-2.28E-1
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	1.26E+0	1.77E-2	-7.21E-1
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	3.39E-4	4.61E-4	-4.79E-3
Abiotic depletion potential for fossil resources	[MJ]	2.29E+4	3.55E+2	-1.52E+4

RESULTS OF THE LCA - RESOURCE USE according to EN 15804+A1: 1 t Hot Rolled Coil

Parameter	Unit	A1-A3	C3	D
Renewable primary energy as energy carrier	[MJ]	1.99E+2	5.40E+1	1.01E+3
Renewable primary energy resources as material utilization	[MJ]	0.00E+0	0.00E+0	0.00E+0
Total use of renewable primary energy resources	[MJ]	1.99E+2	5.40E+1	1.01E+3
Non-renewable primary energy as energy carrier	[MJ]	2.32E+4	4.06E+2	-1.46E+4
Non-renewable primary energy as material utilization	[MJ]	0.00E+0	0.00E+0	0.00E+0
Total use of non-renewable primary energy resources	[MJ]	2.32E+4	4.06E+2	-1.46E+4
Use of secondary material	[kg]	1.82E+1	0.00E+0	9.72E+2
Use of renewable secondary fuels	[MJ]	-1.86E-30	0.00E+0	0.00E+0
Use of non-renewable secondary fuels	[MJ]	-2.20E-29	0.00E+0	0.00E+0
Use of net fresh water	[m ³]	5.48E+0	1.83E-1	2.10E+0

RESULTS OF THE LCA - OUTPUT FLOWS AND WASTE CATEGORIES according to EN 15804+A1: 1 t Hot Rolled Coil

Parameter	Unit	A1-A3	C3	D
Hazardous waste disposed	[kg]	3.09E-5	3.84E-8	-1.02E-3
Non-hazardous waste disposed	[kg]	7.66E+2	1.00E+1	1.68E+2
Radioactive waste disposed	[kg]	0.00E+0	0.00E+0	0.00E+0
Components for re-use	[kg]	0.00E+0	0.00E+0	0.00E+0
Materials for recycling	[kg]	0.00E+0	9.90E+2	0.00E+0
Materials for energy recovery	[kg]	0.00E+0	0.00E+0	0.00E+0
Exported electrical energy	[MJ]	0.00E+0	0.00E+0	0.00E+0
Exported thermal energy	[MJ]	0.00E+0	0.00E+0	0.00E+0

Interpretation

The production stage is the highest contributing stage in the life cycle of Hot Rolled Coil. Module C3 has a low contribution while module D presents negative contribution (credit) for all impact categories except ODP.

The Blast Furnace (BF) stage is the highest contributor in process for all impact assessment categories except POCP. For this category, Sintering is the process with the highest contribution, due to the emissions of carbon monoxide and other gases (SO₂, NO_x) that occur in this process and iron ore fines used in the stage. In BF stage, the most contributing process are the emissions of fuels burning (77%) and the most contributing materials is iron ore (granulated and pellets, 15%) and hard coal for PCI.

Total use of renewable primary energy carrier (PERT) and total use of non-renewable primary energy (PENRT) are dominated by the extraction and processing of raw materials and the generation of electricity, steam and heat from primary energy resources, including extraction, refining and transport.

In general, the main contribution to primary energy in the blast furnace/basic oxygen furnace (BF/BOF) route comes from the use of coal/coke as an energy and carbon source.

References

PCR part A

Product Category Rules for Construction Products.
Part A: Calculation Rules for the Life Cycle

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ESPAÇO ECO
Sustentabilidade que se mede

Instituidora:



BASF
We create chemistry

Author of the Life Cycle

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ArcelorMittal

PCR part B

Product Category Rules for Construction Products.
Part B: Requirements on the EPD for Structural Steel.
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product+methodology+for+the+steel+industry+2014.pd
f](https://www.worldsteel.org/en/dam/jcr:167ec6bc-d974-4405-8d53-56825ad4552f/Co-product+methodology+for+the+steel+industry+2014.pdf)

ISO 14040

DIN EN ISO 14040:2009-11, Environmental
management - Life cycle assessment - Principles and
framework

ISO 14044

DIN EN ISO 14044:2006-10, Environmental
management - Life cycle assessment - Requirements
and guidelines

EN 15804

EN 15804:2012-04+A1 2013/, Sustainability of
construction works — Environmental Product
Declarations — Core rules for the product category of
construction products