ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A1*

Owner of the Declaration	ArcelorMittal
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-ARC-20220192-CBA1-EN
Issue date	07/12/2022
Valid to	06/12/2027

Welded steel pipes

ArcelorMittal

Institut Bauen und Umwelt e.V.

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ECO PLATFORM

EPD VERIFIED

General Information

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Declaration number
EPD-ARC-20220192-CBA1-EN

This declaration is based on the product category rules:
Steel pipes for pressure applications, 11.2017
(PCR checked and approved by the SVR)

Issue date
07/12/2022

Valid to
06/12/2027

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Welded steel pipes

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Declared product / declared unit
1 metric tonne of steel pipes.

Scope:
The declaration applies to 1 metric tonne of steel pipes produced by ArcelorMittal.

The life cycle assessment is based on data from the production and finishing process occurring in the following ArcelorMittal production plants:

- Lexy (FR),
- Iasi (RO),
- Krakow (PL) and
- Karvina (CZ)

Production has been modelled using annual production data from the period 2019. The weighting of production volumes of the different production sites is based on 2019 data.

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.
The EPD was created according to the specifications of *EN 15804+A1*. In the following, the standard will be simplified as *EN 15804*.

Verification

The standard *EN 15804* serves as the core PCR
Independent verification of the declaration and data according to *ISO 14025:2011*
☐ internally ☒ externally

Vito D'Incognito
(Independent verifier)

Product

Product description/Product definition
This EPD describes the welded steel pipes produced by ArcelorMittal.

It covers the non-alloy steel tubes for the conveyance of water and other aqueous liquids, the non-alloy steel tubes suitable for welding and threading (also called gas pipes) and the alloy and non-alloy steel pressure pipes. These pipes can also have more general-purpose applications where pressure is low.

In some cases, the manufacturing route is very similar to each other: welded cold-forming or welded hot-stretch reduction.

For the placing on the market of the products covered by the standards *EN 10224:2002/A1:2005, Non-alloy steel tubes and fittings for the conveyance of water and other aqueous liquids - Technical delivery conditions and EN 10255:2004+A1:2007, Non-alloy steel tubes suitable for welding and threading.*

Technical delivery conditions in the European Union/European Free Trade Association (EU/EFTA)

(with the exception of Switzerland) *Regulation (EU) No. 305/2011 (CPR)* applies. These products need a declaration of performance and the CE-marking.

For the application and use the respective national provisions apply.

Other European standards concerning steel pipes could also be used by manufacturers as reference:

- *EN 10217-1:2019,* Welded steel tubes for pressure purposes - Technical delivery conditions - Part 1: Electric welded and submerged arc welded non-alloy steel tubes with specified room temperature properties
- *EN 10217-2:2019,* Welded steel tubes for pressure purposes - Technical delivery conditions - Part 2: Electric welded non-alloy and alloy steel tubes with specified elevated temperature properties
- *EN 10217-3:2019,* Welded steel tubes for pressure purposes - Technical delivery conditions - Part 3: Electric welded and submerged arc welded alloy fine grain steel tubes with specified room, elevated and low-temperature properties.

Some of the aforementioned standards/products comply with the *Directive (EU) No. 2014/68 (PED)* for which CE-marking is not required.

Application
Welded steel pipes can be used in applications such as transportation conveyance of water and gas, transportation of pressured gases, and others.

Technical Data
The dimensions (wall thickness and outside dimensions), section properties (minimum yield strength, tensile strength, minimum elongation, minimum impact energy) and chemical composition vary according to the grade and quality of the steel to be chosen and are also dependent on the piping design needs.

For a given product, the geometrical tolerances will be fully controlled by the product standards (*EN 10224*, *EN 10255 or EN 10217*) and they will be consistent with execution and design rules in order to assure a safe and suitable system.

Constructional data

Name	Value	Unit
Yield strength at room temperature	195 - 460	N/mm^2
Tensile strength at room temperature	320 - 730	N/mm^2
Elongation at room temperature	17 - 25	%
Minimum average absorbed energy at 0°C	27 - 35	Joule

Base materials/Ancillary materials
The basic materials for the manufacture of ArcelorMittal's steel pipes are non-alloyed and fine-grain steel. Different steel grades and qualities are possible, these being recorded in the specific product standards – *EN 10224* or *EN 10255*.

Alloyed and non-alloyed steels can be found in pipes for pressure purposes – *EN 10217*. Different steel grades and qualities are possible.

Alloying elements are added in the form of ferroalloys or metals (most common elements are Manganese and Silicon). Some small quantities of other elements may be present in the steel.

Reference service life
A reference service life for steel pipes is not declared. These are construction or pressure products with many different applications purposes. The lifetime therefore will be limited by the service life of the work.

LCA: Calculation rules

Declared Unit
The declaration refers to the functional unit of 1 metric ton of welded steel pipes as specified in Part B requirements on the EPD for steel pipes for pressure applications.

Foreground data for the production are integrated into the software model for the considered production site/company. The LCI is assessed as per the annual production data of ArcelorMittal Tubular Products Europe at the sites Iasi (Romania), Krakow (Poland), Karvina (Czechia) and Lexy (France). The background data are taken from *GaBi* Documentation.

Declared unit

Name	Value	Unit
Declared unit	1	t
Density	7850	kg/m^3

System boundary
Type of the EPD: cradle-to-gate - with options. Module A1-A3, module C3-C4 and module D were considered.

Modules A1-A3 include the following:

- The provision of resources, additives, and energy
- Transport of resources and 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 it is shredded and sorted,

thus becoming input to the product system in the inventory.

Module C3-C4 take 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 10% landfill is considered.

Module D refers to the End-of-Life, including recycling.

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.

For the life cycle modelling of the product under study, the *GaBi* Software System for Life Cycle Engineering, content version 2021.2, is used (*GaBi*).

LCA: Scenarios and additional technical information

Current practice for the average pipe product consists of 93 % recycling and 7 % reuse according to *SteelConstruction-info*.

This EPD considers 90 % recycling and 10 % landfill as a conservative approach.

End of life (C1-C4)

Name	Value	Unit
Landfilling	10	%

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

Name	Value	Unit
Recycling	90	%

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	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A1: 1 ton Welded Steel Pipes

Parameter	Unit	A1-A3	C3	C4	D
Global warming potential	[kg CO_2-Eq.]	2.80E+3	1.60E+0	1.43E+0	-1.32E+3
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	3.65E-12	4.69E-14	7.83E-15	-4.39E-12
Acidification potential of land and water	[kg SO_2-Eq.]	5.14E+0	2.99E-3	8.57E-3	-2.05E+0
Eutrophication potential	[kg $(PO_4)^{3-}$-Eq.]	4.82E-1	4.48E-4	9.72E-4	-1.49E-1
Formation potential of tropospheric ozone photochemical oxidants	[kg ethene-Eq.]	8.72E-1	2.60E-4	6.58E-4	-6.12E-1
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	5.44E-2	4.70E-7	1.44E-7	-3.43E-3
Abiotic depletion potential for fossil resources	[MJ]	2.75E+4	1.82E+1	1.95E+1	-1.37E+4

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A1: 1 ton Welded Steel Pipes

Parameter	Unit	A1-A3	C3	C4	D
Renewable primary energy as energy carrier	[MJ]	1.30E+3	1.22E+1	2.70E+0	8.52E+2
Renewable primary energy resources as material utilization	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Total use of renewable primary energy resources	[MJ]	1.30E+3	1.22E+1	2.70E+0	8.52E+2
Non-renewable primary energy as energy carrier	[MJ]	2.87E+4	2.82E+1	2.01E+1	-1.35E+4
Non-renewable primary energy as material utilization	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Total use of non-renewable primary energy resources	[MJ]	2.87E+4	2.82E+1	2.01E+1	-1.35E+4
Use of secondary material	[kg]	8.53E+1	0.00E+0	0.00E+0	0.00E+0
Use of renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of non-renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of net fresh water	[m^3]	1.33E+1	1.18E-2	4.95E-3	-8.80E+1

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A1: 1 ton Welded Steel Pipes

Parameter	Unit	A1-A3	C3	C4	D
Hazardous waste disposed	[kg]	1.10E-5	6.99E-9	2.13E-9	2.96E-6
Non-hazardous waste disposed	[kg]	5.65E+1	1.89E-2	1.00E+2	1.73E+2
Radioactive waste disposed	[kg]	3.56E-1	3.89E-3	2.10E-4	1.47E-3
Components for re-use	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for recycling	[kg]	0.00E+0	9.00E+2	0.00E+0	0.00E+0
Materials for energy recovery	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported electrical energy	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported thermal energy	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0

References

Standards:

Directive (EU) No. 2014/68 (PED)
Directive 2014/68/EU of the European Parliament and of the Council of 15 May 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment (recast) Text with EEA relevance.

EN 10216-1
EN 10216-1:2013, Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 1: Non-alloy steel tubes with specified room temperature properties

EN 10216-2
EN 10216-2:2013+A1:2019, Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 2: Non-alloy and alloy steel tubes with specified elevated temperature properties

EN 10216-3
EN 10216-3:2013, Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 3: Alloy fine grain steel tubes

EN 10216-4
EN 10216-4:2013, Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 4: Non-alloy and alloy steel tubes with specified low temperature properties

EN 10217-1
EN 10217-1:2019, Welded steel tubes for pressure purposes - Technical delivery conditions - Part 1: Electric welded and submerged arc welded non-alloy steel tubes with specified room temperature properties

EN 10217-2
EN 10217-2:2019, Welded steel tubes for pressure purposes - Technical delivery conditions - Part 2: Electric welded non-alloy and alloy steel tubes with specified elevated temperature properties

EN 10217-3
EN 10217-3:2019, Welded steel tubes for pressure purposes - Technical delivery conditions - Part 3: Electric welded and submerged arc welded alloy fine grain steel tubes with specified room, elevated and low temperature properties

EN 10224/A1
EN 10224:2002/A1:2005, Non-alloy steel tubes and fittings for the conveyance of water and other aqueous liquids - Technical delivery conditions

EN 10255+A1
EN 10255:2004+A1:2007, Non-alloy steel tubes suitable for welding and threading. Technical delivery conditions

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

ISO 14025
DIN EN ISO 14025:2011-10, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.

Regulation (EU) No. 305/2011 (CPR)
Regulation (EU) no 305/2011 of the European parliament and of the council of 9 March 2011. Laying down harmonized conditions for the marketing of construction products and repealing council directive 89/106/EEC.

Other References:

GaBi
GaBi dataset documentation for the GaBi Software System and Database for Life Cycle Engineering, thinkstep AG, Leinfelden-Echterdingen, 2021 (http://documentation.gabi-software.com/)

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General Instructions for the EPD programme of Institut Bauen und Umwelt e.V. Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021. www.ibuepd.com

PCR Part A
PCR - Part A: Calculation rules for the Life Cycle Assessment and Requirements on the Background Report, version 1.8, Institut Bauen und Umwelt e.V., www.bau-umwelt.com, 2019

PCR Part B
PCR – Part B: Requirements of the EPD for Steel Pipes for Pressure Applications, Institut Bauen und Umwelt e.V., www.bau-umwelt.com, 2017

SteelConstruction-info
https://www.steelconstruction.info/The_recycling_and_reuse_survey

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