ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	ArcelorMittal Construction
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-AMC-20210131-CBB1-EN
Issue date	19/01/2022
Valid to	18/01/2027

COFRADAL® 200

ArcelorMittal Construction

Institut Bauen und Umwelt e.V.

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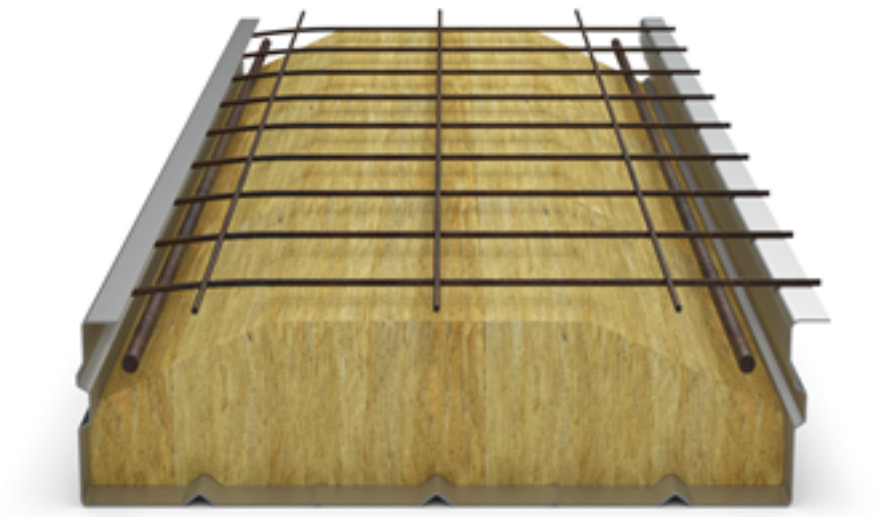

General Information

ArcelorMittal Construction	Cofradal® 200
Programme holder IBU – Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany	**Owner of the declaration** ArcelorMittal Construction Morinval 55800 Contrisson France
Declaration number EPD-AMC-20210131-CBB1-EN	**Declared product / declared unit** The declaration applies to 1m² of Cofradal® 200.
This declaration is based on the product category rules: System floors, 12.2018 (PCR checked and approved by the SVR)	**Scope:** The Life Cycle Assessment is based on data collected from the ArcelorMittal Construction plant in Contrisson and Montataire in France producing Cofradal 200, representing 100 % of the annual production from 2018. 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*.
Issue date 19/01/2022	**Verification** The standard *EN 15804* serves as the core PCR Independent verification of the declaration and data according to *ISO 14025:2010* ☐ internally ☒ externally
Valid to 18/01/2027	
Dipl. Ing. Hans Peters (chairman of Institut Bauen und Umwelt e.V.)	Mr Carl-Otto Neven (Independent verifier)
Dr. Alexander Röder (Managing Director Institut Bauen und Umwelt e.V.))	

Product

Product description/Product definition
This Environmental Product Declaration refers to Cofradal® 200 produced on ArcelorMittal Construction plants in Contrisson and Montataire.

Cofradal® 200 is a prefabricated composite floor system. It includes a specific steel profile, an acoustic and thermal insulation material, as well as a welded mesh and a concrete slab.

For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) Regulation (EU) No. 305/2011 (*CPR*) applies.

The product needs a declaration of performance taking into consideration *EN 1090-1*, Execution of steel and aluminium structures – Part 1: Procedures for attestation of conformity for load-bearing components, and the CE-marking.

For the application and use the respective national provisions apply.

Application
Cofradal® 200 is an integrated composite floor system for all types of construction. Its lightness and structural performance allow it to cross large spans (up to 7 m).

Despite its low self-weight, Cofradal® floor meets the requirements of acoustic regulations without the added ceiling. The 125mm of rock wool Cofradal® allows a fire resistance of REI (min) 120. With an additional insulation, the needed thermal insulation is reached with a U value down to 0.20 W/(m²K).

Technical Data
The technical performance of the product are essentially covered by *EN 1090-1*. The steel sheet is a S 350 GD grade with metallic coating according to *EN 10346*.

Technical data

Name	Value	Unit
Grammage / system weight	236.6	kg/m²
Sound absorption coefficient (EN ISO 354, EN ISO 11654)	85	%
Airborne sound reduction (EN 20140-9, ISO 140-3)	58	dB

Compressive strength	30	N/mm²
Thermal Transmittance (U-Value)	0.78	W/(m².K)

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN 1090-1:2009 Execution of steel and aluminium structures – Part 1: Procedures for attestation of conformity for load-bearing components.*

Voluntary data: *Avis Technique N°3-1/11-687_V2, Cofradal.*

Base materials/Ancillary materials
The product covered by this Environmental Product Declaration is a Cofradal® 200 ready-to-pour. It is mainly composed of a galvanized steel sheet, rock wool insulation, steel reinforcements and finally concrete poured in place. Its finished mass per unit area is 23.00 kg/m² without concrete and packaging, and 236.6 kg/m² with poured concrete (after installation).

The concrete considered is a C30/37 made out of CEM I cement, water and aggregates and, when necessary, additives such as condensers, retarding agents or air-entraining agents.

Steel is mainly iron and carbon, with small amounts of alloying elements. These elements modify the chemical and physical properties of steel such as strength, durability and corrosion resistance. High strength low alloyed (HSLA) carbon steel has a carbon content lower than 0.2 %.

This product contains substances listed in the *candidate list* (date: 26.2.2020) exceeding 0.1 percentage by mass: no

Reference service life
As a structural part of the building, the Cofradal® 200 is expected and specified to reach the same service life as that of the building. Considering the main materials, steel and concrete, the reference service life can be up to 100 years.

LCA: Calculation rules

Declared Unit
This Environmental Product Declaration represents Cofradal® 200, a prefabricated composite floor system.

The declared unit is 1 m², and the EPD refers to a manufacturer declaration of type 1b) declaration of one specific product calculated as the mean of products produced in several plants of one manufacturer.

Declared unit

Name	Value	Unit
Declared unit	1	m²
conversion factor [Mass/Declared Unit] to 1 Kg	236.6	-

This conversion is valid for the final product with its concrete installed.

System boundary
Type of the EPD: cradle-to-gate - with options. Module A, B, C and D were considered.

The following processes were considered in detail for the production stages A1-A3:

- Production of raw materials, production materials (Module A1) and auxiliary materials (Module A3)
- Transport of raw materials, semi-finished products and auxiliary materials to the production site (Module A2)
- Production of steel onsite, including the production of auxiliary materials on-site, disposal of production residues and packaging of raw materials, also taking into account on-site emissions (Module A3)
- Scrap occurring during the production on-site is looped back to satisfy some of the demand for scrap input to the process.

Module A4 addresses the transportation of Cofradal® 200 to the construction site. Module A5 describes the installation of Cofradal® 200 into the building including the addition of the welded mesh and concrete.

As an integrated system for structural floors, the Cofradal® 200 is located in the building internal part that protects it from bad climatic conditions. It could potentially be also covered by finishing components. Its use (Module B) within a building does not involve any specific maintenance.

Within this EPD the modules C1-C4 are included. These modules consider the dismantling of the considered product (C1), the transportation of the dismantled components (steel, concrete, mineral wool) to their final EoL destination, the waste processing for reuse, recovery or recycling (C3) as well as the disposal (C4)

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

Transport from the gate to the site (A4)

Name	Value	Unit
Transport distance	498	km
Capacity utilisation (including empty runs)	30	%

Assembly (A5)

Name	Value	Unit
Auxiliary	44	kg
Electricity consumption	10	kWh
Other energy carriers (diesel)	36	MJ
Material loss (steel)	0.3	%
Material loss (concrete)	1	%

End of life (C1-C4)

Name	Value	Unit
Recycling Steel	85	%
Recycling Concrete	67	%
Energy recovery Mineral Wool	47	%
Landfilling Steel	15	%
Landfilling Concrete	33	%
Landfilling Mineral Wool	53	%

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

Name	Value	Unit
Recycling Steel	85	%
Recycling Concrete	67	%
Energy Recovery Mineral Wool	47	%

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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	X	X	X	X	X	X	X	X	X	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A1: 1 m² Cofadral® 200

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP	[kg CO_2-Eq.]	4.51E+1	6.34E-1	3.10E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	2.44E+0	1.41E+0	2.39E-3	1.06E+0	-1.15E+1
ODP	[kg CFC11-Eq.]	1.49E-13	1.27E-16	1.07E-13	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.27E-13	2.83E-16	2.57E-17	6.15E-15	-5.56E-15
AP	[kg SO_2-Eq.]	1.01E-1	6.96E-4	4.18E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.21E-2	3.55E-3	3.43E-6	6.30E-3	-2.51E-2
EP	[kg $(PO_4)^{3-}$-Eq.]	9.51E-3	1.38E-4	5.26E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.92E-3	8.33E-4	7.76E-7	7.12E-4	-2.49E-3
POCP	[kg ethene-Eq.]	1.44E-2	-1.61E-5	4.90E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.23E-3	-1.10E-3	3.24E-7	4.88E-4	-2.99E-3
ADPE	[kg Sb-Eq.]	5.63E-4	8.15E-8	-2.25E-5	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.00E-6	1.81E-7	3.33E-10	1.05E-7	-4.13E-7
ADPF	[MJ]	1.25E+3	8.39E+0	1.47E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.40E+2	1.87E+1	1.50E-2	1.48E+1	-9.51E+1

Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A1: 1 m² Cofadral® 200

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	5.07E+1	7.04E-1	2.16E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.70E+1	1.57E+0	6.13E-3	1.94E+0	-3.78E+0
PERM	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	[MJ]	5.07E+1	7.04E-1	2.16E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.70E+1	1.57E+0	6.13E-3	1.94E+0	-3.78E+0
PENRE	[MJ]	1.48E+3	8.58E+0	1.57E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.63E+2	1.91E+1	3.59E-2	1.53E+1	-9.70E+1
PENRM	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	[MJ]	1.48E+3	8.58E+0	1.57E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	3.63E+2	1.91E+1	3.59E-2	1.53E+1	-9.70E+1
SM	[kg]	5.54E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	[m³]	1.26E-1	9.96E-4	3.14E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.09E-1	2.22E-3	8.14E-5	3.87E-3	-2.10E-2

Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources 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 resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A1: 1 m² Cofadral® 200

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	6.60E-6	8.42E-7	3.62E-6	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.21E-5	1.87E-6	1.39E-10	2.62E-7	-2.45E-7
NHWD	[kg]	1.24E+0	9.63E-4	7.37E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	7.63E-2	2.14E-3	3.62E-3	7.13E+1	-1.66E-1
RWD	[kg]	8.69E-2	4.65E-5	2.74E-3	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.73E-2	1.04E-4	8.23E-6	2.06E-4	-1.34E-4
CRU	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MFR	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.46E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MER	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EET	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

Note: 5,54 kg steel scrap is used in the production/manufacturing of 1 m² of Cofradal® 200. After use, 10,51 kg steel is recycled. The potential environmental impact calculated for the end-of-life stage (module D) is based on

the net amount of scrap left in the system, which is 10,51 kg – 5,54 kg = 4,97 kg. The system has a net output of 4,97 kg scrap (which carries a potential credit), thus module D shows an environmental benefit.

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PCR Part B
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Candidate list
Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
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CPR
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