

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

PYROCLAD X1



PYROCLAD X1



The Norwegian EPD Foundation

Owner of the declaration:

Carboline Norge AS

Product:

PYROCLAD X1

Declared unit:

1 kg

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR

IBU PCR Part B for coatings with organic binders

Program operator:

The Norwegian EPD Foundation

Declaration number:

NEPD-6498-5758-EN

Registration number:

NEPD-6498-5758-EN

Issue date: 30.04.2024

Valid to: 30.04.2029

EPD software:

LCAno EPD generator ID: 227043

General information

Product

PYROCLAD X1

Program operator:

The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303 Oslo, Norway
Phone: +47 977 22 020
web: www.epd-norge.no

Declaration number:

NEPD-6498-5758-EN

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR
IBU PCR Part B for coatings with organic binders

Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

Declared unit:

1 kg PYROCLAD X1

Declared unit with option:

A1,A2,A3,A4,C1,C2,C3,C4,D

Functional unit:

General information on verification of EPD from EPD tools:

Independent verification of data, other environmental information and the declaration according to ISO 14025:2010, § 8.1.3 and § 8.1.4. Verification of each EPD is made according to EPD-Norway's guidelines for verification and approval requiring that tools are i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPD-Norway, and iii) the process is reviewed annually by an independent third party verifier. See Appendix G of EPD-Norway's General Programme Instructions for further information on EPD tools

Verification of EPD tool:

Independent third party verification of the EPD tool, background data and test-EPD in accordance with EPD-Norway's procedures and guidelines for verification and approval of EPD tools.

Third party verifier:

Elisabet Amat, GREENIZE projects

(no signature required)

Owner of the declaration:

Carboline Norge AS
Contact person: Malgorzata Tarka-Ruda
Phone: +47 32 85 73 00
e-mail: EPD.Norway@carboline.com

Manufacturer:

Carboline Norge AS

Place of production:

Carboline Norge AS
Husebysletta 7
3414 Lierstranda, Norway

Management system:

ISO 9001:2015 and ISO 14001:2015

Organisation no:

980 488 683

Issue date:

30.04.2024

Valid to:

30.04.2029

Year of study:

2022

Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a building context.

Development and verification of EPD:

The declaration is created using EPD tool lca.tools ver EPD2022.03, developed by LCA.no. The EPD tool is integrated in the company's management system, and has been approved by EPD Norway.

Developer of EPD: Malgorzata Tarka

Reviewer of company-specific input data and EPD: Anders Øverby

Approved:



Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:

Pyroclad X1 is a two component, 100% solids epoxy based intumescent coating. It is designed to provide jet fire and hydrocarbon fire protection for structural elements, beams, columns, bulkheads, underdecks and risers. Pyroclad X1 is suitable for applications in the industrial, petrochemical, oil and gas, offshore and refining industries.

Product specification

- Full jet fire certification in accordance with ISO 22899
- Excellent hydrocarbon pool fire protection (ISO 834/BS-476)
- LR, DNV & ABS certification
- Successfully passed Norsok M-501 System 5A environmental test program without a topcoat
- Superior weathering resistance
- Very low moisture absorption
- Explosion resistance
- Extremely durable, impact resistant finish
- High film build properties
- Low flame spread and smoke development

Materials	Value	Unit
Binder	25 - 50	%
Additives	25 - 50	%
Fillers	25 - 50	%
Pigments	2.5 - 10	%
Titanium Dioxide	1 - 2.5	%
Packing	< 1	%

Technical data:

Color:

Part A: Light Gray

Part B: Dark Gray

Mixed: Gray

Film Build 5-6 mm (200-240 mils) per coat (typical)

Solids Content By Volume 100%

VOC Values As Supplied : 17 g/L (0.14 lb/gal)

Ratio 1:1 (by volume)

Shelf Life: 18 Months

Tests / Certification / Listing

General:

Underwriter's Laboratories, Inc.

Intertek Laboratories, Inc.

NORSOK M-501 System 5A Rev. 6

Lloyd's Register

Det Norske Veritas

American Bureau of Shipping

Market:

Europe

Reference service life, product

The reference service life of the product is highly dependent on the condition of use.

Reference service life, building or construction works

The coated object is not declared in this EPD.

LCA: Calculation rules

Declared unit:

1 kg PYROCLAD X1

Cut-off criteria:

All major raw materials and all the essential energy is included. The production processes for raw materials and energy flows with very small amounts (less than 1%) are not included. These cut-off criteria do not apply for hazardous materials and substances.

Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water and waste production in-house is allocated equally among all products through mass allocation. Effects of primary production of recycled materials is allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

Data quality:

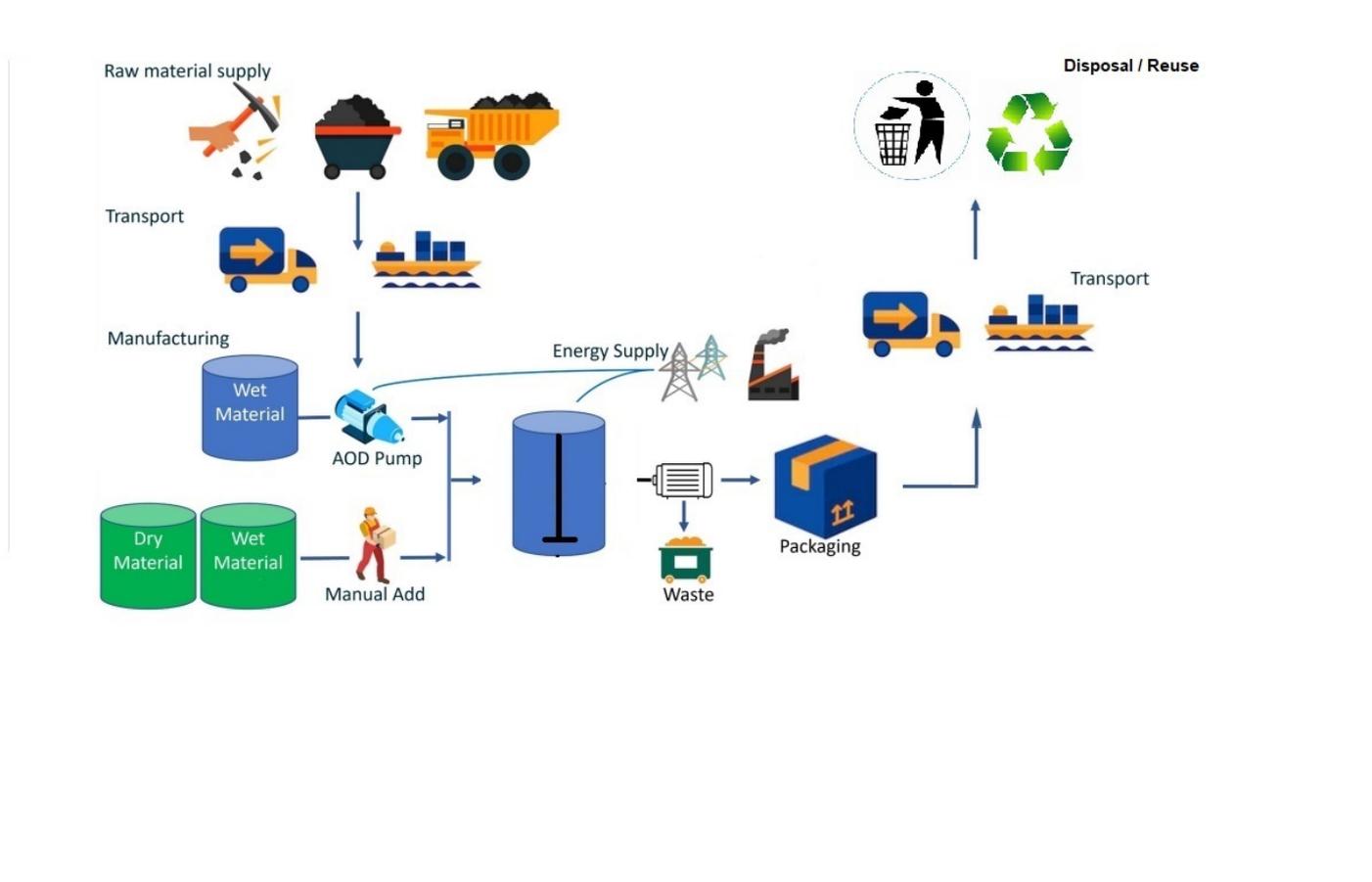
Specific data for the product composition are provided by the manufacturer. The data represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on EPDs according to EN 15804 and different LCA databases. The data quality of the raw materials in A1 is presented in the table below.

Materials	Source	Data quality	Year
Additives	CEPE RM Database v3.0	Database	2016
Chemical	ecoinvent 3.6	Database	2019
Packaging	ecoinvent 3.6	Database	2019
Packaging - Pallet	Modified ecoinvent 3.6	Database	2019
Packaging - Plastic	ecoinvent 3.6	Database	2019
Pigments and Fillers	CEPE RM Database v3.0	Database	2016
Pigments and Fillers	CEPE RM Database v3.0; ecoinvent 3.6	Database	2016
Solvent	CEPE RM Database v3.0	Database	2016
Unverified data	CEPE RM Database v3.0	Database	2016
Unverified data	ecoinvent 3.6	Database	2019

System boundaries (X=included, MND=module not declared, MNR=module not relevant)

Product stage			Construction installation stage		Use stage							End of life stage				Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	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	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

System boundary:



Additional technical information:

For more information please refer to Product Data Sheet and Safety Data Sheet.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

This EPD is prepared for declaring the production process (A1-A3) of 1 kg of packed 'ready-to-use' product. Transport to the client (A4) and end life stage (C modules) and potential environmental benefits (D module) are also included.

Module A4 describes an average distance from the manufacturing site to where the product is being sold to the client.

This declaration covers end-of-life stage (C module) of a coated construction where dried/cured paint is not removed from the surface during demolition.

Module C1 is declared as zero due to the negligible consumption of energy and natural resources for disassembling, since paint is a part of another product that ends its life.

Module C2 is estimated for delivery of paint residues to the closest waste treatment facility and is assumed as 50 km.

Module C3 has a zero impact since dried paint is not recycled or reused.

Module C4 is declared for dried paint, after solvents' evaporation.

Module D is declared for zero since drier or cured paint is non-recyclable nor reusable.

Mesh is not included in data for this EPD.

Transport from production place to user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, over 32 tonnes, EURO 6 (kgkm)	53,3 %	300	0,023	l/tkm	6,90
De-construction demolition (C1)		Unit	Value		
Energy use during decommissioning		kWh/DU	0,00		
Transport to waste processing (C2)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, over 32 tonnes, EURO 6 (kgkm)	53,3 %	50	0,023	l/tkm	1,15
Waste processing (C3)		Unit	Value		
Waste treatment per kg Paint, municipal incineration (kg)		kg/DU	0,00		
Disposal (C4)		Unit	Value		
Waste, paint, to landfill (kg)		kg/DU	1,00		
Benefits and loads beyond the system boundaries (D)		Unit	Value		
Substitution of raw materials (kg)		kg/DU	0,00		

LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document.

Environmental impact											
Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D	
 GWP-total	kg CO ₂ -eq	3,46E+00	2,20E-01	7,47E-02	3,41E-02	0,00E+00	5,68E-03	0,00E+00	1,17E-01	0,00E+00	
 GWP-fossil	kg CO ₂ -eq	3,45E+00	2,19E-01	7,32E-02	3,41E-02	0,00E+00	5,68E-03	0,00E+00	1,17E-01	0,00E+00	
 GWP-biogenic	kg CO ₂ -eq	6,01E-03	8,62E-05	1,39E-03	1,46E-05	0,00E+00	2,43E-06	0,00E+00	9,76E-06	0,00E+00	
 GWP-luluc	kg CO ₂ -eq	1,93E-03	8,29E-05	8,85E-05	1,04E-05	0,00E+00	1,73E-06	0,00E+00	2,05E-06	0,00E+00	
 ODP	kg CFC11 -eq	1,00E-06	4,94E-08	9,95E-09	8,22E-09	0,00E+00	1,37E-09	0,00E+00	3,11E-09	0,00E+00	
 AP	mol H+ -eq	2,76E-02	1,52E-03	4,61E-04	1,10E-04	0,00E+00	1,83E-05	0,00E+00	7,31E-05	0,00E+00	
 EP-FreshWater	kg P -eq	2,19E-03	1,64E-06	1,57E-06	2,71E-07	0,00E+00	4,52E-08	0,00E+00	9,43E-08	0,00E+00	
 EP-Marine	kg N -eq	3,56E-03	4,18E-04	1,65E-04	2,40E-05	0,00E+00	4,00E-06	0,00E+00	2,71E-05	0,00E+00	
 EP-Terrestrial	mol N -eq	3,65E-02	4,63E-03	1,81E-03	2,68E-04	0,00E+00	4,47E-05	0,00E+00	2,99E-04	0,00E+00	
 POCP	kg NMVOC -eq	1,44E-02	1,32E-03	5,06E-04	1,05E-04	0,00E+00	1,75E-05	0,00E+00	1,11E-04	0,00E+00	
 ADP-minerals&metals ¹	kg Sb-eq	5,50E-05	5,50E-06	9,85E-07	6,07E-07	0,00E+00	1,01E-07	0,00E+00	7,41E-08	0,00E+00	
 ADP-fossil ¹	MJ	5,88E+01	3,26E+00	7,19E-01	5,53E-01	0,00E+00	9,22E-02	0,00E+00	2,26E-01	0,00E+00	
 WDP ¹	m ³	5,61E+01	2,89E+00	2,63E+01	4,24E-01	0,00E+00	7,07E-02	0,00E+00	1,47E+00	0,00E+00	

GWP-total = Global Warming Potential total; GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

"Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"

*INA Indicator Not Assessed

1. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator

Remarks to environmental impacts

Additional environmental impact indicators

Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
 PM	Disease incidence	4,20E-07	1,47E-08	9,91E-09	3,13E-09	0,00E+00	5,22E-10	0,00E+00	1,56E-09	0,00E+00
 IRP ²	kgBq U235 -eq	2,25E+02	1,42E-02	5,03E-03	2,42E-03	0,00E+00	4,03E-04	0,00E+00	1,04E-03	0,00E+00
 ETP-fw ¹	CTUe	9,56E+01	2,35E+00	1,44E+00	4,05E-01	0,00E+00	6,74E-02	0,00E+00	1,41E-01	0,00E+00
 HTP-c ¹	CTUh	1,27E-08	0,00E+00	8,00E-11	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,20E-11	0,00E+00
 HTP-nc ¹	CTUh	4,93E-07	2,53E-09	1,33E-09	3,91E-10	0,00E+00	6,50E-11	0,00E+00	1,28E-10	0,00E+00
 SQP ¹	dimensionless	3,55E+01	2,09E+00	2,96E-01	6,34E-01	0,00E+00	1,06E-01	0,00E+00	8,69E-01	0,00E+00

PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Potential Soil Quality Index (dimensionless)

"Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"

*INA Indicator Not Assessed

1. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator
2. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Resource use											
Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D	
 PERE	MJ	7,73E+00	4,38E-02	1,93E+00	6,96E-03	0,00E+00	1,16E-03	0,00E+00	8,43E-03	0,00E+00	
 PERM	MJ	0,00E+00									
 PERT	MJ	7,73E+00	4,38E-02	1,93E+00	6,96E-03	0,00E+00	1,16E-03	0,00E+00	8,43E-03	0,00E+00	
 PENRE	MJ	6,63E+01	3,26E+00	7,19E-01	5,53E-01	0,00E+00	9,22E-02	0,00E+00	2,26E-01	0,00E+00	
 PENRM	MJ	0,00E+00									
 PENRT	MJ	6,63E+01	3,26E+00	7,19E-01	5,53E-01	0,00E+00	9,22E-02	0,00E+00	2,26E-01	0,00E+00	
 SM	kg	1,27E-02	0,00E+00								
 RSF	MJ	5,61E-02	1,55E-03	2,01E-03	2,44E-04	0,00E+00	4,06E-05	0,00E+00	1,75E-04	0,00E+00	
 NRSF	MJ	6,01E-02	5,49E-03	8,28E-03	8,16E-04	0,00E+00	1,36E-04	0,00E+00	3,62E-04	0,00E+00	
 FW	m ³	1,01E-01	3,27E-04	1,61E-02	6,30E-05	0,00E+00	1,05E-05	0,00E+00	2,79E-04	0,00E+00	

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

"Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"

*INA Indicator Not Assessed

End of life - Waste											
Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D	
 HWD	kg	1,74E-02	1,63E-04	2,11E-02	3,03E-05	0,00E+00	5,05E-06	0,00E+00	0,00E+00	0,00E+00	
 NHWD	kg	7,19E-01	1,43E-01	3,58E-02	4,81E-02	0,00E+00	8,02E-03	0,00E+00	1,00E+00	0,00E+00	
 RWD	kg	1,15E-04	2,23E-05	4,90E-06	3,78E-06	0,00E+00	6,30E-07	0,00E+00	0,00E+00	0,00E+00	

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

*Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"

*INA Indicator Not Assessed

End of life - Output flow											
Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D	
 CRU	kg	0,00E+00									
 MFR	kg	0,00E+00	0,00E+00	3,38E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
 MER	kg	0,00E+00	0,00E+00	2,34E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
 EEE	MJ	0,00E+00	0,00E+00	1,09E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
 EET	MJ	0,00E+00	0,00E+00	1,65E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported energy electrical; EET = Exported energy thermal

*Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009"

*INA Indicator Not Assessed

Biogenic Carbon Content		
Indicator	Unit	At the factory gate
Biogenic carbon content in product	kg C	0,00E+00
Biogenic carbon content in accompanying packaging	kg C	0,00E+00

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO₂

Additional requirements

Greenhouse gas emissions from the use of electricity in the manufacturing phase

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (A3).

Electricity mix	Data source	Amount	Unit
Electricity, Norway (kWh)	ecoinvent 3.6	24,33	g CO ₂ -eq/kWh

Dangerous substances

The product contains dangerous substances, more than 0,1% by weight, given by the REACH Candidate List, see table:

Name	CASNo	Amount
Boric acid	10043-35-3	10 - 25 %

Indoor environment

Not relevant.

Additional Environmental Information

Additional environmental impact indicators required in NPCR Part A for construction products										
Indicator	Unit	A1	A2	A3	A4	C1	C2	C3	C4	D
GWPIOBC	kg CO ₂ -eq	3,42E+00	2,19E-01	7,04E-02	3,41E-02	0,00E+00	5,68E-03	0,00E+00	1,17E-01	0,00E+00

GWPI-IOBC: Global warming potential calculated according to the principle of instantaneous oxidation. In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.

Bibliography

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 ISO 14044:2006 Environmental management - Life cycle assessment - Requirements and guidelines.
 EN 15804:2012+A2:2019 Environmental product declaration - Core rules for the product category of construction products.
 ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products.
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