



ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	MAXAMCORP International, S.L.U.
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD-2307-1056-EN
Registration number:	NEPD-2307-1056-EN
ECO Platform reference number:	-
Issue date:	13.08.2020
Valid to:	13.08.2025

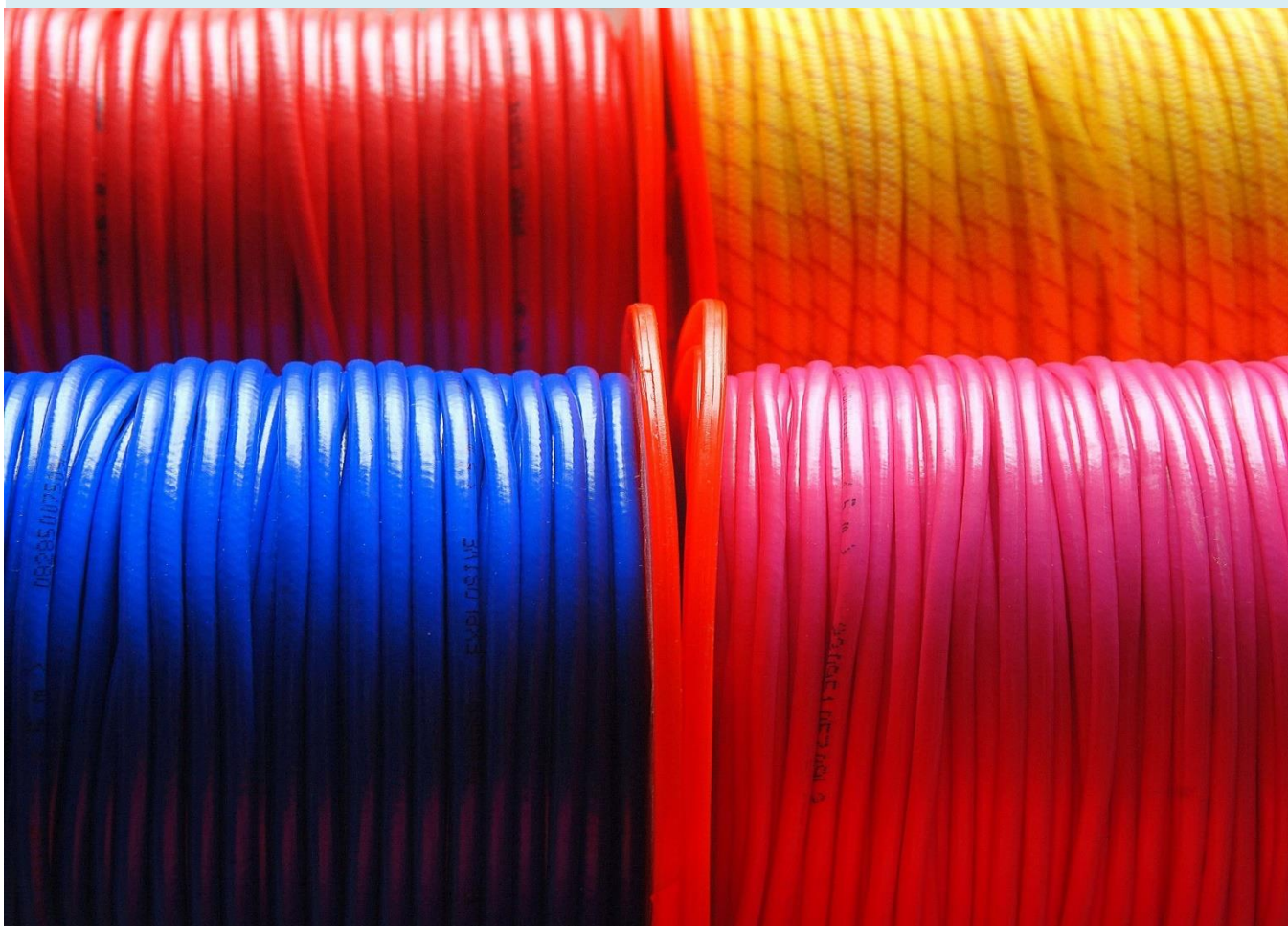
Detonating cords.

RIOCORD PV6/RIOCORD PV10/RIOCORD PV12/RIOCORD F+3,6/ RIOCORD F+5,0

MAXAMCORP International, S.L.U.



www.epd-norge.no



General information

Product:

Detonating Cords: Riocord PV6, Riocord PV10,
Riocord PV12, Riocord F+3,6/ Riocord F+5,0

Program operator:

The Norwegian EPD Foundation
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Declaration number:

NEPD-2307-1056-EN

ECO Platform reference number:

-

This declaration is based on Product Category Rules:

CEN Standard EN 15804 serves as core PCR
NPCR 024 version 1.0 Explosives and Initiation Systems
(03/2016)

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 meter of manufactured, installed and used (detonated) detonating cords

Declared unit with option:

A1-A3, A4, A5

Functional unit: **Verification:**

The CEN Norm EN 15804 serves as the core PCR.
Independent verification of the declaration and data, according to ISO14025:2010

Internal External

Third party verifier:



Elisabet Amat

(Independent verifier approved by EPD Norway)

Owner of the declaration:

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MAXAMCORP International, S.L.U.
Barrio Zuazo s/n
Galdakao (Bizkaia) Spain
Phone: +34 944 57 72 00
E-mail: general@maxamcorp.com

Place of production:

Galdakao (Spain)

Management system:

ISO 14001
ISO 9001
ISO 50001

Organisation no:

ES-B- 84967587

Issue date:

13.08.2020

Valid to:

13.08.2025

Year of study:

LCA conducted in 2019. Production data is from 2018.

Comparability:

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

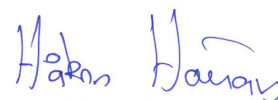
The EPD has been worked out by:

IK Ingenieria



IK /
INGENIERIA

Approved



Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:

RIOCORD is a flexible detonating cord with a core made of an explosive material (PETN). RIOCORD detonates at an approximate speed of 7,500 m/s. Detonating cord are produced at Galdacano (Galdakao) site of MAXAM in Spain.

RIOCORD Standard is used for a very wide range of applications between 3.6 g/m and 100 g/m. RIOCORD reinforced cords are used where high tensile strength and abrasion resistance are required.

Product specification:

EC-type examination certificates:

CE0163 (LOM, Spain), Ep 97.3030 for RIOCORD PV6

CE0163 (LOM, Spain), Ep 97.3031 for RIOCORD PV10

CE0163 (LOM, Spain), Ep 97.3032 for RIOCORD PV12

CE0163 (LOM, Spain), 01-EXP-4293 for RIOCORD F+3.6 and F+5.0

Technical data:

The technical characteristics RIOCORD, Class 1. UN number 0065, (nominal values) are the following:

	PETN Coreload (g/m)	Diameter (mm)	Net Weight (kg)	Packaging rolls x length (m)
PV6	6	3,6	10,6	2x400 or 4x200
PV10	10	4,0	10,0	2x250 or 4x125
PV12	12	4,4	11,0	2x250 or 4x125
F+3,6	3,6	3,6	8,6	2x400
F+5,0	5,0	3,8	8,8	2x400

Market:

Nordic countries (Finland, Sweden, Norway)

In this EPD, the 5 declared products are categorized as follows:

Materials	Standard (PV6/PV10/PV12)	Reinforced (F+3,6/ F+5,0)
Paraffin	-	15-20%
PVC	20-30%	<1%
Cellulose	5-8%	5-10%
PE	4-7%	25-30%
PP	15-10%	10-15%
PETN	40-55%	30-50%

Reference service life, product:

Not relevant. Explosives cannot be used more than once.

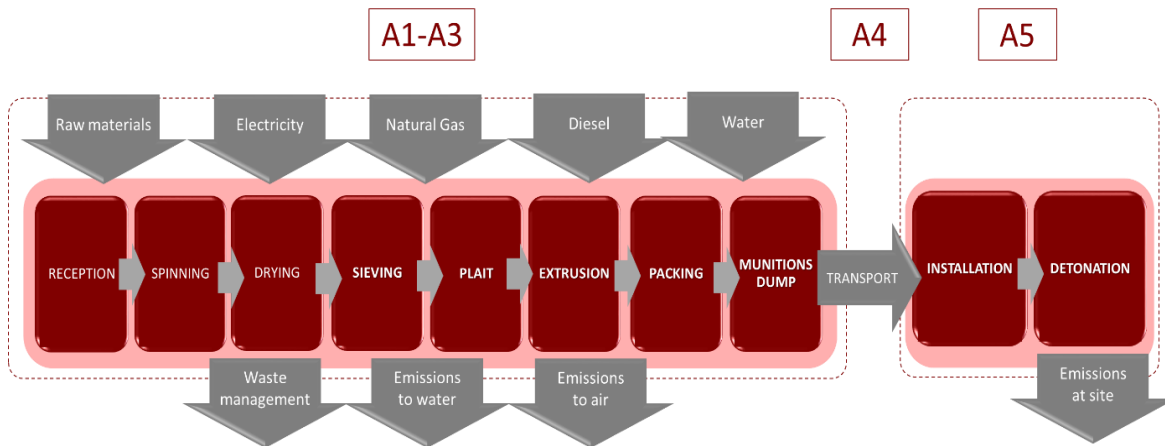
LCA: Calculation rules

Declared unit:

1 meter of manufactured, installed and used (detonated) detonating cord Riocord (PV6/PV10/PV12/ F+3,6/ F+5,0)

System boundary:

The flow diagram corresponding to modules A1-A3, A4 and A5 is shown in the figure below:



Data quality:

Data has been collected in 2018 and is representative of that year. Data for raw material supply, transport to fabrication plant and production of detonating cord (A1-A3) is based on specific consumption data for the factory at Galdakao. Detonation of the cord has been calculated from a balanced chemical reaction, at final state and 1 bar using proprietary software called DETCOM. Generic data is from Ecoinvent v3.5 (November 2018), Allocation, Cut off and SimaPro v 9.0.0.41. Characterization factors from EN15804: 2012 + A1: 2013 (CML August 2016).

Allocation:

The allocation is made in accordance with the provisions of EN 15804. Diesel and lubricant for transport machinery and output waste production have been allocated among all products fabricated at MAXAM through economic allocation.

Cut-off criteria:

All major raw materials and all the essential energy is included. The production process for raw materials and energy flows that are included with very small amounts (<1%) are not included. This cut-off rule does not apply for hazardous materials and substances.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD. This declaration is based on a "cradle to gate with options" assessment, including transportation to the installation site, installation and detonation:

UPSTREAM MODULE:

A1) Supply of raw materials:

- ✓ Extraction and processing of raw materials and recycling processes of materials from the recycling of waste streams from a previous product system (does not include the processes of treatment of waste unrelated to recycling as such).
- ✓ Extraction and processing of fuels.

CORE MODULES:

A2) Transportation to factory:

- ✓ External and internal transport of raw materials to the manufacturing plant.

A3) Manufacturing:

- ✓ Manufacturing of the product under analysis: energy consumption and materials.
- ✓ Emissions from the plant.
- ✓ Packaging materials.
- ✓ Consumables used for the maintenance of the machinery.
- ✓ Treatment of waste generated during the manufacturing process.

CONSTRUCTION PROCESSES

A4) Transportation:

- ✓ Transportation of the product from the plant to the installation site.

A5) Construction installation processes

- ✓ Materials and energy consumed in the installation of the product.
- ✓ Emissions in the use of the product.

The weighted average distance to the installation and detonation site is 2.700 km, the distance between Galdakano and the point of installation in Sweden. Scenarios for manufacture and charging of explosives, as well as detonation at site have also been added. The installation of the product is done manually so there is no consumption of material or energy. Detonation of explosives has been calculated from a balanced chemical reaction, at final state and 1 bar (software DETCOM).

Transport from production place to user (A4)

Type	Capacity utilization (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value
Truck	100%	16-32 t [EURO 5]	2.700,00	l/tkm	0.045

Installation (A5-1)

	Unit	Value
Auxiliary	kg	N/A
Water consumption	m ³	N/A
Electricity consumption	kWh	N/A
Other energy carriers	MJ	N/A
Material loss	kg	N/A
Output materials from waste treatment	kg	N/A
Dust in the air	kg	N/A

Detonation (A5-2)

	Unit	PV6	PV10	PV12	F+3.6	F+5.0
Methane	kg	9,60E-05	1,60E-04	1,92E-04	5,76E-05	8,00E-05
Carbon Oxide	kg	7,20E-05	1,20E-04	1,44E-04	4,32E-05	6,00E-05
Carbon dioxide	kg	3,80E-03	6,34E-03	7,61E-03	2,28E-03	3,17E-03
Hydrogen	kg	1,20E-05	2,00E-05	2,40E-05	7,20E-06	1,00E-05
Water	kg	9,36E-04	1,56E-03	1,87E-03	5,62E-04	7,80E-04
Nitrogen	kg	1,00E-03	1,67E-03	2,00E-03	6,01E-04	8,35E-04
Ammonia	kg	6,60E-05	1,10E-04	1,32E-04	3,96E-05	5,50E-05
Nitrogen Oxide	kg	6,00E-06	1,00E-05	1,20E-05	3,60E-06	5,00E-06
Oxygen	kg	6,00E-06	1,00E-05	1,20E-05	3,60E-06	5,00E-06

LCA: Results

This EPD contemplates a "Cradle to Gate with options" scope, following the guidelines of the document NPCR 024 version 1.0 Explosives and Initiation Systems (03/2016). The LCA results show environmental impacts, resource use and outflows calculated according to EN 15804: 2012 + A1: 2013. Results are given for declared unit for all product types:

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

Product stage			Assembly 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	x	MNR	MNR	MNR	MNR	MNR	MNR	MNR	MND	MND	MND	MND	MND

Environmental impact: RIOCORD PV6, RIOCORD PV10, RIOCORD PV12

Parameter	Unit	RIOCORD PV6			RIOCORD PV10			RIOCORD PV12		
		A1-3	A4	A5	A1- A3	A4	A5	A1-3	A4	A5
GWP	kg CO ₂ -eqv	1,03E-01	6,16E-03	2,21E-02	1,61E-01	9,27E-03	3,23E-02	1,79E-01	1,02E-02	3,44E-02
ODP	kg CFC11-eqv	8,22E-09	1,14E-09	0,00E+00	1,28E-08	1,71E-09	0,00E+00	1,44E-08	1,87E-09	0,00E+00
POCP	kg C ₂ H ₄ -eqv	1,57E-05	1,98E-05	1,90E-05	2,37E-05	2,98E-05	2,63E-05	2,61E-05	3,27E-05	2,63E-05
AP	kg SO ₂ -eqv	4,18E-04	4,62E-06	1,24E-04	6,50E-04	6,96E-06	2,03E-04	7,20E-04	7,63E-06	2,39E-04
EP	kg PO ³⁻⁴ -eqv	1,56E-04	1,01E-06	4,48E-04	2,61E-04	1,52E-06	7,46E-04	2,67E-04	1,66E-06	8,94E-04
ADPM	kg Sb-eqv	1,79E-07	1,85E-08	0,00E+00	2,96E-07	2,78E-08	0,00E+00	3,42E-07	3,05E-08	0,00E+00
ADPE	MJ	1,32E+00	9,32E-02	0,00E+00	1,98E+00	1,40E-01	0,00E+00	2,16E+00	1,54E-01	0,00E+00

Environmental impact: RIOCORD F+3.6, RIOCORD F+5.0

Parameter	Unit	RIOCORD F+3.6			RIOCORD F+5.0		
		A1-3	A4	A5	A1- A3	A4	A5
GWP	kg CO ₂ -eqv	8,50E-02	5,53E-03	2,67E-02	9,84E-02	6,14E-03	2,82E-02
ODP	kg CFC11-eqv	6,97E-09	1,02E-09	0,00E+00	8,14E-09	1,13E-09	0,00E+00
POCP	kg C ₂ H ₄ -eqv	1,50E-05	1,78E-05	1,71E-05	1,66E-05	1,98E-05	1,70E-05
AP	kg SO ₂ -eqv	3,54E-04	4,15E-06	8,21E-05	4,07E-04	4,61E-06	1,07E-04
EP	kg PO ³⁻⁴ -eqv	1,48E-04	9,04E-07	2,72E-04	1,59E-04	1,00E-06	3,76E-04
ADPM	kg Sb-eqv	1,56E-07	1,66E-08	0,00E+00	1,87E-07	1,84E-08	0,00E+00
ADPE	MJ	1,25E+00	8,38E-02	0,00E+00	1,38E+00	9,30E-02	0,00E+00

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

Resource use RIOCORD PV6,RIOCORD PV10, RIOCORD PV12

Parameter	Unit	RIOCORD PV6			RIOCORD PV10			RIOCORD PV12		
		A1-3	A4	A5	A1- A3	A4	A5	A1-3	A4	A5
RPEE	MJ	6,58E-02	9,97E-04	0,00E+00	1,02E-01	1,50E-03	0,00E+00	1,12E-01	1,65E-03	0,00E+00
RPEM	MJ	2,42E-02	0,00E+00	0,00E+00	3,91E-02	0,00E+00	0,00E+00	3,91E-02	0,00E+00	0,00E+00
TPE	MJ	9,00E-02	9,97E-04	0,00E+00	1,41E-01	1,50E-03	0,00E+00	1,51E-01	1,65E-03	0,00E+00
NRPE	MJ	1,33E+00	9,47E-02	0,00E+00	2,00E+00	1,43E-01	0,00E+00	2,19E+00	1,56E-01	0,00E+00
NRPM	MJ	1,98E-01	0,00E+00	0,00E+00	2,70E-01	0,00E+00	0,00E+00	2,72E-01	0,00E+00	0,00E+00
TRPE	MJ	1,53E+00	9,47E-02	0,00E+00	2,27E+00	1,43E-01	0,00E+00	2,46E+00	1,56E-01	0,00E+00
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
W	m ³	1,20E-03	1,61E-05	0,00E+00	1,60E-03	2,42E-05	0,00E+00	1,68E-03	2,65E-05	0,00E+00

Resource use RIOCORD F+3.6, RIOCORD F+5.0

Parameter	Unit	RIOCORD F+3.6			RIOCORD F+5.0		
		A1-3	A4	A5	A1- A3	A4	A5
RPEE	MJ	5,99E-02	8,96E-04	0,00E+00	6,68E-02	9,95E-04	0,00E+00
RPEM	MJ	2,56E-02	0,00E+00	0,00E+00	2,56E-02	0,00E+00	0,00E+00
TPE	MJ	8,55E-02	8,96E-04	0,00E+00	9,24E-02	9,95E-04	0,00E+00
NRPE	MJ	1,10E+00	8,51E-02	0,00E+00	1,23E+00	9,45E-02	0,00E+00
NRPM	MJ	3,16E-01	0,00E+00	0,00E+00	3,17E-01	0,00E+00	0,00E+00
TRPE	MJ	1,41E+00	8,51E-02	0,00E+00	1,55E+00	9,45E-02	0,00E+00
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
W	m ³	1,27E-03	1,44E-05	0,00E+00	1,30E-03	1,60E-05	0,00E+00

RPEE Renewable primary energy resources used as energy carrier; RPEM Renewable primary energy resources used as raw materials; TPE Total use of renewable primary energy resources; NRPE Non renewable primary energy resources used as energy carrier; NRPM Non renewable primary energy resources used as materials; TRPE 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; W Use of net fresh water

End of life – Waste: RIOCORD PV6,RIOCORD PV10, RIOCORD PV12

Parameter	Unit	RIOCORD PV6			RIOCORD PV10			RIOCORD PV12		
		A1-3	A4	A5	A1- A3	A4	A5	A1-3	A4	A5
HW	kg	1,04E-06	5,98E-08	0,00E+00	1,56E-06	9,00E-08	0,00E+00	1,74E-06	9,86E-08	0,00E+00
NHW	kg	5,26E-03	4,46E-03	0,00E+00	7,78E-03	6,72E-03	0,00E+00	8,56E-03	7,36E-03	0,00E+00
RW	kg	3,41E-06	6,41E-07	0,00E+00	4,92E-06	9,65E-07	0,00E+00	5,39E-06	1,06E-06	0,00E+00

End of life – Waste: RIOCORD F+3.6, RIOCORD F+5.0

Parameter	Unit	RIOCORD F+3.6			RIOCORD F+5.0		
		A1-3	A4	A5	A1- A3	A4	A5
HW	kg	9,32E-07	5,37E-08	0,00E+00	1,05E-06	5,96E-08	0,00E+00
NHW	kg	4,46E-03	4,01E-03	0,00E+00	4,98E-03	4,45E-03	0,00E+00
RW	kg	2,87E-06	5,76E-07	0,00E+00	3,22E-06	6,39E-07	0,00E+00

HW Hazardous waste disposed; NHW Non hazardous waste disposed; RW Radioactive waste disposed

End of life - Output flow (INA = Information not available) RIOCORD PV6,RIOCORD PV10, RIOCORD PV12

Parameter	Unit	RIOCORD PV6			RIOCORD PV10			RIOCORD PV12		
		A1-3	A4	A5	A1- A3	A4	A5	A1-3	A4	A5
CR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MR	kg	INA	INA	INA	INA	INA	INA	INA	INA	INA
MER	kg	INA	INA	INA	INA	INA	INA	INA	INA	INA
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ETE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Resource use RIOCORD F+3.6, RIOCORD F+5.0

Parameter	Unit	RIOCORD F+3.6			RIOCORD F+5.0		
		A1-3	A4	A5	A1- A3	A4	A5
CR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MR	kg	INA	INA	INA	INA	INA	INA
MER	kg	INA	INA	INA	INA	INA	INA
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ETE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

CR Components for reuse; MR Materials for recycling; MER Materials for energy recovery; EEE Exported electric energy; ETE Exported thermal energy

Reading example: $9,0 \text{ E-}03 = 9,0 \cdot 10^{-3} = 0,009$

Additional Norwegian requirements

Greenhous gas emission from the use of electricity in the manufacturing phase

Spanish Residual 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).

Data source	Amount	Unit
Residual National production mix based on Ecoinvent v3.5 (Spain)	0.555	Kg CO ₂ -eqv/kWh

Dangerous substances

- The product contains no substances given by the REACH Candidate list or the Norwegian priority list
- The product contains substances given by the REACH Candidate list or the Norwegian priority list that are less than 0,1 % by weight.
- The product contain dangerous substances, more then 0,1% by weight, given by the REACH Candidate List or the Norwegian Priority list, see table.
- The product contains no substances given by the REACH Candidate list or the Norwegian priority list. The product is classified as hazardous waste (Avfallsforskiten, Annex III), see table.

Name	CAS no.	RIOCORD PV6, RIOCORD PV10, RIOCORD PV12	RIOCORD F+3.6, RIOCORD F+5.0
		Amount	Amount
Pentaerythritol tetranitrate	CAS 78-11-5	40-55%	30-50%

Indoor environment





No tests have been carried out on the product concerning indoor climate - Not relevant.

Carbon footprint

Carbon footprint has not been worked out for the product.

Bibliography

ISO 14025:2010	<i>Environmental labels and declarations - Type III environmental declarations - Principles and procedures</i>
ISO 14044:2006	<i>Environmental management - Life cycle assessment - Requirements and guidelines</i>
EN 15804:2012+A1:2013	<i>Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products</i>
ISO 21930:2007	<i>Sustainability in building construction - Environmental declaration of building products</i>
NPCR 024 2016 ver. 1.0	Explosives and Initiation Systems
SimaPro	LCA software, developed by PRé Sustainability https://simapro.com/
Ecoinvent v3.5 (November 2018)	Swiss Centre of Life Cycle Inventories https://www.ecoinvent.org/

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