

# Environmental Product Declaration

In accordance with ISO14025:2006 and EN15804:2012+A2:2019

Firesafe GPG Marine



**FIRESAFE** /

**Owner of the declaration:**  
Firesafe AS Norway

**Product name:**  
GPG Marine

**Declared unit:**  
1 kg

**Product category /PCR:**  
CEN Standard EN 15804:2012+A2:2019 serves as core PCR NPCR 009:2021 Part B for Technical - Chemical products for building and construction industry (Version 3.0)

**Program holder and publisher:**  
The Norwegian EPD foundation

**Declaration number:**  
NEPD-6227-5490-EN

**Registration number:**  
NEPD-6227-5490-EN

**Issue date:**  
11.03.2024

**Valid to:**  
11.03.2029

**Product:**

Firesafe GPG Mortar

**Program operator:**

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**Declaration number:**

NEPD-6227-5490-EN

**This declaration is based on Product Category Rules:**

CEN Standard EN 15804:2012+A2:2019 serves as core. PCR NPCR 009:2021 Part B for Technical - Chemical products for building and construction industry (Version 3.0)

**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, life cycle assessment data and evidence.

**Declared unit:**

1 kg

**Declared unit with option:**

A1-A3, A4, A5, C1, C2, C3, C4

**Verification:**

Independent verification of the declaration and data, according to ISO14025:2010

internal  external



Independent verifier approved by EPD Norway

**Owner of the declaration:**

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**Manufacturer:**

Firesafe AS  
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**Place of production:**

Germany

**Management system:**

ISO14001, management system equivalent to ISO9001

**Organisation no:**

958 249 799

**Issue date:**

11.03.2024

**Valid to:**

11.03.2029

**Year of study:**

2023

**Comparability:**

EPD of construction products may not be able to compare if they do not comply with EN 15804 and are seen in a building context.

**The EPD has been worked out by:**

Synnøve Helen Gustavsen

Approved



Manager of EPD Norway

## Product

### Product description:

GPG Marine (GPGM) is a powder fireproofing compound that when mixed with water forms a mortar. In addition to fire resistant qualities GPGM also has, high explosion rating and good water repellent properties. The product is intended for use in internal conditions with humidity lower than 85 % RH excluding temperatures below 0 °C and without exposure to rain or UV. The mortar hardens into a strong and fireproof material.

The GPG Marine is a mortar applied to seal cable and pipe penetrations through fire barriers. GPG Marine is mainly developed for usage in marine, offshore, petroleum, or other process industries, which need to withstand high fire loads. GPG Marine has high resistance to water/humid exposure and is therefore well suited to a marine environment.

### Product specification:

The composition of the product is described in the following table:

Materials	Value	Unit
Minerals	92	%
Filler	7	%
Binder	0-1	%
Packaging -paper	0,007	kg
Packaging-plastic	0,00056	kg

### Technical data:

Density (weight): 0,7 g/cm<sup>3</sup>

Volume increase by curing: 1,1 vol-%

Initial setting time EN 480-2: 75 minutes

Curing time: 1-3 days. Paintable earliest after 21 days

For more information see <https://www.firesafe.no/product/firesafe-gpg-marine/>

### Market:

Norway, Sweden, Denmark and Finland

### Reference service life, product:

The reference service life of the product is similar to the service life of the building.

### Reference service life, building:

60 years

# LCA: Calculation rules



## Declared unit:

1 kg Firesafe GPG Marine

## 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. This cut-off rule does not apply for hazardous materials and substances.

## Allocation:

N/A

## Data quality:

Specific data for the product composition is collected from the producer. Data represent production of the declared unit and was gathered for EPD-development in the given year of study for this analysis. Background data is based on EPDs in accordance with EN 15804 and LCA databases.

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

Product stage			Assembly stage		Use stage								End of life stage				Benefits & loads beyond system boundary
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
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	MND

## System boundary:

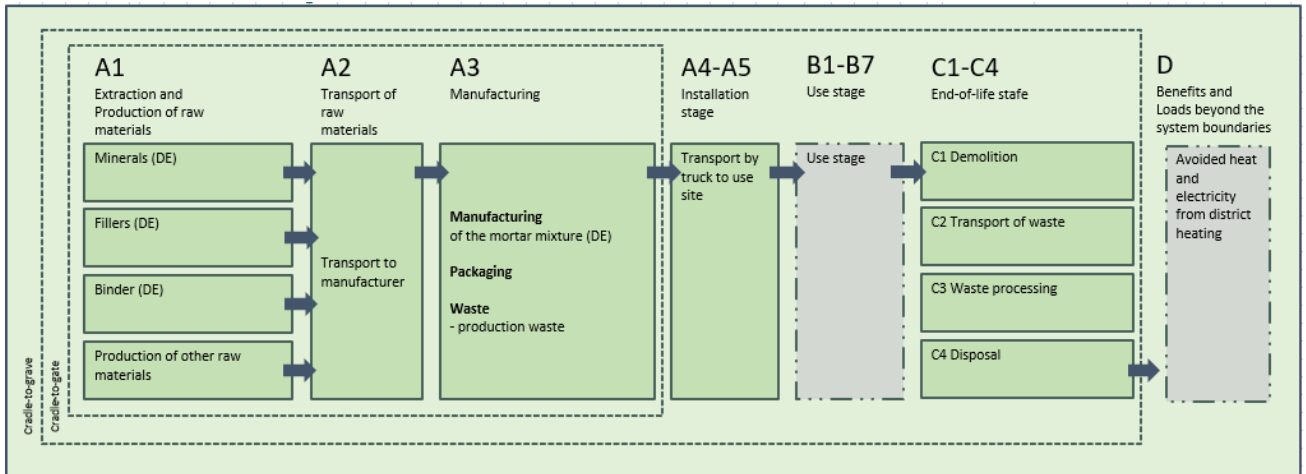
All processes from raw material extraction to product transportation to the building site, assembly as well as end of life stages (A1-A5, C1-C4) are included in the analysis.

A4: Transport from production site in Germany to storage facility in Norway is included. 300km transport from distribution to building site is also accounted for in accordance with PCR.

A5: Electricity consumption on mortar mixtures and water consumption are included in this module. All packaging is sent to average waste disposal.

C1-C2: GPG Marine can be removed with a hammer drill, and sorted at an approved disposal facility.

The flowchart below illustrates the system boundaries for the analysis.



## LCA: Scenarios and additional technical information

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

Scenarios have been developed to account for downstream processes such as demolition and waste treatment in accordance with the requirements of EN 15804 and NPCR Part A and NPCR 009 Part B.

### Transport from production place to assembly/user (A4)

Transport from production place to assembly/user (A4)	Capacity utilization (incl. return) %	Distance (km)	Fuel/Energy consumption	Unit	Value
Truck, lorry 16-21 metric ton, EURO 6	95 %	2100	0,0141	l/tkm	29,6
Truck, distribution facility to building site	50 %	300	0,054	l/tkm	16,2

The scenario for transportation from distribution facility in Norway to building site follows the default scenario provided in NPCR Part B.

### Assembly (A5)

	Unit	Value
Water consumption	kg	0,7142
Electricity consumption, Norway	kWh	0,0599
Output materials from waste treatment	kg	0,00771
Truck, lorry 16-21 metric ton, EUR05	km	50

Assumptions are made for the electricity usage from electrical machines used for mixing the product.

### End of Life (C1, C3, C4)

	Unit	Value
To landfill	kg/DU	1 kg

Due to lack of reliable data for the removal of mortar mass from building structures and other systems, C1 is based on assumptions from electricity usage from drilling. Electricity consumption is set to 0,0267 kWh/DU. The scenario for end-of-life treatment of the mortar mass follows a conservative scenario with declared unit going to landfill (C3 and C4).

### Transport to waste processing (C2)

	Capacity utilization (incl. return) %	Distance (km)	Fuel/Energy consumption (l/tkm)	Value (l/t)
Truck, lorry 16-21 metric ton, EUR05	50%	50	0,054	2,72

It is assumed that the waste is transported 50 km to the local waste landfill in accordance with NPCR.

# LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document. Impact assessment results are presented with core and additional impact indicators presented in EN15804+A2. Reading example: 9,0E-03 = 9,0\*10<sup>-3</sup> = 0,009.

## Core environmental impact indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4
GWP - total	kg CO2 eq	2,35E-01	2,81E-01	2,64E-03	1,07E-02	1,04E-03	1,48E-02	1,48E-02
GWP - fossil	kg CO2 eq	2,25E-01	2,81E-01	2,35E-03	1,06E-02	9,15E-04	1,45E-02	1,45E-02
GWP - biogenic	kg CO2 eq	1,04E-02	4,37E-04	2,70E-04	1,19E-05	1,16E-04	2,46E-04	2,46E-04
GWP - luluc	kg CO2 eq	2,73E-04	8,33E-05	1,39E-05	2,02E-06	6,02E-06	1,12E-05	1,12E-05
ODP	kg CFC11 eq	2,25E-08	6,20E-09	6,69E-11	2,33E-10	2,63E-11	3,11E-10	3,11E-10
AP	molc H+ eq	1,07E-03	5,99E-04	2,29E-05	1,88E-05	9,60E-06	3,22E-02	3,22E-02
EP- freshwater	kg P eq	5,89E-06	1,66E-06	1,54E-07	4,23E-08	6,12E-08	3,10E-07	3,10E-07
EP -marine	kg N eq	2,65E-04	1,64E-04	2,25E-06	5,01E-06	8,98E-07	3,35E-05	3,35E-05
EP - terrestrial	molc N eq	2,12E-03	1,71E-03	2,88E-05	5,11E-05	1,16E-05	3,65E-04	3,65E-04
POCP	kg NMVOC eq	7,10E-04	1,03E-03	8,78E-06	3,31E-05	3,44E-06	2,11E-03	2,11E-03
ADP-M&M <sup>2</sup>	kg Sb-Eq	7,56E-07	3,89E-07	2,27E-07	8,85E-09	1,01E-07	3,08E-08	3,08E-08
ADP-fossil <sup>2</sup>	MJ	2,23E+00	4,08E+00	4,41E-02	1,49E-01	1,74E-02	2,89E-01	2,89E-01
WDP <sup>2</sup>	m <sup>3</sup>	1,21E-01	1,51E-02	3,19E-02	3,98E-04	7,77E-04	1,09E-02	1,09E-02

**GWP-total:** Global Warming Potential; **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; See "additional Norwegian requirements" for indicator given as PO4 eq. **EP-marine:** Eutrophication potential, fraction of nutrients reaching freshwater end compartment; **EP-terrestrial:** Eutrophication potential, Accumulated Exceedance; **POCP:** Formation potential of tropospheric ozone; **ADP-M&M:** Abiotic depletion potential for non-fossil resources (minerals and metals); **ADP-fossil:** Abiotic depletion potential for fossil resources; **WDP:** Water deprivation potential, deprivation weighted water consumption

Reading example: 9,0 E-03 = 9,0\*10<sup>-3</sup> = 0,009

## Additional environmental impact indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4
PM	Disease incidence	1,40E-08	1,88E-08	1,36E-10	4,41E-10	5,37E-11	2,61E-08	2,61E-08
IRP <sup>1</sup>	kBq U235 eq.	3,28E-03	1,71E-03	8,18E-04	4,72E-05	3,52E-04	3,31E-04	3,31E-04
ETP-fw <sup>2</sup>	CTUe	6,54E+00	2,12E+00	2,55E-02	7,33E-02	1,07E-02	6,48E+00	6,48E+00
HTP-c <sup>2</sup>	CTUh	1,28E-10	8,12E-11	6,22E-12	2,21E-12	2,32E-12	3,20E-11	3,20E-11
HTP-nc <sup>2</sup>	CTUh	4,20E-09	3,22E-09	2,61E-10	8,46E-11	1,09E-10	1,58E-09	1,58E-09
SQP <sup>2</sup>	Dimensionless	2,23E+00	3,70E+00	2,00E-02	8,06E-02	8,26E-03	5,91E-01	5,91E-01

**PM:** Particulate matter emissions; **IRP:** Ionising radiation, human health; **ETP-fw:** Ecotoxicity (freshwater); **ETP-c:** Human toxicity, cancer effects; **HTP-nc:** Human toxicity, non-cancer effects; **SQP:** Land use related impacts / soil quality

<sup>1</sup> 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.

<sup>2</sup> 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

## Resource use

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4
RPEE	MJ	3,65E-01	4,82E-02	2,42E-01	1,23E-03	1,07E-01	9,75E-03	9,75E-03
RPEM	MJ	1,20E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
TPE	MJ	4,86E-01	4,82E-02	2,42E-01	1,23E-03	1,07E-01	9,75E-03	9,75E-03
NRPE	MJ	2,23E+00	4,08E+00	4,41E-02	1,49E-01	1,74E-02	2,89E-01	2,89E-01
NRPM	MJ	2,50E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
TRPE	MJ	2,26E+00	4,08E+00	4,41E-02	1,49E-01	1,74E-02	2,89E-01	2,89E-01
SM	kg	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
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
W	m <sup>3</sup>	3,08E-03	4,97E-04	2,41E-03	1,37E-05	7,59E-04	2,83E-04	2,83E-04

**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** Nonrenewable primary energy resources used as energy carrier; **NRPM** Nonrenewable 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

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4
HW	kg	2,27E-04	8,80E-05	8,49E-06	2,35E-06	3,65E-06	3,70E-03	3,70E-03
NHW	kg	2,59E-02	3,18E-01	1,80E-03	6,67E-03	7,58E-04	1,00E+00	1,00E+00
RW	kg	4,43E-06	0,00E+00	2,30E-06	1,07E-06	3,84E-07	2,87E-08	1,61E-07

**HW** Hazardous waste disposed; **NHW** Non-hazardous waste disposed; **RW** Radioactive waste disposed.

## End of life – output flow

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4
CR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MR	kg	3,68E-05	0,00E+00	7,13E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	kg	9,90E-04	0,00E+00	5,82E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	MJ	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

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

## Information describing the biogenic carbon content at the factory gate

Biogenic carbon content	Unit	Value
Biogenic carbon content in product	kg C	-
Biogenic carbon content in the accompanying packaging	kg C	0,0035



## Additional requirements

### Location based electricity mix from the use of electricity in manufacturing

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 (foreground/core) per functional unit.

National electricity grid	Data source	Foreground / core [kWh]	GWP <sub>total</sub> [kg CO <sub>2</sub> - eq/kWh]	SUM [kg CO <sub>2</sub> - eq]
Electricity, low voltage {DE}  market for electricity, low voltage   Cut-off, U	ecoinvent 3.9.1	0,0073	0,434	0,0031

### Additional environmental impact indicators required for construction products

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.

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4
GWP-IOBC	kg	2,24E-01	2,72E-01	2,32E-03	1,03E-02	9,02E-04	1,39E-02	1,39E-02

**GWP-IOBC** Global warming potential calculated according to the principle of instantaneous oxidation.

### Hazardous substances

The declaration is based upon reference to threshold values and/or test results and/or material safety data sheets provided to EPD verifiers. Documentation available upon request to EPD owner.

- The product contains no substances given by the REACH Candidate list.
- The product contains substances given by the REACH Candidate list that are less than 0,1 % by weight.
- The product contains dangerous substances, more then 0,1% by weight, given by the REACH Candidate List, see table.
- The product contains no substances given by the REACH Candidate list.
- The product is classified as hazardous waste, see table.

### Indoor environment






The product meets the requirements for low emissions.

### Carbon footprint

Carbon footprint has not been worked out for the product.

## Bibliography

ISO 14025:2010	Environmental labels and declarations - Type III environmental declarations - Principles and procedures
ISO 14044:2006	Environmental management - Life cycle assessment - Requirements and guidelines
Ecoinvent v3, 2019	Allocation, cut-off by classification. Swiss Centre of Life Cycle Inventories.
EN 15804:2012+A2:2019	Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products
EPD-Norway (2021)	NPCR 009 Part B for Technical – Chemical products for building and construction industry. Reg 06.06.2016
EPD-Norway (2021)	NPCR Part A:2021 Construction products and services version 2.0. Reg 07.04.2017
ISO 21930:2007	Sustainability in building construction - Environmental declaration of building products
Gustavsen (2024)	Life cycle assessment (LCA) report for Firesafe GPG Mortar, GPG Marine and GPG Brick. Asplan Viak, 2024.

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