

# ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	Master Builders Solutions Deutschland GmbH
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
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Valid to	07.06.2026

**Cement-based insulation foam: MasterProtect NFF 2070 IN**  
**Master Builders Solutions Deutschland GmbH**

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## General Information

### Master Builders Solutions Deutschland GmbH

#### Programme holder

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#### Declaration number

EPD-MDS-20210038-CBA1-EN

#### This declaration is based on the product category rules:

cement-based foams, 05.2020  
 (PCR checked and approved by the SVR)

#### Issue date

08.06.2021

#### Valid to

07.06.2026

Dipl. Ing. Hans Peters  
 (chairman of Institut Bauen und Umwelt e.V.)

Dr. Alexander Röder  
 (Managing Director Institut Bauen und Umwelt e.V.)

### Cement-based insulation foam: MasterProtect NFF 2070 IN

#### Owner of the declaration

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 Dr.-Albert-Frank-Straße 32  
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 Deutschland

#### Declared product / declared unit

**1m³ cement-based insulation foam MasterProtect NFF 2070 IN, with an average density of 76.02 kg/m³ and a dry density of 70 kg/m³.**

#### Scope:

The ecobalance is based on the compound MasterProtect NFF 2000 IN produced by BauMineral GmbH by order of Master Builders Solutions Deutschland GmbH. The board SwissPorit, MasterProtect NFF 2070 IN produced out of the compound, is produced by Eberhard Bau AG (CH) until the end of 2021 and by the Swiss Porit AG from the beginning of 2022. The results of the ecobalance are mainly dominated by the compound production. Therefore, the results may serve as a good approximation for other board production locations.

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 14025:2010*

☐ internally ☒ externally

Dr. Eva Schmincke  
 (Independent verifier appointed by SVR)

## Product

### Product description/Product definition

Under the MBCC Group, the Master Builders Solutions brand combines its technological know-how and comprehensive product portfolio to provide the right solutions, based on our experience gained in countless construction projects worldwide.

SwissPorit / MasterProtect NFF 2070 IN boards are an inorganic insulation material consisting of an inorganic binder and inorganic fillers. It is an easy to process material for light, non-flammable and thermally insulating as well as completely recyclable products used in the construction industry.

MasterProtect NFF 2070 IN has been specially developed for permanent, energy-efficient and heat-

insulating prefabrication and construction site applications.

At high, medium and low densities, the product is frost-resistant and shows little water absorption because it has a high proportion of closed pores. Furthermore, it has a high level of stability when exposed to cyclical temperature and humidity.

The product is manufactured in a chemical foaming process (reaction of hydrogen peroxide and a catalyst to form water and oxygen). This can be carried out continuously or in a batch process.

For the use of the product, the respective national regulations at the place of use apply, in Germany for



example the building regulations of the federal states, and the technical regulations based on these regulations.

### Application

Renovation, repair and new construction

- Interior insulation of ceiling, wall and roof
- Underside insulation ceiling / roof
- Insulation between rafters
- Core insulation
- Insulation of double-leaf walls
- Insulation wood frame construction
- External insulation of the wall behind the cladding (ventilated facade)
- External insulation wall behind plaster (External Thermal Insulation Composite Systems, ETICS)
- Insulation of apartment and room partition walls
- Screed insulation
- Brick cavity insulation (brick and concrete)

The insulation panels are processed and applied by hand. The cutting is done using a band saw or hard metal saws. The insulation panels are attached with an adapted mortar and plaster system. Plastic dowels can also be used. The insulation boards can be plastered, painted or coated.

### Technical Data

#### Constructional Data

Name	Value	Unit
Gross density	67 - 72	kg/m <sup>3</sup>
Dimensional stability	<2	%
Thermal conductivity	37.5 - 38.5	W/(mK)
Specific heat capacity	1.1	kJ/kgK
Water vapour diffusion resistance factor	1.5	-
Compressive strength	25	kPa
Flexural stress	20	kPa
Tensile strength	9	kPa
Melting point	1300	°C
Building material class	A1	-
Equilibrium moisture content	5	%

Performance data of the product with respect to its characteristics in accordance with the relevant technical provision (no CE-marking).

### Base materials/Ancillary materials

Name	Value	Unit
Cement	30-40	M. %
Kaolin (calcinated)	15-25	M. %
Fly ash	15-25	M. %
Stabilizer	5-15	M. %
Gypsum	5-10	M. %
Mineral filler	0-10	M. %
PP-fibers	0-1	M. %
Hydrophobing agent	0-0.5	M. %

In addition, 90-120 mass% water (based on solids) is used in the production. Formwork oil is used as an auxiliary material.

**Cement:** Cement serves as the main binder and is made by burning limestone, bauxite and calcium sulfate and then mixing and grinding with gypsum.

**Hard coal fly ash:** Hard coal fly ash is produced when coal is burned. Fly ash is involved in the development of strength when water is added and serves as a secondary binder.

**Calcined kaolin:** The calcined kaolin is a kaolin that is homogenized by a burning process. The resulting metakaolin compacts the structure and participates in the development of strength.

**Anhydride / gypsum:** the reactivity of the cement is controlled by adding anhydride.

**Formwork oil:** An oil based on renewable raw materials is used as formwork oil and is easily biodegradable. Formwork oil is used as a release agent.

**Water-repellent agent:** The water-repellent agent is used to reduce water absorption. Metal soaps that are partially hydrophilic and hydrophobic are used.

**Mineral surcharge:** The surcharge comes from ground production residues of the insulation boards themselves.

**PP fibres:** The use of extruded PP fibres significantly increases flexural strength and adhesive strength.

**Air stabilizers:** Fine-grained inorganic carbonates are used for air stabilization, which have been functionalized beforehand. The partially hydrophobized particles form a boundary layer between the air and water phases.

This product contains substances listed in the candidate list ( 01.05.2020) exceeding 0.1 percentage by mass: no

### Reference service life

When used as intended, the service life of the insulation boards is <50 years according to the Bundesinstitut für Bau-, Stadt- und Raumforschung (BBSR) table "Service life of components for life cycle analyzes according to the assessment system for sustainable building (BNB)".

## LCA: Calculation rules

### Declared Unit

The declared unit is 1 m<sup>3</sup> of MasterProtect NFF 2070 IN foam with an average density at factory gate of 76,02 kg/m<sup>3</sup>.

### Declared Unit

Name	Value	Unit
Declared unit	1	m <sup>3</sup>
Gross density (wet)	76.02	kg/m <sup>3</sup>
Conversion factor to 1 kg	76.02	kg/m <sup>2</sup>
Gross density (abs. dry)	65	kg/m <sup>3</sup>

### System boundary

Type of the EPD: cradle to gate - with options.

#### Module A1:

Raw material and energy supply for production of the (foamable) compound. Packaging materials.

#### Module A2:

Transport of the compound to the converter Switzerland.

#### Module A3:

Foaming, forming and cutting of the compound. Treatment of compound packaging. Foam curing incl. carbonation (carbonation rate of 40% within A3, which leads to a carbon uptake of 1.04 kg CO<sub>2</sub>). Packaging of foam.

#### Module A4:

Transport to the construction site (100 km by truck). Transport distance may be adjusted on building level if relevant.

#### Module A5:

Packaging treatment. Installation losses have not been accounted for since these highly depend on the

building context and application. Eventual losses may be estimated using the indicator results for the manufacturing phase (modules A1-A3) multiplied with the respective loss rate.

#### Module B1:

Carbonation of Ettringite (55% carbonation rate; 95% carbonation rate in total).

#### Module C1:

Manual deconstruction (no loads).

#### Module C2:

Transport to the waste treatment plant (50 km by truck). Transport distance may be adjusted on building level if relevant.

#### Module C3/1:

Recycling as admixture in cement foam production. Average efforts for waste treatment (shredding).

#### Module C3/2:

Recycling as backfill material. Average efforts for waste treatment (shredding).

#### Module D/1:

Avoided burdens for substitution of kaolin and calcium carbonate (non-reactive compound constituents).

#### Module D/2:

Avoided burdens for substitution of gravel.

### 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
Litres of fuel	136	l/100km
Transport distance	100	km
Capacity utilisation (including empty runs)	61	%
Gross density of products transported	76.02	kg/m <sup>3</sup>

### Use or application of the installed product (B1) see section 2.12 "Use"

Name	Value	Unit
Carbonatization rate in the use phase	55	%
Carbon uptake in the use phase	1,46	kg CO <sub>2</sub>

### Reference service life

Name	Value	Unit
Life Span (according to BBSR)	50	a

### End of Life (C1-C4)

Name	Value	Unit
Collected separately type	1	kg
Collected as mixed construction waste	0	kg
Reuse	0	kg
Recycling	0.97	kg
Energy recovery	0	kg
Landfilling	0.03	kg

## 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	MND	MNR	MNR	MNR	MND	MND	MND	X	X	MND	X

### RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A1: 1 m³ cement-based insulation foam

Parameter	Unit	A1-A3	A4	A5	B1	C2	C3/1	C3/2	D/1	D/2
GWP	[kg CO <sub>2</sub> -Eq.]	45.59	0.48	7.62	-1.46	0.45	0.16	0.16	-32.39	-2.72
ODP	[kg CFC11-Eq.]	1.05E-6	7.82E-17	1.08E-15	0.00E+0	7.31E-17	5.46E-16	5.46E-16	-2.32E-13	-3.87E-14
AP	[kg SO <sub>2</sub> -Eq.]	1.09E-1	3.73E-4	6.42E-4	0.00E+0	3.49E-4	1.15E-3	1.15E-3	-2.69E-2	-3.64E-3
EP	[kg (PO <sub>4</sub> ) <sub>3</sub> -Eq.]	3.50E-2	6.86E-5	1.39E-4	0.00E+0	6.42E-5	2.76E-4	2.76E-4	-4.86E-3	-5.29E-4
POCP	[kg ethene-Eq.]	6.96E-3	-1.61E-6	5.67E-5	0.00E+0	-1.50E-6	1.27E-4	1.27E-4	-3.04E-3	-3.64E-4
ADPE	[kg Sb-Eq.]	7.35E-5	3.50E-8	1.33E-8	0.00E+0	3.28E-8	1.85E-7	1.85E-7	-3.75E-6	-4.82E-7
ADPF	[MJ]	660.70	6.48	1.21	0.00	6.06	3.19	3.19	-495.50	-38.16

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 - RESOURCE USE according to EN 15804+A1: 1 m³ cement-based insulation foam

Parameter	Unit	A1-A3	A4	A5	B1	C2	C3/1	C3/2	D/1	D/2
PERE	[MJ]	133.17	0.37	52.50	0.00	0.34	0.24	0.24	-44.88	-10.38
PERM	[MJ]	52.19	0.00	-52.20	0.00	0.00	0.00	0.00	0.00	0.00
PERT	[MJ]	185.47	0.37	0.27	0.00	0.34	0.24	0.24	-44.88	-10.38
PENRE	[MJ]	657.80	6.50	33.70	0.00	6.08	14.10	14.10	-517.00	-46.99
PENRM	[MJ]	43.10	0.00	-32.30	0.00	0.00	-10.80	-10.80	0.00	0.00
PENRT	[MJ]	700.80	6.50	1.42	0.00	6.08	3.30	3.30	-517.00	-46.99
SM	[kg]	13.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	[MJ]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	[MJ]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FW	[m³]	1.72E-1	4.23E-4	1.79E-2	0.00E+0	3.95E-4	9.29E-4	9.29E-4	-3.26E-2	-1.20E-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 – OUTPUT FLOWS AND WASTE CATEGORIES according to EN 15804+A1: 1 m³ cement-based insulation foam

Parameter	Unit	A1-A3	A4	A5	B1	C2	C3/1	C3/2	D/1	D/2
HWD	[kg]	5.85E-4	3.03E-7	9.82E-10	0.00E+0	2.83E-7	8.64E-8	8.64E-8	-3.63E-7	-5.42E-8
NHWD	[kg]	1.05E+0	9.95E-4	4.69E-2	0.00E+0	9.31E-4	8.92E-4	8.92E-4	-1.46E+0	-2.65E+0
RWD	[kg]	5.70E-3	8.05E-6	8.15E-5	0.00E+0	7.53E-6	4.36E-5	4.36E-5	-8.38E-3	-3.50E-3
CRU	[kg]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MFR	[kg]	0.00	0.00	0.00	0.00	0.00	63.00	63.00	0.00	0.00
MER	[kg]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EEE	[MJ]	0.00	0.00	11.30	0.00	0.00	0.00	0.00	0.00	0.00
EET	[MJ]	0.00	0.00	20.20	0.00	0.00	0.00	0.00	0.00	0.00

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; EEE = Exported thermal energy

## References

### Standards

#### **EN 15804/A1**

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.

### Further References

#### **BBSR - Bundesinstitut für Bau-, Stadt- und Raumforschung**

Service Life of Building Components; version 24.02.2017.  
[https://www.nachhaltigesbauen.de/fileadmin/pdf/Nutzungsdauer\\_Bauteile/BNB\\_Nutzungsdauern\\_von\\_Bauteilen\\_2017-02-24.pdf](https://www.nachhaltigesbauen.de/fileadmin/pdf/Nutzungsdauer_Bauteile/BNB_Nutzungsdauern_von_Bauteilen_2017-02-24.pdf)

#### **GaBi**

GaBi Software version 9.5.1, Sphera Solutions GmbH, Stuttgart. GaBi Professional database, Service Pack 40, 2020.

#### **IBU 2016**

Institut Bauen und Umwelt e.V.: General Programme Instructions for the Preparation of EPDs at the Institut Bauen und Umwelt e.V. Version 1., Berlin: Institut Bauen und Umwelt e.V., 2016. "<http://www.ibu-epd.com>"

#### **PCR Product Category Rules for Building-Related Products and Services**

Institut Bauen und Umwelt e.V.: PCR part A: Calculation Rules for the life Cycle Assessment and Requirements on the Project Report, v1.8, 2019.

Institut Bauen und Umwelt e.V.: PCR part B: Requirements on the EPD for cement-based foams, 2020.

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