

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A1

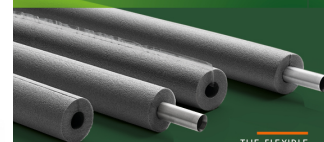
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CLIMAFLEX®naturefoam easy
NMC S.A.

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CLIMAFLEX® | naturefoam






THE FLEXIBLE
PIPE INSULATION MADE OF
RENEWABLE AND RECYCLED
RAW MATERIALS.

nmc
TECHNICAL
INSULATION



1. General Information

<p>NMC S.A.</p> <hr/> <p>Programme holder IBU – Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany</p> <hr/> <p>Declaration number EPD-NMC-20210312-IBD1-EN</p> <hr/> <p>This declaration is based on the product category rules: Insulating materials made of foam plastics, 01.2019 (PCR checked and approved by the SVR)</p> <hr/> <p>Issue date 05.01.2022</p> <hr/> <p>Valid to 04.01.2027</p> <hr/> <div style="text-align: center;">  </div> <hr/> <p>Dipl. Ing. Hans Peters (chairman of Institut Bauen und Umwelt e.V.)</p> <hr/> <div style="text-align: center;">  </div> <hr/> <p>Dr. Alexander Röder (Managing Director Institut Bauen und Umwelt e.V.)</p>	<p>CLIMAFLEX@naturefoam easy</p> <hr/> <p>Owner of the declaration NMC S.A. Gert-Noel Strasse BE-4731 Eynatten</p> <hr/> <p>Declared product / declared unit 1 m³ insulation material CLIMAFLEX@naturefoam easy</p> <hr/> <p>Scope: Product line CLIMAFLEX@naturefoam easy Thermal insulation products for building equipment and industrial insulations made of polythene foam (PEF) according to EN14313. This declaration is an Environmental Product Declaration according to /ISO14025/ describing the specific environmental performance of the product produced in Belgium at the side of Eynatten.</p> <p>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 <i>EN 15804+A1</i>. In the following, the standard will be simplified as <i>EN 15804</i>.</p> <hr/> <p>Verification</p> <table border="1"> <tr> <td colspan="2">The standard <i>EN 15804</i> serves as the core PCR</td> </tr> <tr> <td colspan="2">Independent verification of the declaration and data according to <i>ISO 14025:2010</i></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/> internally</td> <td style="text-align: center;"><input checked="" type="checkbox"/> externally</td> </tr> </table> <hr/> <div style="text-align: center;">  </div> <hr/> <p>Vito D'Incognito (Independent verifier)</p>	The standard <i>EN 15804</i> serves as the core PCR		Independent verification of the declaration and data according to <i>ISO 14025:2010</i>		<input type="checkbox"/> internally	<input checked="" type="checkbox"/> externally
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2. Product

2.1 Product description/Product definition

CLIMAFLEX@naturefoam easy Polyethylene foams have many environmental benefits, having a low density (average 28 kg/m³), few raw materials are required for the manufacture of an article and the environmental impact of their transport is lower than similar articles of higher density performing the same function.

The CLIMAFLEX@naturefoam easy does have a self adhesive strip. Furthermore, the CLIMAFLEX@naturefoam easy are recyclable with exception of the self-adhesive strip.

For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) - Thermal Insulation products for building equipment and industrial installations. Factory made polyethylene foam (PEF) and the CE-marking. For the application and use the respective national provisions apply.

2.2 Application

The function of CLIMAFLEX@naturefoam easy is to ensure the insulation of heating and sanitary

installations for a reference service life (RSL) of 50 years.

This duration is based on the frequency of replacement of sanitary and heating piping in buildings. Although the insulation pipes are still effective after 50 years, it is assumed that when replacing the piping, the insulation CLIMAFLEX@naturefoam easy is not reused and is recycled. 50 years is the minimum Reference Service Life recommended for factory made thermal insulation products".

2.3 Technical Data

Performance data of the product in accordance with the Declaration of Performance with respect to its Essential Characteristics according to /EN 14313/ apply. Further data:

Constructional data

Performance data of the product in accordance with the Declaration of Performance with respect to its Essential Characteristics according to /EN 14313/ apply. Further data:

Name	Value	Unit
Gross density	28	kg/m ³
Thermal conductivity At 40 °C	0.04	W/(mK)
Reaction to Fire Acc.to /EN 13501-1/	BI-s1d0 ; CI-s1d0	-
Max Service Temperature Acc. to /EN 14707	100	°C
Min Service Temperature	0	°C
Water absorption Acc. to EN 13472	WS005	
Traces quantities of water soluble ions and pH-value Acc. to EN 13468 and EN 13472	Cl < 15 – F < 4 - pH 6,1	

2.4 Delivery status

The CLIMAFLEX®naturefoam easy product is a closed-cell bio-polyethylene foam insulation tube designed for applications in heating and sanitary installations. The EPD will cover the whole CLIMAFLEX®naturefoam easy range. The insulating sleeves in the CLIMAFLEX®naturefoam easy range have a thickness ranging from 9 to 20mm and an inside diameter ranging from 15 to 102mm. These products are categorized according to thickness. The category of small thickness products includes the CLIMAFLEX® naturefoam easy 9 and 13mm products while the category of large thickness products includes CLIMAFLEX®naturefoam easy 20 and 25mm products. These two categories are also distinguished by their rating in fire reaction tests. For small thickness products (9 and 13mm) the fire classification is Euroclass BI s1 d0 (Acc. to EN 13501-1) and for large thickness products (20mm) the fire rating is Euroclass CI s1 d0 (Acc. to EN 13501-1).

2.5 Base materials/Ancillary materials

Base materials

CLIMAFLEX®naturefoam easy is a professional bio-polyethylene-based closed-cell foam pipe insulation for continuous energy saving and condensation control purposes. CLIMAFLEX®naturefoam easy provides solutions that follow all necessary guidelines and standards for any type of installation. The CLIMAFLEX®naturefoam easy is equipped with a double-sided self-adhesive means that installed pipes can be insulated twice as quickly as with traditional insulation products. The following table displays the different elements of the formulation for CLIMAFLEX®naturefoam easy. This is in accordance with the PCR Part B: Requirements on the EPD for Insulating materials made of foam plastics and ISO 14025.

This product contains substances listed in the candidate list (date: 08.07.2021) exceeding 0.1 percentage by mass: **No**.

This product contains other CMR substances in categories 1A or 1B, which are not on the candidate list, exceeding 0.1 percentage by mass: **No**.

Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) Ordinance on Biocide Products No. 528/2012): **No**.

Name	Value	Unit
Bio LDPE	58,79	%
Polyethylene	1.23	%
NMC Internally recycled PE	16.8	%
Flame retardant	4.15	%
Pigments and fillers	2.0	%
Volume stabilizer	1,37	%
Blowing Agent	9.11	%
Double-sided self-adhesive	5.18	%
Release band	1.37	%

BIO-PE and fillers are the main components of the product and are responsible for the characteristics and performance of the product

The blowing agent causes the expansion during manufacturing. The flame retardant ensures the fire resistance and conformity with fire protection regulations (see section 2.13).

According to the European Chemicals Regulation "REACH" manufacturers, importers and downstream users must register their chemicals and are responsible for their safe use. NMC S.A. uses exclusively verifiably registered and approved substances in its production. Products manufactured and put on the market by NMC do need to be registered. CLIMAFLEX®naturefoam easy do not contain Substances of Very High Concern (SVHC). Antimony trioxide and halogenated flame retardants are applied.

2.6 Manufacture

The manufacture of the CLIMAFLEX®naturefoam easy product consists of incorporating the ingredients of the formulation into an extruder, adding a foaming agent, mixing, heating and then extruding the mix through a die, during which time foaming takes place. The product is then cooled with water (municipal water), drying and the double-sided self-adhesive is applied as well as the release band. After that the product is cut to size before being packed and stored.

Quality assurance :

The manufacture is certified ISO 9001 for the quality management and the product is certified for CE marking according to CPR (CE Certificate of conformity N° 0749-CPR-BC1-571-4133-0001-01 and 0749-CPR-BC1-571-4133-0002-01)

2.7 Environment and health during manufacturing

During all manufacturing steps of NMC S.A. Belgium, the production follows all national guidelines and regulations. Solar panels are installed on the roof of the warehouse and in the field to reduce the requirement for grid electricity.

2.8 Product processing/Installation

CLIMAFLEX®naturefoam easy can be installed using basic tools (e.g. craft knives) and thus have a self adhesive strip for easy application on installed pipes. No special tools, nor specific protection is necessary. When applying adhesives the information given in the relevant safety data sheets is to be heeded. Any glue and adhesive tapes used during the installation phase were not included in the LCA. Recommendations on how to use the product are

described in the application manuals or videos. More details are listed on the Web Page www.nmc-insulation.com

2.9 Packaging

CLIMAFLEX@naturefoam easy products are packed in cardboard boxes and transported on reusable pallets. All packaging material can be recycled. The pallets used to transport the products are taken back or exchanged when the CLIMAFLEX@naturefoam easy is delivered, so the use of pallets is a close loop economy.

2.10 Condition of use

During the use of the products for the purpose for which they are intended, there are no modifications unless one of the effects listed in extraordinary impacts occurs (see point 2.13).

2.11 Environment and health during use

There are no particular effects on environmental and health impacts during use related to the material composition of the product. The CLIMAFLEX@naturefoam easy products are used in a wide range of applications across the building sector. The PEF foams fulfil the German, Belgian and French regulations regarding the emission of VOC with emissions far below the most stringent limit values. The Eurofin Product Testing institute, at the request of the CEFEP (European group of PEF and FEF manufacturers) has made a wide range of tests for different PEF products from different manufacturers.

The insulation of heating pipes with CLIMAFLEX@naturefoam easy allows a reduction energy dispersion and of course CO₂ emissions during the full service life of the installation. The quantification of this in-use benefit is not within the scope of this EPD, however, this could be calculated using an LCA for the complete pipe/insulation system, and has to be evaluated in the frame of the LCA from the complete heating installation. A software program available on NMC's website <http://cit.nmc-insulation.com/> allows for the calculation of the heat flow and insulation benefit under real use conditions.

2.12 Reference service life

The function of CLIMAFLEX@naturefoam easy is to insure the insulation of heating and sanitary installations for a reference service life (RSL) of 50 years. This duration is based on the frequency of replacement of sanitary and heating piping in buildings. Although the insulation pipes are still effective after 50 years, it is assumed that when replacing the piping, the insulation (CLIMAFLEX@naturefoam easy) is recycled. 50 years is the minimum Reference Service Life recommended in /EN16783/ "PCR for factory made thermal insulation products".

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit for insulating materials made of foam plastic is 1 m³. The EPD will cover the whole CLIMAFLEX@naturefoam easy range. The insulating sleeves in the CLIMAFLEX@naturefoam easy range have a thickness ranging from 9 to 20 mm thick and from 15 to 102mm inside diameter The

2.13 Extraordinary effects

Fire

CLIMAFLEX@naturefoam easy is classified as a combustible insulation material. Due to its material structure, CLIMAFLEX@naturefoam easy does not contribute to an uncontrollable spread of fire under installation conditions typical on a building site. The product is self-extinguishing reducing its contribution to any fire event. There is no possibility of the material self-igniting. CLIMAFLEX@naturefoam easy does not propagate the fire horizontally or vertically. The smoke development in case of fire is very low (class S1).

Fire protection

Name	Value
Building material class	BI / CI
Burning droplets	d0
Smoke gas development	S1

Water

CLIMAFLEX@naturefoam easy is a closed cell foam and obtains the best water absorption class WS005 according to the product standard

Mechanical destruction

CLIMAFLEX@naturefoam easy is chemically inert and does not present any environmental or health risk if mechanically destructed. CLIMAFLEX@naturefoam easy is not UV resistant. The product is not recommended for outside applications without complementary UV protection

2.14 Re-use phase

In principle, if removed carefully, CLIMAFLEX@naturefoam easy can be reused on any other piping system of similar dimensions. Any material not suitable for reuse is fully recyclable.

2.15 Disposal

The CLIMAFLEX@naturefoam easy is recyclable with exception of the self-adhesive strip and can be used as a substitute for virgin PE-LD granulates, with only minor additive additions. There is no chemical difference between bio-based PE-LD and fossil fuel derived PE-LD, so using a mix of sources does not change the recyclability of the product.

2.16 Further information

Additional information about CLIMAFLEX@naturefoam easy can be found on the NMC web site www.nmc-insulation.com Here specification clauses, data sheets and application manuals can be found.

average reference density of CLIMAFLEX@naturefoam easy is 28 kg/m³.

Declared unit

Name	Value	Unit
Declared unit	1	m ³

Gross density	28	kg/m ³
Volume for 1kg	0.0357	m ³
Conversion Factor from 1 m ³ to 1 linear meter	Value for 1 m ³ divided section of the insulation pipe (m ²)	m

Thermal Conductivity λ : 0.040 W/mK at (40°C)
 R-value- thickness- : 25 mm : +/- 3.5 (m²K/W)
 depending on the pipe diameter.

3.2 System boundary

The Data collection refers to the yearly production in 2020.

Module A1 to A3: The LCA calculation covers the production of the raw materials, transport of these to the plant, the mixing of raw materials according to the respective recipes, manufacturing of the foam product and packaging for dispatch. All production takes place exclusively in Eynatten, Belgium.

Module A4: NMC's logistics department reported average figures for the distribution of NMC's products - depending on the country the transport distance varies. In the table below shows, the biggest customers sorted by country as well as the volumes of CLIMAFLEX@naturefoam easy delivered. These customers represent 85,2% of sales volumes in 2020, with the remainder supplied to a large set of smaller customers.

Module A5: Installation of CLIMAFLEX@naturefoam easy products is done by hand and requires no special equipment apart from a knife. The products can be placed end to end and the remaining pieces can be reused. Some glue or tape could be used for the installation, as the quantity or the product used depends on the final customer, he has to calculate the impact of what he used himself. The environmental impact of this type of accessory is not counted in this study. The calculations do not contain any installation waste. Cardboard as packaging material is assumed to be recycled. As input material cardboard made of waste paper is considered. Thus, environmental burden for packaging materials are considered already in A1-A3. The value of the environmental impact for A5 is declared as "0". The choice made is : the final user have to calculate the impact of A5 himself in function of his own case, by accounting for the extra amount of product needed during installation.

Module B1-B7: Once installed the CLIMAFLEX@naturefoam easy product requires no maintenance and no repair. It will be dismantled when the sanitary pipe is replaced. For this reason, there are not expected to be any impacts in B1 to B7 assuming correct specification and installation. The step B1 is not considered in this LCA, although the insulation of the piping contributes to a significant reduction of CO₂ emissions from the heating or cooling equipment, this is not taken into account in this LCA. It should, however, be taken into account in the calculation of environmental impacts of the complete heating and cooling systems or of the complete building.

Module C1: As for the installation of the product, the disassembly is done manually and does not require any specific equipment. Disassembly is generally carried out at the same time as the replacement or removal of sanitary pipes. Consequently, there are no impacts associated with C1.

Module C2: Transport at end-of-life stage is modeled as a Euro Cargo 0-6 mix truck with diesel fuel. The average distance to either mechanical recycling, incineration or landfills is assumed to be 100 km

Module C3: The scenario that has been retained for this Life Cycle Assessment is the 100% recycling scenario.

Module C4: As CLIMAFLEX@naturefoam easy is fully recyclable, the legislation is pushing more in this direction and the overall pressure on plastic recycling is growing, the scenario with recycling is considered.

Module D: The CLIMAFLEX@naturefoam easy is recyclable with exception of the self adhesive strip and can be used as a substitute for virgin PE-LD granulates, with only minor additive additions. There is no chemical difference between bio-based PE-LD and fossil fuel derived PE-LD, so using a mix of sources does not change the recyclability of the product.

3.3 Estimates and assumptions

The LCA calculation is conducted using the Gabi ts - database. Not all necessary LCIs are included in the database. Where data were missing or were unavailable or where suppliers were unable to provide complete information, proxy datasets have been used. The environmental burden for the production of pigments, flame retardants and volume stabilizers are approximated.

3.4 Cut-off criteria

Any glue and adhesive tapes, on behalf of the self adhesive-strip of the product, used during the installation (A5) have not been included as quantification of these materials is uncertain and their use by the various installers is too diverse, adhesives and glues are not required in all/most cases, but may be used for some applications.

In this study no others cut-off criteria have been applied and all elementary incoming processes as well as all energy and water inputs and waste outputs have been counted.

3.5 Background data

The software system for life cycle engineering /GaBi 10/ developed by thinkstep AG was used to perform this LCA. The GaBi LCI database /GaBi 10/ provides the life cycle inventory data for several of the raw and process materials obtained from the background system. The most recent update of the database was in 2020.

3.6 Data quality

All the foreground data requiring such energy or raw material coming from production, were verified and cross-checked before being included in the model. Most of the life cycle inventories for the basic materials are available in the / GaBi 10/ database. For electrical and thermal energy Belgium specific grid mixes and Belgium specific supply for natural gas were considered.

3.7 Period under review

The production data for the year 2020 were used for the realization of this study.

3.8 Allocation

There is no co-product or by-product generated during the production of NMC's products.

Due to the lack of specific data per production line and product, the energy has been allocated per overall produced volume of insulation foam.

Production waste

Most of the production waste from the process (machine start, end of production, non-conforming products, etc.) is recycled internally in order to be reused in the manufacturing process. These impacts are accounted for in A1-A3.

Installation and End-of-Life waste

Installation of the foam products is done by hand and requires no special equipment apart from a knife. Installation off-cut is not considered in this calculations. Any glue and adhesive tapes used during the installation phase were not included in the LCA.

3.9 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.

4. LCA: Scenarios and additional technical information

Transport to the building site (A4)

Name	Value	Unit
Litres of fuel	0.118	l/100km
Transport distance	332	km
Capacity utilisation (including empty runs)	10	%
Gross density of products transported	28	kg/m ³

Installation into the building (A5)

Name	Value	Unit
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Use or application of the installed product (B1) see section 2.12 "Use"

Name	Value	Unit
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Maintenance (B2)

Name	Value	Unit
Information on maintenance	-	-
Maintenance cycle	-	Number/RSL
Water consumption	-	m ³
Auxiliary	-	kg
Other resources	-	kg
Electricity consumption	-	kWh
Other energy carriers	-	MJ
Material loss	-	kg

Repair (B3)

Name	Value	Unit
Information on the repair process	-	-
Information on the inspection process	-	-
Repair cycle	-	Number/RSL
Water consumption	-	m ³
Auxiliary	-	kg
Other resources	-	kg
Electricity consumption	-	kWh
Other energy carriers	-	MJ

Material loss	-	kg
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Replacement (B4) / Refurbishment (B5)

Name	Value	Unit
Replacement cycle	-	Number/RSL
Electricity consumption	-	kWh
Litres of fuel	-	l/100km
Replacement of worn parts	-	kg

Reference service life

Name	Value	Unit
Reference service life years	50	a

Operational energy use (B6) and Operational water use (B7)

Name	Value	Unit
Water consumption	-	m ³
Electricity consumption	-	kWh
Other energy carriers	-	MJ
Equipment output	-	kW

End of life (C1-C4)

Name	Value	Unit
Recycling	29.8	kg

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

One of the benefits beyond the boundaries of the system is the recyclability of the Climaflex product. Recycled PE-LD granulate can be used as a substitute for virgin PE-LD granulate on a one-for-one basis. Furthermore, there are no differences in the properties or performance of bio-based PE-LD and PE-LD derived from fossil fuels. It is assumed that recycled granulate generated from Climaflex products displace the need for fossil fuel derived PE-LD granulate.

Another benefit beyond the boundaries of the system is the recovery of energy generated from the

incineration of waste at end-of-life. This is modeled in the GaBi7 software using an industry-average dataset for the incineration of polyethylene and according to the quantity of waste at end-of-life. The recovery of thermal and electrical energy produced by the incinerator avoids the use of fossil resources.

Name	Value	Unit
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5. 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	MND	MND	MNR	MNR	MNR	MND	MND	MND	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A1: 1 m³ CLIMAFLEX® naturefoam easy

Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
GWP	[kg CO ₂ -Eq.]	14.78	2.58	0.00	0.18	1.93	0.00	-54.42
ODP	[kg CFC11-Eq.]	5.68E-8	2.43E-16	0.00E+0	4.75E-17	1.73E-13	0.00E+0	-7.22E-13
AP	[kg SO ₂ -Eq.]	7.16E-1	5.64E-2	0.00E+0	1.52E-4	1.99E-3	0.00E+0	-6.19E-2
EP	[kg (PO ₄) ³ -Eq.]	6.54E-1	6.06E-3	0.00E+0	3.05E-5	4.84E-4	0.00E+0	-9.75E-3
POCP	[kg ethene-Eq.]	1.90E-1	3.02E-3	0.00E+0	1.98E-5	2.31E-4	0.00E+0	-1.10E-2
ADPE	[kg Sb-Eq.]	1.45E-1	1.25E-7	0.00E+0	1.60E-8	1.43E-6	0.00E+0	-1.32E-5
ADPF	[MJ]	1080.90	34.47	0.00	2.38	25.58	0.00	-2106.53

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 m³ CLIMAFLEX® naturefoam easy

Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
PERE	[MJ]	1610.09	0.73	0.00	0.14	25.89	0.00	-132.50
PERM	[MJ]	838.16	0.00	0.00	0.00	0.00	0.00	0.00
PERT	[MJ]	2448.25	0.73	0.00	0.14	25.89	0.00	-132.50
PENRE	[MJ]	1225.79	34.64	0.00	2.41	77.50	0.00	-2150.48
PENRM	[MJ]	131.83	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	[MJ]	1357.62	34.64	0.00	2.41	77.50	0.00	-2150.48
SM	[kg]	11.73	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
NRSF	[MJ]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FW	[m ³]	0.19	0.00	0.00	0.00	0.02	0.00	-0.24

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 m³ CLIMAFLEX® naturefoam easy

Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
HWD	[kg]	4.83E-4	6.52E-10	0.00E+0	1.27E-10	2.65E-8	0.00E+0	-3.16E-7
NHWD	[kg]	8.13E+0	1.88E-3	0.00E+0	3.79E-4	8.47E-2	0.00E+0	-5.87E-1
RWD	[kg]	8.43E-2	2.28E-5	0.00E+0	4.38E-6	2.04E-2	0.00E+0	-1.65E-2
CRU	[kg]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MFR	[kg]	0.00	0.00	11.73	0.00	29.84	0.00	0.00
MER	[kg]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EEE	[MJ]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EET	[MJ]	0.00	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; EET = Exported thermal energy

6. LCA: Interpretation

The base polymer used at NMC is produced from renewable raw materials (Biomass/Sugar cane). One

of the advantages of using a biopolymer is a significant reduction in greenhouse gas emissions compared to

the use of raw materials of fossil origin. In addition, the use of non-renewable raw materials is avoided in this way.

When we analyse the complete life cycle we see that the most impacting part for all environmental impact factors is the production module and more particularly the raw materials part. With regard to global warming for the complete life cycle, more than 78% comes from the production module 10,8 % of transport to the places of installation and 11,4% comes from the end of life. For all other impact factors, more than 90% of the impacts come from the production phase.

Transport has a more pronounced impact on global warming potential as well as on soil and water acidification potential and abiotic fossil resource depletion potential

A more in-depth analysis of the production module A1 to A3 shows that the production of raw materials and

their transport account for most of 80% of the impact Global Warming Potential.

As the CLIMAFLEX®naturefoam easy is fully recyclable; the choice for the end of life was that of 100% recycling. This avoids the use of new raw materials and or the exploitation of renewable or non-renewable resources.

One way to continue to reduce the environmental impact of the CLIMAFLEX® naturefoam easy would be to continue to diversify our energy sources by switching more and more to renewable energies. To this end, after having greatly increased the number of photovoltaic panels, NMC will acquire a cogeneration system. Looking for more eco-responsible suppliers must also be put in place, as well as finding raw materials manufactured locally to avoid long-distance transport as much as possible.

7. Requisite evidence

7.1. VOC emissions

Eurofins Product Testing A/S has tested a wide range and variety of typical PEF (Polyethylene foam) products marketed in the EU from CEFEP (European Group of PEF/FEF manufacturers) Based on the loading factor 0.05m²/m³ (determined after consideration of the real life applications of PEF products (in living rooms) and recommendations by the experts of the test institute) all results were found to be clearly below the limit values. For all samples below 100mg/m³ TVOC after 28 days. Certificates are available on request.

VOC Emissions

Name	Value	Unit
Overview of Results (28 Tage)	-	µg/m ³
TVOC (C6 - C16)	-	µg/m ³

Sum SVOC (C16 - C22)	-	µg/m ³
R (dimensionless)	-	-
VOC without NIK	-	µg/m ³
Carcinogenic Substances	-	µg/m ³

AgBB overview of results (3 days [µg/m³])

Name	Value	Unit
TVOC (C6 - C16)	-	µg/m ³
Sum SVOC (C16 - C22)	-	µg/m ³
R (dimensionless)	-	-
VOC without NIK	-	µg/m ³
Carcinogenic Substances	-	µg/m ³

7.2 Leaching

According to /EN 13468/ the content of water-soluble chloride ions for CLIMAFLEX®naturefoam easy is <15mg/kg

8. References

EN 1602

EN 1602: 2013: Thermal insulating products for building applications - Determination of the apparent density

EN ISO 8497

EN ISO 8497: Thermal insulation - Determination of steady-state thermal transmission properties of thermal insulation for circular pipes

ISO 9001

ISO 9001: 2015: Quality management systems.

EN 13501-1

EN 13501-1:2007+A1: 2013 Fire classification of construction products and building elements - Classification using test data from reaction to fire tests

ISO 14001

ISO 14001: 2015 Environmental management systems.

EN ISO 14025

EN ISO 14025: 2011-10: Environmental labels and declarations — Type III environmental declarations — Principles and procedures

ISO 14040

ISO 14040: Environmental management — Life cycle assessment — Principles and framework

ISO 14044

ISO 14044: Environmental management — Life cycle assessment — Requirements and guidelines

EN 14707

EN 14707: 2012: Thermal insulating products for building equipment and industrial installations. Determination of maximum service temperature for preformed pipe insulation

EN 15804

EN 15804: 2012-04 + A1 2014: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

CEN/TR 15941

CEN/TR 15941: Sustainability of construction works - Environmental product declarations - Methodology for selection and use of generic data

CEN TS 16516

CEN TS 16516: /AgBB/, /ISO 16000-3/, /ISO 16000-6/, /ISO16000-9/, /ISO 16000-11/ Construction products - Assessment of release of dangerous substances. Determination of emissions into indoor air

EN 16783

EN 16783: 2017 Thermal insulation products - Product category rules (PCR) for factory made and in-situ formed products for preparing environmental product declarations

Eurostat

European Statistics: Recovery rates for packaging waste Paper and cardboard packaging for the European Union 27 countries 2014
<http://ec.europa.eu/eurostat/home>

Eurofins

Eurofins: Product Testing Institute

Gabi ts

GaBi 10 GaBi Software-System and Database for Life Cycle Engineering Copyright © 1992-2021 Sphera Solutions Gmbh Version: 10.5.0.78 DB Schema 8007

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Part B: Requirements on the EPD for Insulating materials made of foam plastics
Version 1.6 (Template) Version 1.2 (PCR specific)

Sphera

Sphera Solutions Gmbh. GaBi 10 LCI documentation. GaBi Databases (sphera.com) Stuttgart, Echterdingen: Sphera Solutions Gmbh

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