

# ENVIRONMENTAL PRODUCT DECLARATION

as per /ISO 14025/ and /EN 15804/

Owner of the Declaration	<b>NMC S.A.</b>
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
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**NOMAZIP®** made of **NMC NATUREFOAM®**  
**NMC S.A.**

[www.ibu-epd.com](http://www.ibu-epd.com) / <https://epd-online.com>



## 1. General Information

<p>NMC S.A.</p> <hr/> <p><b>Programme holder</b> IBU - Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany</p> <hr/> <p><b>Declaration number</b> EPD-NMC-20170103-IBD3-EN</p> <hr/> <p><b>This Declaration is based on the Product Category Rules:</b> Insulating materials made of foam plastics, 07.2017 (PCR tested and approved by the SVR)</p> <hr/> <p><b>Issue date</b> 08.09.2017</p> <hr/> <p><b>Valid to</b> 07.09.2022</p> <hr/> <p>Prof. Dr.-Ing. Horst J. Bossenmayer (President of Institut Bauen und Umwelt e.V.)</p> <hr/> <p>Dr. Burkhard Lehmann (Managing Director IBU)</p>	<p>NOMAZIP® made of NMC NATUREFOAM®</p> <hr/> <p><b>Owner of the Declaration</b> NMC S.A. Gert-Noel-Strasse BE-4731 Eynatten</p> <hr/> <p><b>Declared product / Declared unit</b> 1 m<sup>3</sup> insulation material NOMAZIP® made of NMC NATUREFOAM®</p> <hr/> <p><b>Scope:</b> Product line NOMAZIP® made of NMC NATUREFOAM® Thermal insulation products for building equipment and industrial insulations made of polyethylene 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</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.</p> <hr/> <p><b>Verification</b></p> <table border="1"> <tr> <td colspan="2">The CEN Norm /EN 15804/ serves as the core PCR</td> </tr> <tr> <td colspan="2">Independent verification of the declaration according to /ISO 14025/</td> </tr> <tr> <td><input type="checkbox"/> internally</td> <td><input checked="" type="checkbox"/> externally</td> </tr> </table> <hr/> <p>Vito D'Incognito (Independent verifier appointed by SVR)</p>	The CEN Norm /EN 15804/ serves as the core PCR		Independent verification of the declaration according to /ISO 14025/		<input type="checkbox"/> internally	<input checked="" type="checkbox"/> externally
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## 2. Product

### 2.1 Product description / Product definition

NOMAZIP® made of NMC NATUREFOAM® is a professional bio-polyethylene-based closed-cell foam pipe insulation for continuous energy saving and condensation control purposes. NOMAZIP® made of NMC NATUREFOAM® provides solutions that follow all necessary guidelines and standards for any type of installation. NOMAZIP® made of NMC NATUREFOAM® is equipped with a zip closure.

For the placing on the market of the product in the EU/EFTA (with the exception of Switzerland) Regulation (EU) No. 305/2011 /CPR/ applies. The product needs a Declaration of Performance taking into consideration /EN 14313:2015/ 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

NOMAZIP® made of NMC NATUREFOAM® is used to insulate pipes in building equipment

- Polyethylene foam is a cost-efficient material with good insulating properties.
- Products made of PE foam yield an good cost/performance ratio.

### 2.3 Technical Data

#### Constructional data

Name	Value	Unit
Gross density	27	kg/m <sup>3</sup>
Thermal conductivity	0.04	W/(mK)
Reaction to fire acc.to /EN 13501-1/	E	
Max Service Temperature acc. to /EN 14707/	100	°C
Min Service Temperature	0	°C



## 2.4 Delivery status

The PE products are supplied as, tubes delivery in length of 1 m. Different internal insulation diameters are available for all common pipe diameters up to 60 mm. The insulation pipes do have an integrated closure system without adhesives.

## 2.5 Base materials / Ancillary materials

### Base materials

NOMAZIP® made of NMC NATUREFOAM® are flexible insulation materials based on bio-Polyethylene, which is produced using a mixture of up to seven basic component materials. The following table displays the different elements of the formulation for NOMAZIP®. This is in accordance with the PCR Part B: Requirements on the EPD for Insulating materials made of foam plastics and /ISO 14025/.

Name	Value	Unit
Bio LDPE	71	%
LLDPE	10	%
Pigment 1 black	0,6	%
Flame retardant	4,7	%
Pigment 2	3,5	%
Volume stabilizer	0,9	%
Blowing Agent	9,3	%

PE and fillers give the aspect of the product. The blowing agent causes the expansion during the manufacturing. And the flame retardants ensure the fire resistance. According the European Chemicals Regulation /REACH/. Manufacturers, importers and downstream users must registered their chemicals and are responsible for their safe use on their own. For its production NMC S.A. uses exclusively verifiably registered and approved substances. Products manufactured and put on the market by NMC don't need to be registered. NOMAZIP® made of NMC NATUREFOAM® does not contain SVHC substances. Antimony trioxide and halogenated flame retardants are applied.

## 2.6 Manufacture

The manufacturing process of the NOMAZIP® made of NMC NATUREFOAM® 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. The zip closing is thermo welded (the bio-LDPE melt, no use of glue). The product is cut to size before being packed and stored.

Quality assurance :

The manufacture is certified /ISO 9001/ for the quality management. The product corresponds to the product standard /EN 14313/ and have a Declaration of Performance according the /CPR/ : DOP n° W1PEF500 (see [www.nmc.eu/dop](http://www.nmc.eu/dop))

## 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 to reduce the requirement for grid electricity.

## 2.8 Product processing/Installation

The NOMAZIP® made of NMCNATUREFOAM® can be installed using basic tools like knives. No special tools, nor specific protection is necessary. The recommendations how to use the product is described in the application manuals or video's. More details are listed on the Web Page [www.nmc.eu](http://www.nmc.eu)

## 2.9 Packaging

The NOMAZIP® made of NMCNATUREFOAM® products are packed in cardboard boxes and transported on reusable pallets. The packaging material can be recycled.

## 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 aspects of the material composition during the use. The NOMAZIP® made of NMC NATUREFOAM® is used in a wide range and varieties of applications for which the product is intended to.

The PEF foams fulfill the German , Belgian and French regulations regarding the emission of VOC with emissions far below the most severe limit values. The Eurofin Product Testing institute, on the demand 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 NOMAZIP® made of NMC NATUREFOAM® allow a drastic reduction of CO2 emission during the full service live of the installation. The quantification of this is not in the topic of this EPD, and have to be evaluated in the frame of the LCA from the complete installation. The program available on our website <http://cit.nmcinsulation.eu/> allows calculating the heat flow and insulation benefit in real use condition.

## 2.12 Reference service life

NOMAZIP® made of NMC NATUREFOAM® 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 (NOMAZIP®) is not reused and is disposed of with the piping. 50 years is the minimum Reference Service Life recommended in /EN16783/.

## 2.13 Extraordinary effects

### Fire

According to EN13501-1 NOMAZIP® made of NMC NATUREFOAM® is classified as EURO CLASS E and therefore have a limited speed of inflammation.

### Fire protection

Name	Value
Building material class	E

### Water

Not applicable



### Mechanical destruction

NOMAZIP® made of NMC NATUREFOAM® is chemically inert and does not present any environmental or health risks if mechanically destroyed. NOMAZIP® made of NMC NATUREFOAM® 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, NOMAZIP® made of NMC NATUREFOAM® can be reused on any other piping system of similar dimensions. Any material not suitable for reuse can be recycled 100 % in the traditional recycling loop on the same level as the PE waist.

### 2.15 Disposal

NOMAZIP® made of NMC NATUREFOAM® is fully recyclable using the same recycling systems as those used for other forms of PE waste. Any non-recycled material should be disposed of the materials according to the local regulations, and by the /European Waste Catalogue/ (<http://www.wastesupport.co.uk/ewc-codes/>) waste code 07 02 13 waste Plastic "Low Density Polyethylene"

### 2.16 Further information

Additional information about NOMAZIP® made of NMC NATUREFOAM® can be found on the NMC web Site [www.nmc.eu](http://www.nmc.eu) Here specification clauses, data sheets and application manuals can be found

## 3. LCA: Calculation rules

### 3.1 Declared Unit

The declaration refers to 1 m<sup>3</sup> produced insulation product. For the LCA calculations the average density per product brand is used.

As additional information and support for installers the thermal conductivity coefficient (Lambda-value) and R-value per product brand is given.

#### Declared unit

Name	Value	Unit
Declared unit	1	m <sup>3</sup>
Gross density	27	kg/m <sup>3</sup>
Conversion factor to 1 kg	0.03704	-
Conversion factor from 1 m <sup>3</sup> to 1 Linear meter	Section of the insulation pipe (m <sup>2</sup> )	-
Thermal Conductivity	0.040	W/mK at (40°C)

R-value- thickness : 15 mm : +/- 2,64 (m<sup>2</sup>K)/W depending of the pipe diameter

### 3.2 System boundary

The Data collection refers to the yearly production in 2016.

**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, application of the ZIP closing system and packaging for dispatch. All production takes place exclusively in Eynatten, Belgium.

**Module A4:** Transport of the final product to the application site. The average transport distance has been calculated based on a weighted value for NMC's customers. Capacity utilisation by volume is 100%. However, given the low density of the product, capacity utilisation by mass has been estimated as 10%.

**Module A5:** The products can be placed end to end and the remaining pieces can be reused on other pipes. 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 material are considered already in A1-A3. The value of the environmental impact for A5 is declared as "0".

**Module B1-B7:** The foam insulation products do not require maintenance, replacement or refurbishment while in use. The information modules B1 – B7 are not declared.

Using insulation material influences the energy consumption of the overall heating and cooling equipment. This is not taken into account, as the EPD refer to the product 'insulation material'.

**Module C1:** Disassembly is done manually. There are no impacts associated with C1. The information module is not declared.

**Module C2:** For the transport at end-of-life stage an average distance to landfill is assumed to be 100 km.

**Module C3:** The chosen scenario of 100% landfilling does not require any waste processing. Module C3 is not declared.

**Module C4:** The environmental burden for the chosen scenario of 100% landfilling is declared in module C4. The product contains raw materials from renewable sources. By calculating the environmental burden for the production process the sequestration of CO<sub>2</sub> from atmosphere has taken into account.

The environmental effects of (bio-)plastic on a landfill site in the next 100 years cannot be foreseen as a full picture today. In this declaration it is assumed, that the sequestered CO<sub>2</sub> is still integrated in a solid matrix.

**Module D:** The end-of-life scenarios for packaging material and product do not deliver any benefits for the next system. Recycling of cardboard is a closed cycle with the production process. The product is landfilled; energy or material gain cannot be expected.

### 3.3 Estimates and assumptions

The LCA calculation is conducted using the GaBi-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

In this study no 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 7/ developed by thinkstep AG was used to perform this LCA. The GaBi LCI database /GaBi 7/ 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 2016.

### 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 7/ database. For electrical and thermal energy regional specific grid mixes and regional specific supply for natural gas were considered.

### 3.7 Period under review

The production data for the year 2016 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 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 of other products. These impacts are accounted for in A1-A3. Smaller amounts are disposed of on a landfill site.

### 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	0.422	l/100km
Transport distance	456	km
Capacity utilisation (including empty runs)	10	%
Gross density of products transported	27	kg/m <sup>3</sup>
Capacity utilisation volume factor	0.5	-

### Reference service life

Name	Value	Unit
Reference service life	50	a

### End of life (C1-C4)

Name	Value	Unit
Landfilling	27	kg

## 5. LCA: Results

### DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)

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: 1 m<sup>3</sup> NOMAZIP®

Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
GWP	[kg CO <sub>2</sub> -Eq.]	-10.20	5.45	0.00	0.21	0.00	2.20	0.00
ODP	[kg CFC11-Eq.]	8.71E-8	4.43E-12	0.00E+0	1.70E-13	0.00E+0	5.41E-12	0.00E+0
AP	[kg SO <sub>2</sub> -Eq.]	1.14E+0	2.58E-2	0.00E+0	9.18E-4	0.00E+0	6.08E-3	0.00E+0
EP	[kg (PO <sub>4</sub> ) <sup>3-</sup> -Eq.]	7.93E-1	6.48E-3	0.00E+0	2.29E-4	0.00E+0	6.03E-3	0.00E+0
POCP	[kg ethene-Eq.]	2.28E-1	-1.06E-2	0.00E+0	-3.73E-4	0.00E+0	6.94E-4	0.00E+0
ADPE	[kg Sb-Eq.]	1.13E-1	4.93E-7	0.00E+0	1.89E-8	0.00E+0	4.56E-7	0.00E+0
ADPF	[MJ]	906.66	75.18	0.00	2.88	0.00	31.56	0.00

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: 1 m<sup>3</sup> NOMAZIP®

Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
PERE	[MJ]	2313.49	3.88	0.00	0.15	0.00	2.41	0.00
PERM	[MJ]	684.06	0.00	0.00	0.00	0.00	-684.06	0.00
PERT	[MJ]	2997.55	3.88	0.00	0.15	0.00	2.41	0.00
PENRE	[MJ]	1317.96	75.58	0.00	2.90	0.00	32.82	0.00
PENRM	[MJ]	317.07	0.00	0.00	0.00	0.00	-317.07	0.00
PENRT	[MJ]	1635.03	75.58	0.00	2.90	0.00	32.82	0.00
SM	[kg]	13.62	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 <sup>3</sup> ]	0.55	0.01	0.00	0.00	0.00	0.00	0.00

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:

#### 1 m<sup>3</sup> NOMAZIP®

Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
HWD	[kg]	4.25E-4	3.94E-6	0.00E+0	1.51E-7	0.00E+0	1.27E-7	0.00E+0
NHWD	[kg]	1.06E+1	5.98E-3	0.00E+0	2.30E-4	0.00E+0	3.07E+1	0.00E+0
RWD	[kg]	1.62E-1	1.56E-4	0.00E+0	5.99E-6	0.00E+0	4.97E-4	0.00E+0
CRU	[kg]	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	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; EEE = Exported thermal energy

## 6. LCA: Interpretation

The base polymer used by NMC is produced from renewable resources (biomass). While growing of the plants, atmospheric carbon dioxide is sequestered. 1 kg of bio-polyethylene contains the carbon of 3.14 kg CO<sub>2</sub>. In the production process energy and material are necessary, which lead to CO<sub>2</sub> emissions. Summarizing these effects results in an overall negative value for GWP of -2.15 kg CO<sub>2</sub>e per 1 kg of bio-polyethylene. The total value for GWP (A1-A3) refers to the applied input materials and the emissions for the total process chain to achieve the foam product.

For the EoL-scenario landfilling is assumed. Polyethylene is assumed not to be biodegradable. Thus the sequestered CO<sub>2</sub> remains bonded in hydrocarbon chains. Further longterm effects of plastics on a landfill site on the ecosystems cannot be foreseen so far. The operation of the landfill site requires energy and material, which result to environmental burden for all impact categories,

The most impacting modules of the LCA are the modules A1 to A3 and more particularly the raw material supply.

Transport processes (A2, A4 and C2) also contributes to all impact categories listed.

The value for primary energy demand is mostly from renewable resources due to the use of bio-based polyethylene rather than fossil-based polyethylene. An improvement path to further improve the impact of NOMAZIP® would be to reuse or recycling 100% of NOMAZIP® rather than put on Landfill the material at end of life. From a resource perspective, landfill should also be avoided.

The use of bio-polyethylene for the manufacture of NOMAZIP® makes it possible to obtain a value below 0 with regard to global warming potential. Electricity consumption is the main source of emissions during manufacturing. One of the solutions to continue to improve the assessment of NOMAZIP® would be to modify the sources of electrical supply. For example, by increasing the photovoltaic power installed at the NMC s.a. site or by finding suppliers that produce electricity from more renewable energy sources.

## 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 0.05m<sup>2</sup>/m<sup>3</sup> (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/m<sup>3</sup> TVOC after 28 days. Certificates are available on request.

## 8. References

### ISO 14040:2006

ISO 14040:2006: Environmental management — Life cycle assessment — Principles and framework

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

Institute Construction and Environment e.V. (IBU) Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report Version 1.50

### PCR Guidance-Texts for Building-Related Products and Services

From the range of Environmental Product Declarations of Institute Construction and Environment e.V. (IBU) Part B: Requirements on the EPD for Insulating materials made of foam plastics

### ISO 14044:2006

ISO 14044:2006: Environmental management — Life cycle assessment — Requirements and guidelines

### CEN/TR 15941:2010

CEN/TR 15941:2010: Sustainability of construction works - Environmental product declarations - Methodology for selection and use of generic data

### EN 16783

EN 16783:2017 Thermal insulation products – PCR for factory made and in-situ formed products for preparing environmental product declarations

### 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

### EN ISO 8497:1997

EN ISO 8497:1997: Thermal insulation. Determination of steady-state thermal transmission properties of thermal insulation for circular pipes

### EN 14707:2012

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

### EN 1602: 2013

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

**EN 14313:2009+A1:201**

EN 14313:2009+A1:2013: Thermal insulation products for building equipment and industrial installations. Factory made polyethylene foam (PEF) products. Specification  
+ see part 4.3.3 and annex B of EN 14313:2009+A1:2013 minimum service temperature

**CEN/TS 16516:2013**

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

**ISO 9001:2015**

Quality management systems. Requirements

**European Waste Catalogue**

<http://www.wastesupport.co.uk/ewc-codes/>

**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>

**PlasticsEurope**

Association of Plastics Manufacturers: PlasticsEurope is one of the leading European trade associations  
<http://www.plasticseurope.org/about-us.aspx> Overview Plastic Waste from Building & Construction by Polymer and by Recycling, Energy recovery and disposal.

Building and Construction Post Consumer Waste Generation 2014 (Europe EU 28+2)

**Gabi ts**

GaBi 7 GaBi Software-System and Database for Life Cycle Engineering Copyright © 1992-2016 Thinkstep AG Compilation: 7.3.0.40 DB version 6.115

**thinkstep**

thinkstep (2016) thinkstep AG, 2016. GaBi 7 LCI documentation. <<http://www.gabi-software.com/support/gabi/gabi-7-lci-documentation/>>. Stuttgart, Echterdingen: thinkstep AG

**Institut Bauen und Umwelt**

Institut Bauen und Umwelt e.V., Berlin (pub.): Generation of Environmental Product Declarations (EPDs);

**General Principles**

for the EPD range of Institut Bauen und Umwelt e.V. (IBU), 2015/10  
[www.ibu-epd.de](http://www.ibu-epd.de)

**/ISO 14025/**

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

**/EN 15804/**

/EN 15804:2012-04+A1 2013/, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products



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