ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804

Owner of the Declaration	**Peter Seppele Gesellschaft m.b.H.**
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-PSG-20150321-IBA1-EN
Issue date	14.12.2015
Valid to	13.12.2020

Thermofloc – Zellulosedämmung boratfrei

Peter Seppele Gesellschaft m.b.H.

Institut Bauen und Umwelt e.V.

www.bau-umwelt.com / https://epd-online.com

THERMOFLOC®
Intelligent dämmen mit System

1. General Information

Peter Seppele Gesellschaft m.b.H.	Thermofloc – cellulose insulation borate-free
Programme holder IBU - Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany	**Owner of the Declaration** Peter Seppele Gesellschaft m.b.H. Bahnhofstraße 79, A-9710 Feistritz/Drau
Declaration number EPD-PSG-20150321-IBA1-EN	**Declared product / Declared unit** The required modules were determined in accordance with EN 15804 for a life cycle assessment of the Thermofloc product "from the cradle to the factory gate with options." The considered modules A1-A3, A4-A5, C1-C4 and D were calculated and declared in accordance with the PCR for insulation made of cellulose fibres for 1 kg of insulation.
This Declaration is based on the Product Category Rules: Insulating materials made from cellulose fibres, 05.2015 (PCR tested and approved by the SVR)	**Scope:** Thermofloc – borate-free cellulose insulation from the factory of Peter Seppele Gesellschaft m.b.H., Bahnhofstraße 79, 9710-Feistritz/Drau, in Austria 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.
Issue date 14.12.2015	
Valid to 13.12.2020	**Verification** The CEN Norm /EN 15804/ serves as the core PCR Independent verification of the declaration according to /ISO 14025/ ☐ internally ☒ externally
Prof. Dr.-Ing. Horst J. Bossenmayer (President of Institut Bauen und Umwelt e.V.)	
Dr. Burkhart Lehmann (Managing Director IBU)	Matthias Klingler (Independent verifier appointed by SVR)

2. Product

2.1 Product description

Thermofloc cellulose insulation is manufactured from unmixed paper from daily newspapers plus additives to protect against fire and mould. The cellulose insulation is installed by certified workers with blowing machines specifically equipped for the job.

2.2 Application

- Blow-on insulation that cannot be walked on for ceilings under undeveloped lofts (insulation in between or above the primary structure)

Blow-in insulation between the flooring sleepers of floor constructions as cavity insulation or alternatively damping

Application area ceiling/floor:

- Blow-in insulation for flat roofs with the top cover and unventilated cavities under the roof seal - Blow-in insulation for inclined and unventilated cavities under the roof seal (full rafter insulation)

Application area roof:

- Blow-in insulation for cavities between walls in wooden frame construction

- Blow-in insulation for outside wall cavities in wooden frame construction

Application area walls and facade:

Thermofloc cellulose insulation can be used for purposes where the unloaded insulation is mainly blown into vertical or horizontal cavities to fill the space or blown onto horizontal, slightly curved or slightly inclined (≤ 10°) exposed surfaces as an open layer.

2.3 Technical Data

The technical data of the product can be seen in the following table.

Structural data

Name	Value	Unit
Slump according to ISO 18393 Method A - settling by impact excitation	4.4	%
Slump according to ISO 18393 Method A - settling by vibration	0	%
Water absorption according to EN	14,5 bzw.	kg

1609 with a thickness of 10 cm and density of 30 or alternatively 60 kg/m3	44,0	
Water vapour diffusion resistance factor μ	2	-
flow resistance EN29053 at 30 kg/m³	6.1	kPa/m²
Thermal conductivity λD as per EN 10456; Blow-in process	0.039	W/(mK)
Thermal conductivity λD as per EN 10456; Spraying process	0.042	W/(mK)
Reaction to fire according to EN 13501-1 40-100 mm >100 mm	B-s2,d0	-
Resistance to biological influence according to Annex C of the CUAP	0	class
Metal corrosion according to Annex E of the CUAP	keine	-
Harmful substances according to EU Guideline 67/548/EEC	keine	-
Moisture conversion factor Fm thermal conductivity (23°C 50% rel. humidity -23° 80% relative humidity)	1.027	-
Density range depending on the application area	30 - 60	-
Vertical : Outside wall and cavities between intermediate walls	42 - 60	kg/m³
Inclined : Blow-in insulation in cavities under roof seal >10° inclination	42 - 60	kg/m³
Horizontal : Blow-in insulation in flat roof ceiling cavities	42 - 60	kg/m³
Horizontal : Exposed blow-on insulation that cannot be walked on for ceiling constructions	30 - 44	kg/m³

2.4 Placing on the market / Application rules
ETA-05/0186 valid to 13.11.2015

2.5 Delivery status
The insulation is delivered in PE bags each with 12, 12.5 or 14 kg on pallets each with 21 or alternatively 24 bags per pallet. The pallets are delivered to the customer by truck.

2.6 Base materials / Ancillary materials
For the production of Thermofloc products, exclusively newspaper is used in the form of used paper of the class 2.01 and/or 2.02 in accordance with OENORM EN 643 as a base raw material. There is around 91.6 percent by weight of this in the product, and it is supplied by different waste management companies. Mineral-based additives are added as a stabilising mould and flame inhibitor (referred to a "flame inhibitor" in the following). There is around 8.4 percent by weight of flame inhibitor in the product. The functional chemical group of the flame inhibitor is sulphate.

2.7 Manufacture
1) Unmixed newspaper of class 2.01 and/or 2012 in accordance with EN 643 is taken to the facility with the help of a forklift. The base and auxiliary materials for Thermofloc cellulose insulation are delivered to the plant by truck and stored there until production. The Thermofloc cellulose insulation is manufactured in the production site in Feistritz an der Drau (Austria). The production process is described in the following points.

2) The newspapers reach the shredder via conveyor belt, where the paper is shredded.

3) The shredded newspaper is transported further to the preliminary container by a bucket conveyor via a magnetic separator and non-ferrous metal separator from where it reaches the refiner via weighing belts.

4) In the refiners, the paper is defibered and impregnated in order to protect the cellulose insulation against fire, mould and pests.

5) The cellulose insulation is blown into a filter preliminary container via pipelines and blowers. From there, it is transported further for sacking with the help of augers, where the cellulose insulation is pressed into shape in the pressing chamber by means of a press punch and packaged airtight in sacks. The sacks are placed on disposable pallets with the help of a robot and finally wrapped with Power-Stretch film for export.

2.8 Environment and health during manufacturing
During production there is < 1mg/m3 dust emission. No ingredients with an environmentally hazardous potential are used. Measures for health and environmental protection in the manufacturing process that go beyond the national regulations or plant-specific requirements are described in the scope of the environmental management system according to ISO 14001.

2.9 Product processing/Installation
The cellulose insulation is installed by certified workers with blowing machines specifically equipped for the job.

2.10 Packaging
The products are packaged in PE sacks, placed on pallets and covered with Power-Stretch film.

2.11 Condition of use
No material changes to the composition are to be expected during the utilisation phase with proper use.

2.12 Environment and health during use
With proper use of the product, no hazards to water, air and soil are to be expected according to today's knowledge.

2.13 Reference service life
A conservative estimate of the reference service life of cellulose fibre flakes is 50 years under the following conditions: flawless product, planning, execution and maintenance quality, no extreme inside or outside environmental conditions, Central European climate. /Service Life Catalogue of Bau-EPD GmbH for the preparation of EPDs/, Dated 22.04.2014.

2.14 Extraordinary effects

Fire

Fire Protection

Name	Value
Building material class	B

Burning droplets	d0
Smoke gas development	s2

Water
The behaviour of the product in the event of unexpected exposure to water as well as possible consequences to the environment is not known to the manufacturer.

Mechanical destruction
The behaviour of the product in the event unexpected mechanical destruction as well as possible consequences to the environment is not known to the manufacturer.

2.15 Re-use phase
Unpolluted cellulose insulation can be reprocessed. If this is not the case, or alternatively if the insulation is polluted, then it is disposed of as residual waste and incinerated in a waste incineration plant (thermal utilisation).

2.16 Disposal
Possible disposal routes are re-use or thermal utilisation. The Austrian Waste Code /ASN/ for the product is 91101; the European waste code /EWC/ is 170604.

2.17 Further information
https://www.thermofloc.at/

3. LCA: Calculation rules

3.1 Declared Unit
The required modules were selected in accordance with EN 15804 for a life cycle assessment of the Thermofloc product "from the cradle to the factory gate with options." The considered modules A1-A3, A4-A5, C1-C4 and D were selected and declared in accordance with the PCR for insulation made of cellulose fibres for 1 kg of insulation.

Declared unit

Name	Value	Unit
Declared unit	1	kg
Gross density	30 - 60	kg/m^3

3.2 System boundary
Assessment from the cradle to the grave. The life cycle assessment refers to the provision (module A1), transport (module A2), manufacture (module A3), delivery (module A4), installation (module A5), disposal phase (modules C1-C4) as well as the credits and debits (module D).

3.3 Estimates and assumptions
For the transport costs of all inputs and outputs taken into consideration, either the actual transport distances rounded to km were used or assumptions were made. 150 km was assumed as an average transport distance for the waste disposal. This corresponds to the assumed average transport to the waste incineration plants around Austria.
The average delivery distance to the construction site is 635 km.

10 rounds are assumed for the euro pallets.

3.4 Cut-off criteria
Auxiliary substances such as lubrication oils were not declared. Based on a sensitivity analysis that was carried out, it can be assumed that unconsidered auxiliary substances make up a total of much less than 5% of each individual impact category.

The machines, facilities and other infrastructure required for manufacturing the insulation concerned were not taken into consideration in the life cycle assessment.
All the data from the operating data acquisition for the Thermofloc cellulose insulation of Peter Seppele Ges.m.b.H. were taken into consideration. All raw materials used for the formula and the determined production waste were taken into consideration in the assessment.

3.5 Background data
The modelling was carried out with the Umberto NXT Universial (Version 7.1) software developed by ifu Hamburg GmbH with the use of the /GaBi Professional Database/ 2014. To ensure the comparability of the results, the background data of the data source PE was used whenever possible. Since there was no respective GaBi Professional data record, a data record of the /GaBi Extension database XIIIb: ecoinvent 3.1 integrated/ (2014) was used for the starting material of the flame inhibitor.

3.6 Data quality
The data quality requirements specified in PCR-A/IBU 2013 were complied with. The data that was used was transmitted in June - July 2015 and refers to 2014 as the operating year.

3.7 Period under review
The period of observation ran from January to December 2014.

3.8 Allocation

No by-products are created. The complete treatment of the waste from manufacturing lies within the system limits and does not require any declaration in Module D.

Since separate GaBi data records exist for the thermal utilisation of polyethylene and the pallets, there are no multi-input processes.

The "Thermal Waste Treatment" scenario was selected for the disposal phase as well as the deployment phase. In the process, the "end of waste characteristics" status was not reached before incineration. It is assumed that the plant has an R1 value of <0.6. The environmental impact of the waste treatment and incineration processes is therefore declared as a removal process in C4 and A5 (packaging materials) respectively. The useful energy produced during waste treatment is declared as exported energy in C4 and A5 respectively and the credits produced with the generated energy in Module D. (see IBU 2013)
The used paper is a secondary raw material. The

collection and sorting of the used paper is credited as complete waste treatment to the previous product system and not to the product of Peter Seppele Ges.m.g.H. Only the transport to the plant is credited for this.
No secondary fuels are used.

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

The following technical information is a foundation for the declared modules.

Transport to building site (A4)

Name	Value	Unit
Transport distance Average transport distances domestically and abroad	250 und 800	km
Capacity utilisation (including empty runs)	100	%
Gross density of products transported	30 - 60	kg/m³
Capacity utilisation volume factor	1	-

Installation in the building (A5)

Name	Value	Unit
Auxiliary	-	kg
Water consumption	-	m³
Other resources	-	kg
Electricity consumption	2,60E-05	kWh
Other energy carriers	-	MJ
Material loss	-	kg
Output substances following waste treatment on site	-	kg
Dust in the air	-	kg
VOC in the air	-	kg

Reference service life

Name	Value	Unit
Reference service life	50	a

End of life (C1-C4)

Name	Value	Unit
Collected separately	-	kg
Collected as mixed construction waste	-	kg
Reuse	-	kg
Recycling	-	kg
Energy recovery	0.916	kg
Landfilling	-	kg

Re-use, recovery and recycling potential (D), relevant scenario information

Name	Value	Unit
Cellulose insulation not polluted; re-use	1	kg
Cellulose insulation polluted; energy recovery	0,916	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	MND	MND	MND	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: 1 kg Thermofloc Zellulosedämmstoff

Parameter	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
GWP	[kg CO_2-Eq.]	4.30E-2	1.90E-2	1.80E-2	3.30E-2	2.20E-2	0.00E+0	7.87E-3	0.00E+0	3.10E-2	-8.26E-1
ODP	[kg CFC11-Eq.]	2.69E-9	1.21E-13	2.33E-13	6.19E-14	5.09E-14	0.00E+0	1.46E-14	0.00E+0	6.46E-12	-5.95E-12
AP	[kg SO_2-Eq.]	4.77E-4	8.63E-5	9.80E-5	1.48E-4	1.67E-6	0.00E+0	3.50E-5	0.00E+0	2.95E-4	-5.18E-3
EP	[kg $(PO_4)^{3-}$-Eq.]	5.87E-5	2.20E-5	8.20E-6	4.00E-5	3.14E-7	0.00E+0	9.45E-6	0.00E+0	5.18E-5	-5.43E-4
POCP	[kg ethene-Eq.]	2.94E-5	-2.88E-5	1.13E-5	-5.03E-5	1.94E-7	0.00E+0	-1.19E-5	0.00E+0	2.10E-5	-3.94E-4
ADPE	[kg Sb-Eq.]	2.19E-6	8.94E-10	2.01E-8	1.72E-9	1.15E-10	0.00E+0	4.07E-10	0.00E+0	2.37E-8	-6.71E-8
ADPF	[MJ]	6.56E-1	2.61E-1	5.59E-1	4.43E-1	2.51E-3	0.00E+0	1.05E-1	0.00E+0	3.58E-1	-8.71E+0

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 kg Thermofloc Zellulosedämmstoff

Parameter	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
PERE	[MJ]	3.80E-2	1.50E-2	5.96E-1	3.40E-2	4.00E-4	0.00E+0	8.00E-3	0.00E+0	1.30E+1	-1.65E+0
PERM	[MJ]	1.29E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-1.29E+1	0.00E+0
PERT	[MJ]	1.30E+1	1.50E-2	5.96E-1	3.40E-2	4.00E-4	0.00E+0	8.00E-3	0.00E+0	4.00E-2	-1.65E+0
PENRE	[MJ]	7.52E-1	2.63E-1	6.07E-1	4.45E-1	3.00E-3	0.00E+0	1.05E-1	0.00E+0	4.22E-1	-9.09E+0
PENRM	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	[MJ]	7.52E-1	2.63E-1	6.07E-1	4.45E-1	3.00E-3	0.00E+0	1.05E-1	0.00E+0	4.22E-1	-9.09E+0
SM	[kg]	9.16E-1	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	[m^3]	1.50E-4	2.48E-5	4.51E-4	2.00E-5	4.85E-5	0.00E+0	4.72E-6	0.00E+0	3.79E-3	-1.94E-3

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 kg Thermofloc Zellulosedämmstoff

Parameter	Unit	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
HWD	[kg]	7.56E-7	1.33E-7	2.97E-5	3.57E-7	1.27E-10	0.00E+0	8.43E-8	0.00E+0	0.00E+0	-3.22E-6
NHWD	[kg]	6.17E-2	2.50E-3	2.45E-2	4.50E-3	2.08E-5	0.00E+0	1.06E-3	0.00E+0	2.11E-5	-7.53E-1
RWD	[kg]	3.34E-5	5.41E-7	1.02E-6	7.84E-7	2.38E-7	0.00E+0	1.85E-7	0.00E+0	9.25E-6	-9.17E-5
CRU	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MFR	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MER	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	4.10E-2	0.00E+0	0.00E+0	0.00E+0	1.70E+0	0.00E+0
EET	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	9.20E-2	0.00E+0	0.00E+0	0.00E+0	4.01E+0	0.00E+0

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

It must be noted that the impact assessment results are only relative statements that contain no statements about "end points" of the impact categories, overruns of limits, safety margins or risks.

6.1 Indicators of the life cycle inventory

6.1.1 Use of fresh water resources

The main part of the net fresh water use results from the manufacture of the mineral flame inhibitor. No water is used in the production and blowing-in of the cellulose insulation.

6.1.2 Waste

The largest part of the waste that is produced is non-

hazardous waste. No hazardous and radioactive waste occurs in the production of Thermofloc.

6.1.3 Primary energy use, non-renewable and renewable

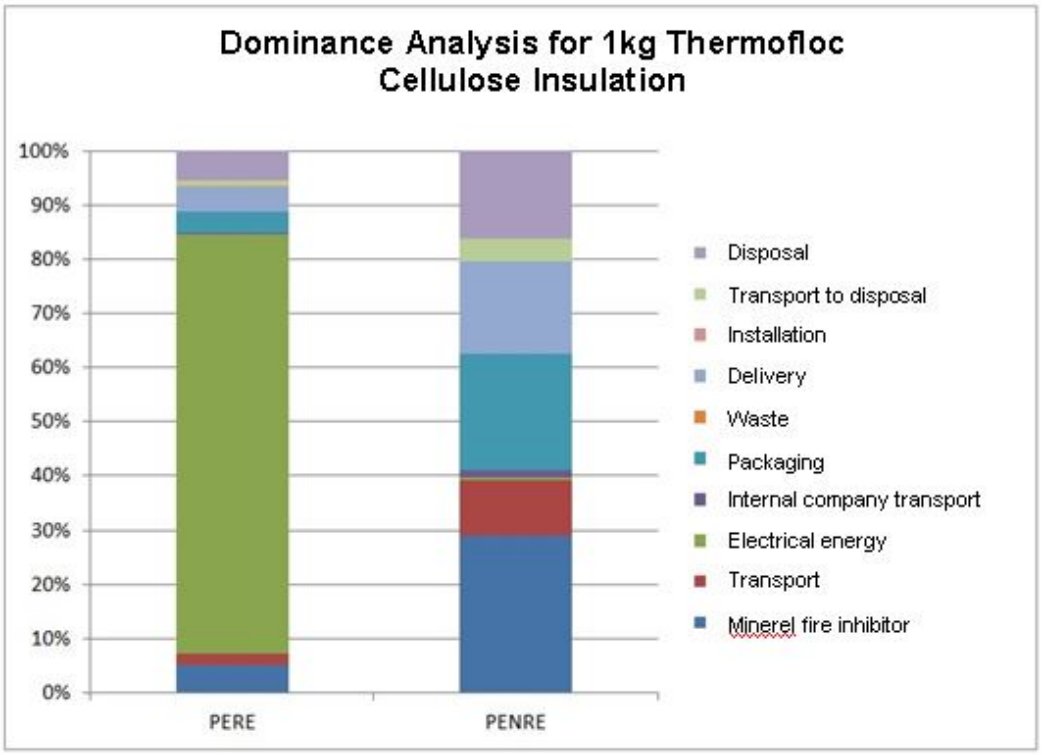

Fig. 5: Dominance analysis of the primary energy use

The primary energy consumption of non-renewable resources (PENRE) is determined to be 50% for the use of gas and electricity for the production of the mineral flame inhibitor and plastic packaging. Furthermore, the delivery, disposal and transport have relevant amounts of the primary energy consumption of non-renewable energy sources. The electricity mix purchased by Kelag is responsible for around 80% of the consumption of renewable energy (PERE). Other factors such as the mineral flame inhibitor, packaging, delivery and disposal make up a total of almost 20%.

6.2 Indicators of the impact assessment

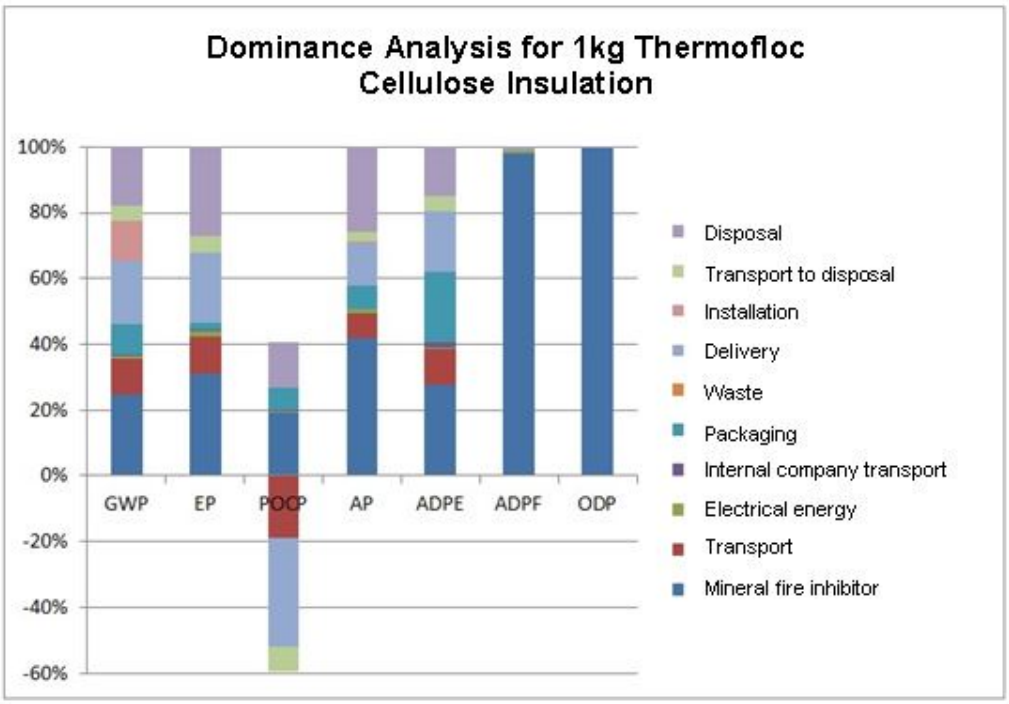

Fig. 6: Dominance analysis of the indicators of the impact assessment

6.2.1 Global Warming Potential (GWP)
The global warming potential (GWP) is determined through the starting material of the flame inhibitor, transport for delivery of the products and through incineration in the waste incineration plant.

6.2.2 Eutrophication Potential (EP)
The main causes of the eutrophication potential are the mineral flame inhibitor, transport of the raw materials to the plant as well as to customers, and disposal in the waste incineration plant.

6.2.3 Photochemical Ozone Creation Potential (POCP)
The transport results in negative values for the POCP, which is attributable to the methods stipulated in EN 15804 in which specific nitrogen oxides have a negative POCP. It should not be concluded that the photochemical oxidation potential is generally improved through the emission of waste gasses. The mineral flame inhibitor and disposal of the product in the waste incineration plant are the largest amount of the negative impacts.

6.2.4 Acidification Potential (AP)
Primarily the mineral flame inhibitor contributes to the acidification potential at 40%, followed by disposal in the waste incineration plant and delivery of the cellulose insulation.

6.2.5 Abiotic Depletion Potential for Elements (ADPE)
The mineral flame inhibitor, packaging, delivery as well as incineration in the waste incineration plant make up almost 100% of the elementary abiotic resource consumption.

6.2.6 Abiotic Depletion Potential for Fossil fuels (ADPF)
At approximately 100%, the abiotic resource consumption of fossil fuels is dominated by the starting product of the mineral flame inhibitor.

6.2.7 Ozone Depletion Potential (ODP)
Just like with the abiotic resource consumption of fossil fuels, the mineral flame inhibitor dominates with just short of 100% of the impact category of the ozone depletion potential.

7. Requisite evidence

Formaldehyde and VOC emissions
As part of the natureplus mark of quality, a test chamber test was carried out for formaldehyde and VOC emissions /test report no. H 6960 FM; Bremer Umweltinstitut GmbH/, of 04.01.2013. The natureplus threshold values were complied with for formaldehyde and VOC

8. References

ISO 14046 Environmental management — Water footprint — Principles, requirements and guidelines; English version ISO 14046:2014

Service life catalogue for the preparation of EPDs
Service life catalogue of Bau-EPD GmbH for the preparation of EPDs, Dated 22.04.2014

OENORM EN 643
Paper and board - European list of standard grades of paper and board for recycling, Edition 2014-12-01

ISO 18393-1
Thermal insulation products - Determination of ageing by settlement - Part 1: Blown loose-fill insulation for ventilated attics, Edition: 2012-07-01

ETA-05/0186
European Technical Approval, Austrian Institute for Building Technology

OENORM EN 1609
Thermal insulating products for building applications - Determination of short-term water absorption by partial immersion, Edition: 2013-04-15

OENORM EN 29053
Acoustics - Materials for acoustical applications - Determination of airflow resistance, Edition: 1993-08-01

OENORM EN 13501-1
Fire classification of construction products and construction methods – Part 1: Classification using test data from fire reaction of construction products, Edition: 2009-12-01

ISO 14001
Environmental management systems - Requirements with guidance for use, Edition: 2015-09-15

ASN
Waste Code Number:: Ordinance of the Federal Minister for Agriculture and Forestry, the Environment and Water Management Concerning a List of Wastes (Ordinance on the List of Wastes)

EWC
Ordinance on the List of Wastes from 10 December 2001 (BGBI. I S. 3379), which was last amended by Article 5 paragraph 22 of the act on 24 February 2012 (BGBI. I S. 212).

GaBi Professional database
GaBi Professional Database 2014, Hrsg. PE International AG, Leinfelden – Echterdingen, 2013.

GaBi Extension database XIIIb: ecoinvent 3.1 integrated
GaBi Extension database XIIIb: ecoinvent 3.1 integrated 2013, Hrsg. PE International AG, Leinfelden – Echterdingen, 2013.

IBU 2015
PCR guide test for building-based products and services – Part B: Requirements of the EPD for

insulation made of cellulose fibres, Version 1.0, of 05.05.2015

Test report no. H 6960 FM
Bremer Umweltinstitut GmbH, of 04.01.2013

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

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