ROMA quick-assembly insulating panel types P, M & D (core made of polyurethane) types FP, FP+, FV & FV+ (core made of mineral wool)

Environmental product information for LEED v4® building certification

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Date	November 2018

ROMA
DÄMM-SYSTEME

This document aims at the identification of linkages between environmental product information covered by EPDs and the requirements of the LEED v4® building certification. It provides an overview of product related features based on the LEED v4 credit library [http://www.usgbc.org/credits 9/2018, LEED BD+C: New Construction

.product description

Prefabricated double-sided steel faced ROMA-sandwich panels with a core made of polyurethane (types P, M & D) or mineral wool (types FP, FP+, FV & FV+) for self-supporting and non-supporting application in roof, wall and ceiling structures. The profiled internal and external steel sheets are made of a core of steel, which is protected against corrosion with zinc and organic coatings. The core is linked to the profiled steel sheets on both sides in order to resist shear forces.

The elements are manufactured in a maximum width of 1150 mm and varying thickness up to 220 mm (polyurethane core) or 240 mm (mineral wool core). Flat and profiled sheets of steel are used as cover layers.

.application

Application as a component in roof, wall and ceiling constructions for mainly static loads.

Sandwich panels in wall and roof applications overtake tasks of the building physics, especially sound, heat and moisture safety. They perform the function of air tightness of the building envelope simultaneously.

.technical data

Technical specifications for both types of sandwich panels are given in DIN EN 14509.

The technical specifications for the core of **polyurethane (PU)** are given in DIN EN 13165.

The technical specifications for the core of **mineral wool (MW)** are given in DIN EN 13162.

Further general technical approvals for sandwich panels are released by the manufactures.

Sandwich element with a core made of	PU	MW	Unit
Density of insulation material (PU)	40	100 – 135	kg/m³
Thickness of the element referring to the overall height of the element(D) in case of flat outer layers; referring to the consistent core thickness without profile (dc) in case of heavily profiled elements	30 – 220	60 – 240	mm
Thickness of the outer layer	0.6		mm
Thickness of the inner layer	0.5		mm
Calculation value for thermal conductivity of the insulation	0.022 – 0.023	0.042 – 0.046	W/(m.K)
Heat transfer coefficient of the total Element including thermal bridges due to overlap and fixing elements	0.745 – 0.101	0.76 – 0.175	W/(m².K)

.environmental product declaration

Owner of the Declaration	Romakowski GmbH & Co. KG
Programme Holder & Publisher	Institut Bauen und Umwelt e.V. (IBU)
ECO-EPD at ECO Platform	yes
Author of the LCA	Daxner & Merl GmbH
Software & Database	GaBi software-system and database for life cycle engineering GaBi 8, database v8.7 [see documentation]
Third-party Verification	Completed; Type III declaration in compliance with ISO 14025
External verifier	Matthias Klingler
Declaration Number	PU: EPD-ROK-20180144-IBC1-EN (Sandwich panels with a core made of polyurethane) MW: EPD-ROK-20180145-IBC1-EN (Sandwich panels with a core made of mineral wool)
Issue date	26.11.2018
Valid to	25.11.2023
Declaration Type	Manufacturer's declaration of an average product according to EN 15804
Functional Unit	1 m² continuously produced sandwich panels with skins made of steel with a surface weight of 14.52 kg/m² [core made of polyurethane (PU)] and 21.09 kg/m² [core made of mineral wool (MW)] manufactured by ROMA Dämmsysteme in Buttenwiesen (Germany).
Conversion Factor to 1 kg	Sandwich panel with a core of polyurethane: 0.06887 Sandwich panel with a core of mineral wool: 0.04742
Variance of Thickness	The thickness of the steel layer is the same for all element types. As a result, the environmental impacts of the panels are dependent on the thickness of the insulation core and referring variations. The subsequent factors shown in table "variance of thickness" represent a simple approximation for the estimation of environmental impacts of sandwich panels with varying thicknesses. Nevertheless, these factors represent rough approximations and need to be used with caution.
Reference period	The reference service life depends on the location, weather conditions and the quality of coating. It thus ranges between 15 and 45 years.
End of life scenario	The end of life scenario assumes a recycling rate of 95 % for the steel parts (landfilling of 5 %). It reflects the recycled content of the product with recycling potentials given for referring net material flows for recycling. After dismantling, the thermal insulation core material of polyurethane is used for energy recovery. The given scenario for mineral wool refers to landfilling of the used material.

.results of the LCA – environmental impacts

Declared unit: 1 m² Sandwich panel with a core made of polyurethane (14.52 kg)					
Declared life cycle stage		**PRODUCT STAGE**	**WASTE TREATMENT**	**DISPOSAL**	**BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY**
Indicator	**Unit**	**A1-A3**	**C3**	**C4**	**D**
GWP	kg CO2-equ	3.49E+01	0.00E+00	9.68E+00	-1.68E+01
ODP	kg CFC11-equ	8.95E-08	0.00E+00	1.75E-13	7.21E-08
AP	kg SO2-equ	9.63E-02	0.00E+00	3.92E-03	-3.16E-02
EP	kg $(PO4)^{3-}$-equ	1.12E-02	0.00E+00	9.88E-04	-2.58E-03
POCP	kg Ethen-equ	1.57E-02	0.00E+00	2.49E-04	-6.48E-03
ADP elements	kg Sb-equ	1.63E-03	0.00E+00	3.20E-08	-4.07E-05
ADP fossil	MJ	5.66E+02	0.00E+00	2.58E+00	-1.79E+02

Declared unit: 1 m² Sandwich panel with a core made of mineral wool (21.09 kg)					
Declared life cycle stage		**PRODUCT STAGE**	**WASTE TREATMENT**	**DISPOSAL**	**BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY**
Indicator	**Unit**	**A1-A3**	**C3**	**C4**	**D**
GWP	kg CO2-equ	4.69E+01	0.00E+00	1.99E-01	-1.29E+01
ODP	kg CFC11-equ	2.43E-10	0.00E+00	4.59E-14	7.21E-08
AP	kg SO2-equ	1.56E-01	0.00E+00	1.09E-03	-2.55E-02
EP	kg $(PO4)^{3-}$-equ	1.65E-02	0.00E+00	1.49E-04	-1.89E-03
POCP	kg Ethen-equ	1.57E-02	0.00E+00	8.63E-05	-5.97E-03
ADP elements	kg Sb-equ	1.67E-03	0.00E+00	2.66E-08	-3.97E-05
ADP fossil	MJ	5.72E+02	0.00E+00	2.60E+00	-1.25E+02

Caption
GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential;
EP = Eutrophication potential; POCP = Photochemical ozone creation potential;
ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources

Variance of thickness:

Impact category	Factors for polyurethane	Factors for mineral wool	
ADPf =	+/- 1.99E+01	+/- 1.15E+01	per 10 mm thickness
ADPnf =	+/- 3.96E-07	+/- 2.73E-07	per 10 mm thickness
AP =	+/- 1.49E-03	+/- 6.32E-03	per 10 mm thickness
EP =	+/- 2.82E-04	+/- 7.05E-04	per 10 mm thickness
GWP =	+/- 5.60E-01	+/- 1.32E+00	per 10 mm thickness
ODP =	+/- 7.52E-09	+/- 1.69E-12	per 10 mm thickness
POCP =	+/- 2.16E-04	+/- 3.13E-04	per 10 mm thickness
PENRT =	+/- 2.00E+01	+/- 1.23E+01	per 10 mm thickness
PERT =	+/- 1.47E+00	+/- 1.90E+00	per 10 mm thickness

.results of the LCA – resource use

Declared unit: 1 m² Sandwich panel with a core made of polyurethane (14.52 kg)					
Declared life cycle stage		**PRODUCT STAGE**	**WASTE TREATMENT**	**DISPOSAL**	**BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY**
Indicator	**Unit**	**A1-A3**	**C3**	**C4**	**D**
PERE	MJ	2.08E+01	0.00E+00	3.32E-01	-4.96E+00
PERM	MJ	4.76E+01	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	6.84E+01	0.00E+00	3.32E-01	-4.96E+00
PENRE	MJ	5.06E+02	0.00E+00	1.14E+02	-1.89E+02
PENRM	MJ	1.36E+02	0.00E+00	-1.11E+02	0.00E+00
PENRT	MJ	6.42E+02	0.00E+00	2.89E+00	-1.89E+02
SM	kg	1.59E+00	0.00E+00	0.00E+00	8.04E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	1.11E+02	0.00E+00
FW	m³	9.62E-02	0.00E+00	2.24E-02	-7.58E-04

Declared unit: 1 m² Sandwich panel with a core made of mineral wool (21.09 kg)					
Declared life cycle stage		**PRODUCT STAGE**	**WASTE TREATMENT**	**DISPOSAL**	**BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY**
Indicator	**Unit**	**A1-A3**	**C3**	**C4**	**D**
PERE	MJ	3.68E+01	0.00E+00	3.16E-01	8.32E+00
PERM	MJ	4.15E+01	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	7.83E+01	0.00E+00	3.16E-01	8.32E+00
PENRE	MJ	6.04E+02	0.00E+00	2.70E+00	-1.21E+02
PENRM	MJ	5.64E+01	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	6.60E+02	0.00E+00	2.70E+00	-1.21E+02
SM	kg	1.59E+00	0.00E+00	0.00E+00	8.04E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m³	9.70E-02	0.00E+00	4.46E-04	1.73E-02

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

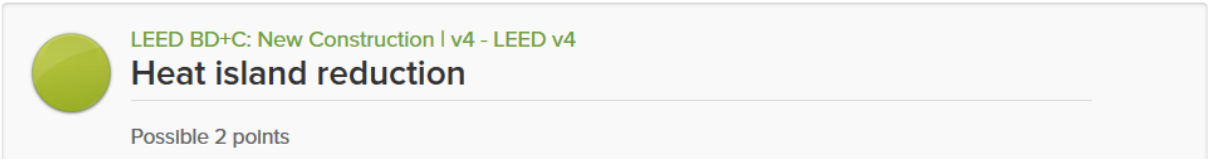
.results of the LCA – output flows

Declared unit: 1 m² Sandwich panel with a core made of polyurethane (14.52 kg)					
Declared life cycle stage		**PRODUCT STAGE**	**WASTE TREATMENT**	**DISPOSAL**	**BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY**
Indicator	**Unit**	**A1-A3**	**C3**	**C4**	**D**
HWD	kg	1.82E-03	0.00E+00	3.22E-09	-8.48E-06
NHWD	kg	6.05E-01	0.00E+00	5.18E-01	1.36E+00
RWD	kg	5.97E-03	0.00E+00	1.24E-04	-5.83E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	1.01E+01	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	1.66E+01	0.00E+00
EET	MJ	0.00E+00	0.00E+00	2.97E+01	0.00E+00

Declared unit: 1 m² Sandwich panel with a core made of mineral wool (21.09 kg)					
Declared life cycle stage		**PRODUCT STAGE**	**WASTE TREATMENT**	**DISPOSAL**	**BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY**
Indicator	**Unit**	**A1-A3**	**C3**	**C4**	**D**
HWD	kg	1.71E-03	0.00E+00	4.22E-08	-8.45E-06
NHWD	kg	1.21E+00	0.00E+00	1.15E+01	1.39E+00
RWD	kg	9.92E-03	0.00E+00	3.89E-05	4.16E-06
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	1.01E+01	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00

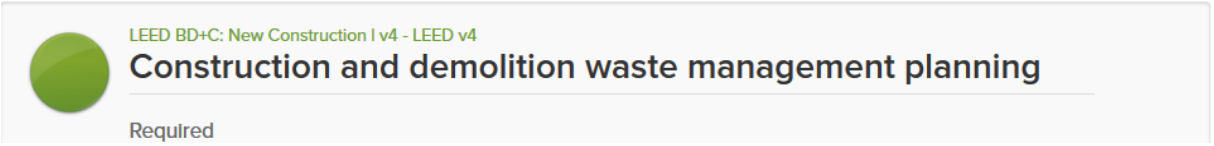
Caption
HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed;
CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery;
EEE = Exported energy, electric energy, EET = Exported energy, thermal energy

.LEED v4 credits with regard to environmental product information



Intent
To minimize effects on microclimates and human and wildlife habitats by reducing heat islands.

Solar reflectance of ROMA-sandwich panels depends on coating specifications such as color and surface design. Different types of surface structures (lined, micro lined and smooth) result in varying reflection characteristics. Therefore, specifications and resulting values are to be checked for certain applications and ambient conditions individually.



Intent
To reduce construction and demolition waste disposed of in landfills and incineration facilities by recovering, reusing, and recycling materials.

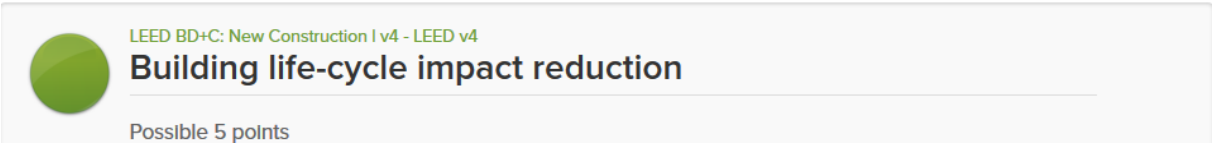
ROMA quick-assembly insulation panels represent a suitable target for diversion of resources from landfill. Waste diversion goals for the project thus may identify ROMA sandwich panels as one of the materials targeted for diversion and state this in the final report accordingly.

Sections 2.8 and 2.9 of the environmental product declarations of ROMA sandwich panel present details for the product's construction phase. In addition, section 2.14 indicates the product's re-use phase. Referring information are compliant with the intent to promote resource efficiency via the effective and appropriate management of construction waste. Aspects described in the EPDs should be considered:

EPD | chapter 2.8 | product processing/installation
Careful planning limits off-cuts on the construction site to a minimum. Cuttings shall be treated as described in EPD chapter 2.14.

EPD | chapter 2.9 | packaging
Packaging materials shall be collected separately.

EPD | chapter 2.14 | re-use phase
The cover sheets of the sandwich panels can be detached from the core and collected, reused or recycled as secondary material in the steel industry after dismantling. The core of polyurethane is used for energy recovery. The recycling of the mineral wool core is potentially possible. If appropriate recycling facilities do not exist, the mineral wool is landfilled.

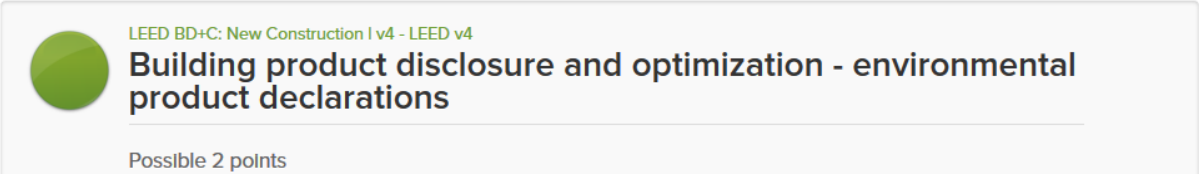


Intent
To encourage adaptive reuse and optimize the environmental performance of products and materials.

Option 3. building and material reuse (2-4 points)
According to Option 3, ROMA quick-assembly insulation panels from off site or on site can be included in the calculation of the percentage of surface area reused or salvaged. Building materials such as structural elements (e.g. roof decking), enclosure materials (e.g. skin) and permanently installed interior elements (e.g. walls) shall explicitly be included in the calculation.

Attention: Materials contributing to this credit may not contribute to MR Credit Building Product Disclosure and Optimization - Sourcing of Raw Materials!

Option 4. whole-building life-cycle assessment (3 points)
The environmental product declaration presents product specific values, which can directly be used for the life cycle assessment of the whole project. Given results are compliant with ISO 14044 (and EN 15804) and report all listed impact categories.

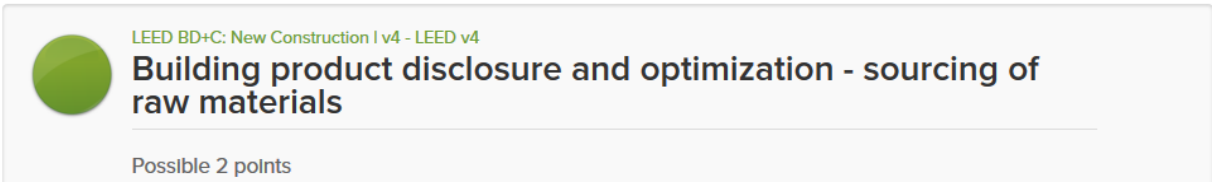


Intent
To encourage the use of products and materials for which life-cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts. To reward project teams for selecting products from manufacturers who have verified improved environmental life-cycle impacts.

Option 1. environmental product declaration (1 point)
ROMA quick-assembly insulating panels meet the following disclosure criteria:

- Environmental product declaration which complies with ISO 14025, 14040, 14044 and EN 15804 with a cradle-to-gate scope with options (Module A1-A3, Module C3-C4 and Module D declared).

- *Product-specific Type III EPD* - Products with third-party certification (Type III), including external verification in which the manufacturer is explicitly recognized as the participant by the program operator are valued as one whole product for purposes of credit achievement calculation.



Intent
To encourage the use of products and materials for which life cycle information is available and that have environmentally, economically, and socially preferable life cycle impacts. To reward project teams for selecting products verified to have been extracted or sourced in a responsible manner.

Product information for ROMA quick-assembly insulating panels within this credit:

Option 1. raw material source and extraction reporting		Description
Third party verified Standard for responsible Sourcing	yes	BES 6001: Issue 3.1, Framework Standard for Responsible Sourcing. Certificate of Approval, Certificate Number: RS0053, Issue: 01. Expiry Date: 5. November 2021 Performance rating: passed. Certification body BRE Global1 The standard specifies requirements for organizational management, supply chain management and management of sustainability issues in order to allow organizations to demonstrate an on-going commitment to the principles of responsible sourcing in relation to the provision of ROMA sandwich panels.
Third-party verified corporate sustainability report (CSR)?	no	
Option 2. leadership extraction practices		Description
Participation in an extended producer responsibility program?	yes	Indirectly yes, as ROMA takes back panels from building sites (cuttings, residuals) when the customer pays the resulting disposal costs.
Recycled content PU-element	11 %	supplier dependent; value may vary
Recycled content MW-element	7.5 %	
of which		
pre-consumer recycled content	n.a.	supplier dependent
post-consumer recycled content	n.a.	supplier dependent
USGBC approved program	no	

Supply of intermediaries to ROMA:

The production of ROMA sandwich panels takes place in Buttenwiesen, Germany. All suppliers of intermediaries (insulation core, surface layer, etc.) are located < 800 km of the manufacturing site. Extraction of referring raw materials are supplier specific.

[1] http://www.greenbooklive.com/pdfdocs/respsourcing/RS0053.pdf

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Building product disclosure and optimization - material ingredients

Possible 2 points

Intent

To encourage the use of products and materials for which life-cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts. To reward project teams for selecting products for which the chemical ingredients in the product are inventoried using an accepted methodology and for selecting products verified to minimize the use and generation of harmful substances. To reward raw material manufacturers who produce products verified to have improved life-cycle impacts.

Product information for ROMA quick-assembly insulating panels within this credit:

Option 1. material ingredient reporting	
Availability of a manufacturer inventory	yes, see EPD section 2.5
Health Product Declaration	no
Cradle to Cradle v2 Basic / v3 Bronze	no
Declare product label	no
ANSI/BIFMA e3 Furniture Sustainability Standard	no
Cradle to Cradle Material Health Certificate	no
USGBC approved program	no
Option 2. material ingredient optimization	
GreenScreen v1.2 Benchmark	no
Cradle to Cradle v2 Gold / v2 Platinum / v3 Silver / v3 Gold or Platinum	no
International Alternative Compliance Path – REACH Optimization	all ingredients comply with REACH requirements
USGBC approved program	no

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Construction and demolition waste management

Possible 2 points

Intent
To reduce construction and demolition waste disposed of in landfills and incineration facilities by recovering, reusing, and recycling materials.

Option 2. Reduction of total waste material
ROMA quick-assembly insulating panels can be reused or recycled as stated in chapter 2.8, 2.9 and 2.14 of the environmental product declaration resulting in less construction waste.

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Low-emitting materials

Possible 3 points

Intent
To reduce concentrations of chemical contaminants that can damage air quality, human health, productivity, and the environment.

Reference to both EPDs (sandwich panels with a core made of polyurethane (PU) and sandwich panels with a core made of mineral wool (MW)), chapter 7, requisite evidence:

Double skin steel faced sandwich panels in wall and roof application enclose the built space. The internal skin is in direct contact to the interior. No legal requirements for the measurement of VOC emissions are in place. A study on behalf of IFBS shows, that thin walled profiled sheets with zinc and organic coating comply with the threshold values according to AgBB scheme.

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Acoustic performance

Possible 1 point

Intent
To provide workspaces and classrooms that promote occupants' well-being, productivity, and communications through effective acoustic design.

Sound Isolation
ROMA sandwich panels contribute to the composite sound transmission class (STCC) ratings. Depending on the used panel type airborne sound reduction Rw(C, Ctr) according to EN ISO 140-3 lies between 26 dB for panels with a polyurethane core and 34 dB for panels with a mineral wool core.

.references

U.S. Green Building Council, 2018. LEED v4 for Building Design and Construction

AgBB, Committee for Health-related Evaluation of Building Products (*Ausschuss zur gesundheitlichen Bewertung von Bauprodukten*)

DIN EN ISO 140-03:2005-03, Acoustics - Measurement of sound insulation in buildings and of building elements - Part 3: Laboratory measurements of airborne sound insulation of building elements (ISO 140-3:1995 + AM 1:2004); German version EN 20140-3:1995 + A1:2004

DIN EN 13162:2013-03: Thermal insulation products for buildings – Factory made mineral wool (MW) products – Specifications

DIN EN 13165:2013-03: Thermal insulation products for buildings – Factory made rigid polyurethane foam (PU) products – Specifications

DIN EN ISO 14021:2016-07, Environmental labels and declarations – Self-declared environmental claims (Type II environmental labelling)

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

DIN EN ISO 14040:2009-11, Environmental management - Life cycle assessment - Principles and framework (ISO 14040:2006); German and English version EN ISO 14040:2006

DIN EN ISO 14044:2006-10: Environmental management - Life Cycle Assessment - Requirements and Guidelines

DIN EN 14509:2009-04: Self-supporting sandwich panels with double-sided metal coatings – Factory made products – Specifications

EN 15804:2012-04+A1 2013, Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products.

DIN 18542:2009-7: Sealing of outside wall joints with impregnated sealing tapes made of cellular plastics – Impregnated sealing tapes – Requirements and testing