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## **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 BREEAM® building certification

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**ROMA**  
DÄMM-SYSTEME

This document aims at the identification of linkages between environmental product information covered by EPDs and the requirements of the BREEAM® (Building Research Establishment's Environmental Assessment Method) building certification. It provides an overview of product related features based on the BREEAM® technical manual for International New Construction 2016 SD233 2.0 [<http://www.breeam.com/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/m <sup>3</sup>
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/(m <sup>2</sup> .K)

## 5.0 Management

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### Man 02 Life cycle cost and service life planning

**Aim**

To deliver whole life value by encouraging the use of life cycle costing to improve design, specification, through-life maintenance and operation, and through the dissemination of capital cost reporting to promote economic sustainability. (BREEAM, 2016)

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

Service life	The reference service life of ROMA sandwich panels depends on the type of application and referring weather conditions. Thus, its service life ranges from <b>15 to 45 years</b> .
End of life	ROMA sandwich panel products can be reused / recycled at its end of life.

### Man 04 Commissioning and handover

**Aim**

To encourage a properly planned handover and commissioning process that reflects the needs of the building occupants. (BREEAM, 2016)

The installation of ROMA sandwich panels depends on the type of application and resulting specifications for installation provided by the supplier.

## 6.0 Health and wellbeing

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### Hea 02 Indoor air quality

**Aim**

To recognise and encourage a healthy internal environment through the specification and installation of appropriate ventilation, equipment and finishes. (BREEAM, 2016)

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. Thin walled profiled sheets with zinc and organic coating comply with the threshold values according to AgBB scheme.

### Hea 04 Thermal comfort

**Aim**

To ensure that appropriate thermal comfort levels are achieved through design, and controls are selected to maintain a thermally comfortable environment for occupants within the building. (BREEAM, 2016)

EPD chapter 2.3 product, table constructional data of the EPD:

Ranges for product specific constructional data for ROMA quick-assembly insulating panels are indicated in the table of technical data. For project specific information, please contact ROMA directly (<https://www.roma-daemmsysteme.de/de/kontakt.html>).

### Hea 05 Acoustic performance

**Aim**

To ensure the building's acoustic performance, including sound insulation meets the appropriate standards for its purpose. (BREEAM, 2016)

ROMA sandwich panels affect ratings referring to composite sound transmission class (STCC). Depending on the used panel type, airborne sound reduction  $R_w(C, C_{tr})$  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.

## 10.0 Materials

### Mat 01 Life cycle impacts

#### Aim

To recognise and encourage the use of robust and appropriate life cycle assessment tools and consequently the specification of construction materials with a low environmental impact (including embodied carbon) over the full life cycle of the building. (BREEAM, 2016)

General information of environmental product declarations of ROMA quick-assembly insulating panels:

Material category	10. Other acc. to <a href="#">table 44</a> of Mat03 Responsible sourcing of construction products
Owner of the Declaration	Romakowski GmbH & Co. KG
Programme Holder & Publisher	Institut Bauen und Umwelt e.V. (IBU)
Mutual recognition with BRE	yes
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 <a href="#">[see documentation]</a>
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 m <sup>2</sup> continuously produced sandwich panels with skins made of steel with a surface weight of 14.52 kg/m <sup>2</sup> [core made of polyurethane (PU)] and 21.09 kg/m <sup>2</sup> [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 m <sup>2</sup> 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 CO <sub>2</sub> -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 SO <sub>2</sub> -equ	9.63E-02	0.00E+00	3.92E-03	-3.16E-02
EP	kg (PO <sub>4</sub> ) <sup>3-</sup> -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 m <sup>2</sup> 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 CO <sub>2</sub> -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 SO <sub>2</sub> -equ	1.56E-01	0.00E+00	1.09E-03	-2.55E-02
EP	kg (PO <sub>4</sub> ) <sup>3-</sup> -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 m <sup>2</sup> 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	m <sup>3</sup>	9.62E-02	0.00E+00	2.24E-02	-7.58E-04

Declared unit: 1 m <sup>2</sup> 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	m <sup>3</sup>	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 m <sup>2</sup> 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 m <sup>2</sup> 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



## Mat 03 Responsible sourcing of construction products

### Aim

To recognise and encourage the specification and procurement of responsibly sourced construction products. (BREEAM, 2016)

ROMA quick-assembly insulating panels matches the BREEAM material category ‘10. Other’ in accordance with [table 44](#).

Type of scheme	Coverage	Specification of implemented scheme	Scope by material category
RSCS <sup>1</sup>	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 Global <sup>2</sup> The standard specifies requirements for organisational management, supply chain management and management of sustainability issues in order to allow organisations to demonstrate an on-going commitment to the principles of responsible sourcing in relation to the provision of ROMA sandwich panels.
EMS <sup>3</sup>	yes	certified environmental management system according to ISO 14001 <sup>4</sup>	key process, material flow, waste treatment, recycling as well as supply chain

## Mat 04 Insulation

Not assessed as a standalone issue within BREEAM International New Construction 2016, but incorporated within [Mat 01 Life cycle impacts](#) and [Mat 03 Responsible sourcing of construction products](#) issues.

Category Mat 04 Insulation may be included in the assessment by fulfilling the requirements given in Mat 03 and the associated tool.

<sup>1</sup> BREEAM recognised responsible sourcing certification scheme

<sup>2</sup> <http://www.greenbooklive.com/pdfdocs/respsourcing/RS0053.pdf>

<sup>3</sup> Environmental management system

<sup>4</sup> <https://www.roma-daemmsysteme.de/en/startpage/company/environmental-management.html>

## Mat 05 Designing for durability and resilience

### Aim

To recognise and encourage adequate protection of exposed elements of the building and landscape, therefore minimising the frequency of replacement and maximising materials optimisation. (BREEAM, 2016)

According to [table 45](#) of 'Mat 05 Designing for durability and resilience', ROMA sandwich panels are applicable to the following building elements for which material degradation effects are to consider:

2. external walls
3. roof or balconies
7. cladding (where exposed to external environment)

Enabling the adaption to varying environmental conditions, a set of product variations of ROMA sandwich panels is available.

Section 2 of the environmental product declaration describes the prefabricated product:

The internal and external steel sheets represent compound materials made of metallic support material (galvanised steel strip) and an organic coating by means of coil coating processes. Performance values of the product are dependent on its characteristics given in the Declaration of Performance according to EN 14509:2013.

**Steel according to DIN EN 10169:** S 280 GD to S 320 GD

**Metallic coating according to DIN EN 10346:** Zinc Z 275, a total of 275 g/m<sup>2</sup> with a zinc content of > 99% or equivalent corrosion protection by another zinc alloy.

**Organic coating according DIN EN 12944-1 (DIN 55634):** Standard polyester coating (SP), coil coating, 25 µm on the visible side and max. 15 µm on the back or alternatively higher quality coatings.

The protective film, which protects the surface of the elements during transport and manipulation activities at the construction site, is to be removed just before installation. Mounting of the panels is to be carried out according to the description given in EPD section 2.8 in order to avoid any damages and subsequently any corrosion. In order to ensure airtightness and heat-insulation of the building envelope, sealant strips according to DIN 18542 and insulation made of polyurethane or mineral wool are used.

Potential losses of zinc vary depending on the local microclimatic conditions. Categorisation follows DIN EN 12944-2 and depends on surface depending loss of mass. No adverse effects are known.

Double skin steel faced sandwich panels with the use in lightweight metal constructions must withstand a term of protection of at least 15 years. The term of protection depends on the location, weather conditions and the quality of the coating. Double skin steel faced sandwich panels exhibit an estimated service life of 40-45 years depending on the use conditions.

Section 2.13 lists the technical data regarding fire (A2s1,d0 according DIN 13501-1), water (no risk) and mechanical deconstruction (no risk).

Further project specific technical information of the products as well as specifications for dimensioning, planning and construction are available at [www.roma-daemmsysteme.de](http://www.roma-daemmsysteme.de).

## Mat 06 Material Efficiency

### Aim

To recognise and encourage measures to optimise material efficiency in order to minimise the environmental impact of material use and waste without compromising on structural stability, durability or service life of the building. (BREEAM, 2016)

Characteristics of ROMA quick-assembly insulation panels when it comes to material efficiency:

Recycled content PU-element	11 %	supplier dependent; real value may vary
Recycled content MW-element of which	7.5 %	supplier dependent; real value may vary
pre-consumer recycled content	n.a.	supplier dependent
post-consumer recycled content	n.a.	supplier dependent
Replacement	ROMA sandwich panels are used for various applications even under extreme conditions regarding both weather and climate. Such projects attest durability for a broad range of long-term application. Simple construction design furthermore allows replacements of insulation panels if necessary.	
End of life	ROMA quick-assembly insulation panels intend dismantling of steel parts and insulation material after the use phase. The steel sheets of the sandwich panels can be detached from the core and collected, reused or recycled after dismantling. The recycling of the mineral wool core is possible. Cores made of polyurethane are used for energy recovery.	

## 11.0 Waste

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### Wst 01 Construction waste management

**Aim:**

To promote resource efficiency via the effective and appropriate management of construction waste. (BREEAM, 2016)

ROMA quick-assembly insulation panels represent a suitable target for diversion of resources from landfill. ROMA sandwich panels may contribute to the BREEAM target rates for diversion from landfill.

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. According to [table 47](#), target rates for diversion from landfill are fulfilled at least by volume and partly by weight depending on thickness and material of the used sandwich panel's core. The following 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.

### Wst 06 Functional adaptability

**Aim:**

To recognise and encourage measures taken to accommodate future changes of use of the building over its lifespan. (BREEAM, 2016)

ROMA sandwich panels are mainly used for the building envelope regarding load-bearing, self-supporting and non-supporting application in roof, wall and ceiling structures. Uniformly designed mounting allows for easy replacement and thus future adaptation of the building's purpose.

Disclaimer: The content of, and results shown in this fact sheet are based on data and information submitted by the client. Therefore, Daxner & Merl GmbH makes no representation or warranty in regard of the correctness or completeness of the content of this document or the results shown.

## .references

BREEAM, 2016. BREEAM® technical manual for International New Construction 2016 SD233 2.0 (October 2018)

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 10169:2011-02, Continuously organic coated (coil coated) steel flat products – Technical delivery conditions.

DIN EN 10346:2015-10, Continuously hot-dip coated steel flat products for cold forming – Technical delivery conditions

DIN EN 12944-1-1:2016-02 – Draft. Paints and varnishes – Corrosion protection of steel structures by protective coating systems – Part 1 General introduction (ISO/DIS 12944-1:2016)

DIN EN 12944-2-1:2018-04 – Paints and varnishes – Corrosion protection of steel structures by protective paint systems – Part 2: Classification of environments

DIN 55634:2010-04, Paints, varnishes and coatings - Corrosion protection of supporting thin-walled building components made of steel.

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

ISO 14001:2015, Environmental management systems – Requirements with guidance for use.

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