Ciclo di convegni

SOSTENIBILITA' E VALORIZZAZIONE DEL PATRIMONIO EDILIZIO

VALUTAZIONE LCA ED EPD

DEL SETTORE DELLE COSTRUZIONI

18 giugno 2014

Organizza

MDS MACRO DESIGN STUDIO
solutions for sustainable architecture

In collaborazione con

BUREAU VERITAS

fermacell

YTONG

ROCKWOOL
FIRESAFE INSULATION

Con il patrocinio di

fondazione architetti e ingegneri liberi professionisti iscritti INARCASSA

GREEN BUILDING COUNCIL ITALIA

Ordine degli Architetti Pianificatori, Paesaggisti e Conservatori della Provincia di Trento

PROGETTO MANIFATTURA

In cooperazione con

Collegio dei Periti Industriali e dei Periti Industriali Laureati della Provincia di Trento

Relatore

Emanuele Rotta
Fermacell

Prestazioni sostenibili con i sistemi costruttivi a secco

The Xella Group

Xella International

Xella Baustoffe GmbH

- Aerated Autoclaved Concrete
- Calcium Silicate Unit
- Mineral Insulation Boards

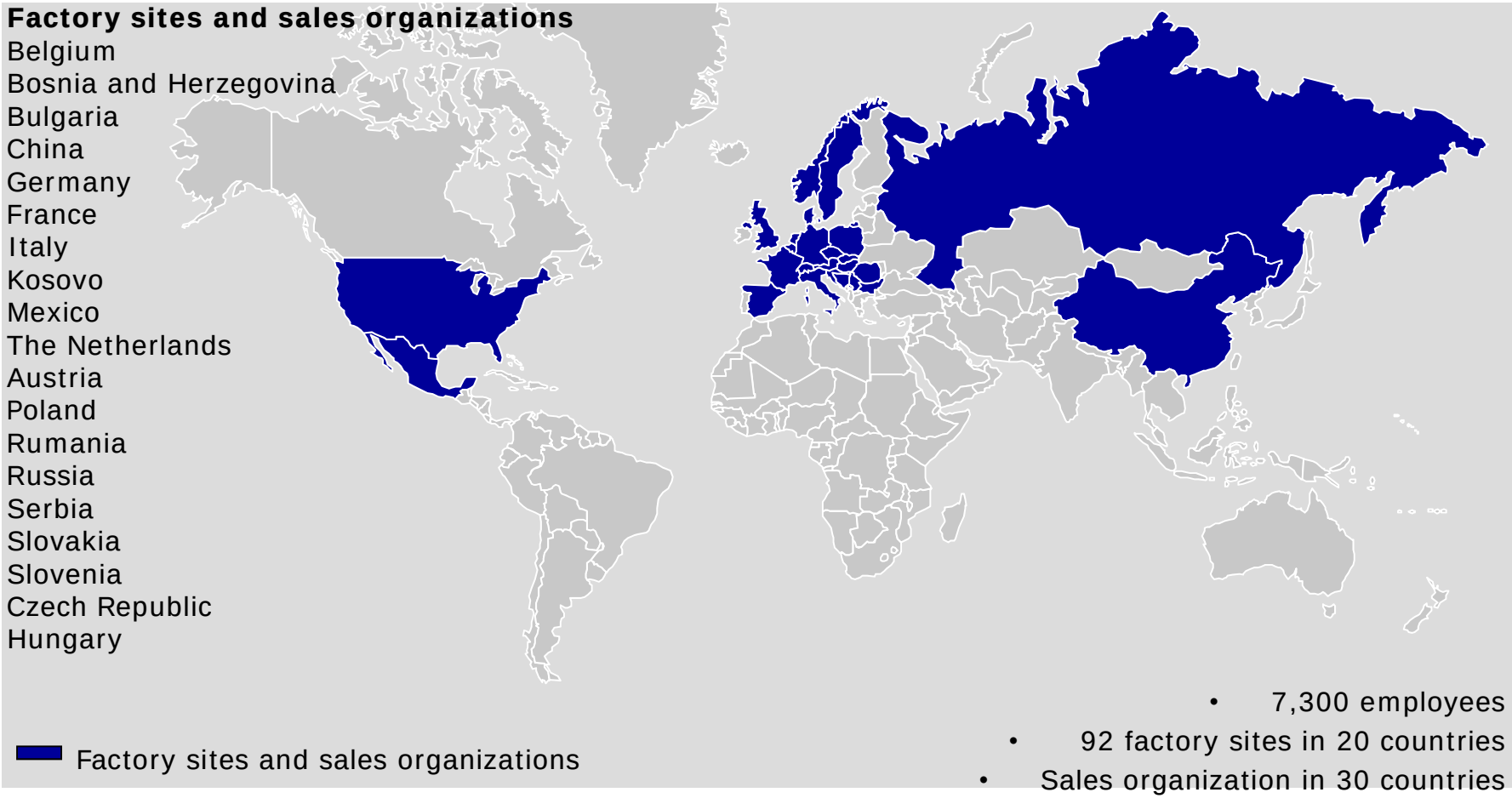
Fermacell GmbH
Dry lining

- Gypsum Fibreboard
- Fire Protection Boards
- Cement-bonded dry lining boards

Fels-Werke GmbH
Resources

- Lime
- Limestone

International Presence of the Xella Group



- 7,300 employees
- 92 factory sites in 20 countries
- Sales organization in 30 countries

fermacell history

- More than 40 years of quality in dry lining

At the end of the 30s the Stein und Erde GmbH was founded.

1971 was the introduction of fermacell

2002, the company was taken over by the Xella Group

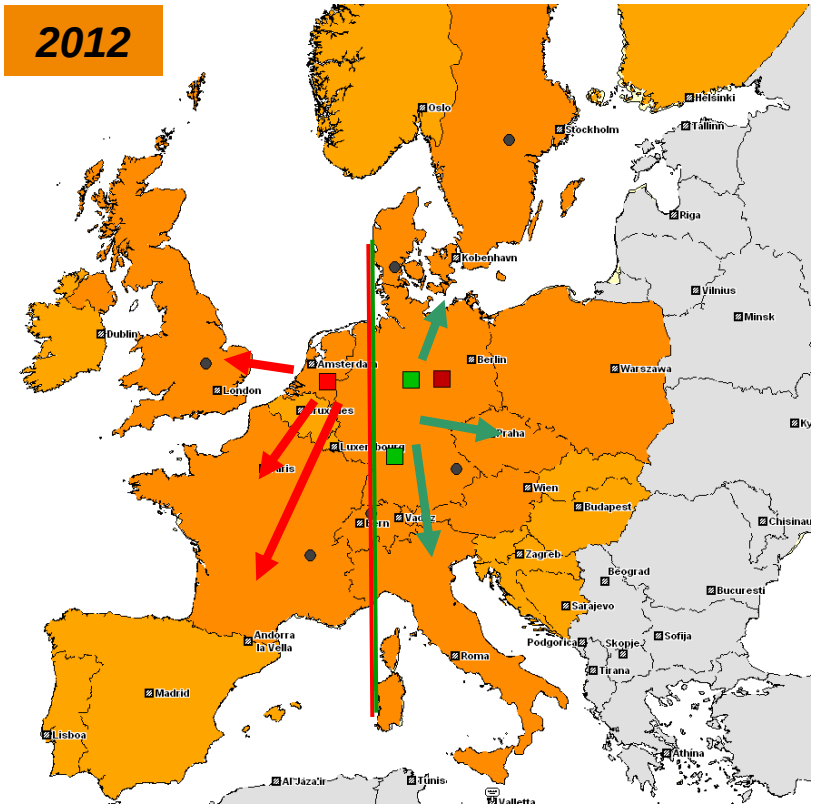
Purchase of a new gypsum factory in Spain and expansion of the existing production in Calbe

1940 1970 1980 1990 2000 2012

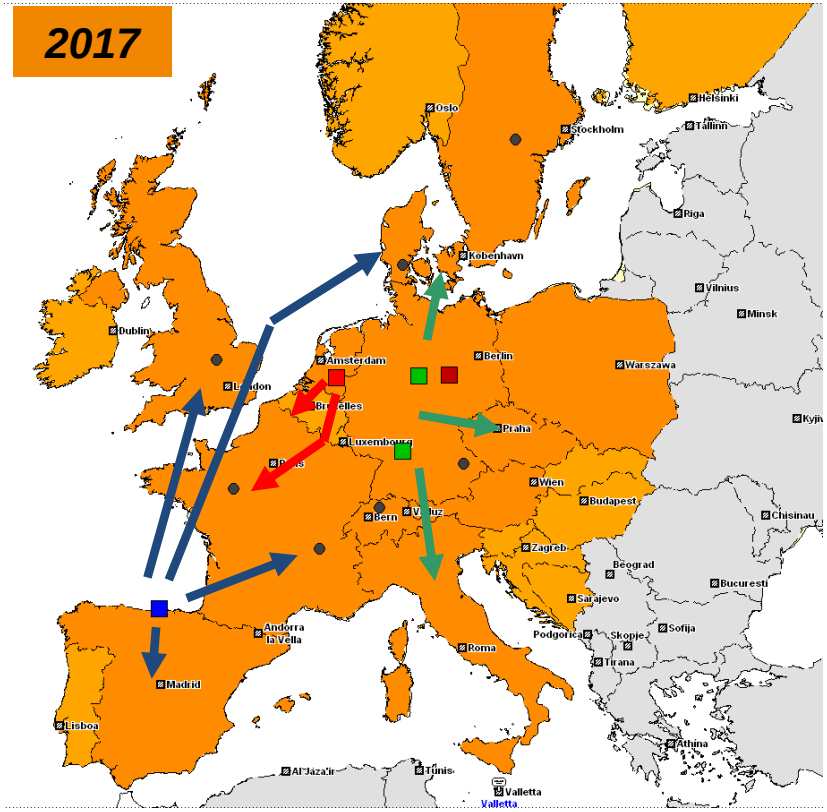
VB Italia

Location - Orejo

2012



2017



- Stock
- Wijchen
- Calbe
- Münchehof / Siglingen
- Santander
- Supply

Production cement boards

Fibra vetro

Argilla espansa

Acqua

Cemento

Rete in fibra vetro

Powerpanel HD

Powerpanel H_2O

Powerpanel TE

Production gypsum fibreboard

Gesso

Acqua

Amido di patate

Fibre minerali

Carta riciclata

Cheratina

Firepanel A1

Gessofibra

Greenline

Product ratings

Tabella 3-2: Contenuto riciclato delle lastre in gessofibra Fermacell					
Fonte	**Materiale**	**Lastra in gessofibra - Münchehof**	**Lastra in gessofibra - Siglingen**	**Lastra in gessofibra - Wijchen**	**Lastra in gessofibra – media ponderata**
Rifiuto pre-consumo	Gesso da desolforazione di gas combusti	55%	28%	77%	57%
Rifiuto post-consumo	Fibre di carta (da carta da macero)	19%	18%	20%	19%
Contenuto riciclato totale PONDERATO (NB: i rifiuti pre-consumo hanno un "peso" del 50%)		**47%**	**32%**	**59%**	**48%**

Tabella 3-3: distanze di trasporto elle materie prime usate negli stabilimenti di produzione Fermacell

Materiale	**Distanza dal fornitore - Münchehof, km**	**Distanza dal fornitore - Siglingen, km**	**Distanza dal fornitore - Wijchen, km**
Gesso emidrato beta (da gesso naturale)	50	30	-
Gesso emidrato beta (da desolforazione gas combusti impianto termo-elettrico a carbone)	130	355	200
Fibre di carta (da carta da macero)	50	50	200
Gesso bi-idrato	100	100	100

Fermacell

Green Building KPIs

from BREEAM and LEED that are relevant for gypsum fibre board products

PE INTERNATIONAL
EXPERTS IN SUSTAINABILITY

Hauptstraße 111 – 115
D – 70771 Leinfelden – Echterdingen

Tel. +49 (0) 711 34 18 17 – 0
Fax +49 (0) 711 34 18 17 – 25

E-mail info@pe-international.com

Internet www.pe-international.com

Estratto da:
BREEAM and LEED KPIs report
Fermacell Gypsum Fibreboard
final_2014_02_27.pdf

Production gypsum fibreboard

Rivendita Fermacell

Product approvals

INSTITUT FÜR BAUBIOLOGIE ROSENHEIM GMBH

Verleihungs - Urkunde

Aufgrund der ausgezeichneten Prüfergebnisse wird der Firma

Xella
Neues Bauen

Xella Trockenbau-Systeme GmbH
47119 Duisburg

für das Produkt

FERMACELL Gipsfaserplatte

das Prüfsiegel

durch das Institut für Baubiologie Rosenheim GmbH verliehen

Uwe Rose
Rosenheim, im April 2008

Das Prüfsiegel wird für die Dauer von 2 Jahren verliehen.
Eine Nachprüfung muss vor Ablauf dieser Zeit im Interesse des Verbrauchers erfolgen und beantragt werden.

D- 83022 Rosenheim ,Heilig-Geist-Str. 54 Telefon 08031 / 3675-0 Fax 08031 / 3675-30 Geschäftsführer: Uwe Rose HRB Traunstein 5362
Bank: Dresdner Bank BLZ 711 800 05, Kontonummer: 2468 53 000, Postbank München, BLZ 700 100 80, Kto-Nr.: 5775-809
E-Mail: i-b-r@t-online.de pruefsiegel@baubiologie.org Unsere Internetseite: www.baubiologie.org

Istituto per la Bioedilizia - Germania

Certifica le percentuali di materia prima contenuta: gesso, carta da riciclo.

Tests and test results:

2.1 Radioactivity
2.2 Biocides, PCB, DDT, metabolites, pyrethroids
2.3 Solvents, and aromatics (VOCs)
2.4 Metals / Heavy metal content
2.5 Rate of heat storage S
2.6 Fine dusts
2.7 Electrostatic behaviour
2.8 Evaluation of thermal behaviour
2.9 Environmental behaviour
2.10 Diffusion and resorptive capacity
2.11 Salmonella test (Ames test)

...IL FUTURO E' IL PROGETTO: SENTINEL HAUS

Product approvals

Viti autofilettanti

Taglialastre

Adesivo per giunti
310 ml

Rete di armatura
per lastre TB

Viti con punta
perforante

Stucco per giunti

Stucco di finitura

Rasante in polvere

Spatola

Legante

Product approvals

Produktprüfung
Zertifizierung
Qualitätssicherung

eco INSTITUT

Gutachten
zum eco-INSTITUT-Label
(KURZFASSUNG)

eco INSTITUT TESTED PRODUCT ID 0907- 13701 - 001

eco INSTITUT TESTED PRODUCT ID 0907- 13701 - 002

eco INSTITUT TESTED PRODUCT ID 0907- 13701 - 003

FERMACELL Gipsfaserplatte
FERMACELL Fugenspachtel
FERMACELL Fugenkleber (ausgehärtet)

Xella Trockenbau-Systeme GmbH, 47119 Duisburg

Prüfbericht Nr. 19400-1 bis 4

eco-INSTITUT GmbH
Sachsenring 69
50677 Köln
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info@eco-institut.de

Akkreditiert ISO/IEC 17025
AKS

Eco Istitut – Colonia (Germania)

1. Emission test:

Volatile organic compounds (VOC)

Formaldehyde

2. Odour testing

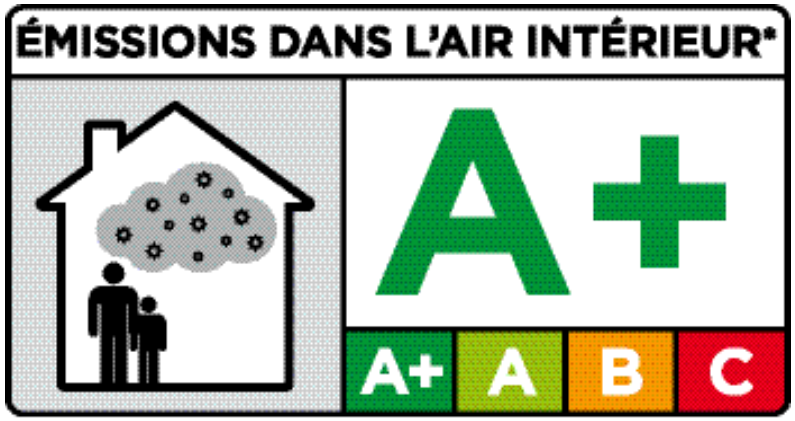
3. Contens analysis:

Organic halogenated compounds (AOX) *

Phthalates (samples 17480-2 and 3)

Parameter	Testing methodology
VOC (volatile organic compounds)	DIN ISO 16000-9, DIN ISO 16000-6 Pre-testing treatment FERMACELL Joint adhesive: 3 days open storage until complete hardening
Formaldehyde	DIN ISO 16000-9, DIN V ENV 717-1
Odours	according to VDA recommendation 270 at 50 % humidity Pre-testing treatment FERMACELL Joint adhesive: 3 days open storage until complete hardening
Organic halogenic compounds (AOX / EOX)	AOX: Binding of the organic halogens to activated charcoal. Combustion of the activated charcoal in an oxygen stream, micro-coulometric determination of the halogen content. EOX: Extraction with ethyl acetate. Combustion of the extract in an oxygen stream, micro-coulometric determination of the halogen content.
Phthalates	Extraction, Analysis with GC/MS

Product approvals



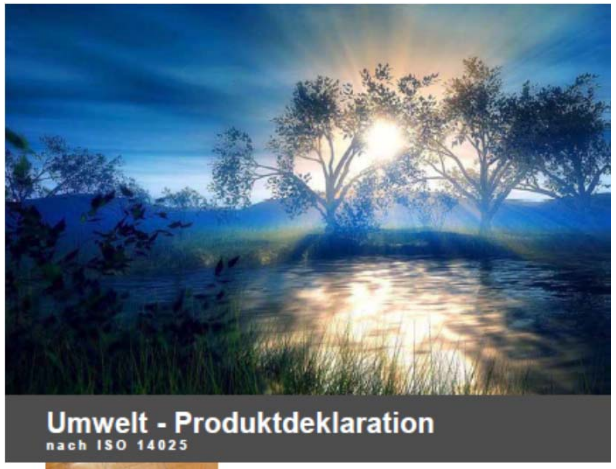
Eco Istitut – Colonia (Germania)

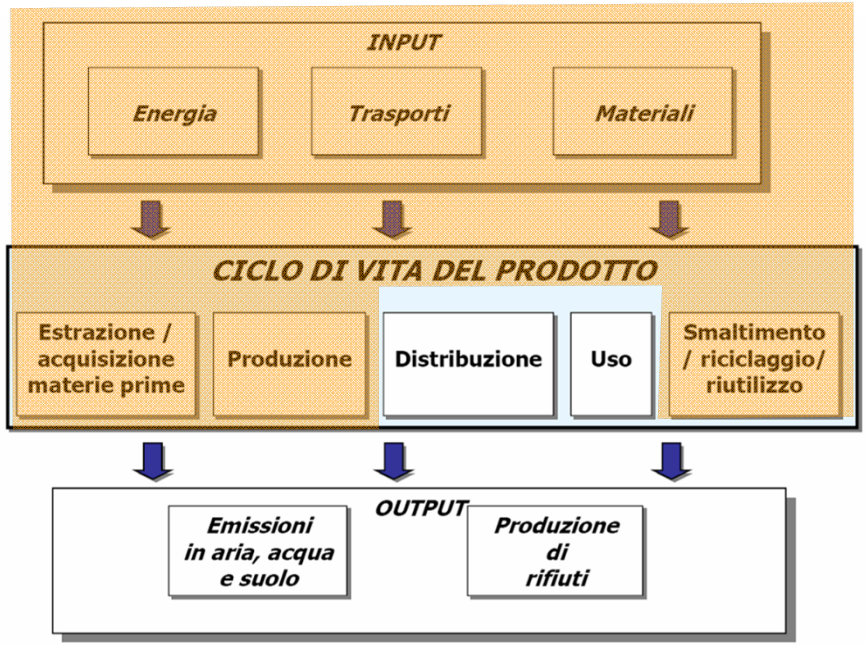
norma EN ISO 16000-9
Tutti i prodotti che vengono commercializzati in Francia dal 1° gennaio del 2012 hanno l'obbligo di riportare un'etichetta che identifichi il livello di emissione dei composti organici volatili.

	A+	A	B	C
Formaldéhyde	< 10	< 60	< 120	> 120
Acétaldéhyde	< 200	< 300	< 400	> 400
Toluène	< 300	< 450	< 600	> 600
Tetrachloroéthylène	< 250	< 350	< 500	> 500
Xylène	< 200	< 300	< 400	> 400
1,2,4-triméthylbenzène	< 1000	< 1500	< 2000	> 2000
1,4-dichlorobenzène	< 60	< 90	< 120	> 120
Ethylbenzène	< 750	< 1000	< 1500	> 1500
2-butoxyéthanol	< 1000	< 1500	< 2000	> 2000
Styrène	< 250	< 350	< 500	> 500
Composés organiques totaux	< 1000	< 1500	< 2000	> 2000

Plaque fibres-gypse FERMACELL	A+
Plaque fibres-gypse FERMACELL greenline	A+
Plaque FERMACELL Powerpanel H2O	A+
Plaque FERMACELL Vapor	A+
Plaque de sol FERMACELL	A+
Plaque de sol avec isolant fibres de bois	A+
Colle à joint FERMACELL	A+
Colle à joint FERMACELL greenline	A+
Colle pour plaque de sol FERMACELL greenline	A+
Enduit pour joint FERMACELL	A+
Enduit de lissage FERMACELL	A+
Enduit de lissage FERMACELL Powerpanel	A+
Plaque FERMACELL Firepanel A1	A+
Plaque AESTUVER	A+

Product approvals





PE INTERNATIONAL GmbH

Institut Bauen und Umwelt e.V.

Fraunhofer WKI Wilhelm-Klauditz-Institut Holzforschung

Qualitätsprüfung und -bewertung

Strumenti e Data:

GaBi Software
PRODUCT SUSTAINABILITY

Scelta degli aspetti ambientali(o categorie di impatto) sui quali si basa l'analisi

Effetto serra	GWP100	Kg di CO_2-eq
Assottigliamento fascia ozono	ODP	Kg di CFC11-eq
Acidificazione	AP	Kg di SO_2-eq
Eutrofizzazione	EP	Kg di NO_3-eq
Formazione di smog foto-chimico	POCP	Kg di C_2H_4-eq

EPD - gypsum fibreboard

EPD - declaration of the gypsum association in Germany **(GIPS – Bundesverband der Gipsindustrie e. V.)** following ISO 14025 and the drafts of CEN/TC 59 Building Construction SC 17 Sustainability in building construction and describes the environmental performances of the mentioned products. Aim is to support the development of environmentally sound and non-hazardous construction.

Modellazione di:

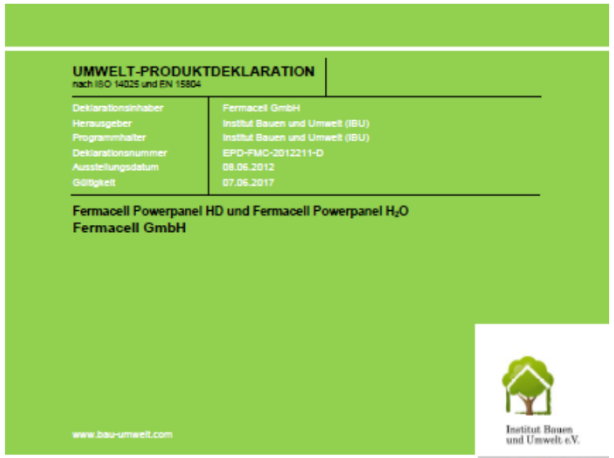
PE INTERNATIONAL GmbH

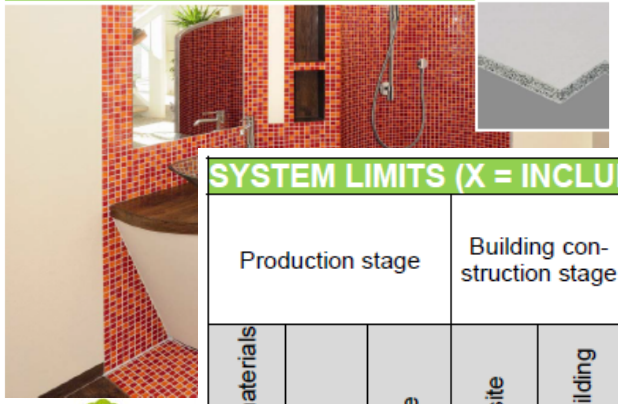
Institut Bauen und Umwelt e.V.

Strumenti e Data:

GaBi Software
PRODUCT SUSTAINABILITY

EPD - powerpanel





- DIN EN ISO 14025:2009-11, Environmental labels and declarations — Type III environmental declarations — Principles and procedures
- DIN EN 15804:2012-04, Sustainability of Construction Works – Environmental Product Declarations for products – Basic rules for the Construction Products product category;
- DIN 38414-4:1984-10, German standard procedure for testing water, waste water and sludge; Sludge and sediment (Group S); Determining elutriation with water (S 4)
- **GaBi software & documentation**

GaBi 4: Software and data base for comprehensive analysis. LBP, University of Stuttgart and PE International, 2011, documentation of the GaBi 4 data base data records, 2011. http://documentation.gabi-software.com/

SYSTEM LIMITS (X = INCLUDED IN LIFE CYCLE ASSESSMENT; MND = MODULE NOT DECLARED)

Production stage			Building con-struction stage		Use stage							Disposal stage				Credits and loads outside the system limit
Provision of raw materials	Transport	Manufacture	Transport to site	Installation in building	Use / Application	Maintenance	Repairs	Replacement	Renewal	Energy used for operat-ing the building	Water used for operating the building	Deconstruction / Demolition	Transport	Waste treatment	Landfilling	Reuse, recovery or recy-cling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	X

EPD - powerpanel

ENVIRONMENTAL EFFECTS OF THE LIFE CYCLE ASSESSMENT: 1 m² Powerpanel HD

		Production	Installation	Credit
Parameter	Unit	A1-A3	A5	D
GWP	[kg CO_2 equiv.]	11.7	0.75	-0.32
ODP	[kg CFC11 equiv.]	5.87E-07	1.86E-10	-1.13E-08
AP	[kg SO_2 equiv.]	3.69E-02	1.59E-04	-2.99E-04
EP	[kg PO_4^{3-} equiv.]	3.96E-03	4.26E-05	-3.86E-05
POCP	[kg ethene equiv.]	2.95E-03	1.34E-05	-3.35E-05
ADPE	[kg Sb equiv.]	2.66E-05	6.75E-09	-2.04E-08
ADPF	[MJ]	112.1	0.32	-5.03

GWP = Global Warming Potential; ODP = Ozone Depletion Potential of the stratospheric ozone layer; AP = Acidification Potential of soil and water; EP = Eutrification Potential; POCP Photochemical Ozone Creation Potential; ADPE = Abiotic Depletion Potential of non-fossil resources; ADPF = Abiotic Depletion Potential of fossil fuels

LIFE CYCLE ASSESSMENT RESULTS - USE OF RESOURCES: 1 m² Powerpanel HD

		Production	Installation	Credit
Parameter	Unit	A1-A3	A5	D
PERE	[MJ]	14.1	-	-
PERM	[MJ]	0.00E+00	-	-
PERT	[MJ]	14.1	9.72E-04	-1.43E-01
PENRE	[MJ]	133.09	-	-
PENRM	[MJ]	0.00E+00	-	-
PENRT	[MJ]	133.09	3.26E-01	-5.42
SM	[kg]	1.07	-	-
RSF	[MJ]	2.01	0	0
NRSF	[MJ]	6.59	0	0
FW	[m³]	0.06	6.84E-04	-7.36E-04

PERE = Regenerative primary energy as an energy carrier; PERM = Regenerative primary energy for material usage; PERT = Total regenerative primary energy; PENRE = Non-regenerative primary energy as an energy carrier; PENRM = Non-regenerative primary energy for material usage; PENRT = Total non-regenerative primary energy; SM = Use of secondary materials; RSF = Regenerative secondary fuels; NRSF = Non-regenerative secondary fuels; FW = Use of fresh water resources

LIFE CYCLE ASSESSMENT RESULTS - OUTPUT FLOWS AND WASTE CATEGORIES: 1 m² Powerpanel HD

		Production	Installation	Credit
Parameter	Unit	A1-A3	A5	D
HWD*	[kg]	-	-	-
NHWD	[kg]	27.70	0.01	-0.40
RWD	[kg]	7.33E-03	2.26E-06	-1.41E-04
CRU	[kg]	-	-	0
MFR	[kg]	-	-	0
MER	[kg]	-	-	0
EE electricity	[MJ]	-	0.39	-
EE heat	[MJ]	-	4.09	-

HWD = Hazardous waste for landfilling; NHWD = Non-hazardous disposed of waste; RWD = Radioactive disposed of waste; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy per type

ENVIRONMENTAL EFFECTS OF THE LIFE CYCLE ASSESSMENT: 1 m² Powerpanel H_2O

		Production	Installation	Credit
Parameter	Unit	A1-A3	A5	D
GWP	[kg CO_2 equiv.]	11.9	0.71	-0.30
ODP	[kg CFC11 equiv.]	5.66E-07	1.75E-10	-1.06E-08
AP	[kg SO_2 equiv.]	3.61E-02	1.50E-04	-2.81E-04
EP	[kg PO_4^{3-} equiv.]	3.35E-03	4.01E-05	-3.64E-05
POCP	[kg ethene equiv.]	3.25E-03	1.26E-05	-3.16E-05
ADPE	[kg Sb equiv.]	3.84E-04	6.36E-09	-1.93E-08
ADPF	[MJ]	120.1	0.30	-4.73

GWP = Global Warming Potential; ODP = Ozone Depletion Potential of the stratospheric ozone layer; AP = Acidification Potential of soil and water; EP = Eutrification Potential; POCP Photochemical Ozone Creation Potential; ADPE = Abiotic Depletion Potential of non-fossil resources; ADPF = Abiotic Depletion Potential of fossil fuels

LIFE CYCLE ASSESSMENT RESULTS - USE OF RESOURCES: 1 m² Powerpanel H_2O

		Production	Installation	Credit
Parameter	Unit	A1-A3	A5	D
PERE	[MJ]	15.7	-	-
PERM	[MJ]	0.00E+00	-	-
PERT	[MJ]	15.7	9.16E-04	-1.35E-01
PENRE	[MJ]	140.36	-	-
PENRM	[MJ]	0.00E+00	-	-
PENRT	[MJ]	140.36	3.08E-01	-5.11
SM	[kg]	1.07	-	-
RSF	[MJ]	2.03	0	0
NRSF	[MJ]	6.62	0	0
FW	[m³]	0.07	6.44E-04	-6.93E-04

PERE = Regenerative primary energy as an energy carrier; PERM = Regenerative primary energy for material usage; PERT = Total regenerative primary energy; PENRE = Non-regenerative primary energy as an energy carrier; PENRM = Non-regenerative primary energy for material usage; PENRT = Total non-regenerative primary energy; SM = Use of secondary materials; RSF = Regenerative secondary fuels; NRSF = Non-regenerative secondary fuels; FW = Use of fresh water resources

LIFE CYCLE ASSESSMENT RESULTS - OUTPUT FLOWS AND WASTE CATEGORIES: 1 m² Powerpanel H_2O

		Production	Installation	Credit
Parameter	Unit	A1-A3	A5	D
HWD*	[kg]	-	-	-
NHWD	[kg]	28.76	0.01	-0.38
RWD	[kg]	7.09E-03	2.13E-06	-1.33E-04
CRU	[kg]	-	-	0
MFR	[kg]	-	-	0
MER	[kg]	-	-	0
EE electricity	[MJ]	-	0.37	-
EE heat	[MJ]	-	3.85	-

HWD = Hazardous waste for landfilling; NHWD = Non-hazardous disposed of waste; RWD = Radioactive disposed of waste; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EE = Exported energy per type

EPD - aestuver

ENVIRONMENTAL PRODUCT DECLARATION
as per ISO 14025 and EN 15804

Declaration holder	Fermacell GmbH
Publisher	Institute Construction and Environment (IBU)
Programme holder	Institute Construction and Environment (IBU)
Declaration number	EPD-FMC-2012111-E
Issue date	08.06.2012
Validity	07.06.2017

AESTUVER and AESTUVER T Fire-resistant board
Fermacell GmbH

www.bau-umwelt.com

Institut Bauen und Umwelt e.V.

Institut Bauen und Umwelt e.V.

Programme holder
Institut Bauen und Umwelt e.V.
Rheinufer 108
53639 Königswinter
Germany

Declaration holder
Fermacell GmbH
Düsseldorfer Landstraße 395
D-47259 Duisburg
Germany

PE INTERNATIONAL

Author of the Life Cycle Assessment
PE INTERNATIONAL AG
Hauptstraße 111 - 113
70771 Leinfelden-Echterdingen
Germany

ENVIRONMENTAL EFFECTS OF THE LIFE CYCLE ASSESSMENT: 1 m² AESTUVER

		Production	Installation	Credit
Parameter	Unit	A1-A3	A5	D
GWP	[kg CO_2 equiv.]	10.0	1.59	-0.69
ODP	[kg CFC11 equiv.]	5.46E-07	3.95E-10	-2.40E-08
AP	[kg SO_2 equiv.]	2.49E-02	3.38E-04	-6.35E-04
EP	[kg PO_4^{3-} equiv.]	3.91E-03	9.06E-05	-8.22E-05
POCP	[kg ethene equiv.]	2.04E-03	2.84E-05	-7.14E-05
ADPE	[kg Sb equiv.]	3.17E-05	1.44E-08	-4.35E-08
ADPF	[MJ]	99.5	0.68	-10.69

GWP = Global Warming Potential; ODP = Ozone Depletion Potential of the stratospheric ozone layer; AP = Acidification Potential of soil and water; EP = Eutrification Potential; POCP Photochemical Ozone Creation Potential; ADPE = Abiotic Depletion Potential of non-fossil resources; ADPF = Abiotic Depletion Potential of fossil fuels

ENVIRONMENTAL EFFECTS OF THE LIFE CYCLE ASSESSMENT: 1 m² AESTUVER T

		Production	Installation	Credit
Parameter	Unit	A1-A3	A5	D
GWP	[kg CO_2 equiv.]	9.4	0.91	-0.39
ODP	[kg CFC11 equiv.]	4.83E-07	2.25E-10	-1.37E-08
AP	[kg SO_2 equiv.]	2.19E-02	1.93E-04	-3.62E-04
EP	[kg PO_4^{3-} equiv.]	3.11E-03	5.17E-05	-4.69E-05
POCP	[kg ethene equiv.]	1.87E-03	1.62E-05	-4.07E-05
ADPE	[kg Sb equiv.]	1.32E-05	8.18E-09	-2.48E-08
ADPF	[MJ]	91.6	0.39	-6.09

GWP = Global Warming Potential; ODP = Ozone Depletion Potential of the stratospheric ozone layer; AP = Acidification Potential of soil and water; EP = Eutrification Potential; POCP Photochemical Ozone Creation Potential; ADPE = Abiotic Depletion Potential of non-fossil resources; ADPF = Abiotic Depletion Potential of fossil fuels

SYSTEM LIMITS (X = INCLUDED IN LIFE CYCLE ASSESSMENT; MND = MODULE NOT DECLARED)

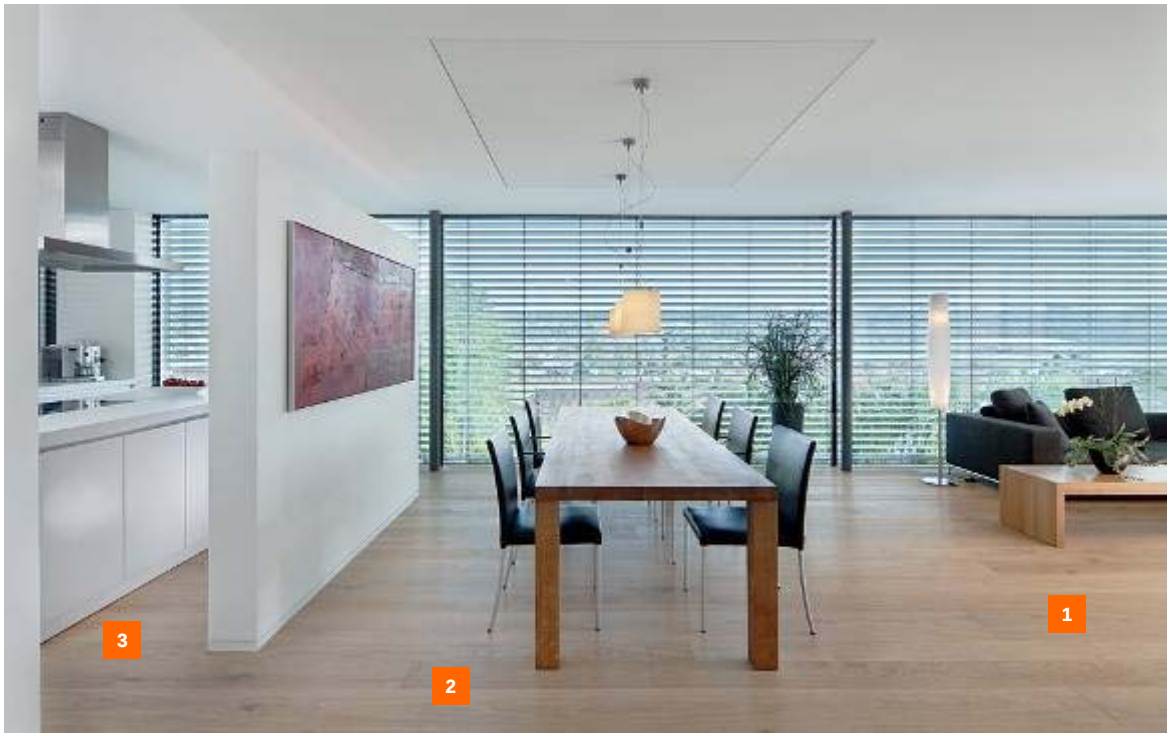
Production stage			Building construction stage		Use stage							Disposal stage				Credits and loads outside the system limit
Provision of raw materials	Transport	Manufacture	Transport to site	Installation in building	Use / Application	Maintenance	Repairs	Replacement	Renewal	Energy used for operating the building	Water used for operating the building	Deconstruction / Demolition	Transport	Waste treatment	Landfilling	Reuse, recovery or recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	X

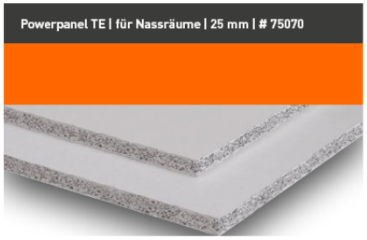
Timber construction

Triple benefits with **fermacell**

1. The **fermacell** gypsum fibreboard (large size) is proper for timber prefabrication.
2. The **fermacell** Vapor steam resistant board is our recommendation for the inner cladding of external walls in timber constructions. It guarantees efficient working through the existing steam brake.
3. The **fermacell** Powerpanel HD is the perfect choice for external cladding for timber framed constructions.

Flooring system

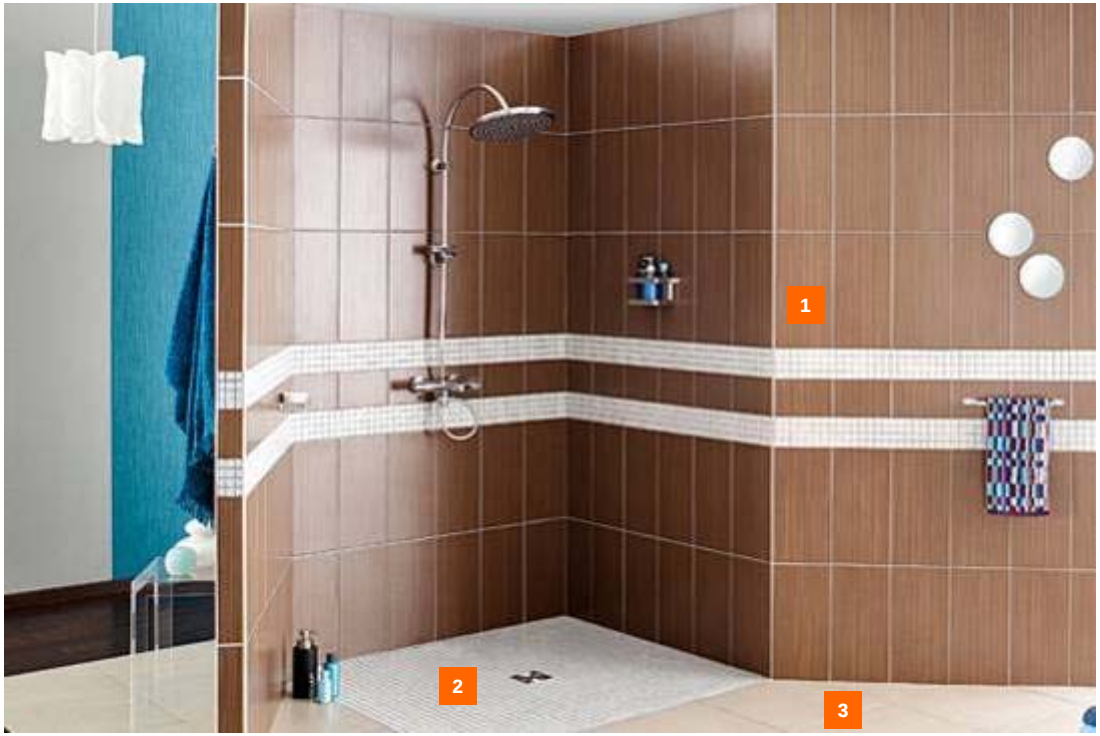


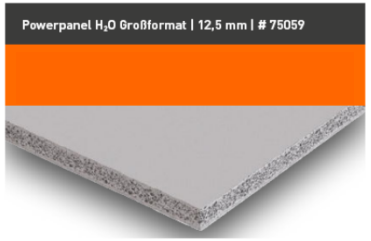


Triple benefits with **fermacell**

1. Impact-sound is not a problem if you know the right solution: The **fermacell** flooring element with wood fiber takes care of peace and harmony at your home.
2. The **fermacell** honeycomb is specially designed for rehabilitation and new construction of wooden beam ceiling constructions where it ensures the necessary sound insulation.
3. Wet rooms become quickly, easily and economically oases of calm with **fermacell** Powerpanel TE.

Wetroom

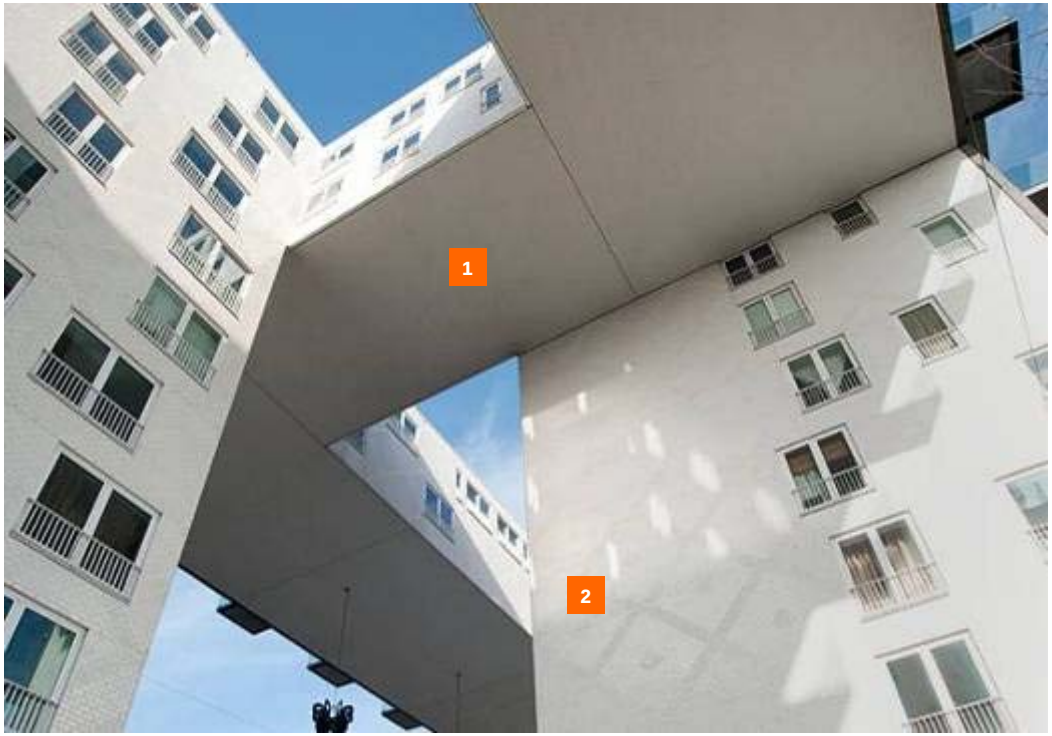




Triple benefits with **fermacell**

1. The **fermacell** Powerpanel H_2O (large size) is a brilliant idea for the safe interior work in wet areas.
2. You can create accessibility in bathrooms easily by the **fermacell** Powerpanel TE shower element.
3. This can be easily connected with **fermacell** Powerpanel TE flooring element - for a tailored solution that leaves nothing to be desired.

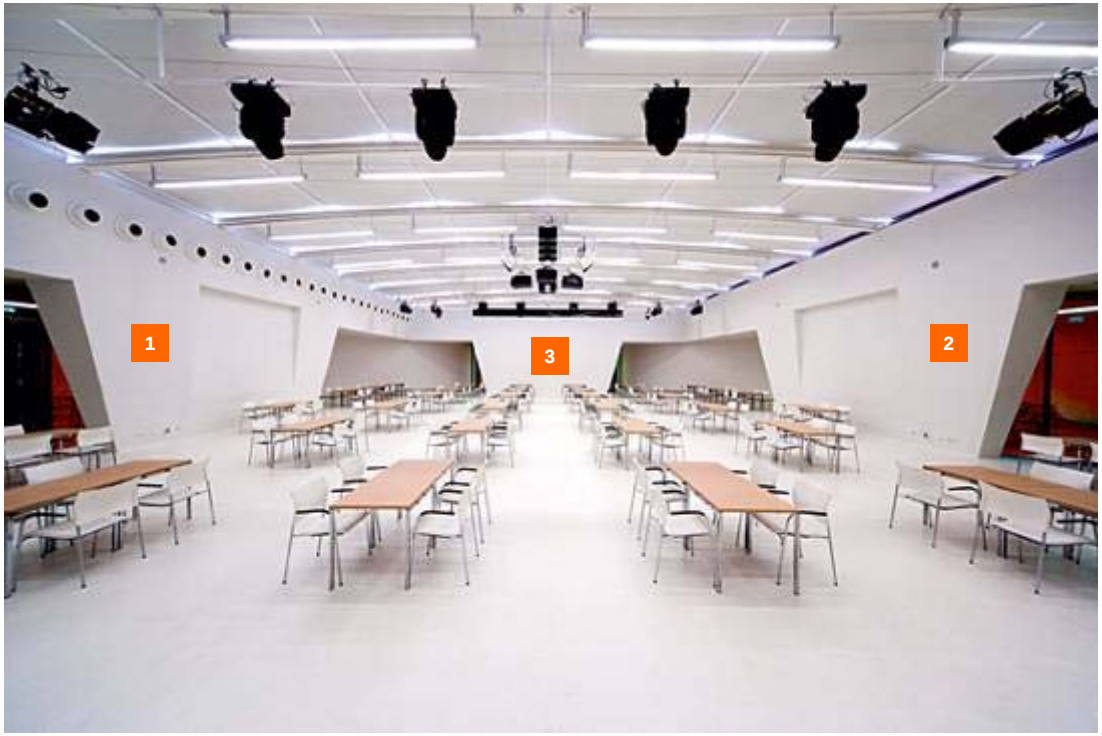
Outdoor-System



Triple benefits with **fermacell**

1. Even where the elements are most effective, fermacell offers the right solution: For the external cladding of ceiling or ventilated façade we recommend **fermacell** Powerpanel H_2O.
2. For use as direct cladding **fermacell** Powerpanel HD is the correct board.

Dry lining – fire and acoustic performance



Triple benefits with **fermacell**

1. If you are looking for efficient solutions in interior design you will find it here. The **fermacell** gypsum fibreboard (large size) can be processed rapidly with
2. the **fermacell** gypsum fibreboard with tapered edge.
3. To create healthy living and working space, you can also use the **fermacell** gypsum fibreboard greenline.

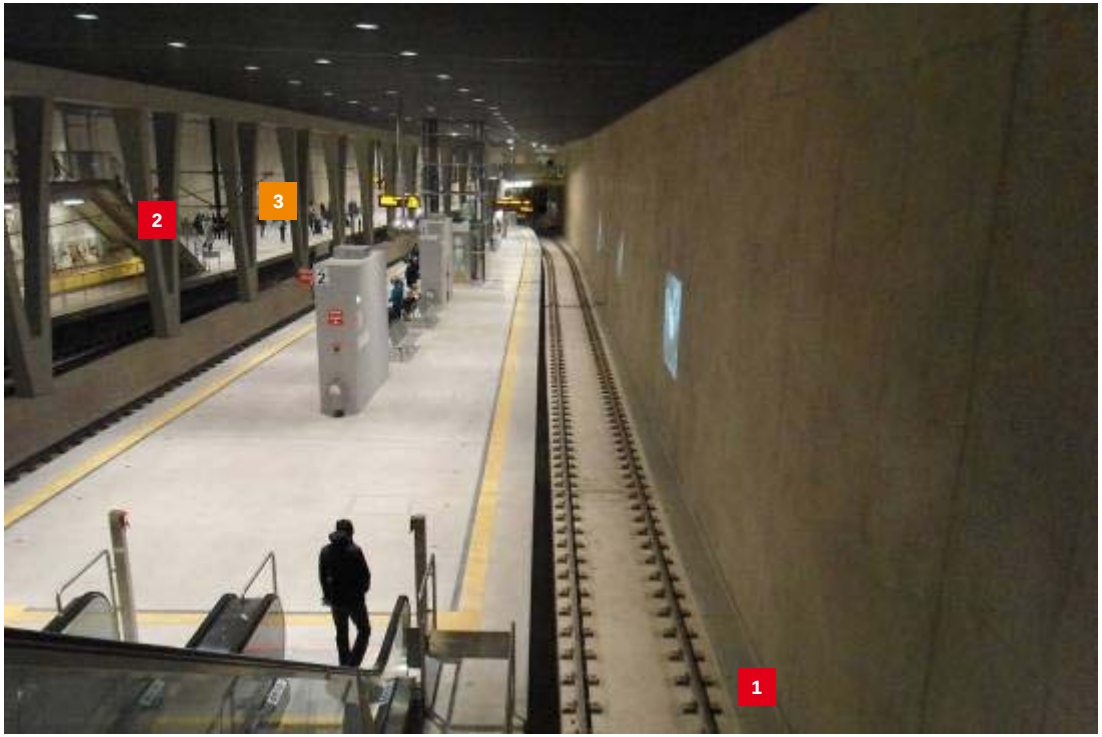
Fire protection solution

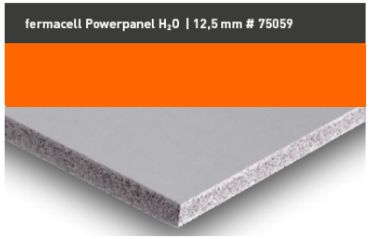
Triple benefits with **fermacell**

1. The **fermacell** Firepanel A1 provides high-performance fire protection for internal spaces- ideal e.g. for separating and shaft walls.
2. **fermacell** AESTUVER fire protection boards can also be used outdoor (atmospheric exposure) as structural fire protection.

Fire protection-tip: The **fermacell** gypsum fibreboards offer comprehensive fire protection solutions in many application areas.

Fire protection solutions for subways





Triple benefits with **AESTUVER**

1. The AESTUVER element D+2 was designed for the safe design of escape and rescue routes in underground transportation facilities.
2. Bearing steel components are protected against the effects of fire exposure by AESTUVER fire protections boards.
3. For attractive designs, the fermacell Powerpanel H_2O is suited with her surface like exposed concrete.

fermacell greenline

Come eliminare in maniera duratura gli inquinanti presenti nell'aria?

Gli effetti di Fermacell Greenline si basano sul potere depurativo della lana di pecora.

Funziona in presenza di finiture traspiranti.

GRAZIE PER LA VOSTRA ATTENZIONE

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