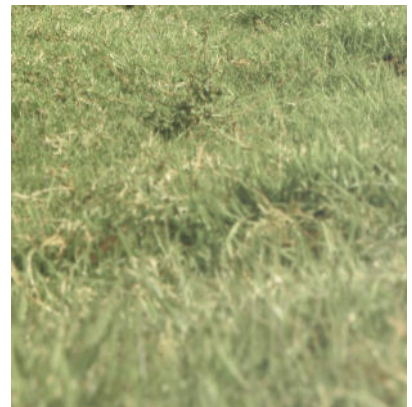
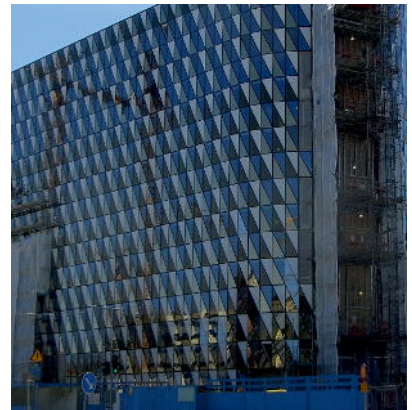
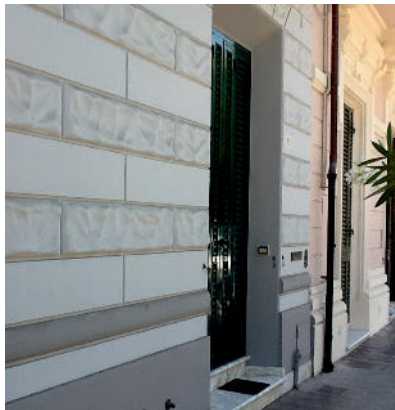


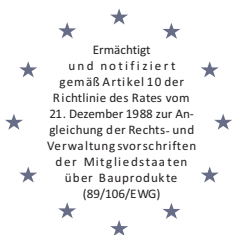
The vacuum insulation façade

The five central topics



VT-A-F-VORGE-B1

NEW: Back-ventilated curtain façade
"Flame-resistant" B1



European technical approval ETA-13/0493

Protection of utility patent pending



Topic Focuses: Overview



VT-A-HYDRO

For full thermal protection façades to render



VT-A-F-HYDROSTUCK

For historic façades



VT-A-F-VORGE-B1/B2

For back-ventilated curtain façades



VT-A-F-HYDROSCHALL

For sound insulation



VT-A-F-PFORIEG-B1

For mullion/transom façades

Topic Focuses: Focus on the Five

Topic Focus VT-A-F-HYDRO

The façade as the classic full thermal protection façade with the standard render systems on the market.

Topic Focus VT-A-F-HYDROSTUCK

Our VT-HYDROSTUCK-VIP panel was developed from the situation of also insulating historic façades on the weather side. The insulating process must therefore no longer necessarily take place on the structurally more difficult room side.

Topic Focus VT-A-F-HYDROSCHALL

Because of the problem of using slim external wall systems as well as slim insulation systems, the need arose to start new developments in the area of airborne sound. Our VT-HYDROSCHALL-VIP system showed 48 dB in testing by Holzforschung Austria with a supporting structure of only 94 mm from KLH Massivholz GmbH and an additional space requirement of only 22 mm.

We are therefore able not only to more than satisfy the necessary building regulations but also to make a large step in the direction of optimising spatial resources and to achieve a further improvement in quality of living.

Topic Focus VT-A-F-PFORIEG

Another topic focus is the mullion/transom façade. Here, we find almost unlimited possibilities for surface designs both inside and outside. Regardless of whether the look should appear through coated aluminium elements, laminated glass elements or panels from Trespa: we design your panel in the desired design and made to measure.

Topic Focus VT-A-F-VORGE-B1

One of the largest areas in the sector of modern façades concerns the area of back-ventilated curtain façades. As well as our classic sandwich elements, which have been tested in accordance with fire protection class DIN 4102-B2, the VT-A-F-VORGE-B1 façade panel – tested in accordance with fire protection class DIN 4102-B1 – has now been added to our range. Generally, in the area of this topic focus, agreement with the local construction authorities must always be sought.

Topic Focuses: The Five

Five basic topic focuses, which are shown below, accompany our façade range.

The objective of our development was to offer the architect and planner, construction engineer and builder a broad range of solutions for the ever increasing challenges of the façade. The main task was to integrate the vacuum insulation into a system that meets the safety-related, the structural and above all also the visual requirements.

In the overall design, we distinguish between the classic rendered façade, the back-ventilated façade and the mullion-transom façade. The focus is always on **reducing insulation thicknesses** by around 80 %, thus also defining very simply the basic **benefit**.

The **advantages** that can be derived from this are easy to determine:

- ⇒ Instead of the 40 cm often required to achieve the specified U-value, we now need only 8 cm space.
- ⇒ The light incidence and the associated added value in quality of life come from the better position of the windows.
- ⇒ The reduction in insulation produces a gain of up to 10 % in usable space and therefore a significant material gain over the entire useful life of the building.

VIP core	20 mm	30 mm	40 mm	50 mm
U-value	0,330 W/(m ² K)	0,220 W/(m ² K)	0,170 W/(m ² K)	0,137 W/(m ² K)
Lambda value	0,007 W/(mK) (as rated value)			
Edges	All edges are secured all-round with a moisture-resistant adhesive tape			
Adapter strips	XPS/PUR insulation strips for fitting the elements into the edge area			
Support core thickness	190 - 220 kg/m ³			
Support core material	Pyrogenic silicic acid with supporting fibres and infrared opacifiers			
Specific thermal capacity	C = approx. 1kJ / (kg K)			
Fire behaviour	Normal flammability (construction material class DIN 4102 - B2, also available in fire protection class B1)			
Compressive stress	At 10 % compression: $\delta_{10\%} = 190$ kPa			
Inner pressure	On delivery of the panel < 7 mbar			
Calculate pressure increase	Approx. 1 mbar / a			
Core tolerances	Thickness +1 / - 2 mm, length ± 2 mm			
Single element test	Every vacuum insulation element is subject to a double quality test			
Fermacell board HD	Fire behaviour A1 (otherwise acc. to technical description by FERMACELL)			
VT-NOISE KILLER BOARDS	According to test set-up 48 db			

NEW: VT-A-F-VORGE-B1 - The B1 back-ventilated curtain façade

VT-A-F-VORGE-B1

back-ventilated curtain façade, “flame resistant” B1



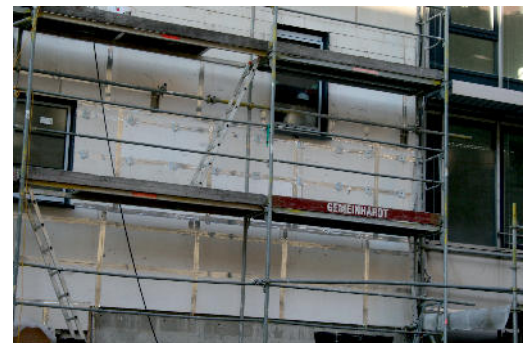
A huge step has been taken in the façades sector, featuring the innovation strength and above all the market leadership of sf vacuum insulation and VARIOTEC.

The eternal wish of planners, architects and investors to be able to use façade systems that allow additional, often very expensive living space, that maintain the variability of the outer skin and that achieve up to passive house qualities even with the lowest insulation thicknesses has now been fulfilled in reality.

We offer you a complete, high-performance insulation system regardless of which façade surface you want to apply in the final stage. With the point anchor structure, we also achieve optimisation of the thermal bridges. The rail system complements the design and allows the use of any surface – from lightweight boards to stone façades.

As is already well known, with vacuum insulation only 5 cm thick, we achieve the insulation value of conventional insulation 40 cm thick. Over the perimeter and height of a building, in the case of a 5-storey building with a perimeter of 80 m, (20 m per side length) 140 m² more of valuable possible living space is created here.

The first façades in buildings of up to 7 storeys have already been implemented successfully under the supervision of architect Mr Martin Forstner from VARIOTEC (see photograph). This was made possible only by the meticulous development of the elements towards “flame resistant” B1.

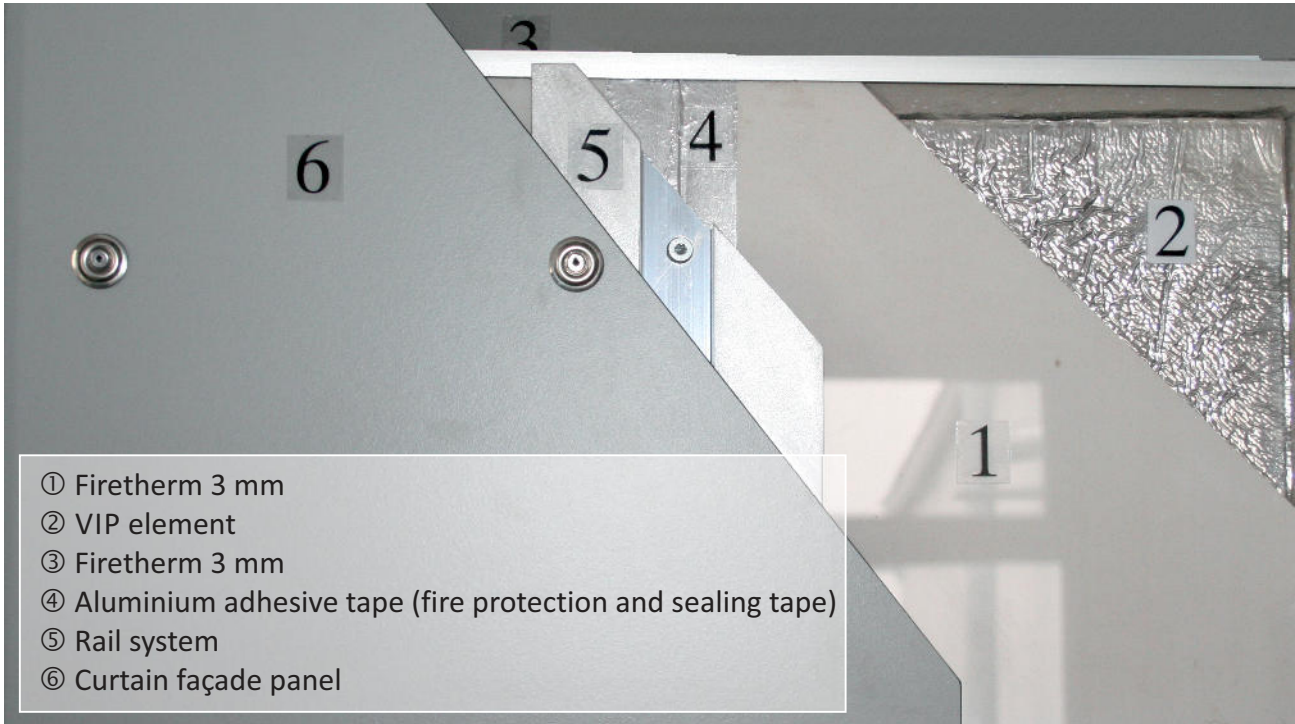


In addition to the successful implementation of the technical solutions, the topic is naturally also covered legally by our European technical approval. As with all our processes, we support the planners right from the beginning of the planning process and support the project in the implementation.

In our vacuum insulation family, we have therefore taken a major step in expanding the variable façade design range and enhanced the highly complex topic of façades alongside our already very successfully used VT-A-F-HYDRO-VIP render façade.

NEW: VT-A-F-VORGE-B1 - Technical details

The panel structure:



- ① Firetherm 3 mm
- ② VIP element
- ③ Firetherm 3 mm
- ④ Aluminium adhesive tape (fire protection and sealing tape)
- ⑤ Rail system
- ⑥ Curtain façade panel

Nachweis
Brandverhalten von Baustoffen

Prüfzeugnis
Nr. 11-001654-PR01
(PZ-H10-01-de-01)

VARIOTEC GmbH & Co. KG
Weilmarterstr. 3-5
92318 Neumarkt/Oberpfalz
Deutschland

Auftraggeber: **Deutschland**

Produkt/ Baustoff: **Vakuum-Isolations-Paneele (VIP)**

Bezeichnung: **"QASA"**

Maße: **Dicke: 60 mm bis 67 mm**

Verwendungsgebiet: **Wärmedämmung**

Sonderbedingen: **-**

Das vorliegende Produkt erfüllt die Anforderungen der

DIN 4102-1 Abschnitt 6
Nachweis der Baustoffklasse
B1 (schwerentflammbar)

-Grenzwert der Rauchentwicklung wurde nicht überschritten
-Brennendes Abtropfen/Abfallen wurde nicht festgestellt

ift Rosenheim
28. Oktober 2011

Julius Müller
Vollr. Müller, Dipl.-Ing. (FH)
Prüfstellenleiter
Brandschutz

Philipp Ruch
Prüfstellenleiter
Brandschutz

ift Rosenheim
Bayerische Prüf- und Zertifizierungsstelle
PÜZ
BAY 18

ift
ROSENHEIM

Grundlagen
DIN 4102-1:1988-05
Brandverhalten von Baustoffen
auf Festkörper - Baustoffe
Begriffe, Anforderungen und
Prüfungen
DIN 4102-15:1993-05
Sprühentzündung von Baustoffen
und Bauteilen - Prüfverfahren
DIN 4102-16:1993-05
Ordnungszahl von Baustoffen
und Bauteilen - Durchführung
von Brandschutzprüfungen
Darstellung

Verwendungshinweise
Dieses Prüfzeugnis dient zur
- Ausdeutung als ein allgemein
nen bauteiltechnisches Prüf-
zeugnis.
Dieses Prüfzeugnis ist kein
wissenschaftliches Vorend-
schlußbescheid.
Gültigkeit
Die genannten Daten und Er-
gebnisse beziehen sich haupt-
sächlich auf den geprüften
und beschriebenen Probekör-
per. Die Prüfung ermöglicht
keine Aussage über weitere
feststehende und qualitätsbestim-
mende Eigenschaften des vor-
liegenden Bauteiles.
Der Nachweis gilt 5 Jahre für
nach 28. Oktober 2016
Veröffentlichungshinweise
Es gilt das Urheberrecht. Bei
Anfragen und Hinweisen zur
Reinigung von ift-Prüf-
dokumentationen".
Dieses Zeugnis kann als Kurz-
fassung verwendet werden.
Inhalt
Der Nachweis umfasst insge-
samt 19 Seiten und keine Anle-
gen:
1 Gegenstand
2 Durchführung
3 Leistungsbeurteilung
Anlagen

Deutsches Institut für Bautechnik
Zulassungsstelle für Bauprodukte und Bauarten
Bautechnisches Prüfamt
Eine vom Bund und den Ländern
gemeinsam getragene Anstalt des
öffentlichen Rechts

Kolonnenstraße 33 B
D-10828 Berlin
Tel.: +49 30 78733-0
Fax: +49 30 78733-320
E-Mail: dibt@dibt.de
www.dibt.de



Deutsches
Institut
für
Bautechnik
DIBt

Mitglied der EOTA
Member of EOTA

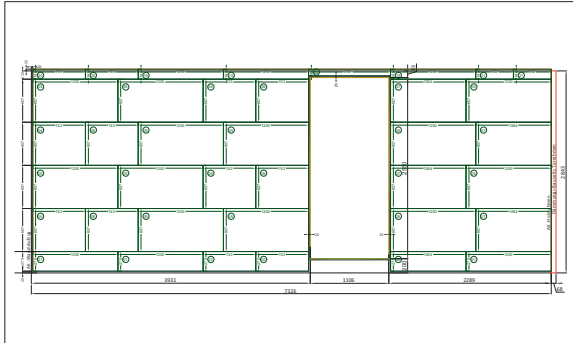
Europäische Technische Zulassung ETA-13/0493

Handelsbezeichnung Trade name	QASA
Zulassungsinhaber Holder of approval	VARIOTEC GmbH & Co. KG Weilmarterstraße 3-5 92318 Neumarkt/Opf. DEUTSCHLAND
Zulassungsgegenstand und Verwendungszweck Generic type and use of construction product	Vakuum Isolations Paneele (VIP) mit werkmäßig aufgetragenen Schutzschichten Vacuum insulation panel (VIP) with factory applied protection layers
Geltungsdauer: Validity	vom from bis to 7. Juni 2013 7. Juni 2018
Herstellwerk Manufacturing plant	VARIOTEC GmbH & Co. KG Weilmarterstraße 3-5 92318 Neumarkt/Opf. DEUTSCHLAND

Diese Zulassung umfasst
This Approval contains

8 Seiten
8 pages

NEW: VT-A-F-VORGE-B1 - Installation plan



Installation plan

In co-operation with the planner and the processor, we produce an installation plan, which also serves as the basis for the production of the panels.



Delivery to the construction site

The individually checked and labelled B1 panels are packed in wooden containers and therefore delivered to the construction site with optimal protection.

The panels are sorted in the factory such that they are adjusted to the planned assembly sequence. Unnecessary travel is thus avoided and a fluid process guaranteed.



All-over adhesion of the elements

The individual elements are glued to the subsurface all over in the first work stage.

Any loose render elements should be removed from the subsurface so a clean and strong connection is guaranteed between the structural elements.



Adhesion of the panel edges

Both for reasons of fire protection and for sealing reasons, the panel edges are glued with the aluminium adhesive tape supplied. The same applies for all connections towards other structural elements.

NEW: VT-A-F-VORGE-B1 - Installation plan



Offsetting the installation anchors

As well as gluing the panels, further fixing is provided by the tie bars, which are installed offset in precisely the areas of the edges and improvement of the safety is therefore guaranteed.

At the same time, the low thermal bridging tie rods service to fix the rail structure.



Detail connections

Careful gluing of all detail connections is important.



Rail installation

The supporting rail structure is installed on the offset tie rods.

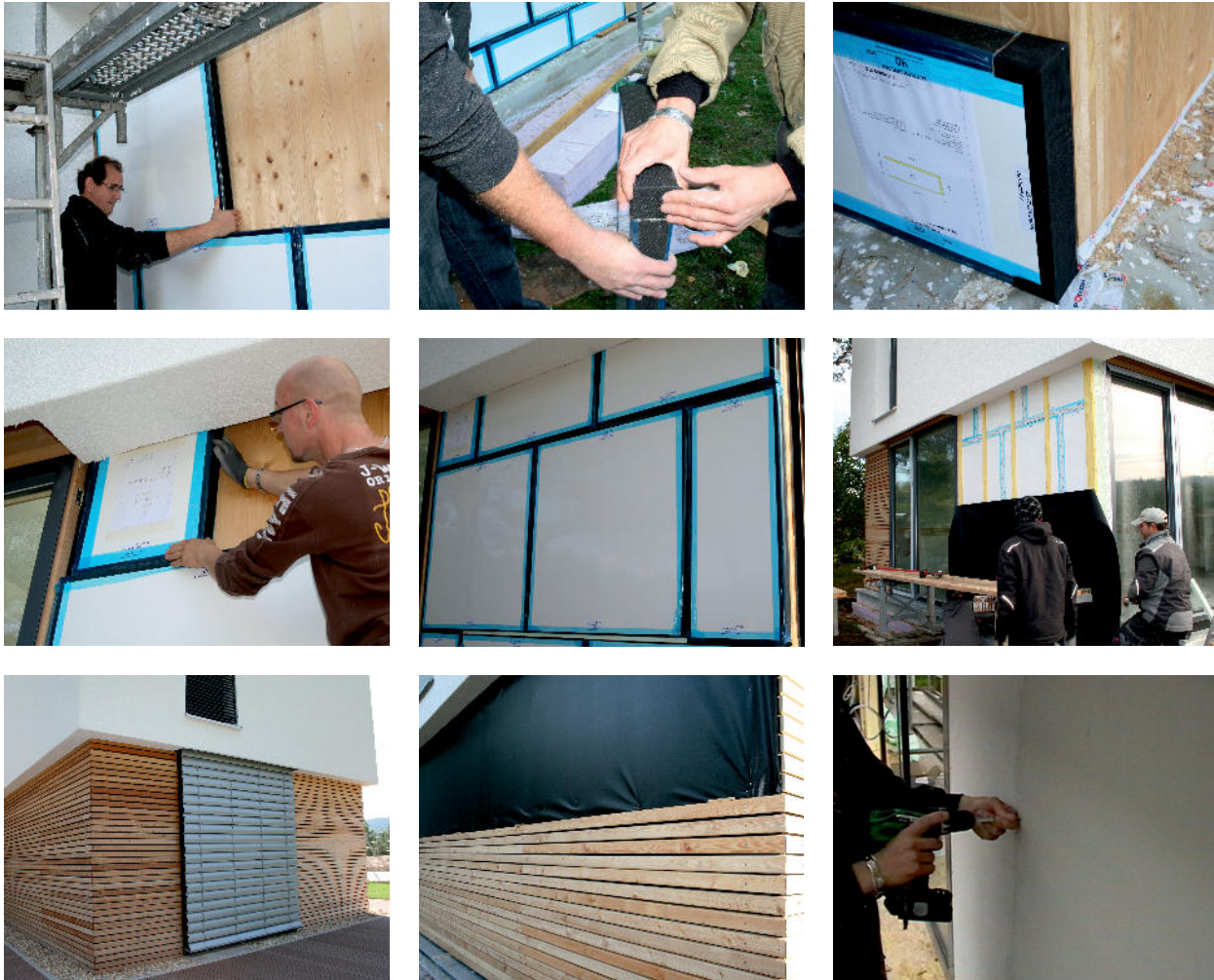


The result

The result is clear to see:

With an overall structure of only approx. 10 cm, passive house wall values can be achieved and a corresponding clearance width can be guaranteed, as shown here in the photograph.

The ventilated curtain façade: **VT-A-F-VORGE-B2**

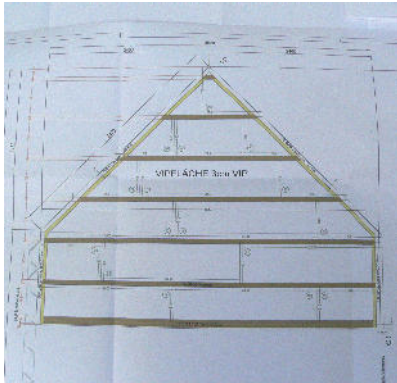


VT-A-F-VORGE-B2

In this construction project, the fire protection requirement was not specified as B1 but was possible to implement with our VT-2VEK 50 panels. Once the counter lathing had been screwed with the pre-planned installation options, only the windproof film remained to install and the visible cladding to apply to this. Particular mention must be made of the absolutely sealed gluing of the edges. The building shown here therefore achieves “passive house plus standard” and over 10 % greater use of space than would have been the case with conventional insulation.

If building regulations demand and fire protection class B1 is required then our **VT-A-F-VORGE-B1 50** panel comes into use.

The rendered façade: VT-A-F-HYDRO



VT-A-F-HYDRO

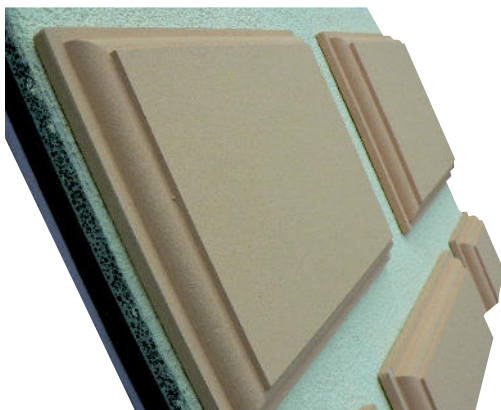
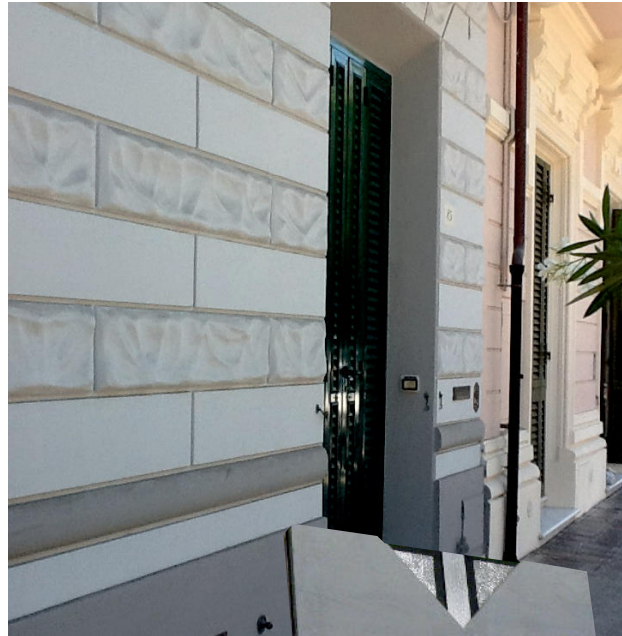
- 15 mm Fermacell Powerpaneel HD
- 5 mm XPS
- 50 mm vacuum insulation
- 10 mm XPS
- Masonry

VT-A-F-HYDRO

A problem that was previously technically unresolved, the classic rendered façade with no back-ventilation and with vacuum insulation, is a thing of the past.

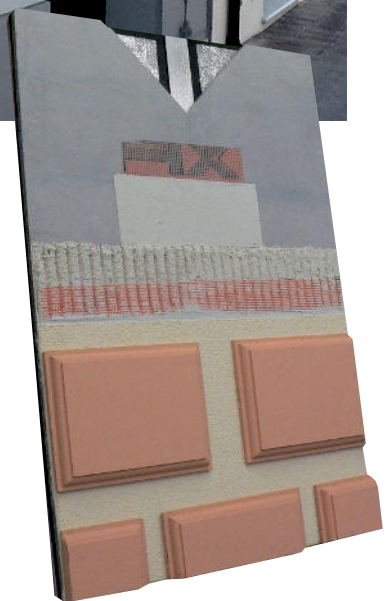
Our new **VT-A-F-HYDRO** façade panel consists of the classic VARIOTEC components with the surface layer from Fermacell. This combination, complemented by our thermo-scantling as the substructure, produces a clean base surface for application of the finishing render. As well as the in-house façade components from Fermacell, other suppliers are also approved. To minimise the usual thermal marks in certain light and temperature situations, we recommend the use of colours with a maximum lightness value of 25.

The historic façade: VT-A-F-HYDROSTUCK



VT-A-F-HYDROSTUCK

- Stucco elements
- Classic silicate render structure
- Filler levelling compound (primer)
- Joint bridging tape
- 15 mm Fermacell Powerpanel HD
- 5 mm XPS
- 50 mm vacuum insulation
- 10 mm XPS
- Masonry



VT-A-F-HYDROSTUCK

This panel allows the application of heat insulation for the first time in the case of historic façades on the thermally more efficient external wall.

The VT-A-F-HYDRO panel comes to fruition as the basic structure. The stucco elements are applied to this completely level and smooth surface and finished with the façade render provided. With this slim, highly efficient insulation, it is now possible to achieve passive house standard even in the case of historic stock.

For example, with an overall structure of approx. 64 mm, we achieve the insulation value of approx. 300 mm conventional insulation. For the detail connections in windows or corners, our technical service is happy to help. For various connections and expansion joints, the manufacturer's specifications of Fermacell must be observed. The execution must always be in line with the corresponding situation and the specific construction authority regulations.

The sound insulating façade: VT-A-F-HYDROSCHALL

VT-A-F-HYDROSCHALL

A significant step in our ongoing pursuit of new developments and optimisations was the improvement of sound values in the area of the wall.

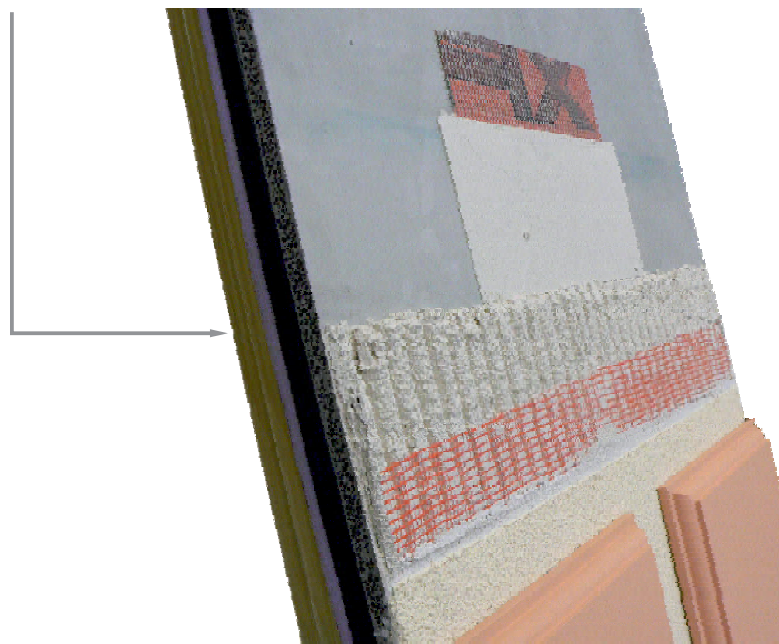
Just a short defining representation of this with respect to airborne noise, which is of very particular interest to us specifically in the case of the façade:

Airborne sound is defined by distinguishing immission noise for example from tram noise, aircraft noise and transmitted noise from neighbouring apartments for example. Essentially, the effects of airborne noise are only ever a question of the quality of the walls, the construction system and the size of the rooms. In the case of immission noise, the choice of windows, the window surfaces and the external doors play a part.

In co-operation with Holzforschung Austria, KLH Massivholz GmbH and Fermacell, we have achieved the optimal sound insulation value of 48 dB for our wall system. We are therefore well above the values required by the construction regulations.

In conclusion, with a total insulation thickness of only 105 mm for the insulation structure including sound insulation and render, we are equivalent to a passive house wall. Compared with a classic EPS façade of 420 mm with generally poorer sound values, we gain over 310 mm in space requirement over the entire scope of the building. With a normal building size, this is equivalent to approximately 20 m² more living space per storey.

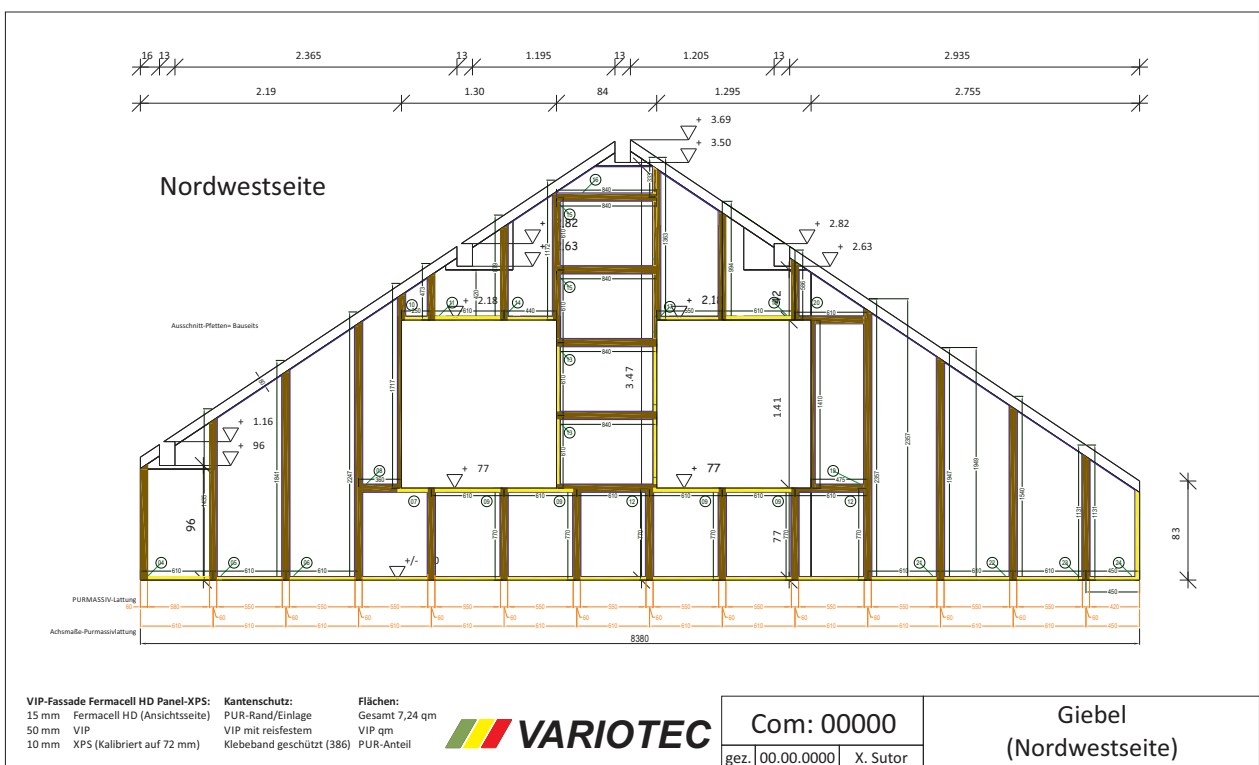
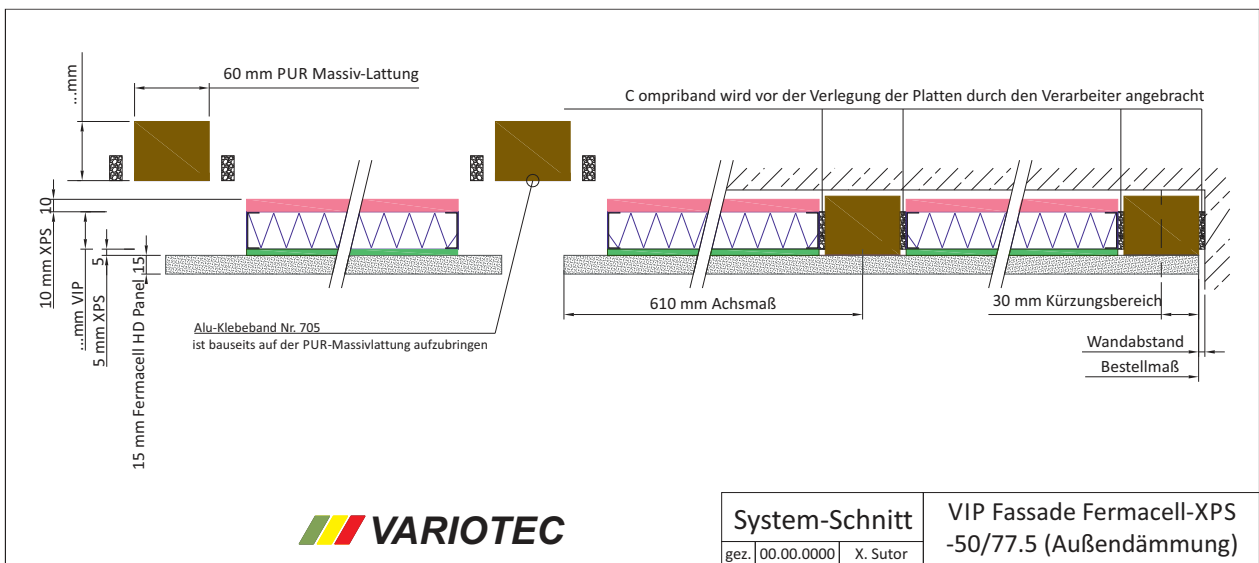
24 mm noise gobble, 2 layers
 10 mm XPS
 40 mm vacuum insulation
 5 mm XPS
 15 mm Fermacell Powerpanel HD
 Render system



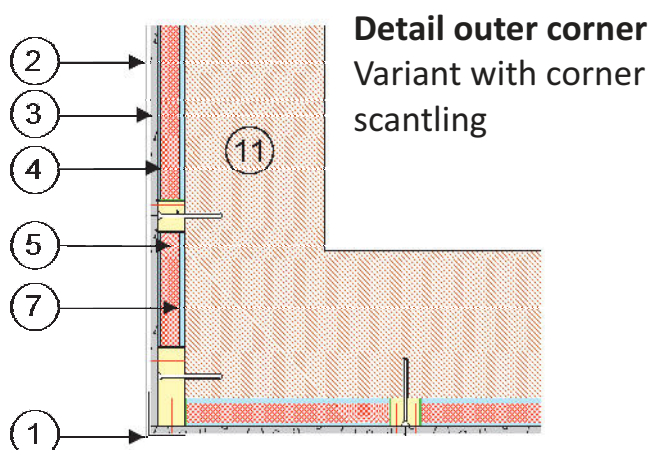
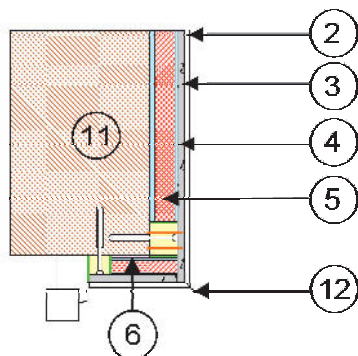
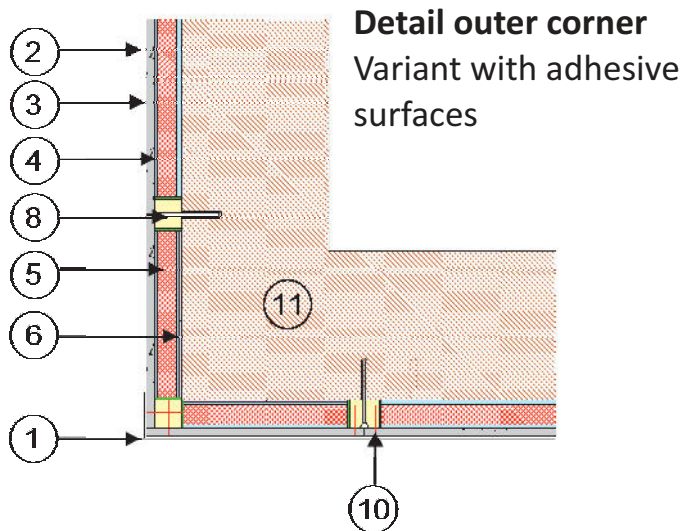
Installation plan: VT-A-F-HYDRO

The strength of VARIOTEC has always been that it offers complete solutions at a high level in terms of construction technology. We support you from planning through to implementation and are happy to contribute our knowledge and experience.

Here is the example of an installation plan for a rendered façade:



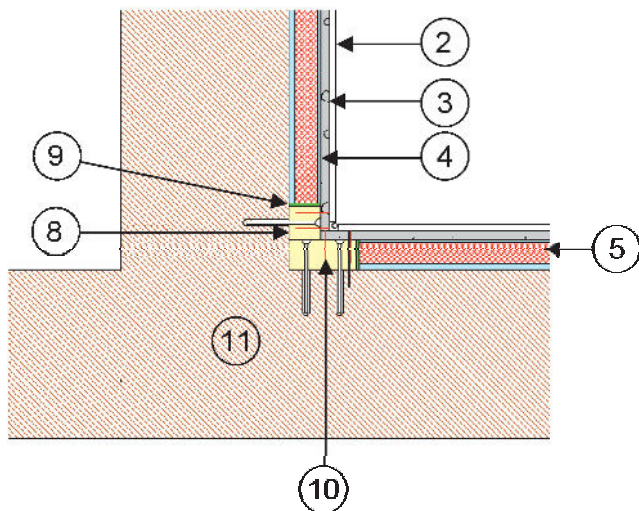
Technical details: VT-A-F-HYDRO



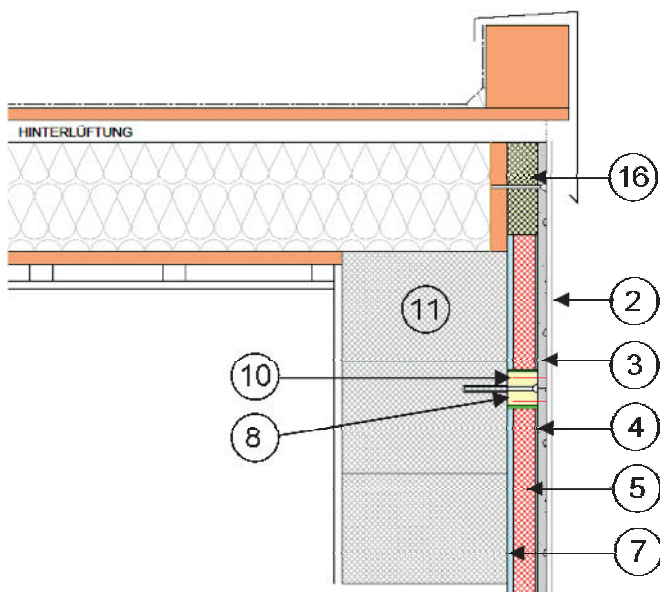
- | | |
|----|---|
| 1 | Edge protection profile board joint including orner joint sealing with FERMACELL reinforcing tape HD
FERMACELL reinforcing adhesive HD |
| 2 | Directly applied plaster system |
| 3 | FERMACELL Power panel HD |
| 4 | 5 mm XPS |
| 5 | 40 mm vacuum insulation |
| 6 | 5 mm adhesive filler |
| 7 | 10 mm XPS |
| 8 | VT Thermo scantling with aluminium adhesive tape |
| 9 | VT Compriband |
| 10 | Clips approved by FERMACELL |
| 11 | Wall system |
| 12 | Drip edge profile or edge protection profile HD |
| 13 | Elastic rear lining |
| 14 | Joints between boards with FERMACELL reinforcing tape HD
FERMACELL reinforcing adhesive HD |
| 15 | Expansion joint profile HD |
| 16 | PUR cut-in element (to be processed at the building site) |
| 17 | VTF sound insulation boards |
| 18 | VT FBH NORIT VIP 20 |
| 19 | Vapour block |

Technical details: VT-A-F-HYDRO

Detail inner corner

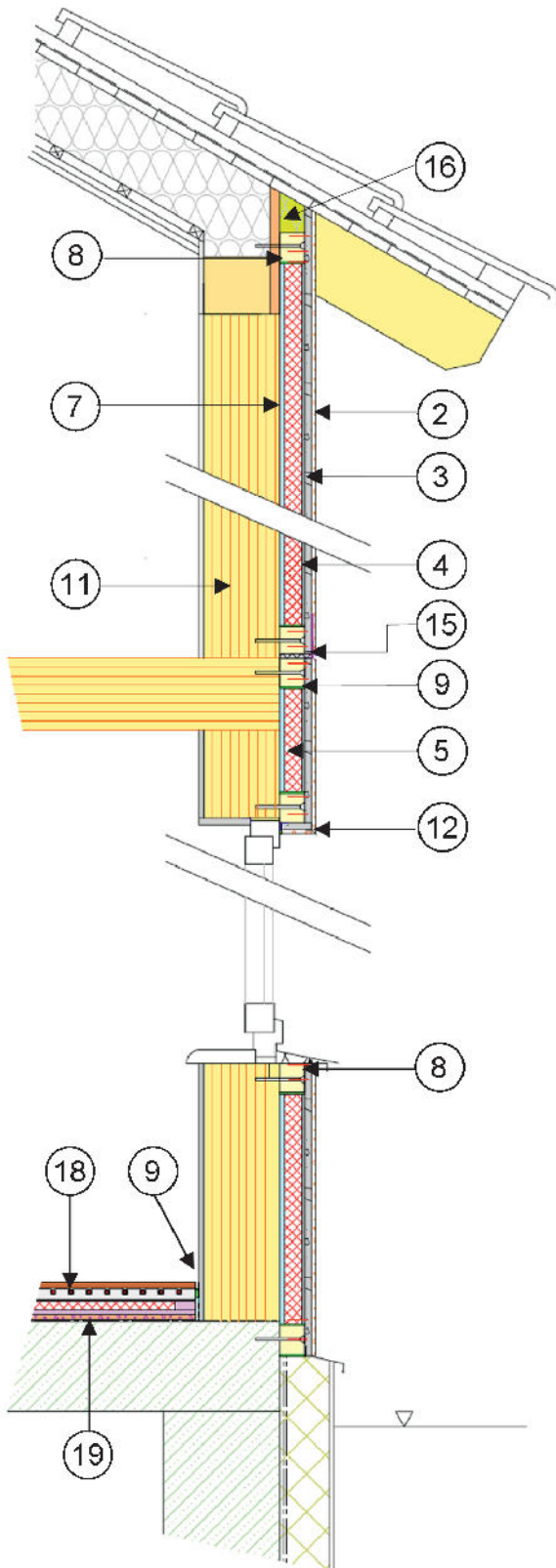


Detail flat roof



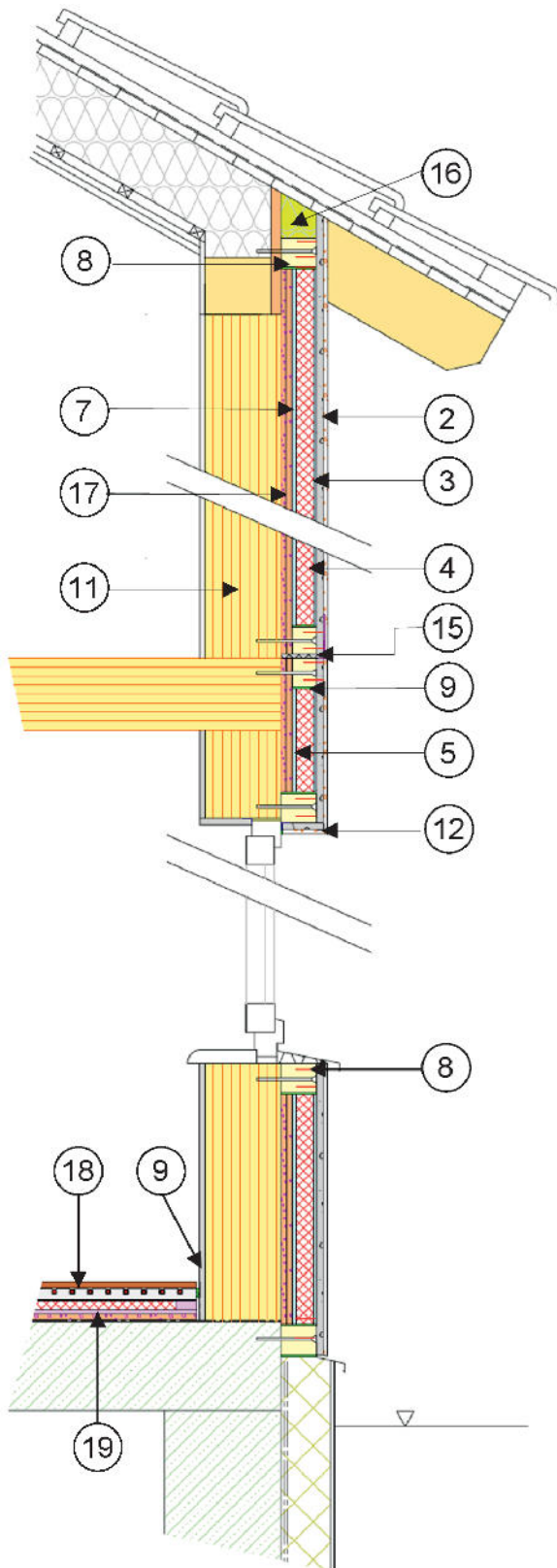
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Technical details: VT-A-F-HYDRO



- | | |
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Technical details: VT-A-F-HYDRO



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| 19 | Vapour block |

Product information/accessories for: VT-A-F-HYDRO, VT-A-F-HYDROSTUCK, VT-A-HYDROSCHELL

FERMACELL reinforcing tape HD

To reinforce the FERMACELL Power panel HD

Very strong fabric with reinforced central strip

Fast assembly due to self-adhesion on one side

Designed for the FERMACELL Powerpanel HD outer wall system

Consumption: approx. 2,0 linear metre per m², width: 12 cm, length/roll: 50 m



FERMACELL reinforcing adhesive HD

For coating the reinforcing tape HD

Dispersion coat (elastic, force-fitting, single-component, acrylate base),

Ready for use, high final strength, temperature resistant from -20 °C to +70 °C,

Solvent free, odour neutral, Consumption: approx. 60 g/ linear metre of joint,

approx. 50 linear metre/bucket, drying time: rainproof after approx. 8 hours, can

be coated after approx. 24 hours, application method: paint brush or roller



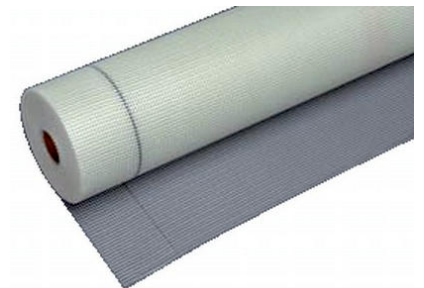
FERMACELL reinforcement fabric HD

For embedding in the FERMACELL light mortar HD

Designed for the FERMACELL Power panel HD outer wall system

Including overlapping markings, highly tear-proof, alkali resistant

Weight: approx. 165 g/m², mesh width: approx. 4 x 4 mm, width: 100 cm, length: 50 m



FERMACELL light mortar HD

Undercoat plaster and final coat for the Power panel HD outer wall boards

Water-repellent mineral light mortar, high yield, can either be used as an

undercoat plaster or as a direct coat on felted surface, machine-processable,

Frost and weather resistant once hard, high diffusion capability,

Light-weight plastering mortar LW in compliance with EN 998-1,

consumption: approx. 6 m²/sack for a layer thickness of 5 mm, yield:

a processed sack equates to approx. 30 l fresh mortar



FERMACELL base profile HD

For creating the base of the Power panel HD outer wall boards

Designed for the FERMACELL Powerpanel HD outer wall system, completely

made of rustproof stainless steel, for permanent and high-quality closures

Material: rustproof stainless steel, length:

250 cm, profile form: single-part angular section with drip edge



FERMACELL ceiling joint profile HD

For creating the ceiling joint of the Power panel HD outer wall boards

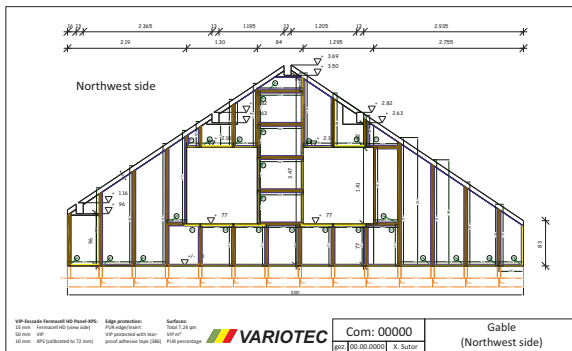
Designed for the FERMACELL Power panel HD outer wall system, completely made of rustproof stainless steel, for permanent and high-quality closures

Material: rustproof stainless steel, length: 250 cm, profile form:

two-part moving profile with drip edge



It is this simple: installation information



Installation plan

After taking the measurements on site, we create an installation plan for you that states the exact position of the individual panels and also defines how to install the façade elements.



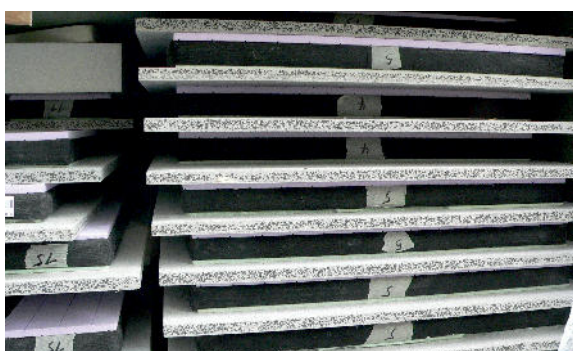
Panel are labelled precisely ex-works

The panels are labelled precisely according to the installation plan and are therefore ready for processing. The precise construction of the façade elements is very clear.



Packaging and information

The content of the respective packaging unit is shown on the information sheet on the upper side of the delivery.



The panels are sorted according to the processing flow

The photo clearly shows numbering of the individual panels. There is also a control label on each panel.



Attachment of the sealing joint

To ensure absolute water-tightness, a PUR adhesive seam is attached below all assembly scantlings on the outer edges of the assembly surface and is then screwed in a force-fitting manner to the subsurface.

It is this simple: installation information



Assembly of the first PUR solid scantling

After it has been aligned precisely, the assembly scantling is screwed directly to the subsurface. The length of the screws used depends on the stability of the respective subsurface. Predrilling is not necessary.



Checking the right angles

To guarantee precise assembly across the entire surface, ensure that the first VT assembly scantling is at a right angle.



Assembly template

Using our assembly template saves you ongoing measurements, because it always keeps the right distances. This not only ensures precision, but also reduces the assembly time.



Thermal reflexion tape

To achieve optimum distribution of the sunlight on the façade and the resulting heat build-up on the surface, the thermal reflexion tape is attached to all VT assembly scantlings.



Compriband assembly

The Compriband is attached to all four sides to prevent the creation of an air gap between the VT assembly scantling and the vacuum insulation panel.

It is this simple: installation information



Panel assembly

In the next step, the first VT-Hydro panel is fitted as shown on the installation plan. The panel is fitted into the pre-mounted VT assembly scantling.



Affixation of the panels

The panels are affixed to the VT assembly scantling by means of compressed air and rustproof clips.



Tinsmith work

The tinsmith mounts the lower joining plate, ensuring that it is thermally separated.



Further assembly steps

All panels are mounted in this way step by step.



Gable assembly

The gable wall was the last surface that was mounted. The 70 m² surface was mounted in precisely one work day.

It is this simple: installation information



Joint tape

The joint tape is self-adhesive and is applied so that the red line is located precisely on the joint.



Filling with reinforcing adhesive

Then the joint tape is coated over with Fermacell reinforcing adhesive and the surface around the tape is smoothed.



Processing the entire surface

The tape is applied over all joints.



Reinforcement fabric

The final step before plastering involved applying the Fermacell reinforcement fabric with the Fermacell reinforcement mortar.



Completion of the façade

In a final step the façade was plastered.

Façade: Glass façade with vacuum insulation elements by VARIOTEC



The building constructed in Sweden has a vacuum insulation panel from VARIOTEC behind every triangular shaped piece of glass as thermal insulation.

As both the angles and the sizes differed, it was possible only with accurate planning and preparatory work to produce these many thousands of elements to fit precisely. Through intelligent planning by the architects and the high technical competence of VARIOTEC, it was possible to energy-optimize the building and thus make it a key project.



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