

Planning for walls and ceilings

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Introduction.

These installation instructions for non-load-bearing FERMACELL structures are designed for specifiers, installers and should be read in conjunction with the appropriate technical information and other FERMACELL documents. In addition, the test certification on FERMACELL structures should be observed. If special physical demands are made on boards (sound reduction, fire resistance and load-bearing), the information and advice in the test certificates should be noted and observed.

These installation instructions include techniques and experience from experience and practice and represent the latest FERMACELL installation knowledge. Installers should, in general, work in accordance with the most recent literature. For enquiries or in cases of doubt, please call our Technical Helpline on 0870 - 6090306.

The same applies to construction and installation advice not dealt with in this brochure.

Drawings are sometimes partially reproduced and should be interpreted only in connection with the relevant measurements and supporting data.

The individual sections in the Chapter "FERMACELL Installation", generally do not apply to the same extent for all FERMACELL wall components. For example, non-load-bearing and load-bearing walls, encasements and fire walls. Doors and glazed areas or sanitary supports are not as a rule considered as insulation for fire walls.

FERMACELL – at a glance.

Made of gypsum and paper fibres with no other bonding material. FERMACELL is environmentally friendly.

Fibre reinforcement provides hidden strength, making FERMACELL the ideal choice for walls in high traffic areas such as schools and sports halls.

FERMACELL can carry great loads from the board itself, eliminating noggins.

FERMACELL is a class 'O' board and provides F 60 applications from single layer applications.

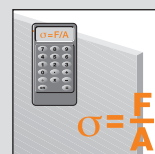
FERMACELL is moisture resistant and can be used in areas where conventional dry lining fails.

Can be used for walls, ceilings or floors where soundproofing is required. Better than solid blockwork. 66 dB partitions only 145 mm thick.

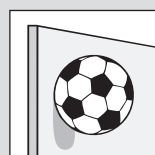
Environmentally Friendly



Loadbearing, structural board



Impact resistant



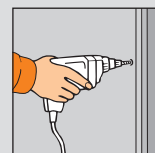
Easy to work



Weight carrying



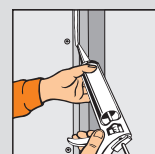
Simple fixing



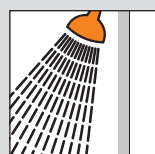
Fire resistant board



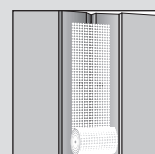
Square edge or ...



Moisture resistant



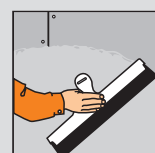
... Tapered edge



Sound-absorbent



Eliminates Plastering



As a Load-bearing wall for racking resistance according to test certificate Z-9.1-187, and Trada test report MT1079a, and as a component of ceilings and roof cassettes. According to Permit Z-9.1-434.

Scouring, breaking, sawing, planing, drilling, routing, grinding.

Simple fixing to sub-structures by screwing or stapling or ballistic nailing.

The glued square edge is stronger than the board. Even with horizontal joints no backing is required.

FERMACELL Tapered Edge board uses standard dry lining techniques.

FERMACELL FST gives a skim type finish using DIY skills and is dry in 30 minutes.

1. FERMACELL Gypsum-Fibre Boards.



1.1 Board characteristics, technical data/nominal values.

FERMACELL consists of gypsum and recycled paper fibres. These two natural raw materials are mixed and after adding water, with no other binder, are compressed and dried. They are then sealed with a starch derivative and cut to the required sizes.

The gypsum reacts with water, penetrates and envelopes the fibres. This produces the high stability and fire resistance of FERMACELL.

Due to its composition, FERMACELL may be used for fire, sound and impact resistance, has high structural and loadbearing capabilities, is moisture resistant and eliminates plastering trades.

FERMACELL Gypsum-Fibre boards contain no materials hazardous to health. The absence of glues eliminates odours and increases the breathing ability of the homogeneous board structure. FERMACELL is ecologically certified.

The FERMACELL production works employ an environmental management system. They are independently monitored under strict quality control, and results are regularly published.

All the FERMACELL manufacturing plants are certified to DIN ISO 9001.

Data, nominal values	
Dimensional tolerances at constant humidity	
Board dimensions	
Length	± 1 mm
Width	± 1 mm
Diagonal difference	2 mm
Thickness: 10 / 12.5 / 15 / 18	± 0.3 mm
Nominal density, strength	
Nominal density (Production target)	1150 ± 50 kg/m ³
Bending strength (value after drying at 40 °C), at right angles to the board surface	≥ 5.8 N/mm ²
Transverse strength	≥ 0.3 N/mm ²
Certified tensile values according to DIN 1052 (Permit No: Z-9.1-434)	
Bending perpendicular to the board surface	1.2 N/mm ²
Bending in board surface	1.1 N/mm ²
Tension in board surface	0.5 N/mm ²
Pressure in board surface	2.0 N/mm ²
Pressure perpendicular to the board surface	2.5 N/mm ²
Shearing in board surface	0.3 N/mm ²
Shearing perpendicular to the board surface	0.6 N/mm ²
Modulus calculations (Permit No. Z-9.1-434)	
E-Modulus perpendicular to the board surface	3800 N/mm ²
E-Modulus parallel to the board surface	3800 N/mm ²
E-Modulus tension	3800 N/mm ²
E-Modulus compression	3800 N/mm ²
Shearing modulus G perpendicular to the board surface	1600 N/mm ²
Shearing modulus G bending in the board surface	1600 N/mm ²
Additional Data	
Vapour Resistance μ	13
Thermal Conductivity λ	0.32 W/mK
Specific Heat Capacity c	1.1 kJ/kgK
Brinell Hardness	30 N/mm ²
Swelling after 24 hrs saturation	< 2 %
Thermal co-efficient of expansion	0.001 %/K
Expansion/shrinkage on alteration of the relative humidity of 30 % (20 °C)	0.25 mm/m
Moisture Content at 65 % relative air humidity and 20 °C air temperature	1.3 %
Construction material category according to DIN 4102 Part 1 (non-combustible)	A2
pH value	7–8

1.2 Quality control, Construction biology.

Quality control.

The quality characteristics of FERMACELL products are continuously controlled at the Xella production. Facilities by our own supervisors in accordance with European Standards. They are also subject to official material testing.

Construction biology.

FERMACELL products are ecologically certified and make an important contribution to overall domestic health and well being.

1.3 Testing and certification.

FERMACELL Gypsum-Fibre boards are independently certified by the BBA and hold European Technical Approvals (ETA's).

For structures with FERMACELL boarding for walls, ceilings and floors, there are many test certificates, approval certificates, reports and similar documents. Reviews of these and/or the complete documents may be obtained from Xella Dry Lining Systems in Sutton Coldfield or downloaded from www.fermacell.co.uk.

1.4 Supply program and accessories.

FERMACELL is an ideal material for dry lining.

It is for building work of all kinds, from the attic to the basement, including:

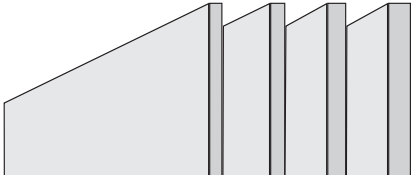
- Partitions (non-load-bearing on steel or timber sub-structures)
- Partitions (load-bearing on timber sub-structures)
- Domestic partitions (load or non-load-bearing)
- Fire walls (load-bearing or non-load-bearing)
- Beam and column encasement
- Dry lining
- Suspended ceilings
- Ceiling linings
- Reveals
- Acoustic floors
- Thermally insulated floors
- Levelling uneven floors
- Over underfloor heating

FERMACELL Gypsum-Fibre Boards.

The high performance, multi purpose building board.

1. Square Edge Programme

Sizes	10 mm	12.5 mm	15 mm	18 mm
Weight per m²	11.5 kg	15 kg	18 kg	21 kg



1500 x 1000 mm	●	●	●	●
1200 x 2400 mm	●	●	●	●
1200 x 2500 mm	●	●	●	●
1200 x 2600 mm	●	●	●	●
1200 x 2700 mm	●	●	●	●
1200 x 3000 mm	●	●	●	●
Special cuts on request				

Special dimensions up to 2540 x 6000 mm are available, please call 0870-6090306 for further details.
FERMACELL is supplied in square edged and tapered edge board formats.

2. Tapered Edge Programme

Sizes	Thickness	T/E	Weight per m²
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1200 x 2400 mm	12.5 mm	on 2 long sides	15 kg
1200 x 1200 mm	12.5 mm	on 4 sides	15 kg
1200 x 2000 mm	12.5 mm	on 4 sides	15 kg

FERMACELL Flooring Elements.

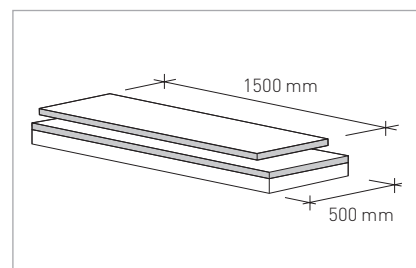
The ideal replacement for wet screeds.

Point loads.

Point loads stated in the table below are based on loaded areas of 1000 mm², spaced at least 500 mm apart.

Point loads to these values should be spaced at least 250 mm from corners and 100 mm from edges of the floor system.

The total number of point loads must not exceed the maximum permitted floor loading capacity.

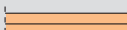
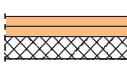
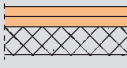
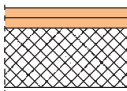
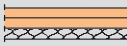
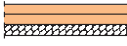


Dimension: 550 x 1550 mm

Covered area: 500 x 1500 mm = 0.75 m²

Suggested Areas of Application

1	Living rooms, corridors and attic conversions in private dwellings.
2	Offices, corridors and attic conversions in office buildings.
3	Wards and waiting rooms in hospitals, lecture theatres, classroom, licensed premises and cellars in private dwellings.
4	Treatment rooms and corridors in hospitals, corridors in schools and colleges, circulation areas in public buildings, churches, theatres and playhouses, ballrooms and sportshalls, exhibition and display areas, shops and warehouses, libraries and archives.

Product Code	Dry flooring element	Depth	Weight	Maximum Point Load	Thermal resistance	Fire resistance classification Fire protection from above DIN 4102	Area of Application	with additional third layer (glued 10 mm FERMACELL)	
								Area of Application	Max. Point Load
2 E 11	 2 x 10 mm FERMACELL	20	0.24	1,5	0.06	F 30	1+2	1+2+3	2.5 (kN)
2 E 22	 2 x 12.5 mm FERMACELL	25	0.30	2,5	0.07	F 60	1+2+3	1+2+3+4	3.5 (kN)
2 E 13	 2 x 10 mm FERMACELL + 20 mm expanded polystyrene	40	0.24	1,5	0.56	F 30	1+2	1+2+3	2.5 (kN)
2 E 14	 2 x 10 mm FERMACELL + 30 mm expanded polystyrene	50	0.25	1,5	0.81	F 30	1+2	1+2+3	2.5 (kN)
2 E 15	 2 x 10 mm FERMACELL + 60 mm extruded polystyrene	80	0.26	1,5	2.06	F 30	1+2	1+2+3	2.5 (kN)
2 E 31	 2 x 10 mm FERMACELL + 10 mm wood fibre	30	0.26	2,5	0.26	F 90	1+2+3	1+2+3+4	3.5 (kN)
2 E 32	 2 x 10 mm FERMACELL + 10 mm Rockwool (Flooring Grade)	30	0.25	1,0	0.31	F 90	1	1+2	1.5 (kN)

Accessories for FERMACELL Gypsum-Fibre Boards.

Article	Part No.	Description	Usage
FERMACELL Joint Filler			
	79001	For filling 5–7 mm gap between boards & stopping screwheads 5 kg bag	25 m ² Joint filling 25 m ² for tapered edge boards 50 m ² covering Jointstik joints
FERMACELL Fine Surface Treatment			
	79019	For giving FERMACELL boards a smoother finish if required 2.5 ltr tub	6 m ² /l
	79002	10 ltr tub	
FERMACELL Bonding Compound			
	79043	For bonding FERMACELL tapered edge boards to masonry 20 kg bag	3–4 kg/m ²
FERMACELL Screws (Drilltip) 3.5 x 25 mm			
	79025	For fixing FERMACELL boards to steel subframes of 0.7 to 2 mm gauge Box of 1000	13/m ² wall 30/m ² ceiling
FERMACELL Screws 3.9 x 30 mm			
	79021	For fixing FERMACELL boards to timber or steel subframes, or a second layer to a first Box of 250	13/m ² wall 30/m ² ceiling
	79011	Box of 1000	
FERMACELL Screws 3.9 x 45 mm			
	79012	For fixing a second layer of FERMACELL to subframes Box of 1000	13/m ² wall 30/m ² ceiling
FERMACELL Jointstik			
	79023	For edge glueing square edged FERMACELL boards 310 ml tube	20 ml/lm
FERMACELL Jointstik Refill			
	79029	For edge glueing square edged FERMACELL boards in larger projects (use in conjunction with 79032 FERMACELL Hand Applicator) 580 ml sachet	20 ml/lm
FERMACELL Jointstik Refill Hand Applicator			
	79032	For use in conjunction with 79029 FERMACELL Jointstik Refill	
FERMACELL Board Knife			
	79015	For scoring and snapping FERMACELL boards	
FERMACELL Spatula 250 mm wide			
	79030	For applying Fine Surface Treatment	
FERMACELL Spatula 450 mm wide			
	79031	For removing excess Fine Surface Treatment	

Article	Part No.	Description	Usage
FERMACELL Jointing Tape			
	79026	For use in joint repair. Roll 50 lm 70 mm wide	
FERMACELL TB Joint Reinforcement Tape			
	79028	For tapered edged boards Roll 45 lm 60 mm wide	

Accessories for FERMACELL Flooring Elements.

Article	Part No.	Description	Usage
FERMACELL Levelling Compound			
	78011	For levelling uneven surfaces: min. 10 mm thick, max. of 60 mm thick 50 l bag	5 m ² /bag at 10 mm thickness
FERMACELL Honeycombe			
	79036	For acoustic pugging 1500 x 1000 x 30 mm	
	79038	1500 x 1000 x 60 mm	
FERMACELL Honeycombe Fill			
	78013	Infill for Honeycombe system 22.5 kg bag	2 bags per m ²
FERMACELL Joint Filler			
	79001	For joint filling & stopping screwheads 5 kg bag	50 m ²
FERMACELL Screws 3.9 x 19 mm			
	79020	For fixing 20 mm FERMACELL flooring elements together Box of 250	11/m ²
	79010	Box of 1000	
FERMACELL Screws 3.9 x 22 mm			
	79024	For fixing FERMACELL flooring elements 25 mm thick or above Box of 250	11/m ²
	79013	Box of 1000	
FERMACELL Floor Glue			
	79022	For glueing FERMACELL flooring elements together 1 kg bottle	25–28 m ² /l
FERMACELL Perimeter Strip			
	79078	For isolating FERMACELL flooring elements from the walls 30 mm	1m lengths 60 per box
	79079	50 mm	

2. Board storage, transport, tools and handling.

2.1 Board storage and transport.

FERMACELL boards are supplied, depending on size, on pallets or timber bearers. Pallets are shrink wrapped.

Boards in large formats can also be fitted with plastic packaging, if requested. When storing, we recommend that the load-bearing capacity of any upper floor be checked. The density of FERMACELL is $1150 \pm 50 \text{ kg/m}^3$.

FERMACELL boards should generally be stored flat on a level base. They should be protected from moisture, particularly rain. Wet boards should be allowed to dry out completely on a level surface before use. When restacking FERMACELL always ensure that the stacking surface is level. Storage of boards on their edges can lead to deformation of the boards and damage to the edges.

Boards should generally to be carried upright. Manual handling of the boards can be made easier with the use of specialist board lifters.

2.2 Tools.

FERMACELL may be worked using normal woodworking tools. In general and especially in enclosed areas, the use of mechanical dust extraction equipment is strongly advised.



A pallet of FERMACELL



FERMACELL should be carried upright



Use standard wood working tools



Circular saw with vacuum attachment



**Measure
to Cut line**



Scoring the board



Snapping the board



Sawing by hand



Sawing with electric jig saw



**Sawing with a circular saw
(with a vacuum attachment)**



**Planing the broken
edge of cut board**



Cutting circular holes

2.3 Cutting FERMACELL Boards.

Marking and cutting FERMACELL Gypsum-Fibre boards should be done at a suitable working height (on a stack). Breaking to size is simple. First mark the cutting line and then score it (one side only) with a FERMACELL board knife along a straight edge.

Slide the pre-scored line over the work table or stack edge, leave the larger board section firmly on the stack and break the overhanging part over the edge. Scoring on the reverse side or cutting into the FERMACELL Gypsum-Fibre Boards is not necessary.

Boards can also be cut using a hand, jig, or electric saw (blades should be tempered or hardened steel, and a slow speed must be used). If you use a hand-held electric saw we recommend the use of a vacuum attachment to collect dust.

For angular cut-outs, the short side should be sawed and the long side should be scored and snapped. For U-shaped cut-outs, saw in two sides and score and break the back side.

The edges of the FERMACELL can then be planed smooth with a Surform, or a wood working plane.



**Screwing to
a steel stud**



**Stapling board
to board**



**Stapling to
a timber stud**

2.4 Screws, staples.

On timber and metal studs, FERMACELL boards are fastened, using special FERMACELL self countersinking screws. Other types of screw are not suitable and will give fixing problems. For modular and factory applications, special screw and nail systems are available – please contact the Xella hotline.

Also, on timber studs, FERMACELL may be stapled using special pneumatically applied staples. For details of screw and staple spacings, see the Table "Spacings of Fixings".

For second and subsequent layers, the outer board layer may be fixed to the sub-structure by stapling or screwing directly to the lower layer of FERMACELL. The length of the fixings and their spacing is given in the Table "Spacings of Fixings".

This is a particularly cost effective method of installation because of the speed of fixing and the low wastage involved. Stapling has no effect on the fire rating or acoustic properties of the construction when compared to the conventional method of screw fixing the outer layer through to the studwork for normal partitions. Certain high fire rated partitions may require the outer layers to be fixed back to the studwork. In loadbearing applications board-to-board fixing means that only the properties of the lower board may be considered for structural purposes. Contact Xella for further information. Second and subsequent layers must be staggered by a minimum of 200 mm.

Type, spacings and usage of fixing materials when fixing first and second layers back to steel or timber studwork for non-load-bearing partitions (per m² partition).

Board thickness	Staples (galvanised and resinated)			FERMACELL screws		
	Gauge ≥ 1.5 mm, Head Width ≥ 10 mm			Gauge = 3.9 mm		
	Length [mm]	Spacing [mm]	Use [no./m ²]	Length [mm]	Spacing [mm]	Use [no./m ²]
Metal – single-layer						
10 mm	–	–	–	30	250	26
12.5 mm	–	–	–	30	250	20
15 mm	–	–	–	30	250	20
18 mm	–	–	–	45	250	20
Metal – 2 layered / 2nd. layer into the stud						
1st. Layer: 12,5 mm	–	–	–	30	400	12
2nd. Layer: 10 mm or 12.5 mm	–	–	–	45	250	20
1st. Layer: 15 mm	–	–	–	30	400	12
2nd. Layer: 12.5 mm or 15 mm	–	–	–	45	250	20
Wood – single layer						
10 mm	≥ 30	200	32	30	250	26
12.5 mm	≥ 35	200	24	30	250	20
15 mm	≥ 44	200	24	45	250	20
Wood – 2 layered / 2nd. layer into the stud						
1st. Layer: 12.5 mm	≥ 35	400	12	30	400	12
2nd. Layer: 10 mm or 12.5 mm	≥ 50	200	24	45	250	20

Type, spacing and usage of fixing materials when fixing 2nd and subsequent layers to the lower layer of board for non-load-bearing partitions (per m² partition).

Board thickness	Diverging staples (galvanised or resinated)			FERMACELL screws		
	Gauge ≥ 1.5 mm, Row spacing ≤ 400 mm			Gauge = 3.9 mm, Row spacing ≤ 400 mm		
	Length [mm]	Spacing [mm]	Use [no./m ²]	Length [mm]	Spacing [mm]	Use [no./m ²]
10 mm FERMACELL to 10 and/or 12.5 mm FERMACELL	18 – 19	150	43	30	250	26
12.5 mm FERMACELL to 12.5 and/or 15mm FERMACELL	21 – 22	150	43	30	250	26
15 mm FERMACELL to 15 mm FERMACELL	25 – 28	150	43	30	250	26
18 mm FERMACELL to 18 mm FERMACELL	31 – 34	150	43	45	250	26

Joining Square edged boards.

2.5 Adhesive joint.

Edges of the boards must be clean, dry and free from dust. FERMACELL Jointstik adhesive is applied to the edge of the board in a continuous 3 mm bead prior to the fixing of the next board. Because the adhesive expands on contact with air, the bead should be applied to the centre of the edge of the board and not the 'V' between the board and the subframe. If the bead is applied here, excess Jointstik may be trapped between the board and subframe and cause subsequent lipping.

The next board is then fitted to the subframe, spreading the adhesive across the face of the joint and ensuring that the gap is less than 1 mm. Fix as before.

Allow the adhesive to fully harden before attempting to remove any excess (typically 24 hrs). Once hardened, the excess can be struck off with a decorator's scraper or similar tool. There is no requirement for noggins behind these joints, although if offcuts are being jointed (i.e. using the 5–7 mm gap and Joint Filler method), then the joint should be backed by a strip of FERMACELL.

The final gap between boards when jointing with FERMACELL Jointstik adhesive should be less than 1 mm. Gaps greater than this may result in weaker joints and possible show through with certain paint finishes.

If Jointstik has been left longer than 24 hours and is hard to remove, use a Surform or any similar tool. The joint and screw heads should then be stopped with FERMACELL Joint Filler.

All joints above 5000 mm partition height must be jointed using FERMACELL Jointstik adhesive. Horizontal joints are jointed in the same manner as vertical ones.

For double or multi-layer boarding, the lower layers are dry butt joined, irrespective of the performance requirements of the partition.

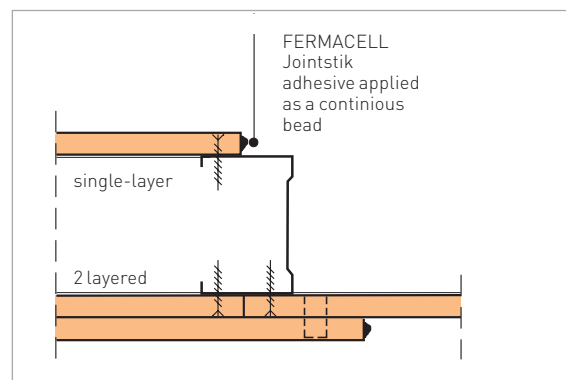
On multi-layer applications joints must be staggered by a minimum of 200 mm.

Fixing and Jointing offcuts of FERMACELL.

Unlike normal installation of FERMACELL boards, offcuts are installed prior to jointing. A 5–7 mm gap is left between the boards, which is then filled with FERMACELL Joint Filler (FERMACELL Jointstik adhesive is not a gap filler). The filler can then be rubbed down prior to final decoration. Please note: FERMACELL Joint Filler sets to a very hard finish. For this reason we recommend that only the immediate area of the joint or screw/staple head is filled and that excess filler is not applied.

Jointstik Usage.

20 ml FERMACELL jointstik adhesive is used per metre.



FERMACELL Jointstik adhesive to the centre of the edge of the board

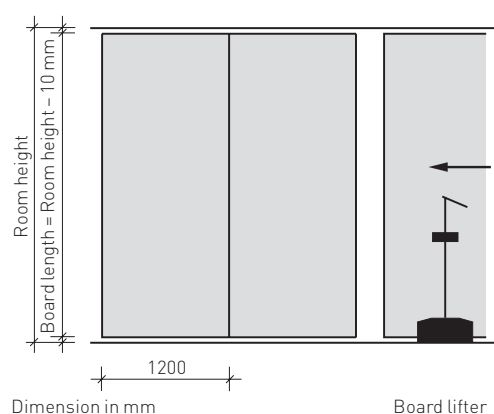
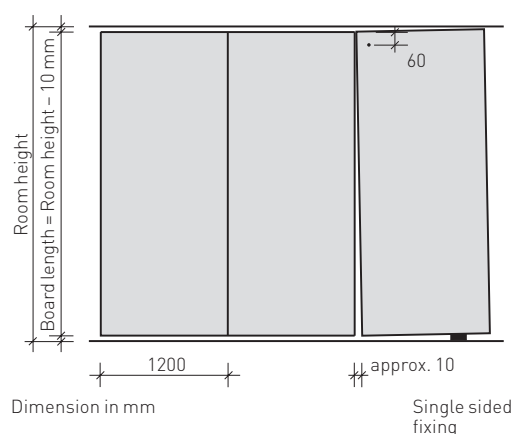


Applying the 310 ml cartridge to the board edge

Consumption FERMACELL joint adhesive		
Board-size	310 ml Cartridge	580 ml Sachet
1500 x 1000 mm	11 m ²	20 m ²
2400 x 1200 mm	22 m ²	40 m ²

(assumed wall height 2.5 m)

Consumption FERMACELL Joint Filler	
Consumption per m ² FERMACELL wall/ceiling area (one side only)	
Fine filling of	100 g
Jointstik/adhesive joint	
5–7 mm Jointfiller method	200 g



Fixing the first board.

The first FERMACELL board is screwed on to the stud, starting at the open leg.

Staples can also be used for timber studs. FERMACELL Jointstik is then applied in a 3 mm bead to the centre of the edge of the outer layer of board. The working temperature of the adhesive should not be below + 10 °C. The room temperature should not be below + 5 °C.

Mounting subsequent boards.

After the first board is fixed, and the Jointstik bead has been applied to the centre of the edge of the board, the next board is placed over the stud and then slid towards the first board in such a way that the board edges come together at the top and a narrow wedge-shaped gap is formed below between the two boards.

For this method of fixing the board length must be about 10 mm shorter than the room height. Fasten the FERMACELL board at about 60 mm below the upper edge with a FERMACELL screw (3.9 x 30 mm) to the steel stud or with staples to the timber stud. When the wedge support at the floor is removed, the second board swings under its own weight against the first board and the Jointstik is compressed giving a 1 mm butt joint.

Screws should be fastened continuously from top to bottom. Alternatively, the next board can be moved into place using a board lifter. With this mounting technique care must be taken that sufficient pressure is exerted towards the joint to ensure a 1 mm butt joint. In this case screws / staples are fixed from the centre of the board outwards towards the top/bottom of the board with a screw spacing of ≤ 250 mm or a staple spacing of ≤ 200 mm; see Chapter 4.10 for further details.

Double boarding.

For double boarding joints must be staggered by a minimum of 200 mm in both horizontal and vertical directions. The adhesive jointing technique is only required on the outer board layer; the first layer is dry butt joined. This also applies to fire rated structures.

Removal of excess adhesive.

Depending on room temperature and humidity, the adhesive will have cured after 24 hours. Excess adhesive may now be removed. This can be done, for example, with a trowel or paint scraper. Any high spots can be removed with a Surform. The joint area and counter-sunk screws/staples heads are then finished by stopping with FERMACELL Joint Filler.

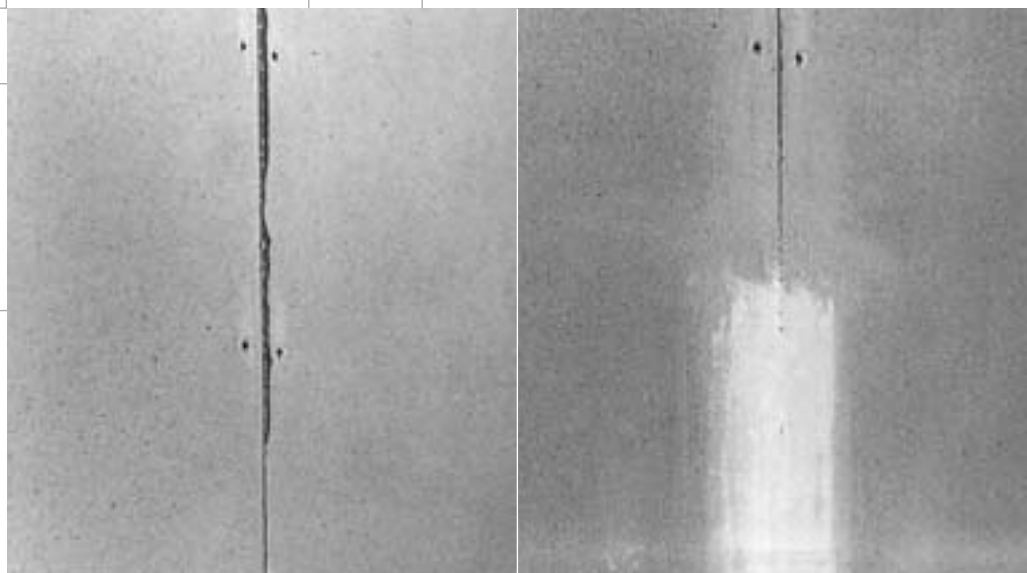
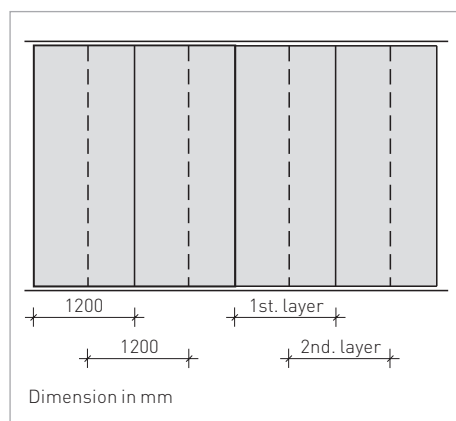
2.6 Filler joint – Square edged Boards.

Because FERMACELL Jointstik is NOT a gap filling adhesive, non square edge boards – for example boards that have been scored and snapped – must be filled with FERMACELL Joint Filler.

Irrespective of whether FERMACELL boards are screwed or stapled to the sub-structure, sufficient joint widths should be left at the board joints. These are:

- 5–7 mm for 10 mm or 12.5 mm boards.
- For thicker boards the joint width should be $\frac{1}{2}$ x board thickness.

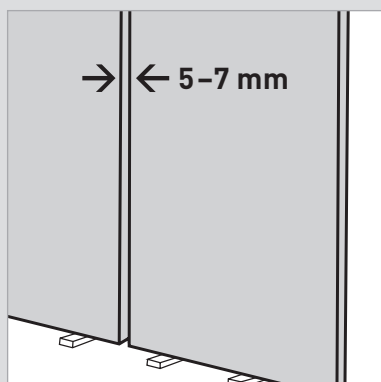
The joints are filled with FERMACELL Joint Filler without taping and with no joint cover strips. The screw heads or staple backs are filled with the same material. The formation of traverse or horizontal joints is described in section 2.8.



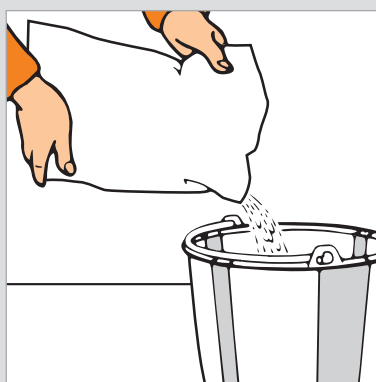
**Joint adhesive
partially removed**

**Fine finishing
partially completed**

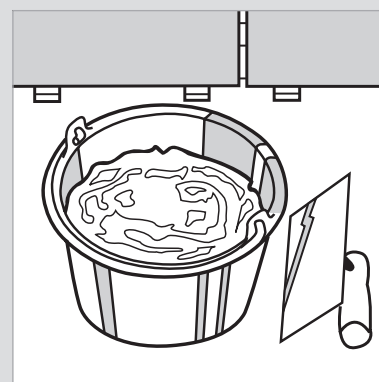
**The adhesive joint
must be 0.5–1 mm wide.**



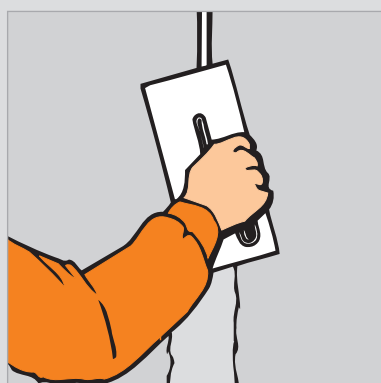
Joint width of 5-7 mm or use
 $\frac{1}{2}$ x board thickness



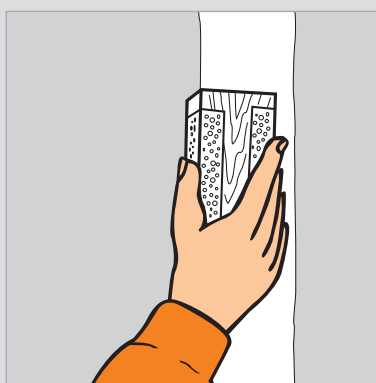
Scatter joint filler
in the water



Use clean buckets,
tools and water



Fill joints and
over fixings



Excess filler is
removed by sanding

Care should be taken that the joints are clean and free of dust before filling. Filling may only be carried out once the fixed boards have acclimatised with the building interior (i.e. free of a high degree of trapped humidity). If wet plaster is specified for the rooms, jointing may only be done after drying out. If mastic asphalt is specified, all jointing work must be done after the screed has cooled.

FERMACELL Joint Filler is scattered into the mixing water and must be allowed to 'slake' for 2-3 minutes. The filler is then mixed to a smooth plastic mass. Clean vessels and tools should be used for mixing. Do not mix the filler mechanically as this will accelerate hardening. For more details see the packaging.

The FERMACELL Joint Filler should be pushed into the full depth of the joint between the boards. The trowel is

pushed over the joint firstly in one direction and then the other. This ensures that the full depth of the joint is filled completely.

Once the filler has hardened it can be rubbed down; where any shrinkage has occurred during the drying out a second feather fill may be required. This is then rubbed down prior to final decoration. Please note: FERMACELL Joint Filler sets to a very hard finish. For this reason we recommend that only the immediate area of the joint or fixing head is filled and that excess filler is not applied.

Quantity required for FERMACELL Joint Filler for room-high boards

Board thickness	Consumption in kg per m ² FERMACELL	Consumption in kg per m run Flat joint
10 mm	0.1	0.2
12.5 mm	0.2	0.2
15 mm	0.3	0.3
18 mm	0.4	0.5



**Tapered edge board
being taped and jointed**

2.7 Tapered Edge Board Joints.

This method of jointing tapered edge board is suitable for non-load-bearing applications such as internal partitions, dry lining, ceilings and sloping roofs. Fibre and Paper tapes are available for jointing. Xella recommends using paper tapes for superior strength. Fibre taped joints are weaker, may therefore crack and cannot be guaranteed.

Jointing procedure.

The boards are dry butted together and fixed to the substructure using FERMACELL screws. In the case of timber structures, staples may also be used. Ensure all joints are clean and free from dust before any jointing commences.

Bed the paper tape with FERMACELL Joint Filler, ensuring that the 'V' of the joint is completely filled, and leave to dry.

Screw heads should also be filled at this point. Once dry apply a second coat of FERMACELL Joint Filler over the paper tape, ensuring that excess material is removed. Internal corners should be jointed following the same procedure. It may be helpful to fill one side of the internal angle at a time. External corner beads should be fixed and filled flush to the bead edge and board surface.

If wet plaster or a wet screed is to be applied in the same room as where the FERMACELL boards are installed (e.g. cement, plaster or anhydrite floor coatings), the FERMACELL boards should not be jointed until this work has been completed and the FERMACELL has completely dried out (Board humidity $\leq 81.3\%$). If a mastic asphalt coating is to be applied then this must be allowed to cool before any filling takes place.

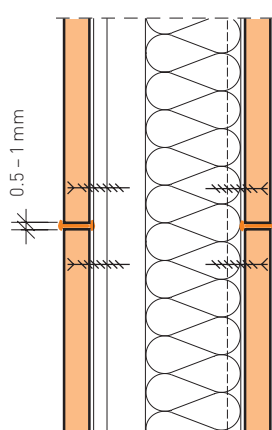
2.8 Horizontal joints.

Since horizontal joints can weaken the stability of free-standing structures, such as non-load-bearing walls, casings, fire and shaft walls, and usually cost more, they should be avoided or minimised. If they are nevertheless necessary, proceed as follows:

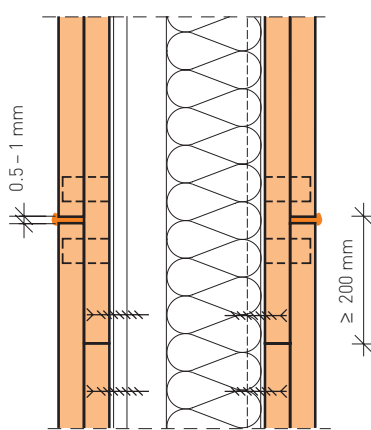
With single-layer applications horizontal joints using Jointstik adhesive do not require any backing. Where cut boards (filled joint) or tapered edge boards are to be used the joints must be backed either with offcuts of FERMACELL or other suitable backing material (timber grounds/steel support plates).

With double-layer applications horizontal joints for the first/lower board layer are butt joined (without adhesive), as long as the wall height is no greater than 80 % of the maximum permitted wall height for that particular construction type. For greater heights, the horizontal joints in the lower board layer should be formed as adhesive joints without any backing behind the joint. The horizontal joints of the relevant second/outer board layer are installed as adhesive joints using FERMACELL recommendations. Generally joints should be staggered between the upper and lower board layer by ≥ 200 mm.

For triple and multi-layered applications the lower board layers are butt joined and the outer board layers are formed as adhesive joint.



Adhesive joint without backing



1.-lower layer dry butt joined,
2.-outer layer glued

Care must be taken with horizontal board edges to ensure that these are clean and free of dust immediately before application of FERMACELL Jointstik.

For further information on the maximum installation heights of FERMACELL partitions please refer to the relevant FERMACELL documentation "The Modern Approach to Dry Lining", or to our website: www.fermacell.co.uk

3. Non-load-bearing internal partitions to DIN standard 4103.

3.1 Definition.

Non-load-bearing internal partitions to DIN standard 4103 are components inside a building, which serve only to divide rooms and are not structural. Partitions derive their stability through connection with adjoining elements.

Partitions may be built-in as fixtures or can be moveable. They may be constructed as single- or multi-leaf panels and, with the appropriate specification, can function as protection against fire, heat, moisture and sound.

3.2 Areas of application.

There are two areas of application:

Application 1:

Areas where few people congregate, such as houses, hotel rooms, offices or hospitals and rooms in similar use, including the corridors.

Application 2:

Areas where larger numbers of people congregate, such as in larger conference rooms, schoolrooms, consulting rooms, exhibition and sales rooms and rooms in similar use.

3.3 Requirements.

Partitions and their junctions to adjacent building components must be constructed so that they withstand static (mainly dead loads) and intermittent dynamic loads, which can arise when in use.

Partitions must be able to support, apart from their own weight, tiles, other linings, fittings and be able to transfer loading to other load-bearing components, such as walls and ceilings. The walls may also serve a secondary function as support for ceilings and floor structures in the event of a collapse.

3.4 Soft and Hard Impact Tests.

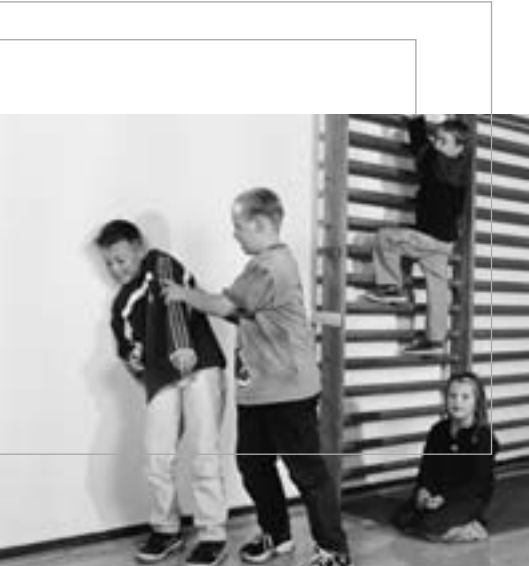
FERMACELL partitions are tested for hand and soft impact to DIN 4103 Part 1.

Soft impact Test.

The test for soft impact is conducted as a quasi-static load, to assess the behaviour of the whole partition. A soft impact on a light weight partition can be caused, for example, by the impact of a human body (a fall from a ladder or scaffolding) or in the case of fire by excessive body pressures caused by panic on corridor walls which border escape routes.

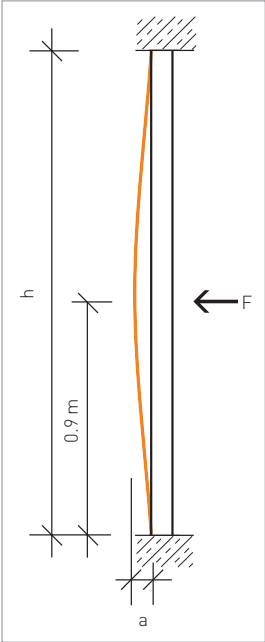
The tests for this type of impact resistance have been carried out on single layered FERMACELL partitions (12.5 mm board) on a steel studwork construction using 100 mm x 0.6 mm vertical C section profiles installed at 625 mm centres.

During the test a force F was applied at right angles to the face of the wall at the mid point between floor and ceiling.

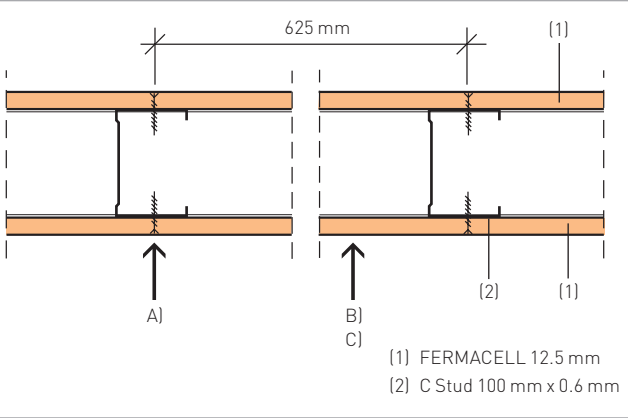


Soft impact

Test for soft impact
(incorporating DIN 4103)



Type of load: Load soft impact, horizontal	Load F
	kN
A) Load on sub-structure over studwork to deflection = 5 mm	1.119
B) Load between studwork to deflection = 5 mm	0.605
C) Load between studwork to board penetration	1.505



h = 3000 mm
a = Deflection of the partition and the board
by 5 mm and/or breakthrough
F = Loading using a ram of Ø 50 mm

The force was applied to the partition both on the stud and at the mid point between the studs using a pneumatic ram with a 50 mm diameter shoe. In the first test the load was increased until a deflection of 5 mm from the Perpendicular axis was reached. A similar method was used for the second test which was carried out at the mid point

between the studs. The third test, also at the mid point between the studs was continued until penetration of the board occurred.

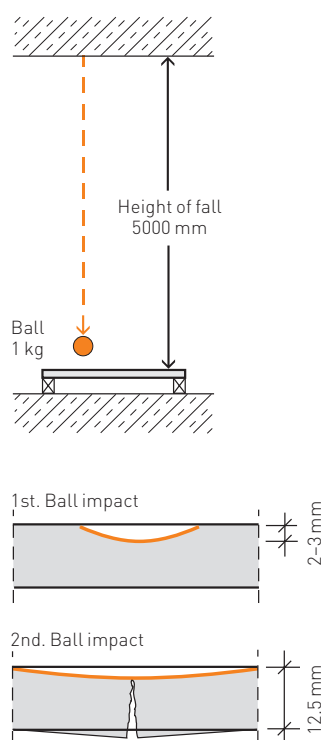
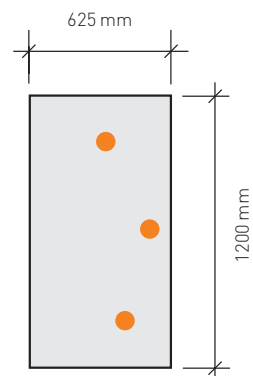
The force necessary to achieve the set deflection was measured and the results are given in the table above.



An example of Hard Impact

Test for hard impact
(to DIN 4103)

Impact area of the
ball on the board



Hard impact Test.

As with the test and analysis for soft impact, the test for hard impact is carried out to the requirements of DIN 4103 Part 1. The resistance to hard impact is determined by a drop ball test. A steel ball 63.5 mm in diameter, weighing 1030 g is released in free fall on to the face of a 12.5 mm FERMACELL board. The drop ball tests are carried out on 1000 mm wide pieces of board, spanned between two supports at 625 mm centres. The impact points are in the middle of the board and near the edge of the board (see attached sketch).

Results.

1. After 15 drops from 1000 mm, no indentation was seen on the face of the board. The board was then cut at the impact points and no structural difference was observed in the cross section.
2. From a drop height of 4500 mm, distinct indentations appeared, which were seen in the reverse face of the board. The ball did not break through the board.
3. From a drop height of 5000 mm to 5500 mm, the board broke parallel to the supports.

4. Site Installation.

4.1 General working conditions.

Like all building materials, FERMACELL boards are subject to dimensional change depending on the influence of temperature and moisture.

To carry out perfect dry construction work on walls, ceilings and floors, it is essential that the following procedures are followed:

FERMACELL Gypsum-Fibre boards and FERMACELL components should not be installed when the mean relative humidity is $\geq 80\%$.

FERMACELL boards must be fixed at a mean relative humidity of $\leq 80\%$ and a room temperature of at least $+5\text{ }^{\circ}\text{C}$. The temperature of the adhesive should be $\geq +10\text{ }^{\circ}\text{C}$. The boards must be acclimatised to the installation room area, and in the 12 hours after jointing the relative room climate should not change significantly. Lower temperatures and relative humidities prolong curing periods. The occurrence of frost during transport and storage does not damage FERMACELL Jointstik.

The filling of FERMACELL joints may only be carried out at a mean relative humidity of $\leq 70\%$ (corresponding to a board moisture level of $\leq 1,3\%$). The room temperature should be $\geq +5\text{ }^{\circ}\text{C}$. The same conditions apply to fine filling work.

Wet plaster/screeds should usually be installed before installing FERMACELL. Wet trades must be complete prior to filling joints. Areas should be dry, since moisture on site hinders the drying of the filler and can cause linear expansions of the boards.

Hot/melted asphalt should be laid, and allowed to cool, before filling the board joints, since the joints can tear due to tension from the effect of heat in the lower wall area.

Using the jointstik joint technique, the hot/melted asphalt can be laid immediately after. Adequate heat evaporation, dispersion and ventilation should, however, be ensured.

Gas burner heating can damage the boards due to the risk of condensation and thermal shock.

This applies particularly to cold interiors with poor ventilation. Rapid heating, which can result in thermal shock, should be avoided.

4.2 Setting out.

Mark out the location of the walls on the floor with a chalk line. If the stud wall erection does not take place directly after measuring, a permanent form of marking should be used.

The wall line should then be transferred with a plumbline or a telescopic spirit level from the floor to the ceiling. For larger projects and as a general, preference the use of a building laser is recommended.

Door frames and supports for wall-mounted loads should also be marked out on the floor. Care should be taken to note the locations of any services within floors, walls and ceilings where FERMACELL partitions are to be fitted.



**Siting the wall axes with a chalk line
or construction laser**

Laying the steel track sections on the floor on top of insulating strips



Fixing the stud on to the wall on insulating strips



4.3 Fixing the track.

The head and floor track are fixed to the structure using appropriate fastenings along the construction lines previously marked out. Similarly, end of row studs (C sections) are fixed to the flanking walls. Where required an acoustic or fire resistant isolation strip is placed between the stud or track section and the sub-structure.

Intermediate steel studs are cut short by about 10 mm to allow for any minor tolerance differences. The steel studs should sit into the header track by at least 15 mm, and in the floor track should rest on the footer steel section. With larger walls and room heights, a longer stud may be created by splicing.

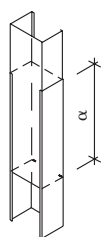
Splicing details are given in the table opposite. The spacing between horizontal fixing points should be a maximum of 700 mm and vertical fixing points a maximum of 1000 mm. With uneven flanking components and increased requirements for sound absorption, the spacings between the fixing points should be reduced.

To meet the fire resistance and acoustic requirements for the partitions, connections to the main structure should be sealed and secured using suitable materials. For this purpose, self-adhesive strips or mineral-fibre edge insulating strips can be used. For partitions with fire resistance requirements, non-combustible sealing

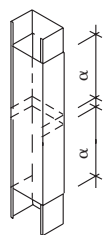
materials should be used.

For separated studwork, two separate sub-structures are arranged parallel to each other and fixed, so that the header and footer tracks are installed with a minimum clearance between the studs at all points. These provide greater acoustic performance and excellent fire resistance. However, for greater wall heights cross bracing may be needed. Details are provided later in this booklet.

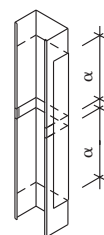
Different ways of splicing studs for extensions of up to 1 m



1) Boxed



2) Butt joined
and boxed
with extra
C profile



3) Butt joined
and linked
with extra
U profile

For further information and greater splice heights, contact Protektor for specific details (01562-515200).

Extending Stud profiles



Installing
the Studs

Overlapping measurements for the various Stud profiles.

Profile	Overlapping – α –
C 50	≥ 500 mm
C 75	≥ 750 mm
C 100	≥ 1000 mm

It is imperative that the splice be mechanically fixed to the studs using screws, rivets or nuts and bolts. Contact Protektor (01562-515200) for further information.

4.4 Installation of steel studs.

The steel studs are inserted vertically into the track profiles fastened to the floor and ceiling. There must be no fixing or mechanical connection between the stud and the track.

The studs are initially placed approximately at the required centres. Precise and vertical positioning should follow with the subsequent boarding. The maximum stud centres, irrespective of board format, are shown below.

If there are special requirements for high acoustic performance, generally separated stud details are most effective. Alternatively the Protektor Acoustic stud provides a similar acoustic performance in a single stud application.

There are three variants of double-stud construction:

- Steel double stud walls, where the stud and track profiles are arranged parallel to each other and are connected with self-adhesive insulating strips.
- Steel double stud walls, where the stud and track profiles are arranged separately and parallel to each other with no interconnections.
- Steel double stud walls, where the stud and track profiles are arranged parallel to each other and the stud profiles are connected at $\leq 1/3$ wall height sections. Offcuts of FERMACELL or steel studs can be used for this purpose.

Maximum stud spacings¹⁾ in mm for different board thicknesses of FERMACELL

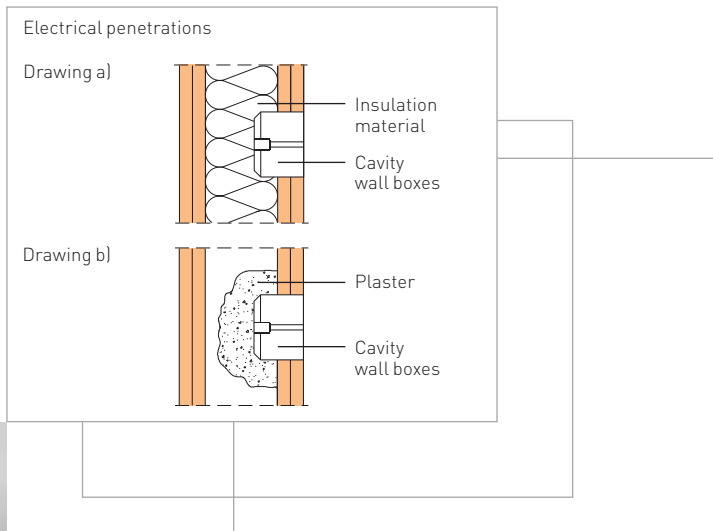
10 mm	12.5 mm	15 mm	18 mm
500	625	750	900 ²⁾

1) Applies for a constant environmental climates up to 80 % relative humidity.

2) On the basis of a separate load tests for structural wall 1 S 33, a stud spacing of 1000 mm may be selected for 18 mm FERMACELL.



Construction of timber stud partitions with steel angles or by skew fixing



4.5 Installation of timber studs.

The timber studs are fitted between the relevant upper and lower timbers, erected upright and fixed at the precise centres with metal angles or by skew fixing. The centre spacings are to be selected from the table on the previous page. For double timber stud work, proceed as in Chapter 4.4.

4.6 Installation of electrical equipment.

Electrical wiring may be installed as required in the cavities between FERMACELL boards, either horizontally or vertically, before the installation of insulating material. The work must be carried out by qualified electricians. For laying the cables, the webs of the studs are provided with appropriate penetrations. In timber stud holes should be drilled.

Holes for cavity wall boxes and other penetrations are made with padsaws or jigsaws (with mechanical extraction).

If special requirements for fire resistance or sound reduction have been specified for the partitions, precautions are to be taken around openings/penetrations so as not to affect the physical characteristics of the structure. In general penetrations should be avoided in party wall or high performance acoustic wall situations.

Sockets, switches, junction boxes.

Sockets, switches, junction boxes, etc. may be installed at any desired point in partitions (boarded both sides) but not directly opposite one another.

Two alternatives are:

- Walls with insulating material according to DIN 4102 Part 4 (melting point $\geq 1000^\circ\text{C}$). Layers of insulating material required for fire resistance must be retained but may be compressed to 30 mm.
- Walls with other insulating material or with no insulating material. The sockets are to be enclosed with FERMACELL Jointfiller (20 mm thick) or surrounded with boards of the same thickness as that of the partition. See diagrams (a) and (b) respectively.

4.7 Installation of sanitary equipment.

Sanitary equipment can be installed in the cavities between FERMACELL Gypsum-Fibre Boards before boarding and before the installation of insulating materials. The required structural sections of the Building Regulations must be observed in regard to these installations and thus the work must be carried out by skilled installers.

The installation of pipework, including the encasement collars, will determine by the diameter of the pipe the size of the web cut out required in the stud profiles, and thus the thickness of the FERMACELL Gypsum-Fibre Board. In the case of large diameter pipework separated stud walls will be required, see Chapters 7.4 & 7.6.

For sound reduction reasons (e.g. reduction of the sound from flowing water) pipe fixings to the sub-structure should be isolated by intermediate layers of rubber, felt or a similar material where pipework penetrates FERMACELL. The cut edges of FERMACELL should be a minimum of 10 mm from pipe ducts or mounting supports. These gaps must then be sealed with a suitable flexible, paintable sealant; in the case of fire walls an intumescent sealant should be used.

Web cuts in metal studs.

Maximum cut sizes:

$$\left. \begin{array}{l} \rightarrow \text{Width} \\ \rightarrow \text{Height} \end{array} \right\} \leq h_{st} \text{ (web depth)}$$

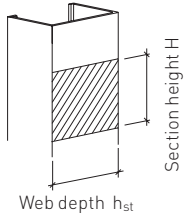
Other Limitations:

- Areas of installation restricted to (houses, hotels, hospital wards)
- Maximum wall height up 3000 mm
- 50 mm stud, double boarding is required

4.8 Sound reduction for pipework and cable penetrations through partitions.

Cable and pipe ducts for domestic installations should be fitted with the aim of reducing any air leakage and providing the optimum sound-proofing. Pipe ducts should be fitted with insulating collars and must have no contact with the wall lining and sub-structure. Levers and handles must be sound-proofed according to the manufacturers instructions. Where necessary, sound reduction systems are to be installed. Sockets must be staggered by at least one stud section and must not be installed opposite one another. Insertion of mineral wool behind the sockets is recommended.

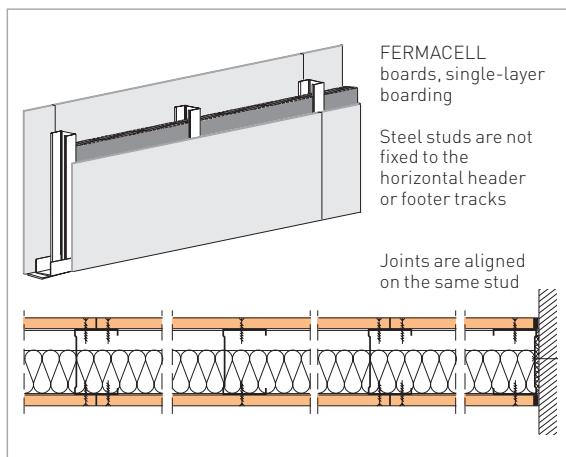
Maximum web sections in C profiles of metal stud walls

Metal studs	Boarding	Web cut-outs, no. of openings	Measurement of the sections: section height $H \leq$ web depth h_{st}
C 75/C 100	single-layer	1x per stud	
C 75/C 100	multi-layer	2x per stud	
C 50	multi-layer	1x per stud	

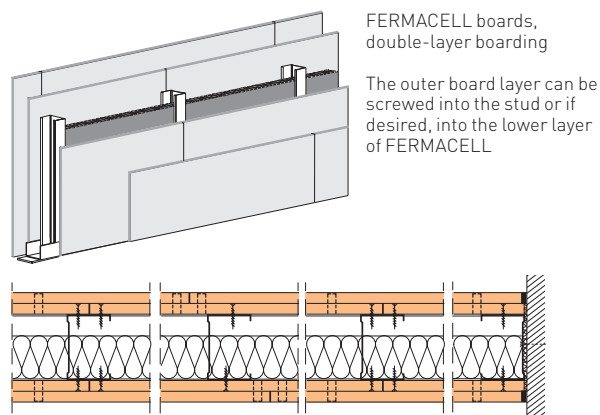
The openings listed above are in addition to the existing H-section punchings.

The web sections may be fixed in accordance with DIN 18182 Part 1 Table 1 Stud 1.

Please contact the Xella Technical Hotline for more details.



Arrangement of FERMACELL boards on metal studwork



Installation of insulating material

4.9 Installation of insulating materials.

Insulation may be installed into FERMACELL partitions if required, preferably in "batt" form.

The batt thickness and density varies according to the sound reduction and fire resistance requirements. The minimum thickness should be 40 mm. In fire rated constructions, the insulating materials indicated in the test certificates are to be used.

The insulating materials must cover the full surface in the cavity, be laid tight to the edges and fixed permanently to prevent slipping. Splits or holes in the insulating material reduce the performance and protection against sound, fire or heat. Double layers should be laid staggered.

4.10 Fixing FERMACELL to studwork.

FERMACELL is easily fixed to the supporting sub-structure. The number of layers required will depend on the specific requirements of the overall construction with regard to fire, sound or loadbearing requirements.

FERMACELL cross slot screws are used to fix FERMACELL to steel or timber studs. Staples can also be used to fix FERMACELL to timber stud (see Chapter 2.4). Both methods can then be used for fixing board to board.

FERMACELL may, in certain circumstances, be fitted to steel constructions using pneumatically fired nails. Please call our Technical Hotline for more information.

Important!

FERMACELL boards are fixed onto the studs symmetrically (i.e. the joints mirror each other on the stud and are not staggered). With double boarding the outer layer is staggered from the lower layer both vertically and horizontally by a minimum of 200 mm. In addition, with steel studs, the boards must not be fixed to the header or footer track. With timber studs the boards are fixed to both vertical studs and the header and footer timbers.



Boarding on steel studs

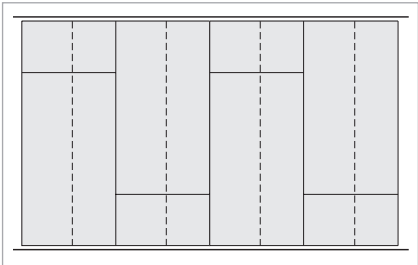


Boarding on timber studs using staples



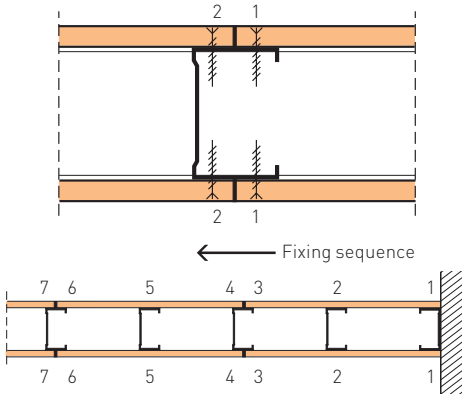
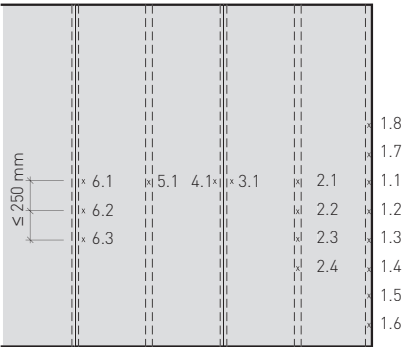
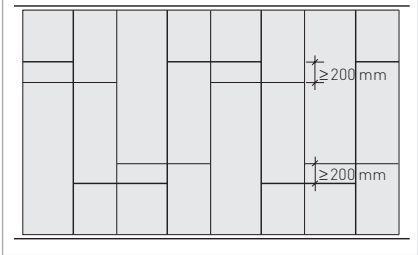
Using a high speed screwdriver

On steel studs boards must be fixed to the vertical studs only, and not to the horizontal header and footer tracks.



Single-layer FERMACELL boarding showing staggered joints

Double-layer FERMACELL boarding showing staggered joints for both layers



Fixing sequence for fixing FERMACELL to steel studs using FERMACELL Jointstik adhesive. If boarding from one side only then the screws should be fixed from the top downwards, see Chapter 2.5.

For spacing and number of fixings required of either screws or staples when fixing FERMACELL, please refer to the table in section 2.4.

FERMACELL boards are normally mounted vertically on the sub-structure. The board length corresponds to

the room height, less the upper and lower spacing gaps. Horizontal joints are to be avoided. If these are necessary, the joints are to be arranged with a stagger of at least 200 mm. Transverse/cross joints are not permitted.

5. Surface Preparation.

5.1 Preparation of the surface.

The surface to be treated should be dry and free of stains and dirt. Special care should be taken to ensure that:

- spots of plaster, mortar and similar have been removed,
- scratches, dents, etc. have been retrowelled with FERMACELL Joint Filler or FST as required,
- all filled areas have been sanded flat and smooth,
- all board surfaces, joints, and filled areas are equally dry,
- all dust has been thoroughly removed.

FERMACELL boards are supplied pre sealed with a starch derivative. Extra priming is only necessary, if the specification for the type of finish to be used requires this, for example, for thin, textured or structural plaster, lacquer coating, vinyl or oil based paints or tile adhesive. Low-water content primer should be used. For multi-coat systems, the drying times of the manufacturer must be observed at all times.

In all cases the recommendations of the manufacturer for any application onto FERMACELL should be observed. Failure to do so may result in loss of warranty of the system.

5.2 Conditions on site.

Before any decoration, the moisture content of the boards must be less than 1.3 %. This moisture content level will be attained automatically within 48 hours if the relative humidity of the air is kept below 70 % and the air temperature is over 15 °C during this period, and if the boards are stored off the ground in well ventilated conditions.

All other wet applied coats and plasters must be dry prior to fixing FERMACELL boards. The surface must be free of dust.

5.3 Joint Finishing.

After sanding, brush off any loose dust. The joint can then be textured to match the texture of the board. This is done using a thin slurry coat of ready mixed jointfiller applied with a damp sponge. Rub the slurry coat on to the joint and then finish off with a light dabbing motion. This will put a light stipple on the joint, which will disappear when painted.

5.4 Coatings and Painting.

Ensure all surfaces are clean, dry and free from dust and oil.

All commercial paints, such as latex, dispersion paints or lacquers may be applied to FERMACELL boards. Mineral coatings, such as lime and silicate paints, may only be applied to FERMACELL, if the manufacturer of these coating systems has already approved them. For use with gypsum based boards with latex paints, attention must be paid to the covering capacity. Working with lamb's wool or expanded plastic rollers is a matter of choice depending on the coating material.

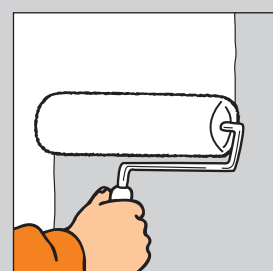
Where conventional matt emulsions are used, the joint can be stippled as described previously, and a mist and two top coats of emulsion applied with a roller. Where thinner paints are considered, or a semi-gloss finish such as a vinyl silk paint is to be applied, the use of FERMACELL FST is recommended to provide a very smooth final surface. Where high gloss paints are to be used such as eggshell finish, these highlights even the most minor of surface imperfections. In these cases the paint manufacturers instructions must be followed at all times as a primer/sealer is normally required and a second coat of FST may be required. We recommend that a ≤ 1 m test area is tried first to ensure that the finish quality is acceptable.

In all cases the paint manufacturers instructions should be followed.

5.5 Wallpaper.

With the exception of vinyl wallpapers, all types of paper can be applied to FERMACELL using standard trade pastes without priming the surface beforehand. Because FERMACELL is homogeneous the boards can be repeatedly repapered.

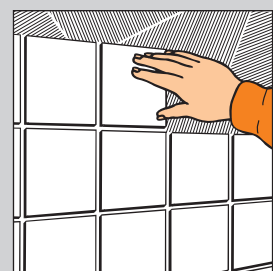
When using vinyl paper it is recommended that the board is primed and a low water content paste is used.



Painting



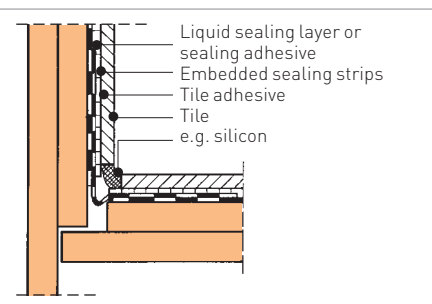
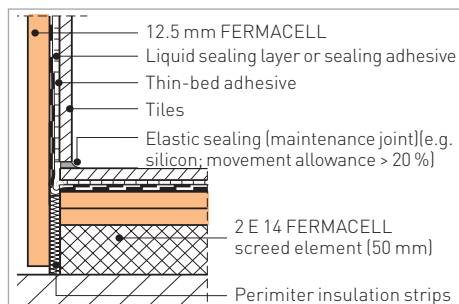
Wall-papering



Tiling

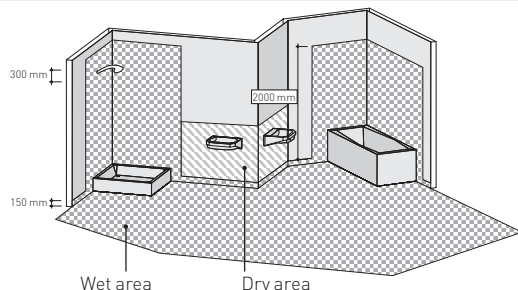
The term "ready for painting" does not mean that the painter need only paint the surfaces and does not exclude the obligations of the painter/decorator to make good any ridges, grooves, bulges, filler residues, etc, which arose during filling, without roughening the adjacent board surface.

The following illustrations show detailed solutions for correct installation of shower and bath connections to walls.



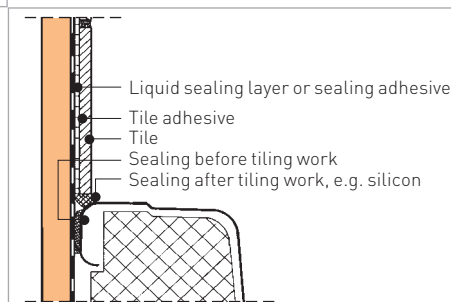
Wall /floor formation in wet areas

Internal corner construction in wet areas

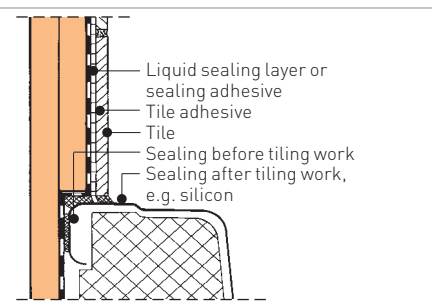


Areas for waterproof sealing

Important: FERMACELL should not be used in areas where standing water is likely to come into contact with the board (e.g. so called 'wet floors').



Wall junctions between shower and baths and single-layer FERMACELL partition



Wall junction where an additional layer of FERMACELL is used above the bath or shower

5.6 Plaster and Textured Plasters.

Both smooth and textured plasters can be applied to FERMACELL. The use of a smooth plaster is not normally recommended as the same finish can be achieved much faster using FST and at a fraction of the cost. Where plasters are being applied, all joints must be reinforced with a fibre tape fixed with PVA adhesive, and a sealant (PVA or similar) applied to the whole surface of the board. It is recommended that a test area is tried first as some plaster formulations will crack under certain conditions.

5.7 Tiles.

If the adhesive manufacturer requires a priming coat, this should be allowed to dry for 24 hours before tiling work commences. Surfaces subject to frequent splashing should be treated with a suitable waterproofing sealant suitable for use with a gypsum based board. Tile adhesives with a low water content should be used and tiles fixed with a thin bed method without pre-wetting. The back face of the tile should be in contact with 80 % of the adhesive bed. Follow the adhesive instructions and observe the tile manufacturers recommendations.

Wet areas, such as showers and bathrooms, must be treated with an extra sealant. For this purpose, a paintable waterproofing agent should be applied that is suitable for use with a

gypsum based board and cement powder adhesives. Please refer to the manufacturer for guidelines and application details. The wall surfaces, which require sealing, must be protected against the penetration of water at least to a height of 2000 mm above the bath floor with an adequate spacing at the side above the actual shower and bath area. For showers, sealing must extend to at least 300 mm above the shower-head.

Corners and penetrations should be sealed with recommended sealing tapes or sealing collars proprietary to the system. In addition, the entire base of the walls in a room with a shower or bath should be sealed against any rising moisture to a height of at least 150 mm above the finished floor level. In all cases refer to the manufacturers instructions.



For larger commercial projects FST is available in an LS sprayable version for use with airless spray machines. Please contact the Xella technical department for further details.

Surface finishing with
FERMACELL FST



5.8 FERMACELL Fine Surface Treatment (FST) for a smoother finish.

Ready mixed FERMACELL FST can be used direct from the tub.

FERMACELL FST is suitable for the smooth finishing of internal wall and ceiling areas. The white dispersion filler contains water and very fine pulverised dolomite marble.

Handling.

FERMACELL FST should not be used below + 5 °C. The surface should be free of dust, dry (over several days at a mean humidity of $\leq 70\%$) and free of any loose materials. Since the FERMACELL boards have been primed in the factory, no extra priming of the boards is necessary. Where work involving moisture is proposed, such as the introduction of wet screed or wet plaster, any filling should be carried out only after drying out. In the case of hot/melted asphalt, any filling should only be done after cooling.

Surface Finishing.

FST is applied to the board surface direct from the tub using a squeegee, a steel float or a 250 mm spartula. Work on about 1–2 m² at a time and ensure that the surface is fully covered. Then immediately remove all excess FST (if clean return it to the tub) using the same tools or a 450 mm wide spartula. This will dry within 45 minutes and a second layer can be applied if desired. If necessary flat the surface with a 120–200 grit sandpaper or an offcut of FERMACELL prior to further decoration.

The spring steel blade should then be cleaned and dried, to prevent rust. Minor uneven patches can, if necessary, be easily removed by hand sanding.

The FERMACELL Handy Guide and information sheet contains full information and instructions on the use and application of FST.



**Corridor wall TFB
boards veneered
with real wood**

5.9 Veneers, laminates and coatings.

FERMACELL board is uniquely suited for foil, veneer and moulded laminated plastic coatings. Due to its special surface treatment, it is suitable for many glue systems and this does not affect the classifications of the test certificates for fire resistance of FERMACELL partitions (F 30-A/F 60-A/F 90-A).

Dimensions.

These special FERMACELL TFB boards can be supplied in the following thicknesses

- 12.5 mm
- 15 mm
- 18 mm

with a tolerance of to ± 0.2 mm. Other thicknesses are available on request. Prices and delivery times are available on request. Please contact the office for further details.

Important advice for coating operation.

FERMACELL has a high density ($1150 \pm 50 \text{ kg/m}^3$) and is less compressible than wood material. The compression procedure must therefore be carried out using flexible pressure tools, in order to spread the pressure evenly.

Being gypsum based, FERMACELL is stable up to $+40^\circ\text{C}$, above this point it loses stability steadily but slowly. From 100°C this occurs rapidly as the crystal water matrix breaks down, and therefore reduces its strength. Moisture measurements must be carried out when drying at $+40^\circ\text{C}$ and hot adhesive systems must, in all cases, be carried out below 95°C .

The values for swell and shrinkage due to climate changes between FERMACELL and veneer coatings show greater differences than between wood boards and veneer. The tensile strength of the surface of FERMACELL is also lower than for wood based boards. It is therefore necessary to use glues with high penetration capability. From experience urea glues give values of over 0.5 N/mm^2 tensile strength. This guarantees the suitability of veneered special FERMACELL TFB boards in the range of 40 % to 70 % relative humidity.

For coatings with materials with lower swell and shrinkage values as veneer, dispersion glues (tensile strength 0.3 N/mm^2) can be used.

The application of edge coatings can be carried out in the normal way. Fusion adhesives with low viscosities and long open times have also proved satisfactory. The stability of the adhesion of corners and edges with primers can be substantially improved.

In all cases we recommend that trials for adhesion are carried out to test compatibility.

The quality of the gluing is the sole responsibility of the veneering company.

6. Test certificates and FERMACELL special structures.

By ramping the audience rows, the best sight lines are achieved.
The consequence is very high walls.



Tall, thin, high performance partitions give greater useable floor areas



6.1 Structural tests and studs.

The physical characteristics of FERMACELL walls have been tested and assessed to European Standards for sound reduction, fire resistance, and rigidity. The design of individual structures must comply with the specification details given in these documents.

Test certificates for fire resistance of FERMACELL walls are available either from official test certificates complying with BS 476, DIN 4102 Part 2 and EN

standards, or from official assessments based on these tests. Certificates for airborne sound insulation of FERMACELL walls is available from test certificates according to BS, DIN and EN standards, as well as conforming to the requirements of Part E, BB 93 and HTM 56.

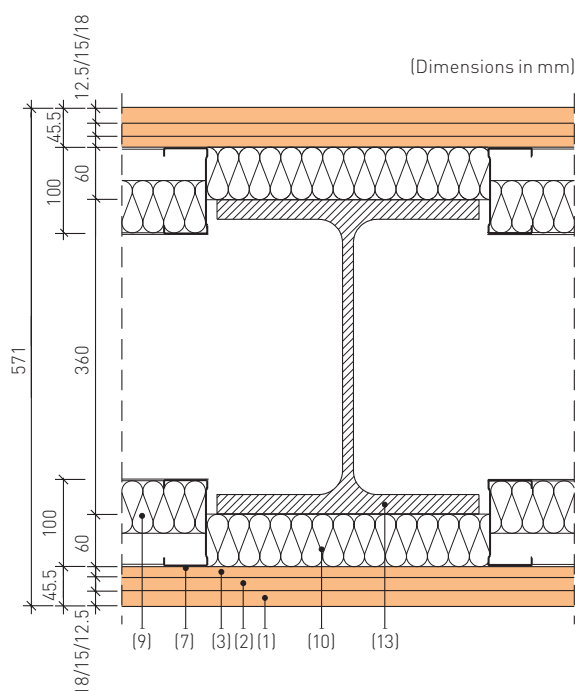
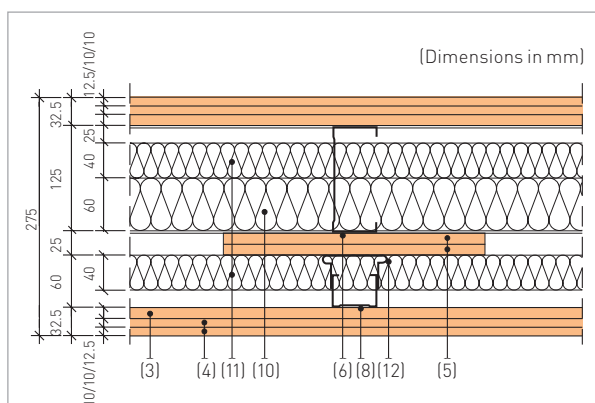
Racking certificates are available for FERMACELL walls in static and dynamic intermittent loading based on tests to DIN 4103 Part 1, and British Standards.

6.2 Cinema partitions.

Cinema complexes, film studios and multiplex-cinemas are frequently constructed, for reasons of cost and time, in structural steel. The interior finishing, walls, casings, claddings are then, for construction and speed reasons, completed with stud partitions. By this means, a multi-functional construction design is produced which allows for changes of use to be made at a later date.



- (1) FERMACELL board 18 mm
- (2) FERMACELL board 15 mm
- (3) FERMACELL board 12,5 mm
- (4) FERMACELL board 10 mm
- (5) FERMACELL strips 12.5 mm
- (6) Protektor Stud profile 125 x 0.6 mm
- (7) Protektor Stud profile 100 x 0.6 mm
- (8) Protektor Metal framing profile 50 x 0.6 mm
- (9) Rockwool 80/50 [mm]/[kg/m³]
- (10) Rockwool 60/40 [mm]/[kg/m³]
- (11) Rockwool 40/40 [mm]/[kg/m³]
- (12) Protektor VCD30 clip
- (13) HE-B/IPB 360 steel column



Weighted sound insulation value $R'_w = 68$ dB

Weighted sound level difference $D'_w = 78$ dB

Fire resistance F 90-A, Height up to 10 m

Further information on the physical characteristics, maximum heights, area dimensions, etc. can be found in the brochure entitled: "FERMACELL The Modern Approach to Dry Lining". For further information, see the FERMACELL Data-Sheet: "Cinema Partitions with FERMACELL".

Weighted sound insulation value $R'_w = 71$ dB

Sound insulation in octave band 63 Hz: $R'_w = 53$ dB

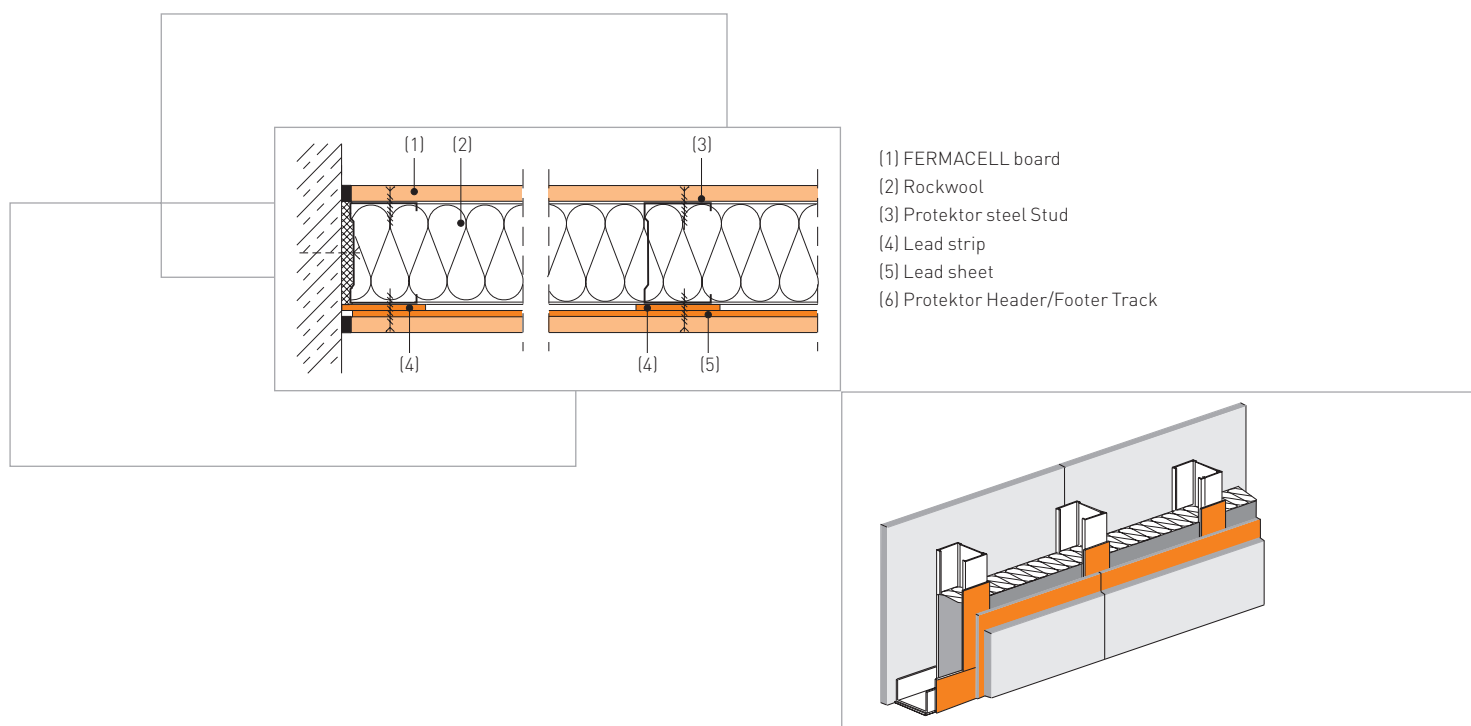
Fire resistance (each side) F 90-A, height up to 5 m

These light, non-load-bearing interior walls must, because of their intended use, meet the highest sound reduction requirements, provide adequate fire resistance and, in the light of their particularly great heights and high mechanical demand, comply with all requirements for structural stability and rigidity.

FERMACELL walls, casings and stud walls comply with fire resistance requirements, set out in British Standards and DIN 4102 Part 2.

Depending on design, installation conditions and the building shell type, these FERMACELL structures with overall thicknesses ≥ 200 mm, achieve site sound reduction values up to $R'_w = 71$ dB in the frequency range between 100 to 3200 Hz, and $R'_w = 53$ dB in the octave band of 63 Hz. Laboratory measurements give sound reduction values up to $R_w = 86$ dB. These structures also comply with the static requirements according to DIN 4103.

The walls are constructed using only FERMACELL boards on Protektor steel studs. Cost effectiveness is achieved, depending on the specification, because it is necessary to only fix the lower layers of FERMACELL to the studwork (dependent upon fire rating requirements). Subsequent layers are fixed to the first or lower board layers using staples or screws.

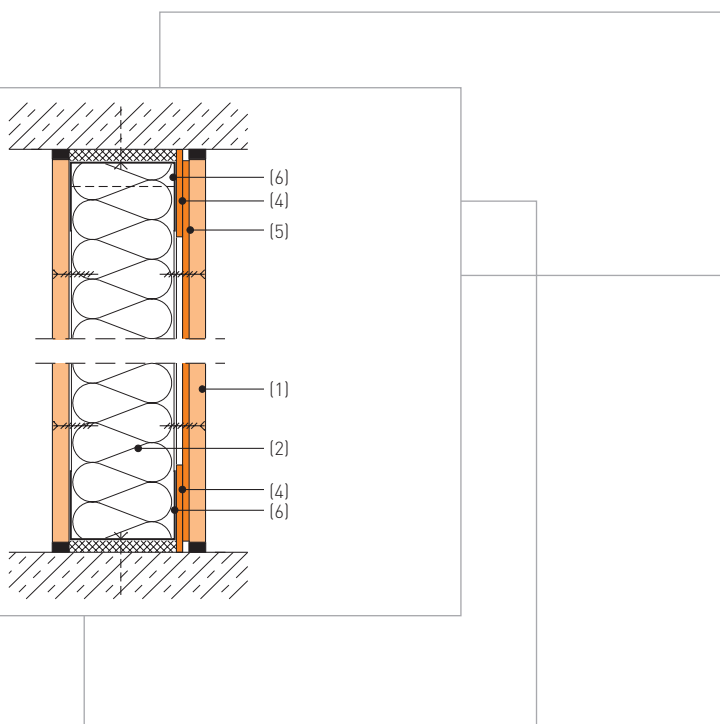


6.3 Radiation protection walls.

Diagnostic or therapeutic sources of radiation in hospitals, clinics and doctor's practices must be screened so that no radiation can penetrate adjacent walls and ceilings.

The legal requirements for radiation protection can be satisfied using simple dry lining techniques with FERMACELL boards. These consist of applying a lead sheet to the reverse side of FERMACELL Gypsum-Fibre boards. The thickness of the lead lining is determined by the required lead lining value, which is in turn dependent on the type of appliance and/or the intensity of the radiation emission source specified.

The application of lead sheets to the reverse sides of FERMACELL Gypsum-Fibre boards for radiation protection walls must cover the surface and be permanently secured against slipping/slumping. This is usually achieved by factory lamination or, by the construction company on site. In determining the thickness of the lead sheet, layers of 0.5 mm should be assumed.



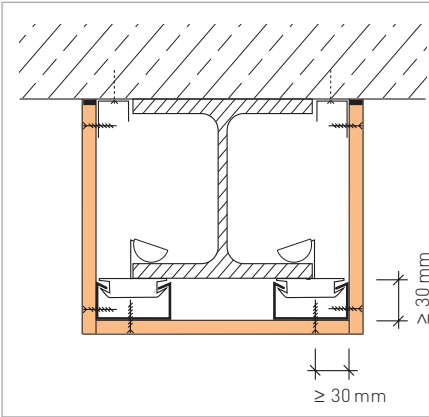
To guarantee consistent radiation protection, the vertical butt joints (filler or adhesive joint) between the lead lined FERMACELL building boards and the studs at the board centre should be covered with self adhesive lead strips at least 50 mm wide, which are adhered direct to the flange of the Stud profile.

For the wall, floor and ceiling connections of FERMACELL radiation protection walls to the adjacent building components, a lead sheet strip at least 50 mm wide should be adhered to the flange of the structure connection profile, so that it butts tight to the adjacent components.

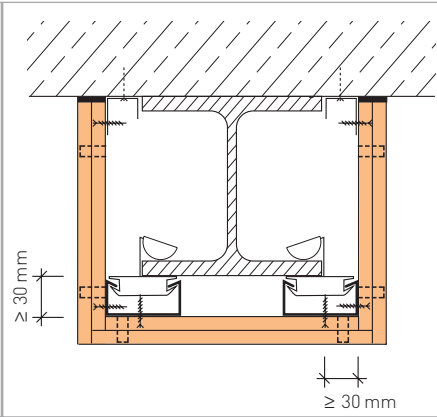
Where penetrations are needed such as electric sockets, door and window elements, switchboxes, inspection boxes, etc. as well as corner and T-connections, consistent radiation protection must also be provided, if required.

6.4 Other special structures.

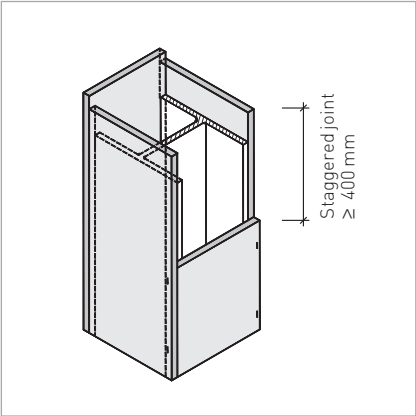
Where special structures, such as partitions, casings and wall claddings which require design in relation to sports halls, clean rooms (avoidance of contamination at the workplace), bullet proof details (with steel sheet linings of various thicknesses), burglar-proofing, blast-proof constructions (e.g. shelters) and screening against electrostatic alternating fields (e.g. Faraday screens) have not been dealt with in these documents. Technical information on these items, with structural and construction detailing, may be obtained from the Xella HotLine on 0870-6090306.



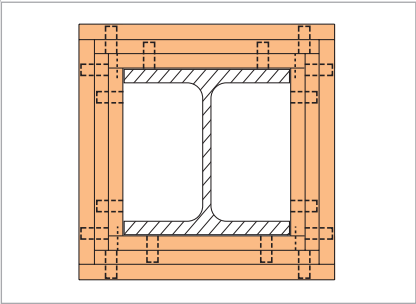
Single-layer steel beam encasement for 3-sided exposure to fire



2 layer steel beam encasement for 3 sided exposure to fire



Encasement of a steel support for 4-sided exposure to fire



3 layer steel beam encasement for 4-sided exposure to fire

Beam Encasement.

Fire resistance category			
F 30-A	F 60-A	F 90-A	F 120-A
FERMACELL in mm			
10	10 + 10	15 + 12.5	18 + 18

Minimum lining thickness for steel girders with $H_p/A \leq 300 \text{ m}^{-1}$

Column Encasement.

Fire resistance category				
F 30-A	F 60-A	F 90-A	F 120-A	F 180-A
FERMACELL in mm				
10	2x 10	2x 15 + 1x 12.5	4x 15	5x 15

Minimum lining thickness of steel supports with $H_p/A \leq 300 \text{ m}^{-1}$

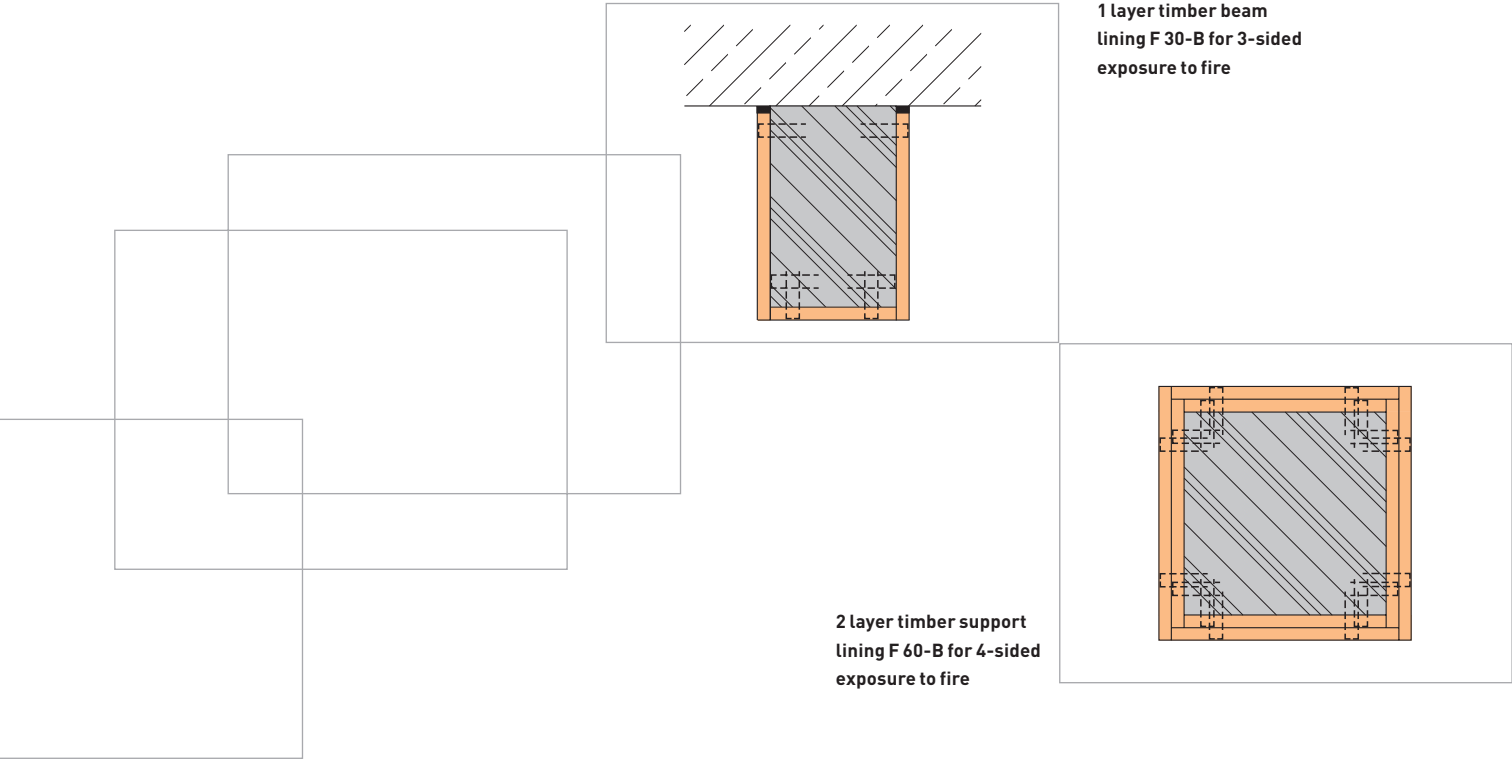
6.5 Beam & Column Encasement with FERMACELL.

When encasing beams and columns Protektor stud and track systems may also be used, instead of the support clips shown (for example, Protektor Support Clips No. 6141).

The span width of the boards, i.e. the spacings between the steel support profiles, must be $\leq 400 \text{ mm}$.

For information on jointing details for the various board layers and jointing techniques, see the section on joint formation on Page 14 of this document.

With double layer boarding, both layers can be fastened into the wood component or alternatively the outer board layer may be fixed directly into the first layer of board. The butt joints of the boards should be staggered by at least 400 mm.



Fire resistance category	
F 30-B	F 60-B
FERMACELL in mm	
10	10 + 10

Minimum lining thickness of timber beams and columns

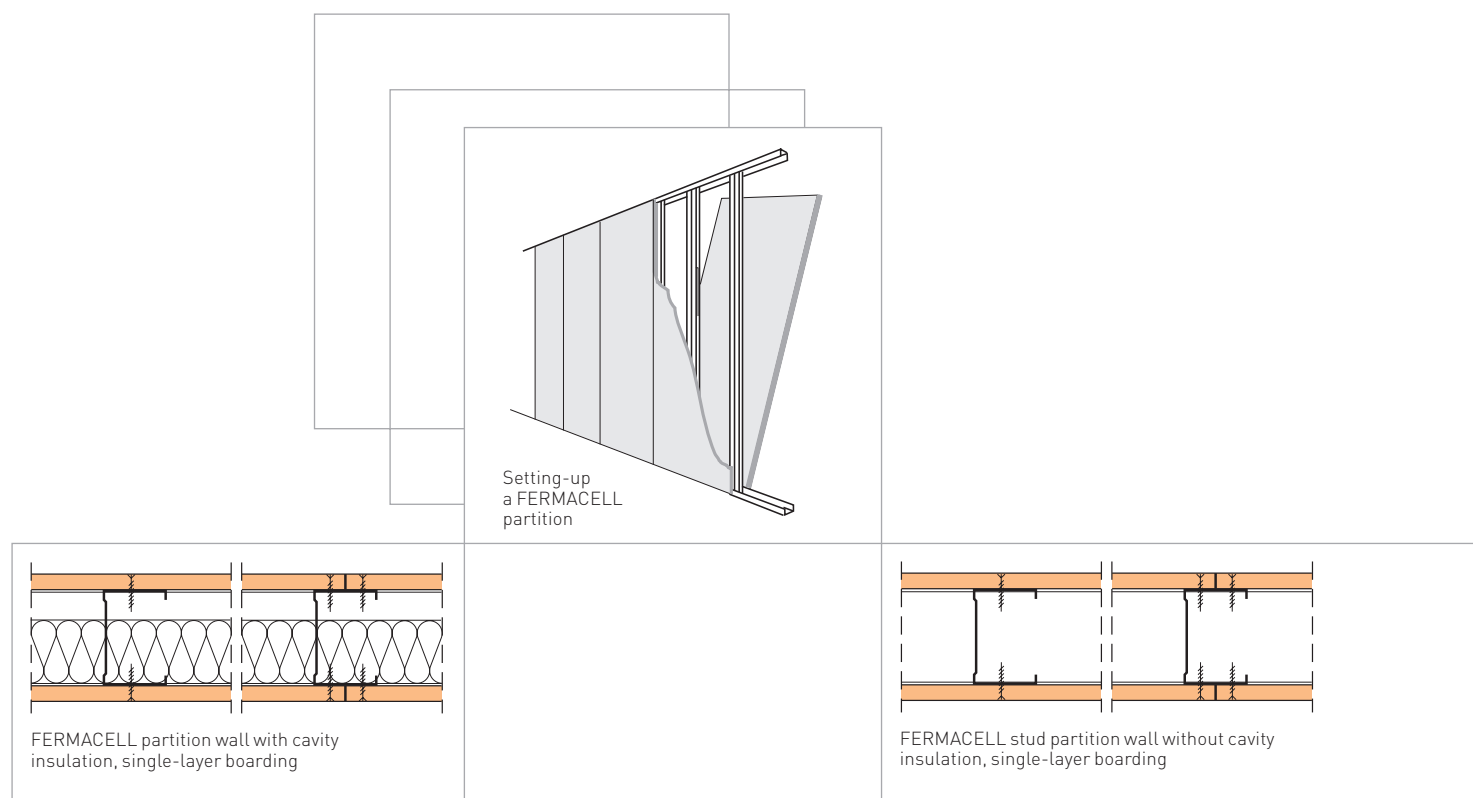
6.6 Lining of timber beams and supports with FERMACELL Gypsum-Fibre boards.

The lining of timber or laminated timber beams, supports and tie beams with FERMACELL boards may be necessary due to specification or for specific levels of fire resistance. In regard to fire resistance requirements, the wooden components must show a rectangular cross-section with a definite minimum thickness and also qualify to Grade II according to DIN 4074 Part 1. In addition they must also comply to the necessary British Standards.

For information on jointing details for the various board layers and jointing techniques, see the section on joint formation on Page 14 of this document.

With double layer boarding, both layers can be fastened into the timber component or alternatively the outer board layer may be fixed directly into the first layer of board. The butt joints of the boards should be staggered by at least 400 mm.

7. Steel Stud partitions with FERMACELL.



7.1 Single stud walls with single-layer boarding.

Install the Protektor steel studwork at 600 mm centres as described in Sections 4.3 and 4.4.

Jointing is carried out as described in Chapters 2.5 and 2.6 (middle of joint = middle of profile). Ensure that fixing of FERMACELL Gypsum-Fibre boards to the Stud profiles is carried out with FERMACELL screws 3.9 x 30 mm; at spacing of 250 mm (see table in Chapter 2.4).

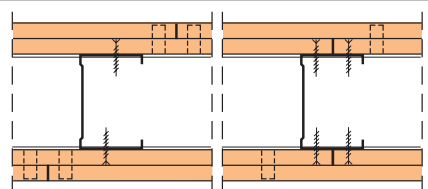
The FERMACELL boards must not be screwed to the header or footer track. Set the top and bottom screws about 50 mm from these.

After first fix of services and any insulation within the cavity the second side of the wall should be boarded, as described above. Ensure that joints are mirrored on the same studs, as per Chapter 4. Measurements for doors and windows are described in Chapter 10.

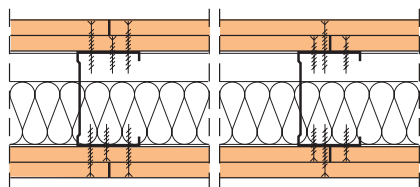
Finally, joints and fixings should be flush filled with FERMACELL Joint Filler as described in Chapter 2.5. All vertical and horizontal junctions with other types of materials should be filled with a flexible paintable filler/sealant. Any special connections/junctions for movement or expansion junctions are detailed in Chapter 9; and these must be installed where any movement is anticipated.

7.2 Single stud walls with two or more layers.

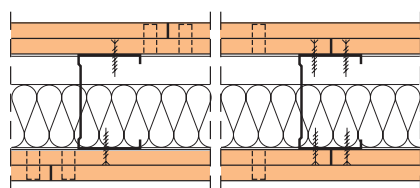
Construct the FERMACELL partition as per 7.1, but



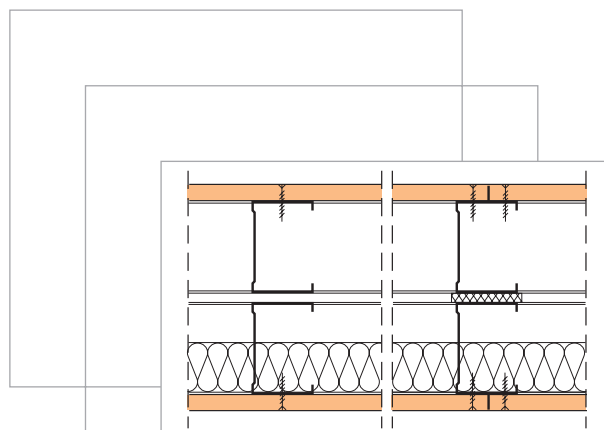
FERMACELL partition wall with no cavity insulation, double-layer boarding



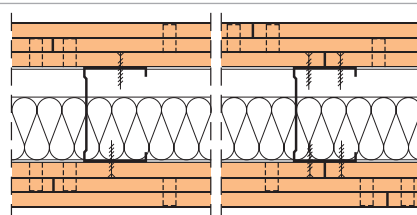
FERMACELL stud partition wall, double-layer boarding. Both board layers screwed to Protektor stud profile



FERMACELL stud partition wall, double-layer boarding. Outer board layers stapled to 1st/lower board layer



FERMACELL separated stud partition wall single-layer boarding. Studs separated (left) or connected with self-adhesive insulating strips (right)



FERMACELL stud partition wall with insulation. 2nd and 3rd layers fixed to 1st layer using staples.

1. First board layer(s).

- Width 1200 mm, room height
- Board thickness as required
- Board butt joined, without adhesive or filler (also applies for fire protection and sound rated structures)
- Fixings – FERMACELL screws 3.9 x 30 mm, spacing as per Chapter 2.4

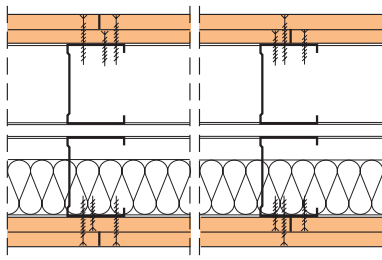
2. or 3./outer board layers.

- Width 1200 mm, room height
- Fix boards with adhesive joint as Chapter 2.5 or with 5–7 mm joint filler method as Chapter 2.
- Staggered butt joint between 1st and 2nd board layer by one stud spacing (600 mm with 12.5mm FERMACELL), if both board layers are to be fixed back to the studs, or

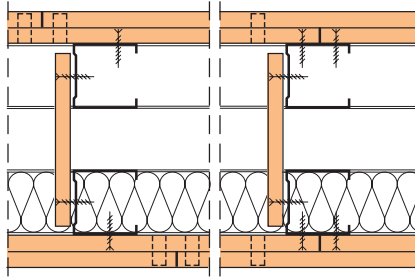
- Staggered butt joint between 1st and 2nd board layer by a minimum of 200 mm, if the 2nd board layer is stapled or screwed to the 1st board layer.
- Where the second layer of board is to be fixed back to the stud, the FERMACELL 3.9 x 45 mm screws should be used, spacing as per the table in Chapter 2.4 or
- The outer layer of board can be fixed to the first layer of board with galvanised diverging staples or FERMACELL screws 3.9 x 30 mm, spacing as table in Chapter 2.4.

7.3 Single layered separated stud constructions.

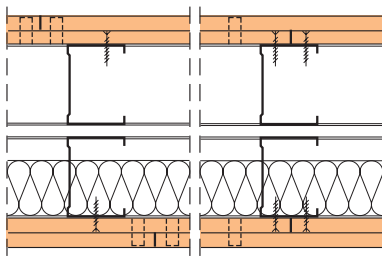
With separated stud partitions, two parallel sets of studs are constructed side by side and these are either separate or connected by support strips between the vertical studs at $\frac{1}{3}$ and $\frac{2}{3}$ of the wall height. Wall thickness, height details and physical characteristics should be specified depending on the performance requirements. When using support strips it is preferable to use a separating strip between the support strip and the stud.



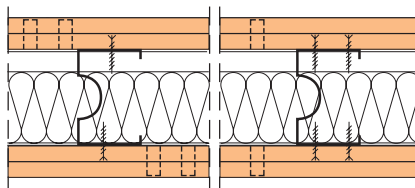
FERMACELL stud partition wall with twin Protektor studs, double-layer boarding. Both board layers screwed to the stud



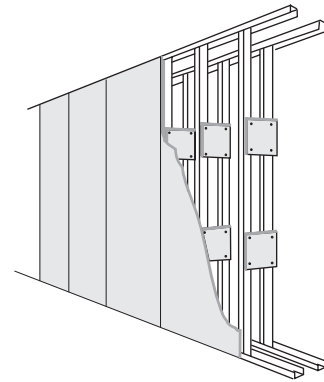
Cross bracing in a separated stud wall



FERMACELL stud partition wall with twin Protektor studs, double-layer boarding. 2nd outer board layer stapled to 1st/lower board layer



FERMACELL high performance acoustic wall with Protektor Acoustic stud, double layer boarding. 2nd outer board layer stapled into 1st/lower board layer



FERMACELL Service wall

7.4 Multi layered separated stud constructions.

These are constructed as per sections 7.2 and 7.3. the subsequent layer of board can either be fixed back to the stud or board to board fixings may be used; dependant on system fire requirements.

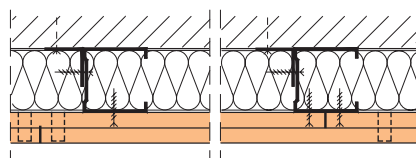
7.5 Acoustic stud partitions.

These are simple stud wall details utilising Protektor acoustic studs, and they can be single or multi-layered. Construction of the FERMACELL partition is as per Chapter 7.1 and 7.2.

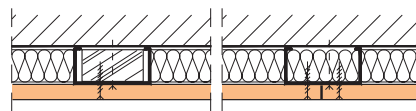
7.6 Separated stud walls with large service voids.

These FERMACELL walls are built as a standard separated stud construction, but with larger gaps between the studs to accommodate large services such as soil pipes (typically 100 mm).

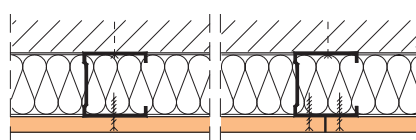
To provide the required lateral support between these separated studs, the vertical studs are cross braced at $\frac{1}{3}$ and $\frac{2}{3}$ rd height points. This can be achieved using offcuts of FERMACELL, or timber or steel stud. Where pipe supports are required in the cavity, it is better to use timber or steel cross bracing to fix these supports to.



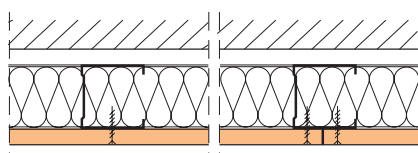
Sub-structure using Protektor C studs fixed to support walls with angles, with insulation, double-layer boarding.



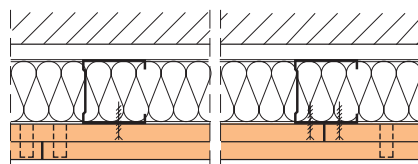
Sub-structure in CD profiles, with/without wood insert with insulation, single-layer boarding



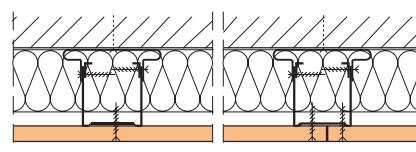
Sub-structure using Protektor C studs fixed directly to rear wall with screws, with insulation, single-layer boarding



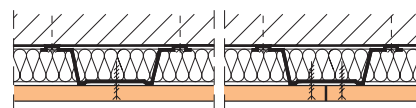
FERMACELL independent wall lining, single-layer boarding



FERMACELL independent wall lining, double-layer boarding



Sub-structure using Protektor adjustable VCD system, with insulation, single-layer boarding



Sub-structure using Protektor metal furrings, with insulation, single-layer boarding

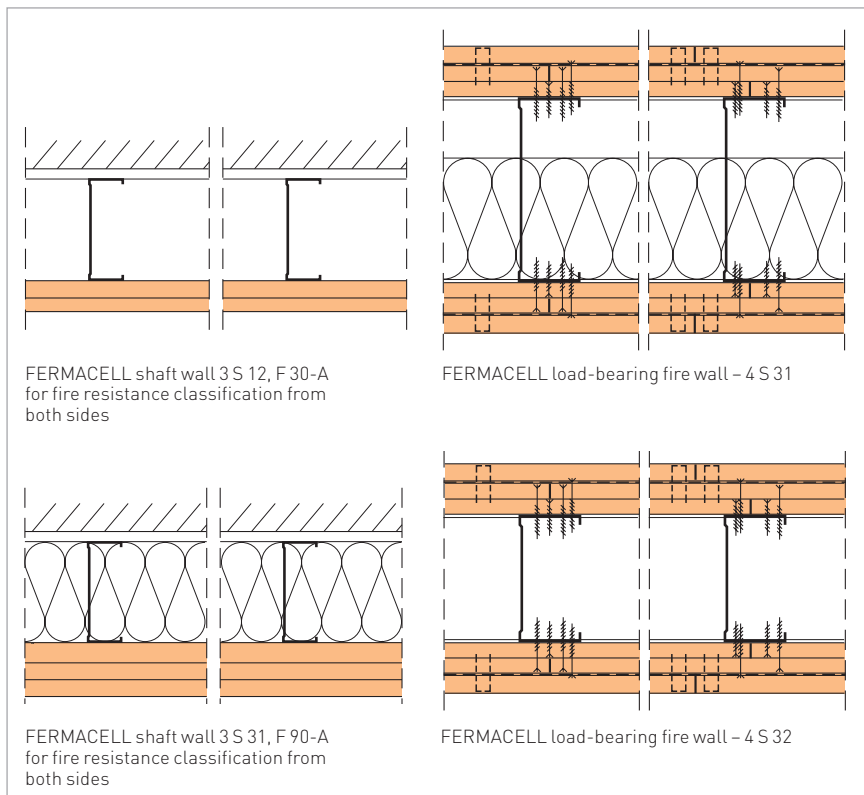
7.7 Dry lining.

These walls are constructed as detailed in section 7.1 and 7.2, but with boarding to one side only.

The fire resistance classification for these dry lining details applies to both sides, so that they can also be used as shaft walls. Vapour barriers should be used as required.

7.8 Wall linings.

For FERMACELL wall linings with metal sub-structures, various profile systems can be selected. FERMACELL recommend Protektor steel profiles.



With all constructions, the installation details provided by FERMACELL/ XELLA must be observed at all times. Additional information on wall thicknesses, wall heights and physical characteristics can be found on the FERMACELL website www.fermacell.co.uk.

7.9 Shaft walls.

With respect to fire resistance, the details described in section 7.7 can also be used as shaft walls.

7.10 Fire walls.

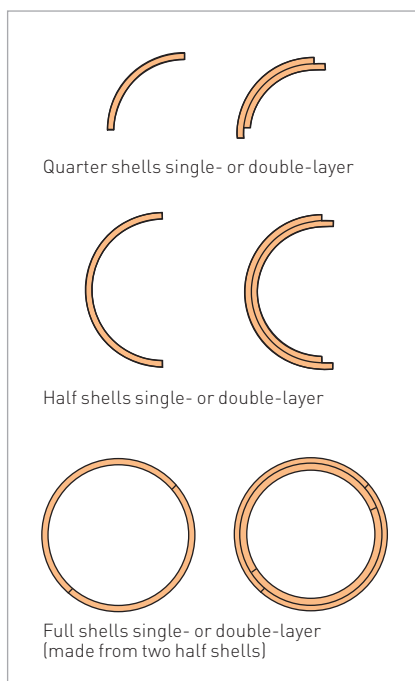
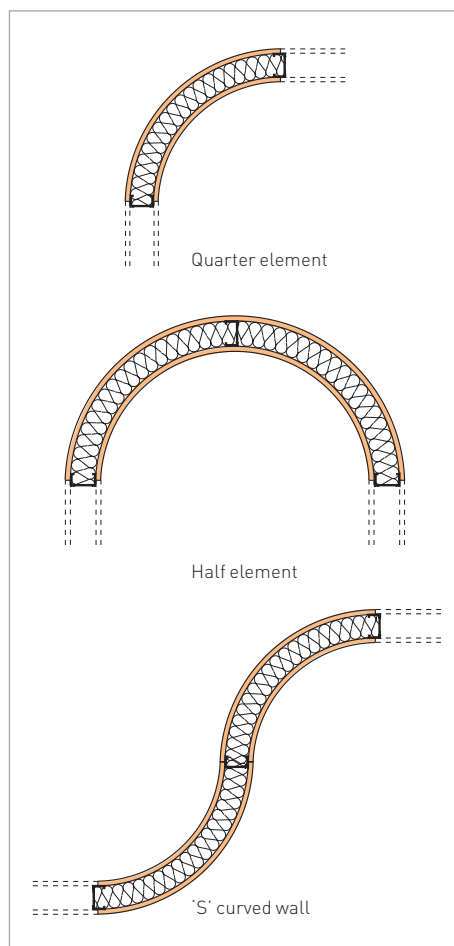
Construction of FERMACELL fire walls Type 4 S 31, F 90-A and 4 S 32, F 90-A are as described in section 7.2, but a 0.38 mm thick sheet steel plate is inserted between the 2nd and 3rd layers of board.

The load-bearing fire wall 4 S 31 construction includes:

- FERMACELL boards, 12.5 mm thick.
- Sub-structure of supporting Protektor C stud and track profiles in galvanised steel sheet 1.5 mm and an additional sheet steel plate 0.38 mm.
- Rockwool for cavity insulation.

The non-load-bearing fire wall 4 S 32 construction includes:

- FERMACELL boards 12.5 mm thick.
- Sub-structure of Protektor C stud and track profiles in galvanised sheet steel 0.6 mm and an additional sheet steel plate 0.38 mm.
- No cavity insulation. If an insulation layer is required, this will enhance the performance of the wall if the insulation has an A2 classification.



7.11 Bending FERMACELL.

Bending FERMACELL Gypsum-Fibre boards.

When preparing curved wall and ceiling structures using standard size 10 mm and 12.5 mm FERMACELL boards, there are three methods of application. These depend on the areas where the curved walls are to be used and the required radius.

For a radius ≥ 4000 mm, use dry bending with stud spacing ≤ 300 mm. In this case, standard size boards are fixed lengthways on to the studs.

For a radius between ≤ 4000 mm to ≥ 1000 mm, wet bending (locally, on site) is recommended; the stud centres should be ≤ 250 mm. The FERMACELL boards must be humidified/wetted over a period of at about 10 hours, these are then placed over pre-formed templates to the required radius. After drying, the FERMACELL boards will regain their original properties, but will be a curved board.

For a radius ≤ 1000 mm, specialist treatments are required. The specially curved elements may be applied as single/loose quarter or half shells for encasing columns, supports and similar components.

8. Timber stud partitions with FERMACELL.

8.1 Simple timber stud walls – single-layered.

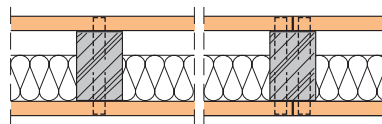
The partitions are constructed as described in Chapter 7.1, but:

- Timber sub-structure to be softwood, Grade S10, Cut Category S10, square-edged
- Boards can be fixed with galvanised steel staples or screws as per the table in Chapter 2.4.

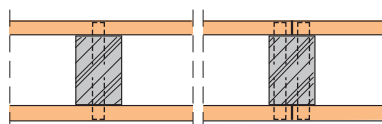
8.2 Simple timber stud walls – multi-layer.

The partitions are constructed as described in Chapter 7.2, but:

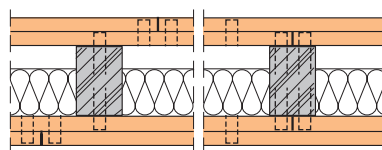
- Timber studs to be as per Chapter 8.1.
- Boards can be fixed with galvanised steel staples or screws as per the table in Chapter 2.4.



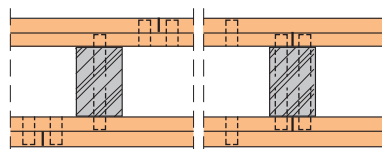
FERMACELL timber stud partition with cavity insulation, single-layer



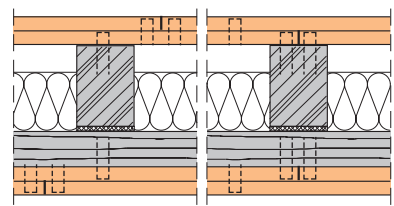
FERMACELL timber stud partition without cavity insulation, single-layer



FERMACELL timber stud partition with cavity insulation, double-layer



FERMACELL timber stud partition without cavity insulation, double-layer



FERMACELL timber stud partition with cavity insulation with cross battens, double-layer

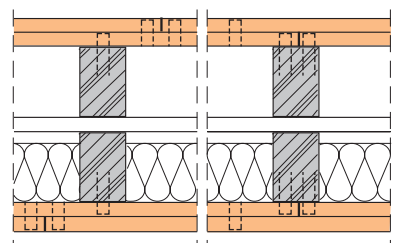
8.3 Simple timber stud walls with cross battening – multi-layer.

The partitions are constructed as described in Chapter 7.2, but on the vertical timber stud a timber cross batten is fixed (30 mm x 50 mm); spacing is given in the table on page 2, and is dependant on the board thickness being used. The use of mineral wool or a similar resilient type of material is recommended between the studs and the cross battening for acoustic purposes.

- Boards can be fixed with galvanised steel staples or screws as per the table in Chapter 2.4.

8.4 Double stud wall – multi-layer.

The partitions are constructed as described in Chapter 7.4.



FERMACELL separated timber stud partition with cavity insulation, double-layer

Further systems are available with timber studs, such as

- Loadbearing timber stud walls, with cavity insulation
- Loadbearing timber stud walls, without cavity insulation
- Gable end walls, load-bearing
- Outer wall, load-bearing.

8.5 Single stud walls with combined steel/timber sub-structures.

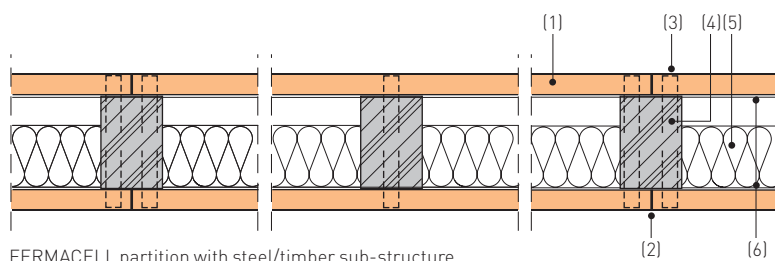
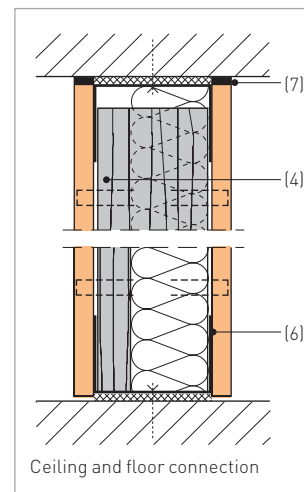
FERMACELL stud partitions with hybrid sub-frames offer the benefits of speed of erection when compared with either all steel or all timber sub-frames.

The steel header, footer and vertical profiles can be fixed with a hammer fixing directly into the shell of the building. This is quicker and simpler than fixing with timber studs.

Uneven areas on the adjacent structure can be levelled off without difficulty, particularly when sound reduction and fire resistance performance are taken into account.

The vertical timber stud used in this hybrid construction can be fitted without the need for an exact length to be cut. This is then easily fitted into the header and footer steel profiles. Minor differences in the overall room height for the partition can be adjusted without difficulty.

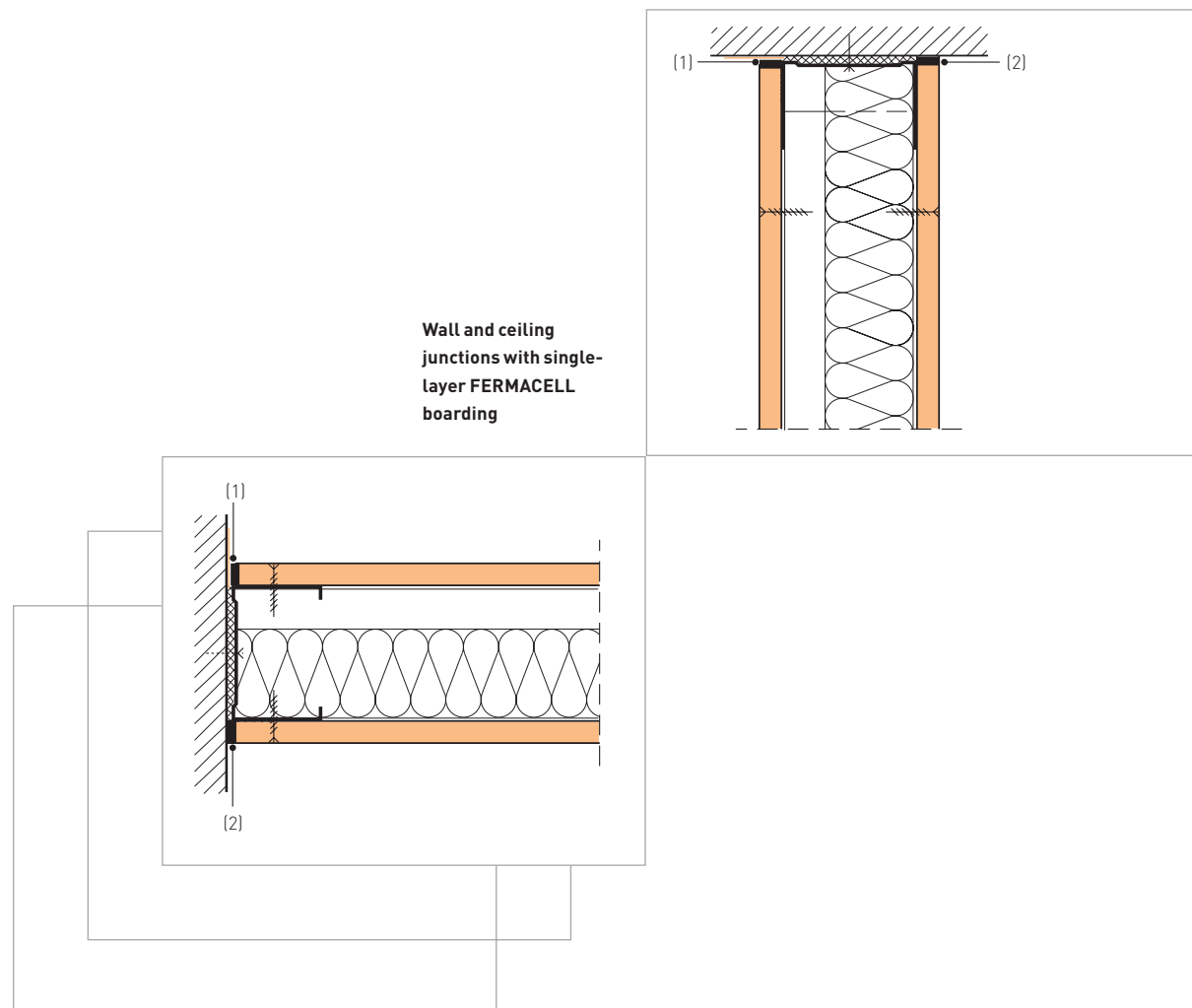
Boards can then be stapled to the vertical timber studs. Acoustic and fire performance is comparable to the equivalent all timber construction.



- (1) FERMACELL board 12.5 mm
- (2) FERMACELL adhesive joint
- (3) Galvanised staples
- (4) Timber stud
- (5) Insulation material
- (6) Steel header/footer track
- (7) FERMACELL Joint Filler with isolation strips and/or flexible caulking

The subsequent boarding (single or multi-layer) of vertical timber studs is particularly time-saving and economical, since FERMACELL boards can be fixed to timber studs with staples.

9. Junctions, connections, expansion joints.



9.1 Separate wall and ceiling connections.

Where FERMACELL abuts other materials such as plaster, exposed concrete, masonry, steel or wood, care must be taken as each has a different differential movement rate (expansion and contraction with environmental changes). There are several ways of addressing this with FERMACELL.

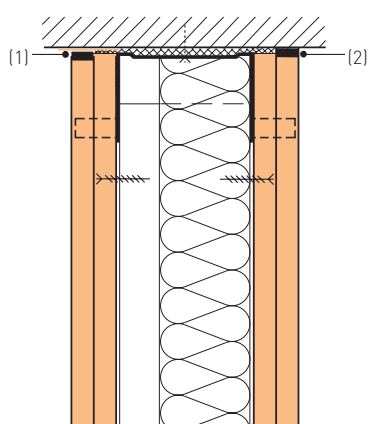
1) Junctions using FERMACELL Joint Filler and a separation tape.

Firstly the backs of the profile (timber or steel) being fixed to the wall must be backed with an isolation strip (for fire and acoustic purposes). Before fixing the board to the studs, attach separation strips, (e.g. PE foil, paper or adhesive strips, etc.) to the main structure and allow these to extend past the line of the external face of the completed wall. When fixing the boards to the studs, leave a 5–7 mm gap and fill with FERMACELL Joint Filler. After the joint filler has hardened, cut the protruding separator strips flush with the board.

For fire resistance requirements:

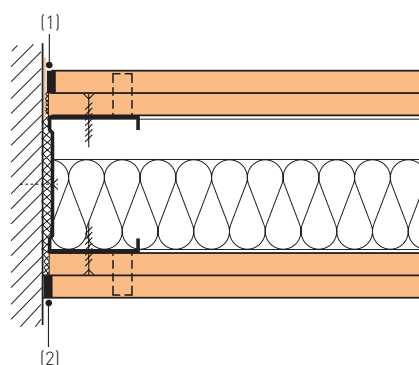
ensure that the isolation strip is a fire rated material suitable for use in this type of construction. Rockwool type material should be of a thickness ≤ 5 mm; where required it may be necessary to increase the end gap to be filled with FERMACELL Joint Filler to a width of 6–10 mm.

This type of junction assumes that there will be no building movement as it forms a rigid joint. If any movement occurs then an artificially straight crack is engineered where the separation tape lies. This can then be covered as required for aesthetic purposes.



**Wall and ceiling junctions
with double-layer
FERMACELL boarding**

- (1) Junctions with FERMACELL Joint Filler
and isolation strips
(2) Junctions with mastic sealing material.



2) Junctions with elastic/flexible sealing material.

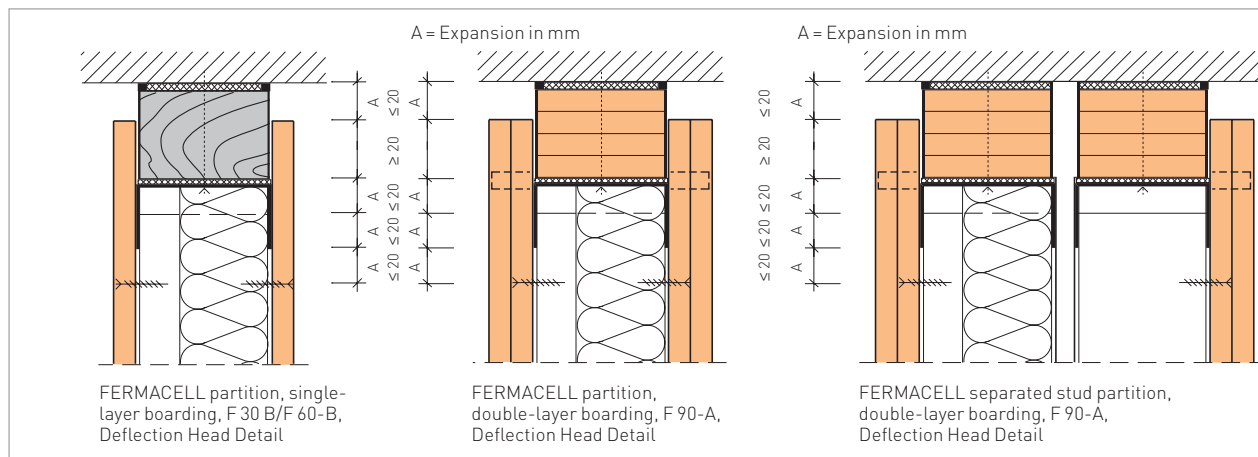
The studwork and isolation material behind the stud should be fitted as detailed with the joint filler method. No separation strips are used. The gap between the FERMACELL and the main structure can then be filled with a flexible sealant, which has a permanent expansion of at least 20 %. The board edge should be primed before sealing. Nominally the gap left should be a minimum of 3–5 mm, but up to 5–7 mm is allowable.

For fire resistance requirements:

The Isolation strip must be fire rated; mineral wool types are usually an 'A' classification material (melting point $\geq 1000^{\circ}\text{C}$). Flexible intumescent materials may be used, however, the manufacturers instructions must always be followed. The FERMACELL edges must always be primed.

Where the construction calls for more than one layer of board, the inner layers must be butted up against the isolation material, or if any gaps are left then these must be sealed with either FERMACELL Joint Filler or an intumescent material before the final layer is fixed in place.

Corner and T-junctions of FERMACELL boards with each other should be jointed either by the joint filler method or the jointstik method (glue). Where the jointstik method is used ensure that the junctions run true. In addition it can be difficult to remove the jointstik adhesive from internal corners, thus if the joint does not run true, use the joint filler method.



9.2 Deflection Head Details.

Deflection head details are required where deflection in the main structure to which the head is to be fixed is expected to exceed 10 mm after installation. Deflection head details must be constructed in such a way that no forces from the main structure are transmitted into the lightweight partition details.

With an anticipated ceiling deflection of ≤ 10 mm, no deflection head details are required. The pre-requisite for this is that the length of the Stud profiles and the length of the FERMACELL boards are also installed ≤ 10 mm than the room height to accommodate this minimal movement.

As shown above the deflection head detail can be constructed using FERMACELL strips (cut to exactly fit the width of the head profile) or timber sections. The total thickness of the FERMACELL strip or timber section must correspond to the dimension of the ceiling deflection specified/expected, plus the overlap for the boarding.

For F 30 partitions, timber sections must be > 50 mm wide, for F 60 partitions the timber section must be > 70 mm wide. For F 90 partitions use FERMACELL strips.

Where using FERMACELL strips, these should be cut in to lengths the width of the head profile, glued to each other before assembly and then fixed with staples or screws and then

fastened flush with the edge to the ceiling profiles. Using appropriate fixings these should then be fitted through the head profile and the FERMACELL strips into the ceiling at a distance of ≤ 700 mm. Where the ceiling is uneven then a mineral wool isolation strip is recommended (melting point 1000°C for fire rated partitions). With particularly high strip numbers, the fixing spacing should be reduced or the strips should be locked in place with an appropriate angle section.

For fire rated partitions the fixing centres in to the main ceiling should be reduced.

Where timber sections are to be used the timber and header profile must be fixed to the ceiling at the same time with a single fixing at ≤ 700 mm centres (as with the FERMACELL strips). Insulation strips and flexible sealants can be used to fill any gaps with uneven ceilings. For filling gaps with uneven ceilings for fire and acoustic purposes the appropriate materials should be used.

The Stud profiles should be cut down in length to allow for the anticipated ceiling deflection. Care must be taken to ensure that with any movement the studs always sit to a minimum depth of 25 mm within the header profile. For larger deflection movements a deep flange channel may be required. In all cases confirm the amount of movement with the specification.

The FERMACELL boards are to be cut short of the ceiling height by the required deflection amount. The edge of the board should overlap the FERMACELL strips or timber section by a minimum of 20 mm. Boards must only be fixed to the vertical stud profiles, they must not be fixed to the header or footer track under any circumstance.

The first screw to be fitted into the stud below the head detail must be set down from the leg of the header profile by the required deflection amount.

If there are fire resistance requirements (F 30 to F 90), the minimum width of the strips of FERMACELL, according to DIN 4102 Part 4, Section 4.10.5, should be 50 mm.

For wall heights above 5000 mm, the deflection head detail must be mechanically stabilised with appropriate extra measures, such as support brackets.

The information in Chapter 9.2 also applies to roof junctions, where, after the installation of light partitions, ceiling deflections can be expected.

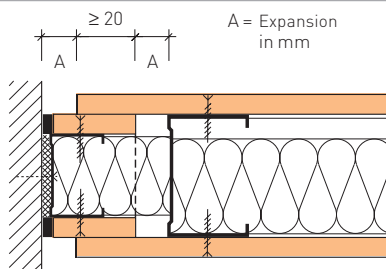
The chain dimensioning alongside the deflection head details on Pages 50 and 51 apply to structures with fire resistance requirements according to DIN 4102 Part 4.

9.3 Wall movement joints and façade junctions.

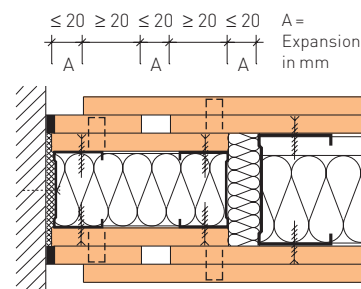
Exterior façades, principally curtain walls, can be subject through wind loads, to pressure and suction movements, and therefore must receive special attention in regard to the design, construction and assembly.

Various constructions are shown in the following illustrations.

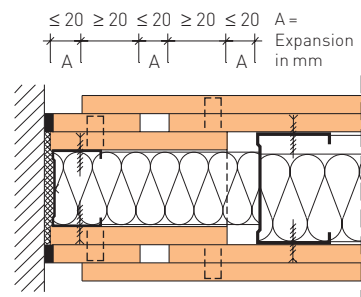
With these junctions care must also be taken that no structural forces from the building shell affect the FERMACELL boards. Care should be taken to ensure the required sound-reduction and fire resistance characteristics are met (see also Reports to DIN 4102 Part 4, Section 4.10).



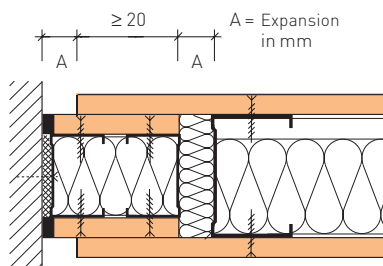
FERMACELL partition, single-layer boarding, F 30-A / F 60-A. Wall movement joint and/or façade junction with a Protektor steel stud and strips of board



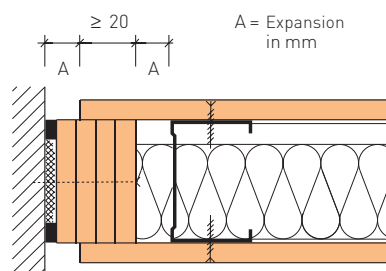
FERMACELL partition, double-layer boarding, F 90-A. Movement joint detail and/or façade junction with two Protektor steel studs and strips of board



FERMACELL partition, double-layer boarding, F 90-A. Wall movement joint and/or façade junction with a Protektor steel stud and strips of board



FERMACELL partition, single-layer boarding, F 30-A / F 60-A. Wall movement joint and/or façade junction with two Protektor steel studs and strips of board



FERMACELL partition, single-layer boarding, F 30-A / F 60-A. Wall movement joint and/or façade junction using strips of FERMACELL

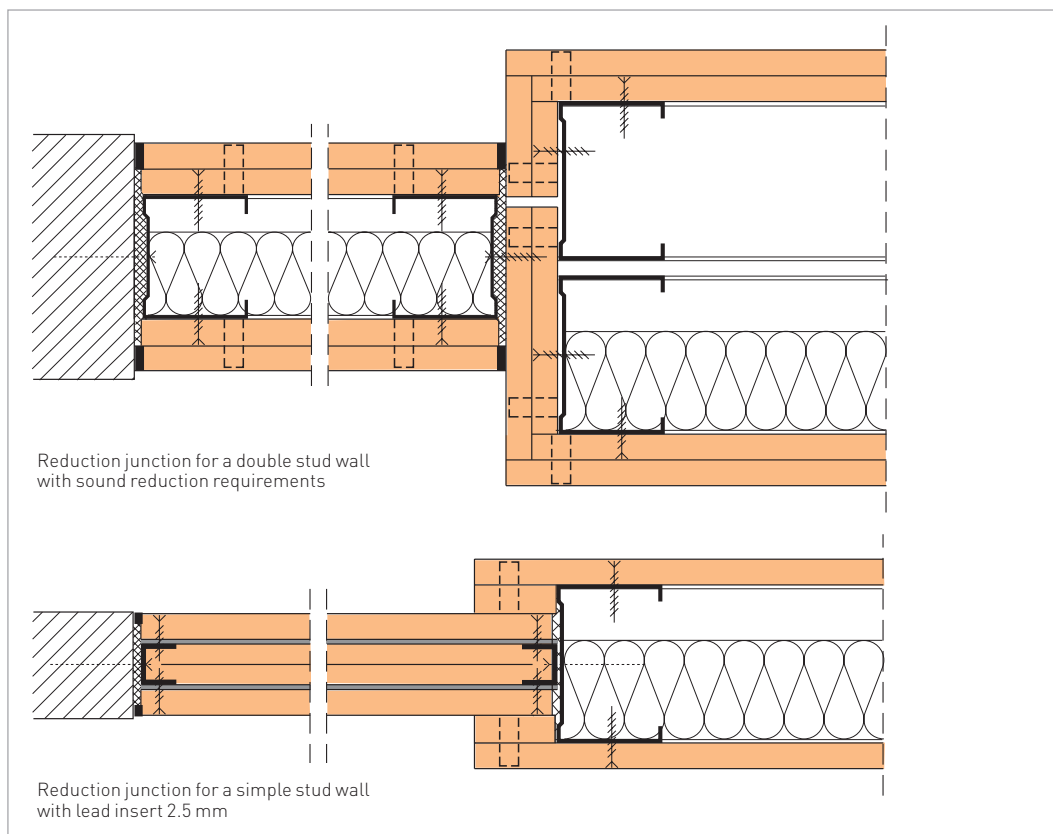
The dimensional details shown alongside these details apply to structures with fire resistance requirements according to DIN 4102 Part 4.

9.4 Reduction junctions (tapered wall and façade junctions).

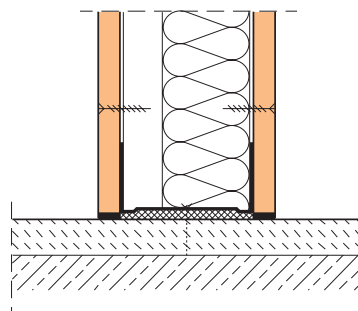
When joining partitions to narrow building components (such as window posts), the thickness of the partition must be reduced to match the size of the junction section. As the wall thickness of the reduced section will be less than the original, in certain areas instead of a double stud wall (party wall) perhaps only a simple stud system is possible, and the sound reduction values of the whole wall will be affected. To compensate, a lead sheet can be fitted in the reduced wall section on one or both

sides of the wall. The surface area of the reduced wall section should be kept as small as possible. (For calculating the resultant sound reduction dimension of a component, which is composed of different sound insulation materials, see DIN 4109 Supplement 1 to Chapter 11).

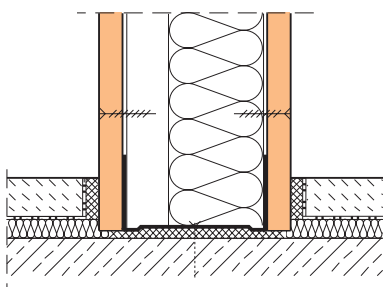
For fire resistance requirements the same boarding thicknesses and mineral wool insulation is required in the reduced wall section as in the main wall detail.



When considering using Tapered and/or movement wall junctions the reduction in sound and fire resistance values caused by the tapered element should be calculated before using or designing these details in partition constructions.



Partition on composite screed

Floating screed against partition
($R_{L,w,R}$) = 70 dB

9.5 Floor junctions construction.

Tight floor junctions are essential for sound reduction and fire resistance. Sealing the junction with the correct material is therefore essential.

Longitudinal and flanking transmission issues must be resolved at an early stage, thus further highlighting the importance of sealing all sound transmission paths and air gaps. This will also affect the type of junction details specified depending upon the level of performance required.

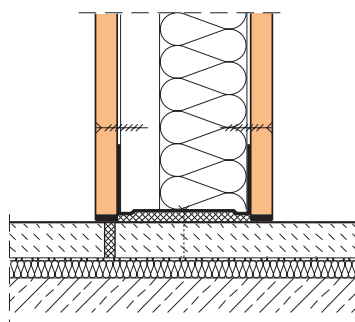
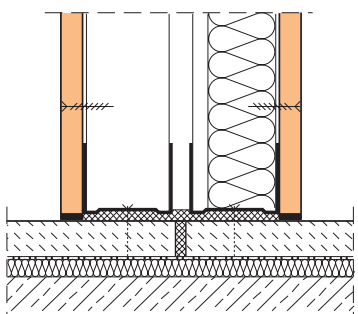
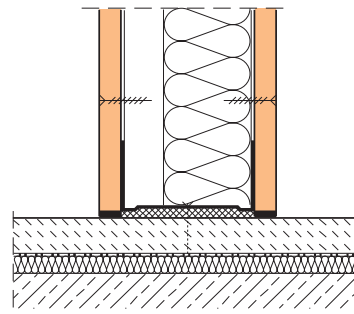
From an acoustic standpoint a floating screed against the finished partition is most effective.

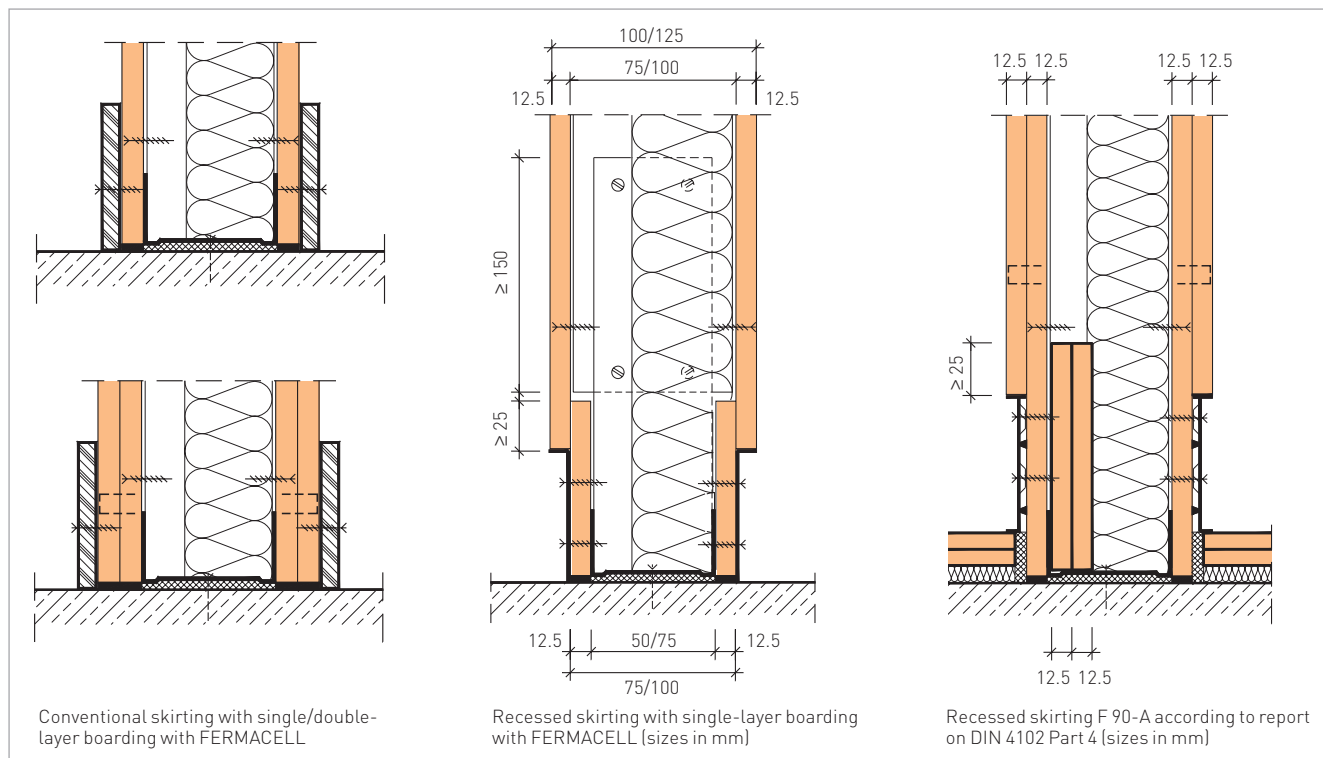
With a continuous floating cement screed, an acoustically effective expansion joint should be set in the region of the wall junction; unless the sound reduction requirements for the partition are very low. For expansion joints in the screed below the wall components, loading requirements (e.g. the load of the partition itself) should be taken into account.

A continuous asphalt screed will give better sound reduction than a continuous cement screed.

The flanking insulation value for each type of construction is expressed as $R_{L,w,R}$. " show the $L_{w,R}$ as subscript a in tables on the same page.

These details also apply to fire rated constructions.

Partition on floating screed with
expansion joint ($R_{L,w,R}$) = 55 dBDouble stud partition on floating screed with
expansion joint ($R_{L,w,R}$) = 55 dBPartition on continuous floating screed
($R_{L,w,R}$) = 38 dB



The junction of the FERMACELL boards with the floor can be constructed in various ways, according to the requirements and the function of the skirting. The function of the skirting is to protect the wall against damage, soiling, etc. Before the skirting is constructed, distinguish between:

– Conventional skirting

In this case, the base profiles (wood, metal, plastic) are fastened to the FERMACELL boarding after finishing. Due to the great strength of FERMACELL, this can be done direct in the board, irrespective of the sub-structure.

– Recessed skirting, partition with single-layer boarding

Where single-layer FERMACELL walls, with no fire resistance requirements, require a recessed skirting detail, FERMACELL board strips should be arranged as per the drawing using the same thickness of board as the outer layer.

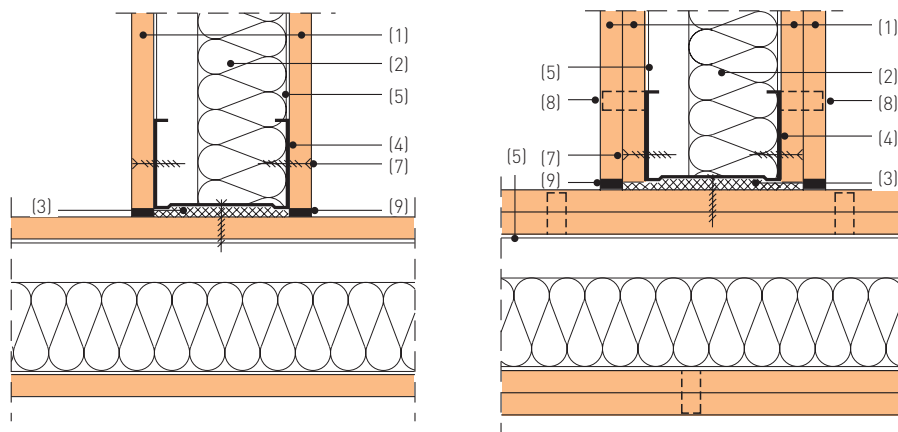
Where the boards overlap a minimum lap of 25 mm must be used. The steel stud profiles should be shortened by the recess height required and mechanically fixed with an overlap of 150 mm with a reduced width steel C profile so the loaded characteristics of the partitions are not affected.

– Recessed skirting, partition with double-layer boarding

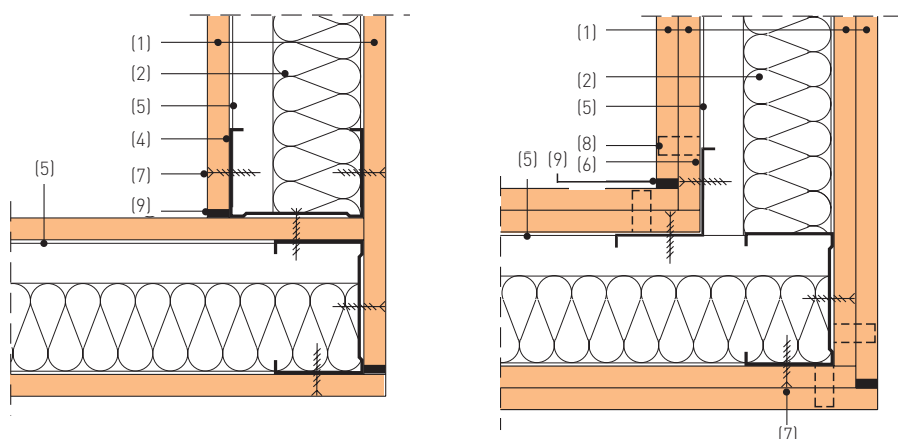
Where recessed sections are required in double layered wall details, the inner layer of board should be set down to floor level (with the required separation gap from the floor) and the outer layer then cut short the required distance. Reduced boarding at the base represents a weak point in the wall linings in regard to fire and sound insulation so to maintain the sound reduction and fire resistance, additional layers of board material should be built into the wall cavity.

With steel stud sections $\geq 75 \times 50 \times 0.6$ mm any affect on the sound insulation can be minimised.

The dimensional details shown alongside the details apply to fire rated structures in accordance with DIN 4102 Part 4.

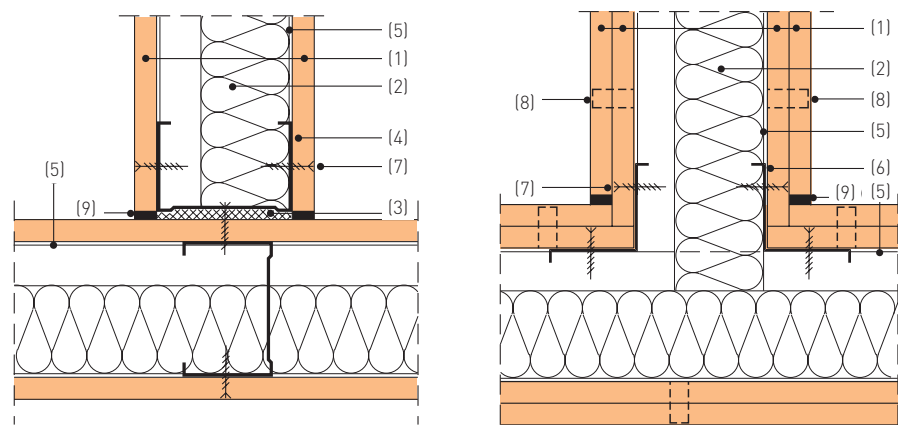


T-junctions with single or double-layer boarding, with Protektor C stud fixed to FERMACELL board.



Corner connections with single or double-layer boarding

- 1) FERMACELL boards 12.5 or 10 mm
- 2) Insulating material
- 3) Edge insulating strips
- 4) Protektor Stud profile
- 5) Protektor Header or footer track
- 6) Inner corner profile
- 7) FERMACELL screws 3.9 x 30
- 8) Staples, galvanised, for fixing FERMACELL in FERMACELL
- 9) FERMACELL Joint Filler



T-junction with Protektor C stud fixed back to stud in main wall.

Wall T-junction with interrupted longitudinal flanking transmission and Protektor inner corner profile

9.6 Corner and T-junctions.

When constructing FERMACELL corner and 'T' junctions, use the steel profiles and construction details as shown above.

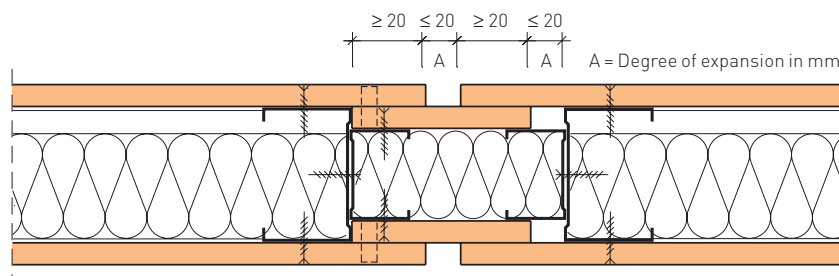
For partitions with enhanced sound reduction requirements, the FERMACELL boarding of the flanking partition should

be interrupted. The FERMACELL boards are then fastened to the corner or T-junction using wall inner corner profiles and/or outer corner profiles.

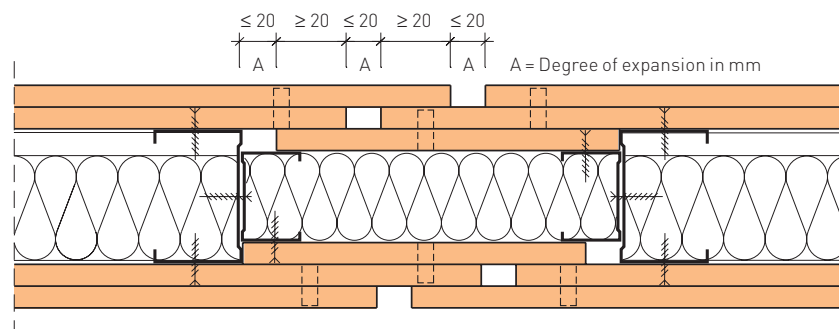
The corner joints of the FERMACELL boards should be formed using the 5 to 7mm joint filler joint as described in Chapter 2.6.

The corner and T-junctions of single or double-layer boarded FERMACELL walls with a timber substructure should be constructed in the same manner. Where any building movement is expected, the internal junctions may be jointed with a flexible sealant. FERMACELL edges must be primed. Where a fire performance is required then a fire rated sealant must be used.

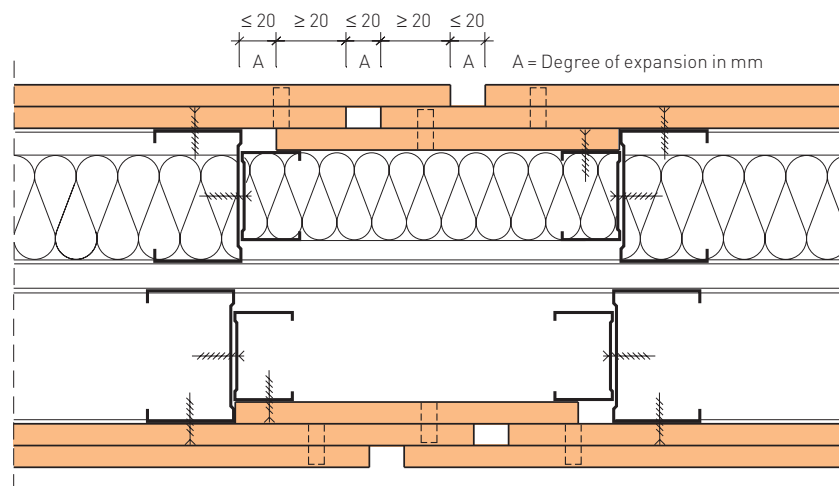
The dimensional details shown alongside the details apply to fire rated structures in accordance with DIN 4102 Part 4.



FERMACELL stud partition wall, single-layered boarding F 30-A/F 60-A.
Expansion joint



FERMACELL stud partition wall, double-layered boarding, F 90-A.
Expansion joint



FERMACELL separated stud partition wall, double-layer boarding, F 90-A.
Expansion joint

9.7 Expansion joints.

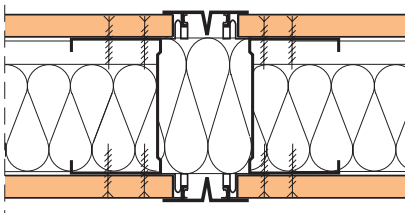
Expansion joints are required in FERMACELL partitions on steel studs and where there are expansion joints in the shell of the building.

As partitions with FERMACELL boards are subject to dimensional movement with changes in the internal climates (elongation and shrinkage),

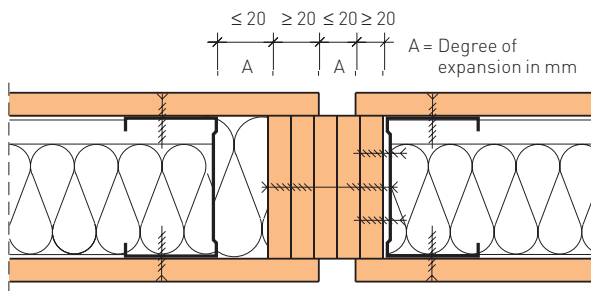
this must also be taken into account with expansion joints. Spacing of expansion joints depends on the jointing method:

- Filler joints require movement joints at a maximum of 8.0 m
- Adhesive joints require movement joints at a maximum of 10.0 m.

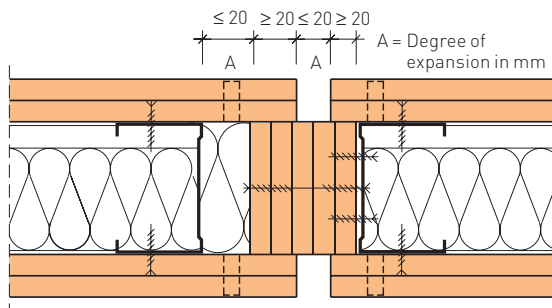
Movement joints for single and double layered partitions should be constructed as detailed above. Care should be taken, that a consistent separation of the two leaves is maintained within the FERMACELL as well as the sub-structure. Measures to safeguard the required sound reduction and fire prevention characteristics should be taken into account.



FERMACELL stud partition wall, single-layer boarded, with no fire resistance requirement.
Expansion joint with capping profile



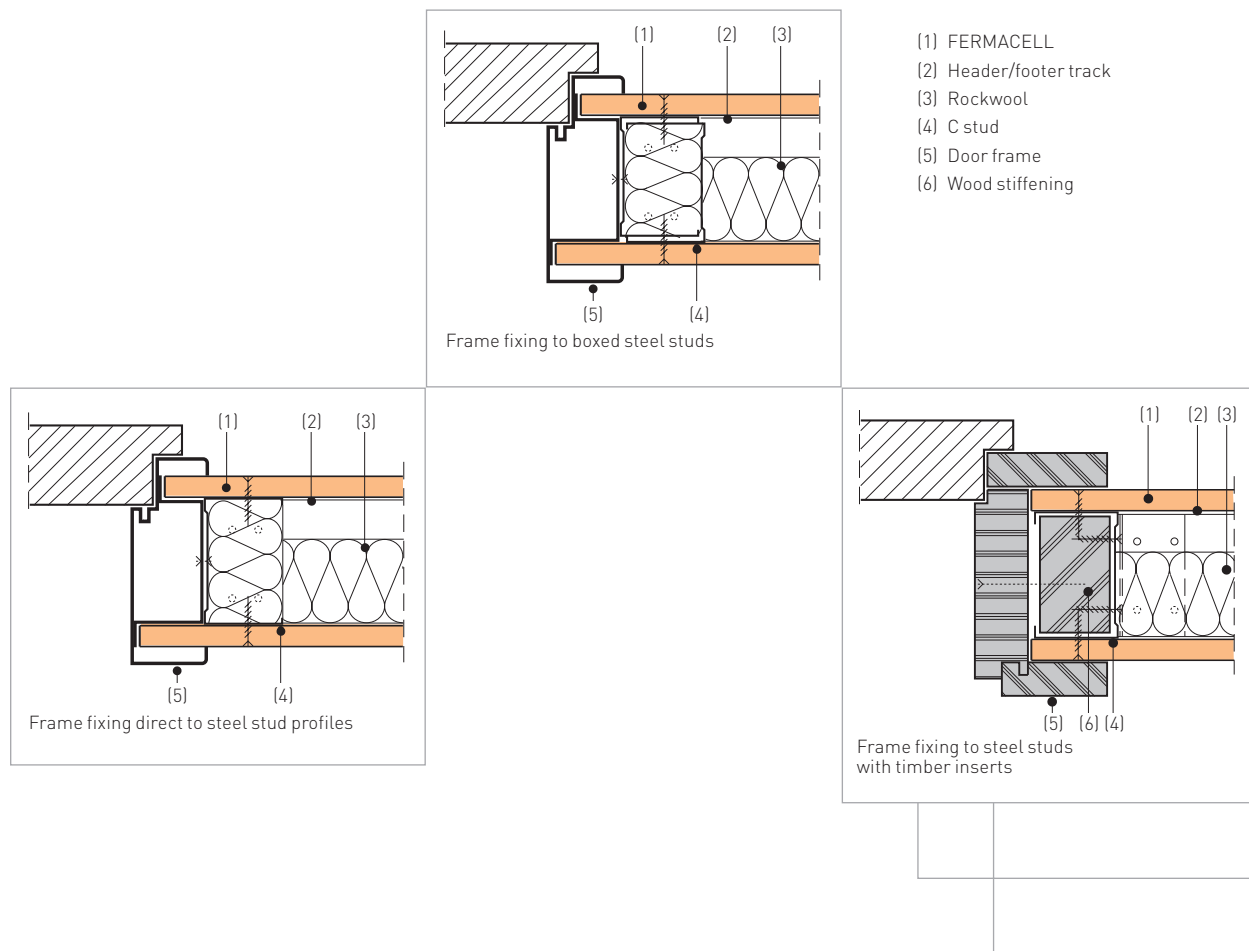
FERMACELL stud partition wall, single-layer boarding, F 30-A/F 60-A.
Expansion joint with board strips



FERMACELL stud partition wall, double-layer boarding, F 90-A.
Expansion joint with board strips

For thin walls stud profiles of 50 mm x 50 mm x 0.6 mm, the construction shown above with strips of FERMACELL should be used. The strip is fixed at 1000 mm centres by fully threaded screws, M6 type (drill holes 8 mm).

10. Doors and windows.



10.1 Door mountings, frames and wall openings.

Door frames in FERMACELL partitions are built independent of the main structure. This applies to single section perimeter frames, together with the assembly of the sub-structure, or with multi-section perimeter frames tied to the board.

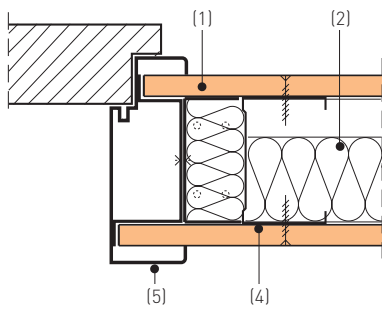
Whichever type and construction of door frame is used, the position of the door frame is marked out on the floor

and the stud erected in accordance with the FERMACELL installation instructions. The footer track is omitted in the door/opening area. The frames can then be installed. For more information please contact the Xella Technical Hotline.

Insulation, if required, must be installed where fire and acoustic integrity are required.

Depending on the specification and requirements, various door frames can be fitted into FERMACELL partitions:

- One-part perimeter frames in steel or timber
- Special frames for doors with higher sound reduction and fire resistance requirements
- Room-high door frames, e.g. with extended posts for a fanlight or solid upper section
- Wooden block frames
- Sliding door frames in or in front of the wall
- Protective screen frames

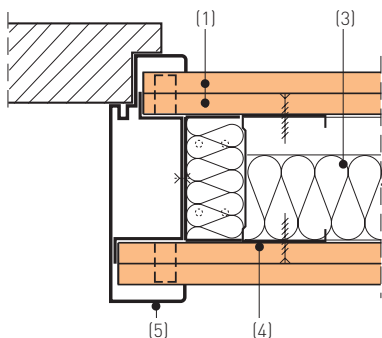


Frame fixing using Protektor proprietary door reinforcement kits, single-layer boarding

10.2 Door frame installation methods.

There are many different methods of fixing that can be used for securing door frames to/in FERMACELL partitions and fire walls. These depend on the room height (wall height), door width, weight of the door leaf, including door furniture, etc. Installation methods include:

- Fixing the door frame direct to normal Stud profiles
- Fixing the door frame to boxed Stud profiles
- Fixing the door frame to steel stud profiles with timber inserts (Timber flush fitted into the stud)
- Fixing the door frame to 2 mm thick Protektor proprietary door reinforcement kits



Frame fixing using Protektor proprietary door reinforcement kits two-layered boarding

Fixing the door frames direct to normal Stud profiles.

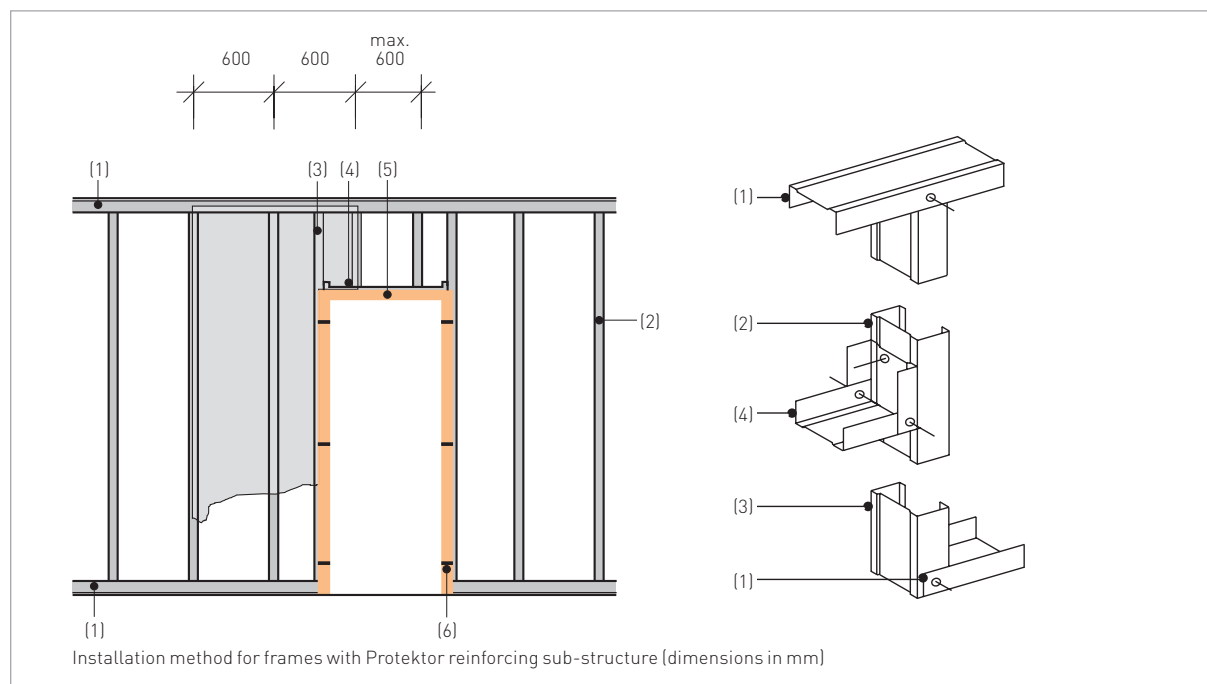
Irrespective of the type of construction (dry lining, timber frame or modular construction), normal Stud profiles are used for frame fixing with light door leaves of about 25 kg (including furniture) and/or a door width of a maximum 855 mm and/or a room height (wall height) of a maximum of 2600 mm at the door openings.

Fixing the door frames to boxed Stud profiles or fixing the door frames to steel studs with timber inserts.

With medium-heavy door leaves of 35 kg (including furniture) and/or a door width of a maximum 900 mm and/or a room height (wall height) of a maximum 2800 mm, two boxed steel studs are used as reinforcing profiles for the door opening.

Alternatively, a header track profile can also be placed on the stud profile or a timber can be inserted into the stud profile. In all cases, these reinforcing sections must extend to the full height of the partition/room.

- (1) Header/footer profile
- (2) Protektor C stud
- (3) Protektor C stud with reinforcement kit
- (4) Header/footer Lock profile
- (5) Frames
- (6) Fixing strap



Fixing door frames to 2 mm thick door reinforcement kits.

For fixing door frames with heavy door leaves of ≥ 35 kg (including furniture) and/or a door width of ≥ 900 mm and/or a room height (wall height) of ≥ 2800 mm, a specialist Protektor door reinforcement kit should be used for frame fixing around the door opening. These door reinforcing kits are fixed directly to the floor and ceiling with heavy duty angle straps.

The door reinforcement kits should be fitted independently of the main stud frame, especially where there is anticipated movement within the wall (e.g. head deflection). The reinforced stud runs from floor to soffit on either side of the door opening. The angle strap at the head can be set to allow for the anticipated head deflection. The "H" section across the head of the door is also braced using the reinforcing channel.

If greater loads are to be accommodated, then special profile sections will need to be provided which have been designed specifically for the loads specified. Again, care should be taken with the main connection angle straps to the floor and soffit.

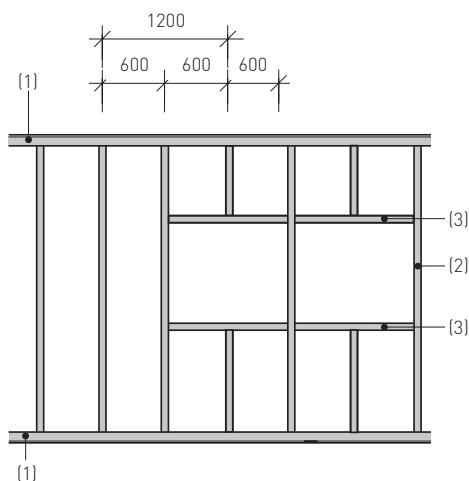
FERMACELL boards may be fixed to the reinforced sections using FERMACELL drill tip screws where no significant movement within the main structure is anticipated. However, where movement is anticipated, the FERMACELL board is not fixed into the reinforcing channel but into the standard stud adjacent to it (see drawings above).

For all door details the support profiles must run floor to soffit to provide a stable fixing background. Allowances should be made at design stage for any movement to be accommodated within the door frame detail. In all cases seek instruction from the manufacturer.

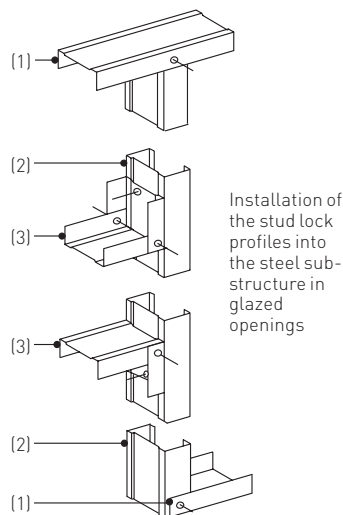
Above the door opening, a track profile is built in as a door lintel. Two Stud profiles are placed into this door lintel profile (with no mechanical fixing). They ensure, that the board joints do not lie on the door studs but above the door lintel.

When boarding around doors and openings it is imperative that joints do not run vertically from corners. The boards should be cut to allow joints to sit above the door head and offset from the edge of the door/opening by > 200 mm.

For more information on these specialist applications, please refer to the steel stud manufacturers guidelines.



Construction of glazing openings in FERMACELL partition (dimensions in mm)



- (1) Header track
- (2) C stud
- (3) Footer track with crosspiece

10.3 Installation methods for glazing.

Where glazing details are to be installed in FERMACELL walls, attention should be given to the stud spacing and specification. The vertical studs should be fitted to match the required opening size. If the opening is greater than 600 mm then additional stud section will be required above and below the opening (as with standard steel stud fixing, these are left 'floating' within the header and footer tracks).

As with the door frame details, where excessive window weights are to be accommodated then the use of Protektor reinforcing profiles is recommended. Contact Protektor or the Xella Technical Hotline for installation information. Manufacturers instructions must be followed.

As described previously FERMACELL boards must be fitted in such a way as to eliminate vertical joints over window edges.

10.4 Boarding layout for door and glazing openings.

For door elements which are not room-high, FERMACELL boards should be cut, so that the board joints do not line up with on the stud or reinforcement profiles adjacent to the door frames, but always in the area above the door openings. There must be an offset of ≥ 200 mm from the frame edge [see drawings]. (Horizontal board joints should be avoided in the door frame area or should be formed as adhesive joints see Chapter 2.7).

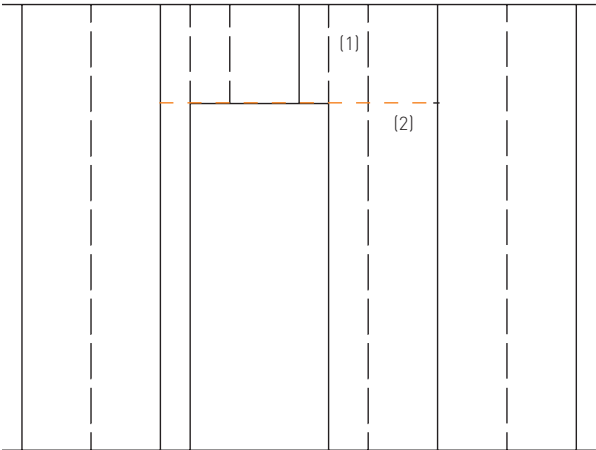
Board joints in the front and rear side of the wall should be staggered in door support areas.

With double-layer boarding, the joints for the relevant outer board layer should be staggered to the lower board layer a minimum of 200 mm, or by one stud spacing.

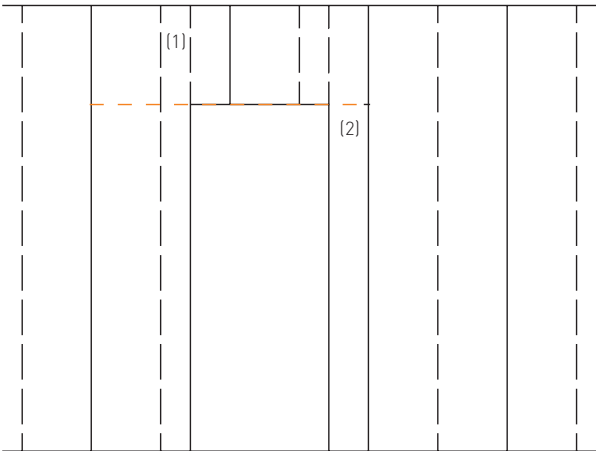
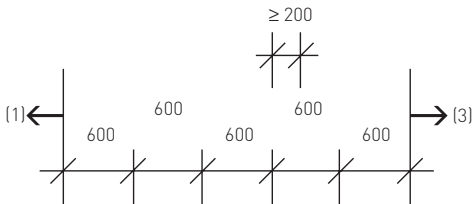
The board is fixed above the door opening using FERMACELL screws. FERMACELL is fixed only to the stud sections, not to the header or footer tracks. The use of FERMACELL Jointstik is recommended as these joints give greater joint strength in these high stress areas.

Joints between boards outside the door area must be made on the same stud. i.e. mirrored.

Boarding layout for single-layer lined FERMACELL partition



Boarding of the front side



Boarding of the rear side (dimensions in mm)

- (1) Room height reinforcement profile for door frame
- (2) Horizontal board joint, adhesive joint as in 2.7
- (3) Joints between boards outside of the door area must be made on the same stud.

11. Suspended ceilings and ceiling linings with FERMACELL.

11.1 Fixing centres for the sub-structure.

For ceilings, the load-bearing parts of the sub-structure should be constructed according to the table below. Other suspension systems should be fixed so that the maximum deflection of 1/500 of the span is not exceeded. This deflection has been taken into account in the table. Ensure that the suspension system is fixed in the correct manner with the appropriate fixings.

11.2 Suspended ceilings with FERMACELL.

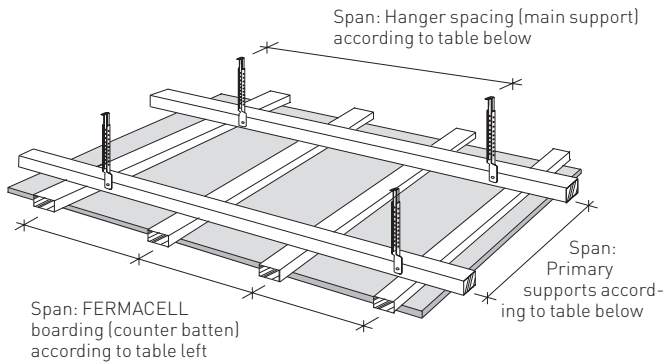
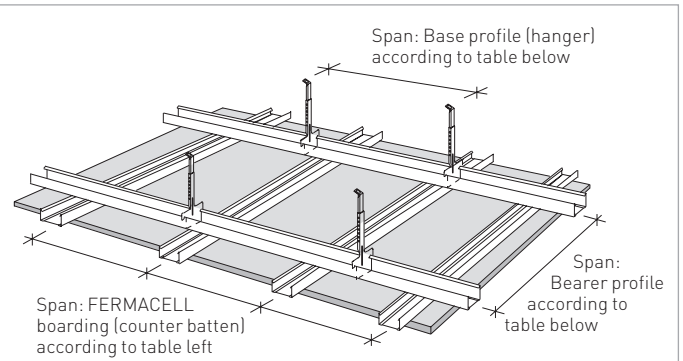
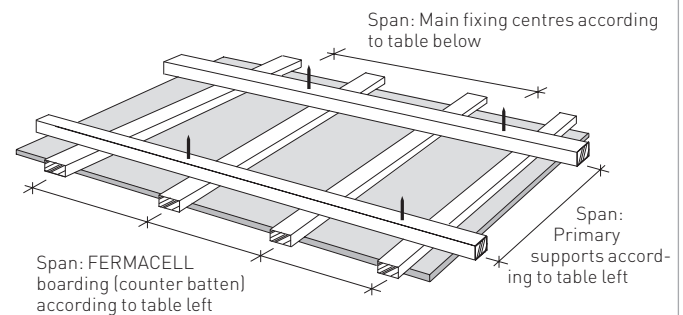
For suspended ceilings, commercially available hangers, such as Nonius hangers, punched strips or slotted strips, wires or threaded rods are used.

For fixing these structures to solid ceilings, frame fixings approved by Building control should be used. These frame fixings must be suitable for this purpose and the design loads of the whole system. Further details can be found in the relevant technical information, and manufacturers instructions should always be followed.

Ensure that the hanger cross section size is suitable for the load-bearing requirements, taking into account any safety factors.

Field of application/ Type of structure	Multiplying factor for board thickness	Maximum pitch/spacing between linear suspension/counterbatten elements per board thickness			
	- [d]	10 mm	12.5 mm	15 mm	18 mm
Horizontal surfaces (suspended ceilings, ceiling linings)	40 x d	400	500	600	720
Roof slopes (10° – 50° pitch)	40 x d	400	500	600	720
Roof slopes (51° – 90° pitch)	40 x d	400	500	600	720

Information applies for permanent use at a relative air humidity up to 80 %.

Primary bearers, suspended**Suspended ceiling with timber sub-structure****11.3 Spans, profile and counter-batten cross-sections for ceiling linings and suspended ceilings.****Suspended ceiling with steel sub-structure****Primary bearers fixed direct to ceiling****Ceiling lining with direct fix timber sub-structure**

Sub-structures		Permissible spans in mm ⁽¹⁾		
		single-layer boarding to 15 kg/m ²	double-layer boarding to 30 kg/m ²	multi-layer boarding to 50 kg/m ²
Steel sheet sections	[mm]			
Primary bearers	CD 60 x 27 x 06	900	750	600
Support sections	CD 60 x 27 x 06	1000	1000	750
Timber battens (width x height) [mm] x [mm]				
Primary bearers fixed	48 x 24	750	650	600
direct to ceiling	50 x 30	850	750	600
	60 x 40	1000	850	700
Primary bearers, suspended	30 x 50 ⁽²⁾	1000	850	700
	40 x 60	1200	1000	850
Secondary bearers	48 x 24	700	600	500
(battens)	50 x 30	850	750	600
	60 x 40	1100	1000	900

(1) The term "span" in relation to primary bearers or base timbers is taken to mean the distance between hangers and the relation to primary bearers or supporting sections. In regard to requirements for fire resistance, refer to the requirements stated in the relevant technical information and test certificates.

(2) Minimum timber bearer size to be 50 mm wide by 30 mm deep.

11.4 Fixing materials and centres for ceilings.

All fixing materials must be adequately protected against corrosion.

FERMACELL boards are stapled or screwed to timber (see table below). FERMACELL is screwed using FERMACELL screws for steel up to 0.7 gauge. FERMACELL recommend

a minimum of 0.6 gauge metal sections with a 50 mm fixing face. All fixings should be set below the board surface, prior to being stopped with FERMACELL Joint Filler.

When fixing FERMACELL boards do not induce stress into the boards. When fixing care must be taken to ensure that fixing takes place either from the centre

of the board to the edges, or from the board edge continuously through to the other edge. Under no circumstances should the board be fixed from each corner towards the centres at the same time. Care should be taken to ensure that the boards are pressed firmly back against the sub-structure.

Spacing and material fixing usage for ceiling structures per m² ceiling area.

Board thickness	Staples, [galvanised and resinated] d ≥ 1.5 mm			FERMACELL screws d = 3.9 mm		
	Length	Spacing	Use	Length	Spacing	Use
Metal – single-layer	[mm]	[mm]	[Unit/m ²]	[mm]	[mm]	[Unit/m ²]
10 mm	–	–	–	30	200	22
12.5 mm	–	–	–	30	200	19
15 mm	–	–	–	30	200	16
Metal – double-layer / 2nd layer into the sub-structure						
1st layer: 10 mm	–	–	–	30	300	16
2nd layer: 10 mm	–	–	–	45	200	22
1st layer: 12.5 mm	–	–	–	30	300	14
2nd layer: 12.5 mm	–	–	–	45	200	19
1st layer: 15 mm	–	–	–	30	300	12
2nd layer: 12.5 mm or 15 mm	–	–	–	45	200	16
Timber – single-layer						
10 mm	≥ 30	150	30	30	200	22
12.5 mm	≥ 35	150	25	30	200	19
15 mm	≥ 44	150	20	45	200	16
Timber – double-layer / 2nd layer into the sub-structure						
1st layer: 10 mm	≥ 30	300	16	30	300	16
2nd layer: 10 mm	≥ 44	150	30	45	200	22
1st layer: 12.5 mm	≥ 35	300	14	30	300	14
2nd layer: 12.5 mm	≥ 50	150	25	45	200	19
1st layer: 15 mm	≥ 44	300	12	45	300	12
2nd layer: 12.5 mm or 15 mm	≥ 60	150	22	45	200	16

1) Where [d] = staple gauge.

2) Use per m² is based on the maximum spacing for support members.

Type, spacing and use of fixing materials when fixing board to board.

Board thickness	Diverging staples, [galvanised and resinated] d ≥ 1.5 mm, Spacing in rows ≤ 300 mm			FERMACELL screws d = 3.9 mm, Spacing in rows ≤ 300 mm		
	Length	Spacing	Use	Length	Spacing	Use
Ceiling zone per m² ceiling surface	[mm]	[mm]	[Unit/m ²]	[mm]	[mm]	[Unit/m ²]
10 mm FERMACELL on 10 mm FERMACELL	18 – 19	120	35	30	150	30
12.5 mm FERMACELL on 12.5 or 15 mm FERMACELL	21 – 22	120	35	30	150	30
15 mm FERMACELL on 15 mm FERMACELL	25 – 28	120	35	30	150	30

11.5 Separate ceiling junctions.

Where FERMACELL ceilings or roof structures, single or double-layer, adjoin with other types of material, such as plaster, exposed concrete, masonry, steel or wood, a flexible mastic must be used at the junction point. The mastic must have 20 % movement capacity, and must be fire or acoustic rated as required.

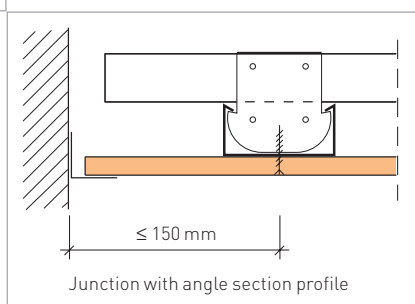
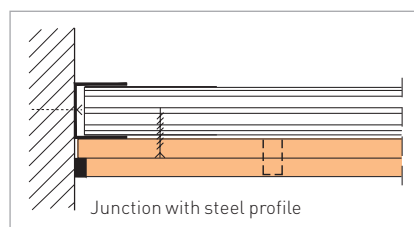
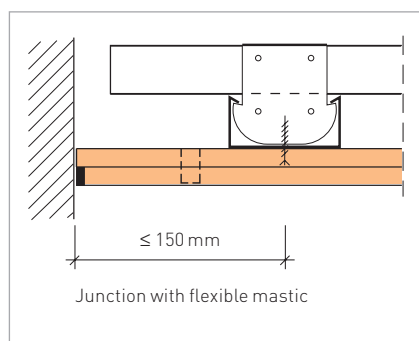
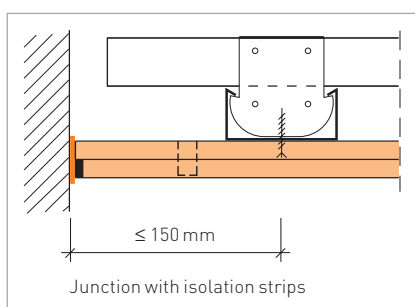
This is to avoid a rigid connection at these junctions, such as shown in these diagrams, there are several alternatives:

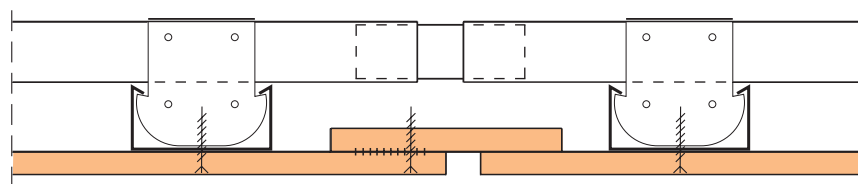
Fasten Polythene or adhesive strips to the adjacent component, allowing the strip to overhang past the face of the FERMACELL board. Maintain a joint width of 5–7 mm between the boards and the adjacent component, and fill with FERMACELL Joint Filler. After the FERMACELL Joint Filler has hardened the excess strips should be cut flush with the board.

Fill the ceiling junction joints between FERMACELL boards and the adjacent component with a flexible mastic; this material must have a 20 % movement capability. The joint should be a width of 5–7 mm. The board edge must be primed before caulking.

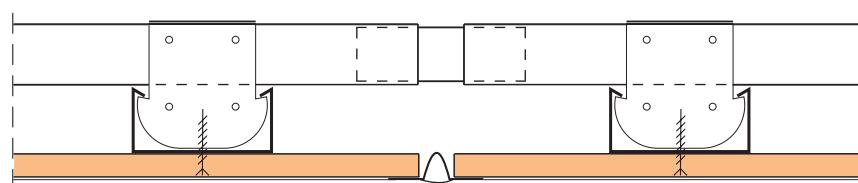
Both details which show the FERMACELL Joint Filler being used with a separation strip assume no movements from the main building shell. The distance from the support profile in the main ceiling structure to the wall should be at least 150 mm.

A rigid connection between the FERMACELL and the junction angle is not permissible.

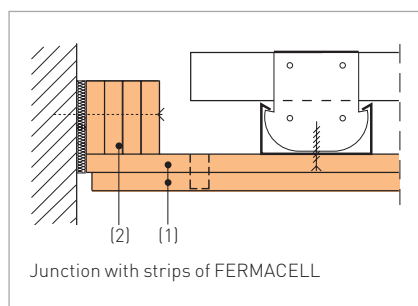




FERMACELL ceiling/roof structure with fire resistance requirement.
Expansion joint for single- or double-layer boarding. Board strips one-sided glued and screwed.



FERMACELL ceiling /roof structure with no fire resistance.
Expansion joint with capping/cover profile.



- (1) FERMACELL boards 10 mm (12.5 mm)
- (2) Strips of FERMACELL

11.6 Wall junction with shadow joint.

Wall junctions with shadow joints can be constructed using strips of FERMACELL placed above the ceiling board at the perimeter. Alternatively for non fire rated ceilings, timber sections may also be used.

11.7 Ceiling Expansion joints.

Expansion joints in FERMACELL ceilings and roofs are required in the same areas where there are movement joints in the main building shell. Since ceilings and roofs boarded with FERMACELL are subject to a changing internal climate and thus differential movement (expansion and shrinkage), expansion joints should be used as required. These should be set at a maximum of 8000 mm.

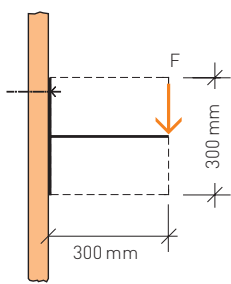
Construction of the ceiling expansion joints for single and double layered systems are illustrated above. Where fire resistance is paramount, refer to British Standards and DIN 4102

12. Fixing loads to FERMACELL wall boards and ceiling linings.

12.1 Lightweight fixings.

FERMACELL boards have a great hanging strength. Many items can be fixed directly to the boards without the need to fasten to the sub-structure. The table below shows at the load-bearing capacity of a wide range of fittings. The

stated loads are based on a safety factor of 2 for a permanent loading in a relative air humidity up to 85 %. The total single loads for walls should not exceed 1.5 kN/m and for free-standing dry lining and double stud walls not physically connected to one another, 0.4 kN/m.



Permissible load F applied to a cantilevered arm at distance shown, using a single fixing directly into the board

Maximum permitted load in kg per fitting type by FERMACELL board thickness²⁾

	Picture hooks fixed with nails ¹⁾		
			
10 mm	15	25	35
12.5 mm	17	27	37
15 mm	18	28	38
18 mm	20	30	40
12.5 + 10 mm	20	30	40

- 1) Conditions: Maximum load depends on the hook. Fixing the hook directly into FERMACELL board.
- 2) Safety factor 2 (permanent loading with relative air humidity up to 85 %).

Maximum permissible load in kg¹⁾ per fixing by FERMACELL board thickness in mm²⁾

Wallloads fixed with toggle bolts or screws	Toggle bolt	Screw with continuous thread Ø 5 mm
		
10 mm	40	20
12.5 mm	50	30
15 mm	55	30
18 mm	55	35
12.5 + 10 mm	60	35

- 1) Conditions: Tested to DIN 4103, safety factor 2 (observe toggle bolt manufacturers fixing instructions).
- 2) Stud spacing to be 50 x board thickness, max.

The stated load values can be added up, if the fixing centres are ≥ 500 mm. For lesser fixing centres, 50 % of the relevant permissible load per fixing should be used. The total single loads for walls should not exceed 1.5 kN/m and for free-standing dry lining and double stud walls not physically connected to one another, 0.4 kN/m. The stability of the wall or casing should be verified as described above according to DIN 4103 Part 1 and BS 5234.

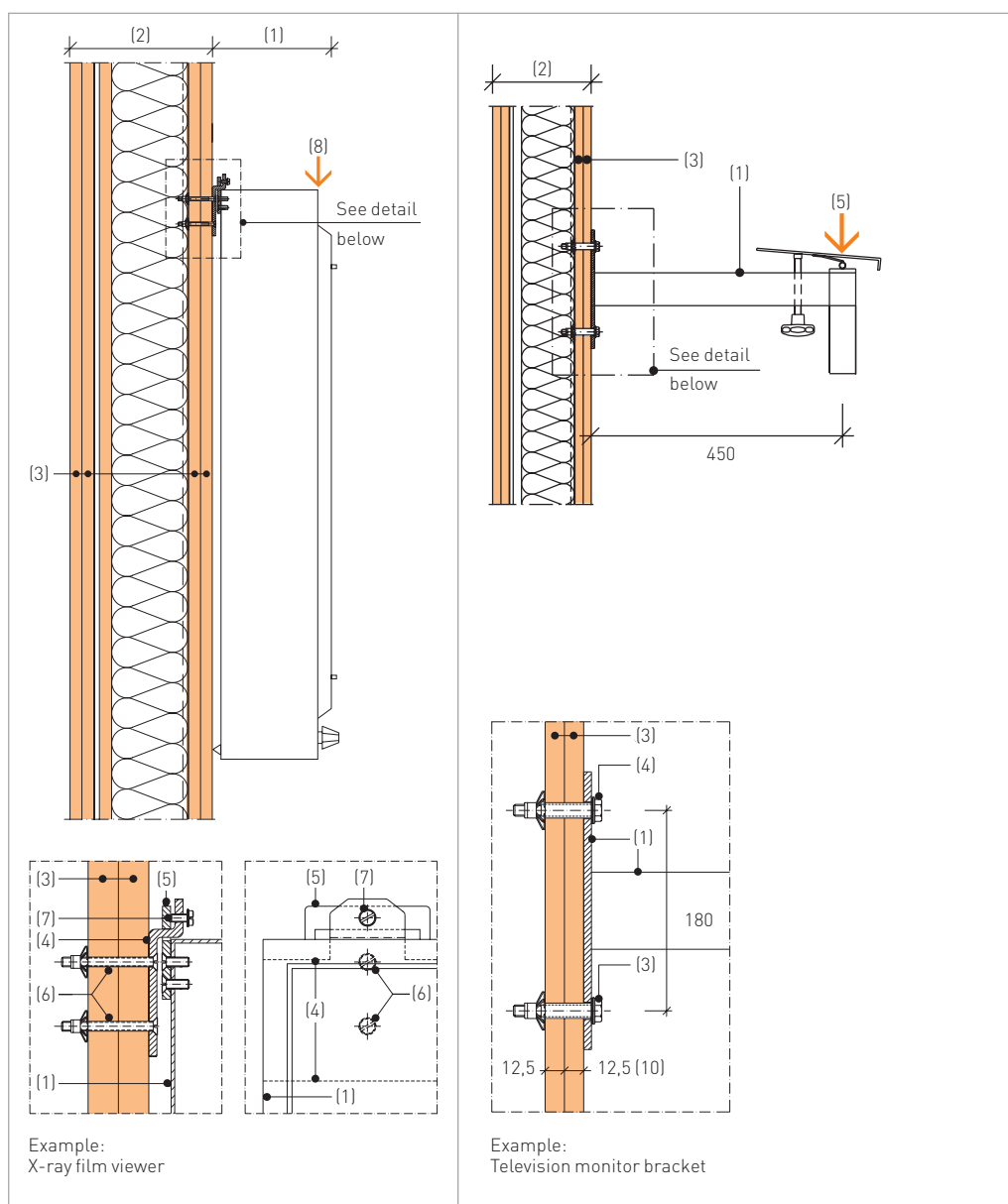
12.2 Light and medium-heavy loads.

Light and medium-heavy loads, such as shelves, hanging cupboards, cabinets, boards, etc. may be fastened directly to FERMACELL boards with screws or toggle bolt fixings; again no additional support fixtures are required. Toggle bolts should be of a splayed back fixing type which spreads the load over the back of the board. Toggle bolt sizes should be M6 or M8. The instructions of the toggle bolt manufacturer in regard to hole diameters and fixing usage should be followed.

The permissible loading per board size are given in the table on the previous page. The stated loads are based on a safety factor of 2. Where fixings are within 500 mm of each other then the loading capacity per fixing must be halved.

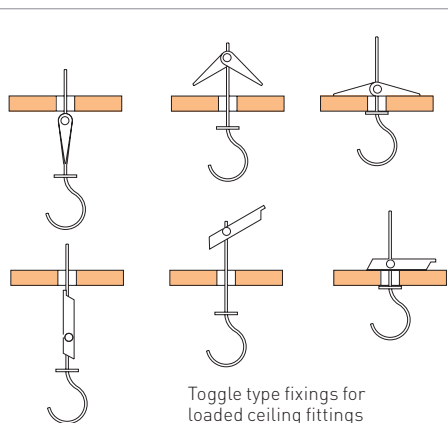
Where 'live' or excessive (e.g. cantilever sanitation units, hand rails, drop down bench units) loads are to be applied to the boards, then additional support structures may be needed, alternatively the fixings may be located back into the studs.

Examples of fixing heavy fittings with toggle fixings.



- (1) X-ray film viewer
 (2) FERMACELL partition wall
 (3) FERMACELL boards 12.5 mm
 (4) Wall support bracket
 (5) Hanging bracket
 (6) Cavity plug with screws M 4
 (7) Bracket locking bolt
 (8) Permitted load – see table on page 69
 (light and medium – heavy loads)

- (1) Bracket, wallfixing with 4 plugs
 (2) FERMACELL partition wall
 (3) FERMACELL boards 12.5 mm
 (4) Steel cavity plug with screws M 8
 (5) Stated load for fixings
 – in the middle of the board 140 kg
 – near the stud 180 kg



12.3 Fixing loads to ceiling linings.

Ceiling loads can easily be fixed to FERMACELL ceilings. Special steel cavity fixings and steel spring fixings can be used (see diagrams). Smaller loads may be fixed directly with fully threaded screws.

The allowable loads per fixing are shown in the table below.

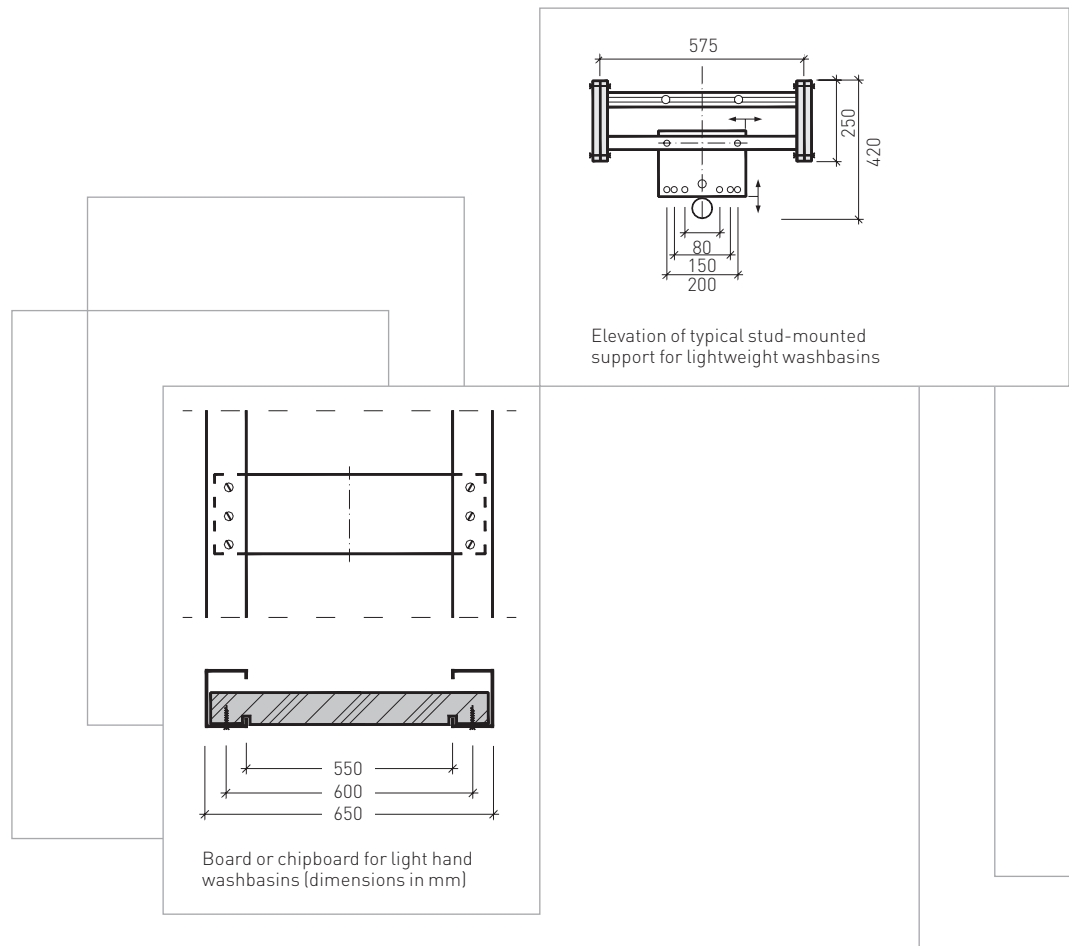
Maximum allowable load in kg ¹⁾ per FERMACELL board thickness in mm ²⁾	
FERMACELL Board Thickness (mm)	kg ³⁾
10 mm	25
12.5 mm	30
15 mm	35
18 mm	40
12.5 + 10 mm	40

1) Tested to DIN 4103, safety factor 2.

2) Support spacing of the sub-structure $\leq 35 \times$ board thickness. Board fixed to the sub-structure with FERMACELL screws.

3) Observe the manufacturers operating and installation instructions.

Where additional loads are to be applied then the loading capability of the sub-structure should be checked.

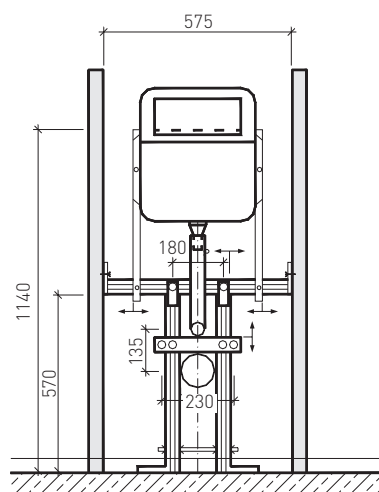


12.4 Installation of sanitary supports.

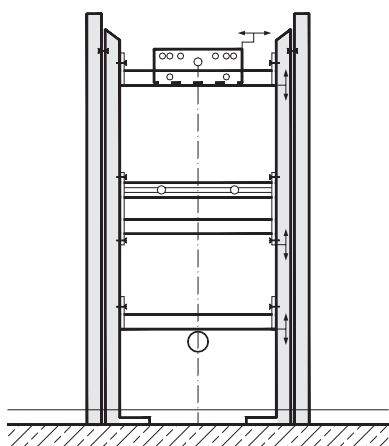
For fixing heavy loads with dynamic/live loadings, such as sanitary objects (washbasins, wall-suspended lavatory pans, built-in WC cisterns, bidets, urinals), specialist support sections are required.

Lightweight sanitary items can be fixed to horizontally mounted metal rails, timber noggins, or timber strips at least 40 mm thick. These support elements must be fixed securely to the main stud supports. It is recommended that the studs at this point are fixed with the open sections facing each other so that the support pieces can be face fixed as per the diagram above; giving a flush fixing section at the rear of the board; thus ensuring greater stability and support.

Heavy sanitary items should be fixed to prefabricated support stands. There are many systems available; generally these are welded metal frames with adjustable fixing points to suit the required stud centres. These frames should be floor mounted, as per manufacturers instructions, and these stands should be fitted flush with the front face of the stud framework.



Supports for wall-suspended WCs with cantilevered cisterns (dimensions in mm)



Elevation of typical floor mounted support for washbasins, urinals or sinks

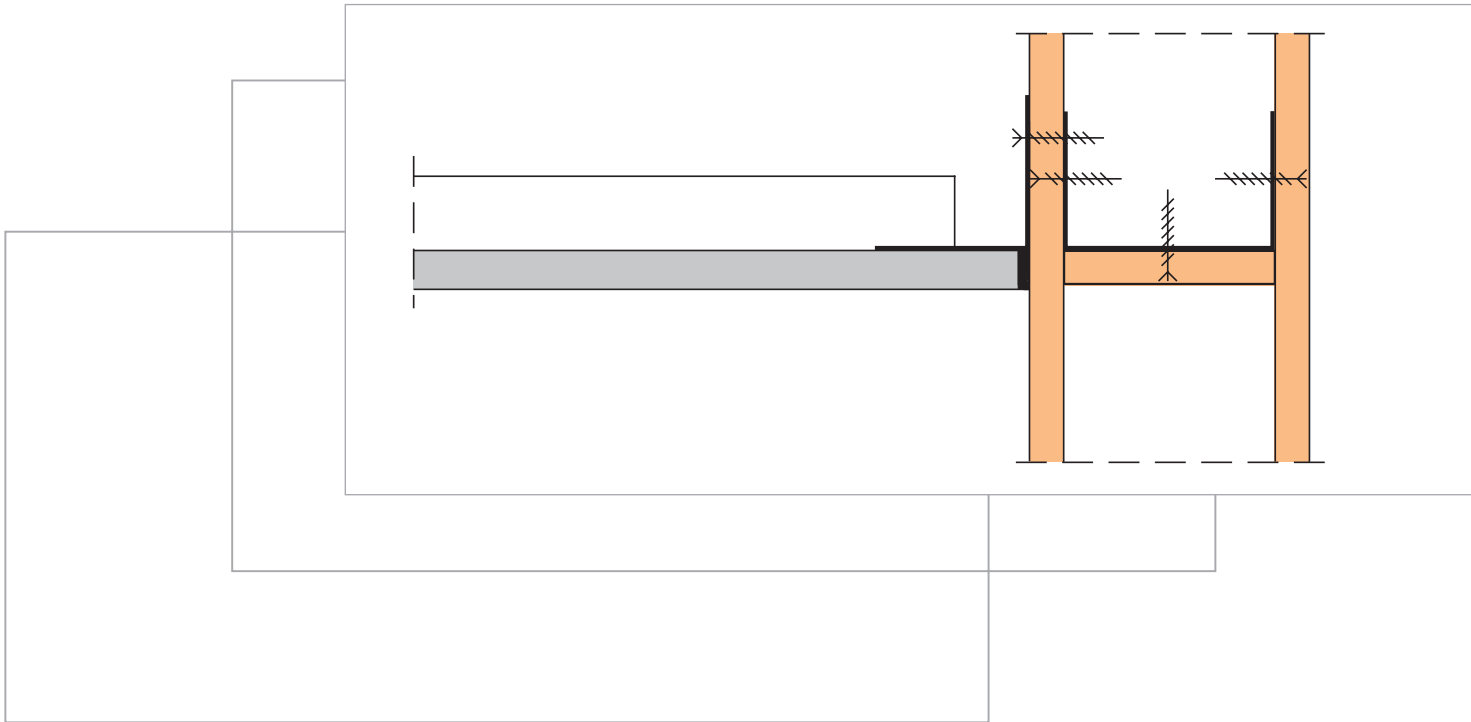
In the case of particularly heavy loads, heavily used sanitary fittings or relatively high walls, it is recommended that instead of the standard stud a 2 mm thick reinforcement stud with special connection flanges is used (see diagrams above).

If especially heavy loads are built into FERMACELL separated stud walls, the vertical studs should be cross braced at $\frac{1}{3}$ and $\frac{2}{3}$ the height of the partition using board strips.

Irrespective of the type and location of the reinforcing sub-frame or supports, all pipe and ducting through the boarding should be cut out clean with a 10 mm diameter clearance, the edges should be primed and closed with an elastic antifungicidal sealant. The board edges must be primed before the application of these sealant types (always follow manufacturers instructions).

13. Junction of lightweight partitions to suspended ceilings.

Internal partition detail at junction
with fire rated suspended ceiling



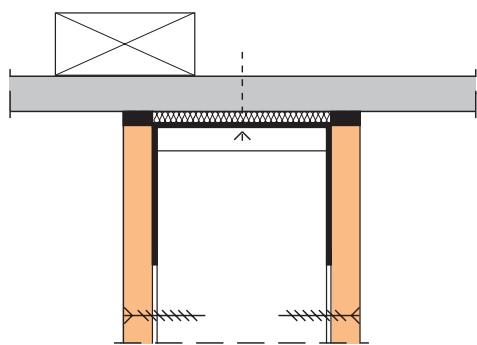
13. Junctions of lightweight partitions to suspended ceilings.

Partitions may only be connected to suspended ceilings which have been classified as fire resistant, when account has been taken that, in the case of a fire and the subsequent destruction of the lightweight partition, the wall structure will not overload the suspended ceiling.

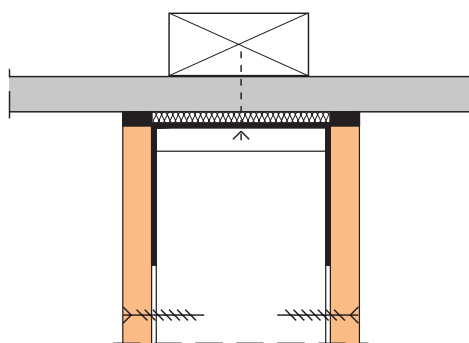
Junctions between fire rated ceilings and partitions (perimeter detail).

The partition must demonstrate at least the same fire resistance rating as the flanking FERMACELL ceiling system.

A further horizontal section (stud profile) is required inside the partition, with an additional section of board fixed to it (see diagram). A steel angle is required in the ceiling construction to provide structural integrity.



Fire junction F 30/F 60



Fire junction F 90

For partitions effective as fire resistant constructed to F 90: The classification of the partition retains its classification F 90, if the flanking building components (e.g. FERMACELL ceiling systems) demonstrate fire resistance classification of at least equal value and the upper head track of the wall construction is fixed to the bearer profile of the ceiling system.

Junctions between fire rated partitions and ceilings (head detail).

For partitions with a fire resistant construction of F 30 or F 60: The classification of the partition retains its classification F 30 or F 60, if the flanking building components (e.g. FERMACELL ceiling systems) demonstrate a fire resistance classification of at least equal value.

14. Frequently Asked Questions.

DIY

Q Can I really install FERMACELL myself?

A As long as you are reasonably fit, Yes. The board is heavier than standard wall board, so if you are tackling the project on your own, use the One Man Board formats. Otherwise, having read the manual, all of the installation steps are straightforward and logical. If you are using FERMACELL for the first time, start in an area which is out of sight (an airing cupboard for example) where you can practice your technique.

Installation compared to plasterboard.

Q I'm an experienced builder/dry liner – what should I know that's different about FERMACELL?

A It's heavier, and not as easily cut as plasterboard. You should therefore allow more time, or more labour for the project (about 25 % on average). Unless you are using the tapered edge board, the installation sequence does not follow the traditional tacking and jointing technique – each board is edge glued to it's neighbour in sequence which generally lends itself to a three man team rather than two (one for gluing and screwing, and two for placing the boards). The glue dries overnight and is scraped off, the screw (or staple) heads stopped with FERMACELL filler and the board finished according to specification.

Cost.

Q OK, it's got all the benefits, but what about the cost?

A About three times the price of plasterboard in material terms. But since boards don't stay up on their own, you also need to factor in the cost of the other elements. The studwork is about the same, but you will save money because you don't need noggins. You need to allow for insulation in both cases. Installation is about 25 % more expensive (see the question above). All in all, a like for like partition using FERMACELL will cost about 20 % more than a standard wallboard equivalent. Except that the standard wallboard one isn't equivalent - the FERMACELL variant is impact resistant, carries wall mounted fittings anywhere on the board, has incredible acoustic performance (from 52 dB on steel stud compared to 45 dB for wallboard) and is a moisture rated, one hour firewall. To achieve this with plasterboard you must use specialist boards, multiple layers and so on.

Where FERMACELL really wins is when you are considering skimming plasterboard. Assuming you can find a plasterer, the result will take 3 days to dry out and have added anything up to £ 6 per metre to your costs. FERMACELL is already abrasion resistant, but if you want skim coat smoothness, use FERMACELL FST (Fine Surface Treatment) – a ready mixed face filler that binds into the surface of the board and is DIY/non-skilled trade application that dries in 30 minutes and is ready to paint in 45.

In performance terms, the resultant FERMACELL construction is closer to a solid masonry wall than a drywall partition.

Large and non standard size boards.

Q I understand FERMACELL make large boards – tell me more.

A Boards up to 6000 x 2540 mm are available, and we can also make boards as small as 400 mm x 400 mm. They must be ordered through a FERMACELL stockist with a minimum quantity of 200 m². This allows elimination of waste (you can have a board tailored to your floor to ceiling height), or to reduce jointing costs – the cost of plasterboard and tape and jointing is about the same square metre cost of a FERMACELL board, so you get the benefits of FERMACELL for free. This is particularly relevant if you are manufacturing large panels (e.g. SIPs) or modular systems. Also, if you don't have joints in a wall, they can't crack.

Please note that large format boards require special handling and storage – more information is available from the Xella hotline +44 (0)870 6090306.

Skim	FST	↑ Installed costs, £
Jointing	Jointing	
Insulation	Insulation	
Board Fix	Board Fix	
Board	Board	
Noggins		
Studwork	Studwork	
Supply and Fix	Supply and Fix	
Plasterboard	FERMACELL	

Cutting FERMACELL.

Q Are any special tools needed?

A No. FERMACELL may be cut with standard woodworking tools. When using a circular saw, use a vacuum attachment, select a blade with fewer teeth – a maximum of 16 is advisable – and reduce the cutting speed. This will prevent excessive quantities of dust being created (the dust doesn't contain anything harmful, but avoidance of exposure to dust generally is good practice). Battery powered skillsaws are ideal.

Fixing.

Q Can I use standard drywall fixings?

A No. FERMACELL is a very dense board and standard fixings will either break or result in failure of the finished construction. All FERMACELL products match the board characteristics – others do not!

Q How else can I fix FERMACELL?

A On timber structures, FERMACELL may be fixed using special staples. Recommendations on staple dimensions are contained in the handy guide, and staple guns and accessories are available for hire or purchase through trade outlets. Contact the manufacturers for details of local outlets. BeA (01482 861075), Haubold (0151 479 3010), SENCO (01925 445566) and Young Black (01793 838400) manufacture a range of tools suitable for this type of work.

It is also possible under special circumstances to nail FERMACELL to steel studwork. Please contact the xella hotline for further details.

Jointing.

Q Is FERMACELL available in a tapered edged format?

A Yes. This has been recently introduced to allow the high performance benefits of FERMACELL to be used in conjunction with conventional dry lining techniques. The product is available in 2400 x 1200 x 12.5 mm format with a tapered edge on the two long sides, and in the handy 1200 x 1200 x 12.5 mm 'One Man Board' with a tapered edge on all four sides. The product is available to order through FERMACELL distributors.

Q How do I finish the joint?

A Once the Jointstik adhesive has dried, it can be removed with a scraper and the glue line and screw heads filled with filler. The joint area is then finished with a filler slurry applied with damp decorator's sponge in a circular, dabbing motion. This will match the joint to the slight texture present on the rest of the board. A mist and two top coats of undiluted paint can then be applied. For very smooth finishes use FERMACELL FST.

Q How do I detail external angles?

A Allow the first board to extend past the corner of the stud by its own thickness (due to shrinkage, best results are obtained using metal stud). Fix the second board leaving a 5–7mm gap between and fill using FERMACELL Joint Filler. If using Jointstik, fix the first board flush with the corner of the stud, apply a bead of Jointstik along the edge of the fixed board and fix the second board. Angle beads are not necessary. Once the boards have been jointed and finished, it may be preferable to profile the external corner into a small radius (2–3 mm) to mimic the effect of a plaster bead. On partitions where a sharp edge is required (typically in commercial applications), a paper reinforcing tape can be used in conjunction with FST.

Q When do I use Jointstik and when do I use FERMACELL Joint Filler?

A In general, use Jointstik whenever possible. If the edges of the boards are uneven – for example when using offcuts, then FERMACELL Joint Filler should be used. Because Jointstik takes 24 hours to harden, the filler method can be used if a job needs to be completed quickly. Remember – do not mix the two techniques – Jointstik is not a gap filling adhesive and glues the boards together as they are installed; FERMACELL Joint Filler is applied once all boards have been fitted to the 5–7mm gap left between the boards.

Fire.

Q Is FERMACELL a F30 (1/2hr) board?

A Fire ratings come from the overall construction, not the individual board. A variety of constructions are shown on our website, together with datasheets.

Finishing.

Q What's special about FERMACELL filler?

A It's a combined filler, sealant and adhesive. Joints made with FERMACELL will won't crack. It also sets very hard, so don't be tempted to put too much on or you will spend all your time sanding it back. When mixing it, use clean tools, bucket and water – every time – and put the water in first, adding the filler after. Once the filler has soaked up the water, WAIT – allow it to slake for 5 minutes before gently mixing it into a consistent goo. This way, it will last up to 35 minutes before going off. If you mix it mechanically, it will set prematurely.

Q Can I skim FERMACELL?

A Yes, although it is not necessary as FERMACELL will accept direct decoration. The board is presized, but we recommend that a PVA sealant is applied first as some finishing plasters can craze in certain conditions. When skimming, jointing must still be carried out using Jointstik and joints should be taped. A finish identical to skim plaster can be achieved by using FERMACELL FST which is dry in 45 minutes, is non-skilled and costs a fraction of the costs of specialist plasterwork.

Q What about paint, tiles or wallpaper?

A Paint should be applied as a mist coat and two undiluted top coats. Tiles can be fixed directly. In areas such as showers, a waterproof mastic is recommended. All wallpapers except vinyls can be applied without priming. On vinyls, use a low water content paste.

Moisture.

Q Is FERMACELL waterproof?

A It can be used in domestic showers or bathrooms, or in semi-exposed applications such as soffit, and areas of high humidity (up to 80 % Rh). It's OK for carport ceilings, but not for facades.

Q Can I use FERMACELL in swimming pool applications?

A Not recommended. This is because, whilst the pool area may be ventilated mechanically, air conditioning can break down causing the relative humidity to exceed 80 % Rh. In these conditions, the board can soften and sag.

Q Is FERMACELL available as a foil backed board?

A No. Where a vapour barrier is required (and generally it is good practice to have a condensation risk analysis -CRA - completed before one is omitted from the construction) we recommend the use of a 200 g (min) VCL sheet fixed to the face of the studs, with joints overlapped by 200 mm and taped. This will ensure that a continuous and effective vapour barrier is provided. Foil backed boards cannot, by definition, be sealed at joints.

Dot and dab.

Q Can I fix FERMACELL to masonry walls using plaster dabs?

A Yes, although this method is not recommended because the unique strength of FERMACELL can be compromised by the weakness of this method. A better solution is to use a direct mechanical fix – metal firrings or timber battens – and then fix FERMACELL to this substructure. This method also allows a greater choice of readily available insulation. If you are using this method, then select Tapered Edge boards.

CLS Timber.

Q Can I fix FERMACELL to CLS (38 mm x 89 mm) section timber?

A Yes, but added care should be taken because of the narrower fixing face (we generally recommend a 50 mm wide fixing face). When using CLS, fix the boards with pneumatically applied nails or staples, and the CLS should be graded as straight as possible. It is not practical to use the filler method of jointing with this narrower timber and fire certification is limited to a maximum of F 60. Please check with the Xella hotline for further information.

Timber vs. Steel studwork?

Q Why should I use one sort or another?

A This is largely down to personal preference on site, although each has it's benefits. Timber is more familiar, and often more readily available. It also allows the FERMACELL board to be stapled to the studwork, which is a very fast and cost effective method of installation. Steel studwork is more stable, and can be more precise. Cutting steel sections with tin snips is quicker and installation of the studwork faster (the vertical 'C' studs are held in position by the 'U' channel at top and bottom without any mechanical fix). Acoustic performance with steel studwork is far better because of the reduced transmission path across the partition

Please note that the fixing techniques are different, and that changing profile thickness from that stated in the construction tables may have an adverse effect of performance. This advice applies to non load bearing structures only. Pay specific attention to the notes regarding installation sequence and do not fix the board to the U Channels.

Steel studwork.

Q Does Xella make steel studwork for use with FERMACELL or can I use any type?

A Xella does not make steel studwork although we strongly recommend the use of Protektor studwork and metal accessories. Other stud types have not been tested by Xella and as such are not warranted as a system; the majority of other makes that are available are made from thinner gauge steel and the additional mass of the FERMACELL board means that a thinner section may not provide sufficient rigidity. Protektor studs have a 0.6 mm gauge and a 50 mm fixing face.

The studs and accessories are available from Cornercare (telephone 01562 515200).

Mineral Fibre Insulation.

Q Why are there variations in the thickness and density of the Mineral Wool?

A Virtually all FERMACELL constructions are multipurpose – construction 1 S 21 for example is a moisture resistant, 52 db sound insulating, impact resistant, weight carrying wall that can be One hour fire rated up to 10 m. The insulation used, together with the studwork configuration, contributes to these remarkable attributes. Varying thickness or density of mineral wool can affect the thermal, fire and acoustic insulation properties of a particular construction. In general, greater thickness of mineral wool will positively influence all insulation properties, although with densities above 20 kg/m³ acoustic insulation improvements may be limited. When using mineral wool insulation to improve acoustic insulation, avoid over-filling the cavity as this can lead to acoustic bridging and a reduction in the acoustic performance of the construction. A maximum of 80 % (depth) fill is recommended.

Sound.

Q If I fix FERMACELL direct to the wall, will I silence noisy neighbours?

A A little, but best results are obtained by constructing an independent lining that is less than 75 mm deep.

Q What about the acoustic regulations (Part E, BB93 and HTM56)?

A The new regulations have not only increased the acoustic performance requirements between rooms, but have added a significant requirement for on site testing of the finished constructions. FERMACELL sponsor a web site dedicated to these new regulations which contains links to other regulatory sites, testing authorities, a simplified explanation of the new requirements of Part E and the parallel regulations for schools and hospitals (BB93 and HTM56 respectively), the Robust Detail process and a full listing of the constructions tested to comply with these requirements. For more information visit www.part-e.info.

For the latest FAQ's and literature please visit www.fermacell.co.uk or call 0870-6090306 if you have a specific technical question not answered here.

Technical changes may be made. Issue Date 10.2004
Please ask for the latest version of this brochure. For further information,
please ring our Technical Hotline.

Technical Hotline: 0870 - 6090306

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