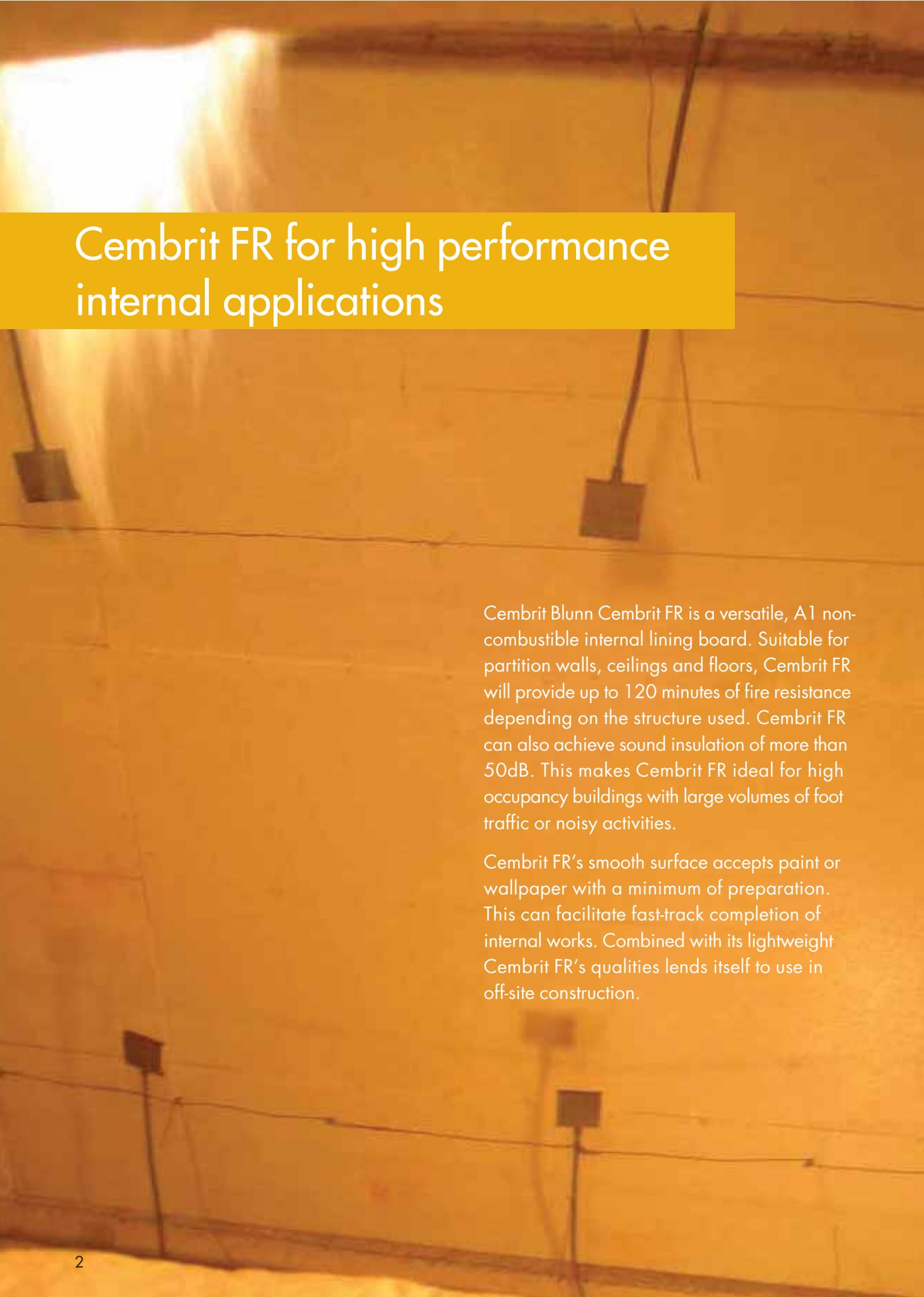


CEMBRIT BLUNN

CEMBRIT FR



FIRE RATED BUILDING BOARDS FOR HIGH PERFORMANCE INTERNAL APPLICATIONS



Cembrit FR for high performance internal applications

Cembrit Blunn Cembrit FR is a versatile, A1 non-combustible internal lining board. Suitable for partition walls, ceilings and floors, Cembrit FR will provide up to 120 minutes of fire resistance depending on the structure used. Cembrit FR can also achieve sound insulation of more than 50dB. This makes Cembrit FR ideal for high occupancy buildings with large volumes of foot traffic or noisy activities.

Cembrit FR's smooth surface accepts paint or wallpaper with a minimum of preparation. This can facilitate fast-track completion of internal works. Combined with its lightweight Cembrit FR's qualities lends itself to use in off-site construction.



Fire rated partition walls

Cembrit FR can be used as partition walls and floors as well as fire barriers, fire doors and fire surrounds.

Steel stud partitions

In steel stud partitions, the floor and ceiling channels should be set out and fixed at 600mm centres. Perimeter studs should be secured with webs flat to adjoining walls at 600mm centres.

The joints must be installed on the same stud. When installing oversize walls, the stud calculations must be made case-by-case, following the general instructions given here.

Timber / Steel stud partitions

Pages 4 and 5 show the maximum permissible height of the partition according to the wall specification. The tables also show the fire proof rating, the sound rating R value and the corresponding structure. All framing must be straight, plumb and true, and provide a firm support for the boards.

Ceilings

Cembrit FR boards can be used as ceiling linings on both timber and metal frameworks.

On timber constructions the boards are normally fixed to the underside of the joists or bottom cords of the roof trusses. Noggings must be added to provide support. Fix boards starting at the centre, using Cembrit Blunn nails at 150mm centres. All fixings should be 12mm from the edge of the board and no closer than 75mm to a corner.

With metal framework systems the framework should be erected as instructed by the framework manufacturer. Attach the board using Cembrit Blunn screws at 150mm centres, 12mm from the edge of the board and no closer than 75mm to a corner.

Where insulation is included in a sound-insulating or fire-proofing system, make sure that there are no gaps or uncovered areas to affect the ceiling's performance.

Suspended Ceiling Systems

Strong, dense, non-combustible and easily decorated Cembrit FR ceiling tiles are available bevelled or square edged for use in suspended ceilings.

Fire Ratings

Reaction to fire

Cembrit FR (base board and ceiling tiles only) is Classified as A1 – EN 13501-1:2002 Reaction to fire

Test methods

- Determination of the non-combustibility performance of the fibre-cement flat sheet Cembrit FR according to SFS-EN ISO 1182:2002
- Determination of the heat of combustion of the fibre-cement flat sheet Cembrit FR according EN ISO 1716:2002".

Report numbers – RTE3901/05 Classification report (8 November 2005), RTE3900/05 (7 November 2005), RTE3899/05 (7 November 2005)

Fire resistance as an element in walls and ceilings

Cembrit FR has been tested as a component in a structure to achieve various fire-ratings according to SFS-EN 1364-1:1999

Fire resistance tests for non-loadbearing elements – Part 1: Walls and SFS-EN 1364-2:1999

Fire resistance tests for non-loadbearing elements – Part 2: Ceilings.

Statements and report numbers – VTT-S-5800-06 Statement:

Statement on the fire resistance of Cembrit FR – board structures of structures (12-06-2006)

- VTT-S-6053-06 (16 June 2006) Statement on the fire resistance of loadbearing insulated, two-sided Cembrit FR 9mm double boarded wall with timber studs
- VTT-M-03929-07 (26 April 2007) Statement on the fire resistance of loadbearing Cembrit FR – board walls (REI30 classified walls)
- VTT-S-2223-07 (2 March 2007) Statement on the fire resistance of Cembrit FR – board structures (3 facades and 2 shaft walls)
- Statement of facades and shaft walls – Swedish Brandskyddslaget Jørgen Thor (30-10-2006)
- VTT RTE4190-05 (21 February 2006) Fire resistance test on a non-loadbearing, insulated, two-sided Cembrit FR 9mm double boarded wall with timber studs (66mm)
- VTT RTE3771-05 (15 December 2005) Fire resistance test on a non-loadbearing, insulated, two-sided Cembrit FR 9mm double boarded wall with 45mm steel studs
- VTT RTE4432-05 (21 February 2006) Fire resistance test on a non-loadbearing, uninsulated, two-sided Cembrit FR 12mm double boarded wall with steel studs (45mm)
- VTT-S-2114-06 (5 April 2006) Fire resistance test on model specimens for horizontal and vertical shaft walls
- VTT-S-3438-06 (4 May 2006) Fire resistance test on a non-loadbearing suspended Cembrit FR – ceiling construction

Fire & Sound ratings – timber stud partitions

Fire Rating	Sound Class CK 600 R _w	Max Wall Height mm		Thickness mm	Wall Type	Detail Code Number	Dimensions*	
		c/c 450	c/c 600					
EI 30	30	3000		63	E 45/45 9-9 M45	W1a		
		3000		81	E 45/45 9+9-9+9 M0	W2a		
		3000 4000 4000		69 94 119	E 45/45 12-12 M0 E 70/70 12-12 M0 E 95/95 12-12 M0	W3a W3b W3c		
	35	3000		69	E 45/45 12-12 M45	W4a		
		4000		87	E 70/70 8SP-9 M70	W5a		
		4000		88	E 70/70 9-9 M70	W6a		
		3000 4000 4000		81 106 131	E 45/45 9+9-9+9 M45 E 70/70 9+9-9+9 M0 E 95/95 9+9-9+9 M0	W7a W8a W8b		
	REI 30/EI 60		4000	119	E 95/95 12-12 M95	W9a		
	EI 30	40	4000		106	E 70/70 9+9-9+9 M70	W10a	
			4000		131	E 95/95 9+9-9+9 M95	W10b	
44		4000	133	E 95/95 9+12-12+9 M95	W11a			
48		4000	131	D 70/95 9+9-9+9 M95	W12a			
EI 60	35	3000		93	E 45/45 12+12-12+12 M0	W14a		
		3000		81	E 45/45 9+9-9+9 S45	W15a		
		4000		94	E 70/70 12-12 S70	W16a		
		4000		113	E 95/95 9-9 S95	W17a		
		4000		118	E 70/70 12+12-12+12 M0	W18a		
REI 30/EI 60		4000	119	E 95/95 12-12 S95	W19a			
REI 30/EI 60	40	4000	143	E 95/95 12+12-12+12 M0	W20a			
EI 90	40	4000		106	E 70/70 9+9-9+9 S70	W21a		
		4000		131	E 95/95 9+9-9+9 S95	W21b		
EI 120	44	4000		137	E 95/95 9+12-12+9 S95	W22a		
		4000		131	D 70/95 9+9-9+9 S95	W23a		
		4000		186	DD 70/70 9+9-9+9 S140	W24a		

* Note all dimensions refer to planed timber.

Explanations (walls):

E 45/45 9-9 M45:

Single posts; 45mm post/45mm rail; 9mm FR – 9mm FR; Mineral wool 45mm; No. W1a

E 45/45 9+9-9+9 S45:

Single posts; 45mm post/45mm rail; 9+9mm FR - 9+9mm FR; rock wool 45mm; No. W15a

D 70/95 9+9-9+9 S95:

Split-level posts; c/c between posts 300/225mm; 70mm post/95mm rail; 9+9mm FR – 9+9mm FR; Rock wool 95mm; No. W23a

DD 70/70 9+9-9+9 S140:

Double posts; c/c between posts 300/225mm; 70mm posts/70mm rail; 9+9mm FR – 9+9mm FR; Rock wool 140mm; No. W24a

Explanations (other):

Wooden rails:

45xb mm; b = rail width (45,70 or 95mm)

Wooden posts:

45xh mm, h = post height (45,70 or 95mm)

M:

Mineral wool – glass wool or rock wool

NOTE! For EI 60 and up rock wool must have a minimum density of 28kg/m³

W5a:

8SP means 8mm damp room board

W24a:

10mm minimum distance between rails

R

in the fire rating column = load bearing wall

Fire & Sound ratings – steel stud partitions

Fire Rating	Sound Class CK 600 R _w	Max Wall Height mm		Thickness mm	Wall Type	Detail Code Number	Dimensions*
		c/c 450	c/c 600				
EI 30	30	3000		69	E 45/45 12-12 M0	S1a	
		3000		94	E 70/70 12-12 M0	S1b	
		3000		119	E 95/95 12-12 M0	S1c	
	35	3000		81	E 45/45 9+9-9+9 M0	S2a	
		3000		63	E 45/45 9-9 M45	S3a	
		3000		69	E 45/45 12-12 M45	S4a	
	40	3000		88	E 70/70 9-9 M70	S5a	
		3000		81	E 45/45 9+9-9+9 M45	S6a	
		4000		87	E 70/70 8SP M70	S7a	
		4000		112	E 70/70 9+12-12+9 M70	S8a	
44	4000		119	E 95/95 12-12 M95	S9a		
EI 60	35	3000		93	E 45/45 12+12-12+12 M0	S10a	
		4000		94	E 70/70 12-12 S70	S12a	
	40	4000		118	E 70/70 12+12-12+12 M0	S14a	
		4000		119	E 95/95 12-12 S95	S15a	
	44	4000		143	E 95/95 12+12-12+12 M0	S16a	
EI 90	40	3000		81	E 45/45 9+9-9+9 S45	S17a	
		4000		106	E 70/70 9+9-9+9 S70	S18a	
	48	4000		131	E 95/95 9+9-9+9 S95	S19a	
		4000		131	D 70/95 9+9-9+9 S95	S20a	
	44	4000		112	E 70/70 9+12-12+9 S70	S21a	
EI 120	48	4000		137	E 95/95 9+12-12+9 S95	S22a	
		4000		186	DD 70/70 9+9-9+9 S140	S24a	

* Note all dimensions refer to planed timber.

Explanations (walls):

E 45/45 12-12 M0:

Single post; 45mm post/45mm rail; 12mm FR – 12mm FR; Mineral wool 0mm; No. S1a

E 45/45 9+9-9+9 S45:

Single posts; 45mm post/45mm rail; 9+9mm FR – 9+9mm FR; rock wool 45mm; No. S17a

D 70/95 9+9-9+9 M95:

Split-level posts; c/c between posts 300/225mm; 70mm post/95mm rail; 9+9mm FR – 9+9mm FR; Mineral wool 95mm; No. S20a

DD 70/70 9+9-9+9 S140:

Double posts; c/c between posts 300/225mm; 70mm posts/70mm rail; 9+9mm FR – 9+9mm FR; Rock wool 140mm; No. S24a

Explanations (other):

Steel profiles:

Hot-galvanized, cold-rolled sheets according to DS/EN 10327:2004

Steel rails:

0.56x30/b/30mm, Z 275; b = rail width (45, 70 or 95mm)

Steel posts:

0.56x5/40/h/43/5mm, Z 275; h = profile height (45, 70 or 95mm)

M:

Mineral wool – glass wool or rock wool

NOTE! For EI 60 and up rock wool must have a minimum density of 28kg/m³

S7a:

8SP means 8mm damp room board

S24a:

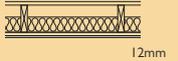
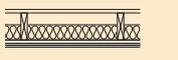
10mm minimum distance between rails

Fire rated ceilings

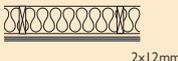
Suspended ceiling

Fire Rating	Sound Class CK 600 R_w	Structure	Detail Code Number	Dimensions*
EI 30	28	Steel hangers 1.25 x 25mm, 42mm Rockwool, Primary profile P45 c/c distance 1200mm, Secondary profile steel hat profile S25/85 c/c distance 400mm, 2 x 12mm FR	S31a	 2x12mm

Ceiling / floor **

Fire Rating	Sound Insulation Class	Structure	Detail Code Number	Dimensions*
REI 30	32	22mm Chipboard/22mm wooden fibre board/21mm veneer board, 45 x 170 timber battens/studs c/c distance 600mm, 95mm Rockwool, 28 x 70mm timber battens c/c distance 400mm, 12mm FR	MB 1	 12mm
REI 60	40	22mm Chipboard/22mm wooden fibre board/21mm veneer board, 45 x 170 timber battens c/c distance 600mm, 95mm Rockwool, steel hat profile S25/28 c/c distance 400mm, 2 x 12mm FR	MB 2	 2x12mm

Attic ceiling

Fire Rating	Sound Insulation Class	Structure	Detail Code Number	Dimensions*
REI 30	28	45 x 170 timber battens/studs c/c distance 600mm, 170mm Rockwool, vapour barrier (e.g. plastic foil), 28 x 70 timber battens c/c distance 400mm, 12mm FR	VB 1	 12mm
REI 60	32	45 x 170 timber battens/studs c/c distance 600mm, 170mm Rockwool, vapour barrier (e.g. plastic foil), Steel hat profile S25/28 c/c distance 400mm, 2 x 12mm FR. Rockwool density min. 28kg/m ³	VB 2	 2x12mm

* Note all dimensions refer to planed timber.

** Structures are based on the statement from Swedish Brandskydslaget 30.10.2006.

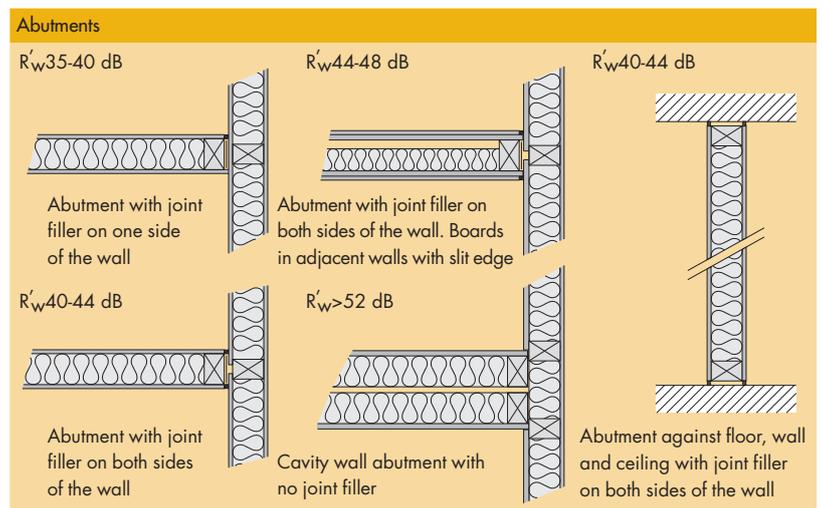


Sound insulation partition walls

Acoustic insulation

Cembrit FR Board offers good acoustic insulation. A reduction of upto 58 dB can be achieved when Cembrit FR Building Board is used in combination with mineral wool insulation. Close attention should be paid to details such as corners and edges, where an acoustic sealant should be used. The general acoustic insulation performance of the board, when used in different partition structures, is set out in the tables on pages 4 and 5.

The performance will depend on the structure used. The effectiveness of sound-damping structures is affected not only by the frequency of the sound and the location of its source, but also by the quality of the construction of the partition. For this reason, close attention should always be paid to construction details.



Use a proprietary acrylic acoustic sealant

Sound Proof Insulation

Planning on the basis of predetermined requirements for airborne sound insulation Cembrit FR partitions are always expected to have lesser sound proofing properties when installed in buildings than those measured in laboratories. The primary causes are sound transmission around the partition and variations in the installations, e.g. the coupling of edges in double walls as well as minor leaks. The difference between laboratory values and field values often amounts to 4-7 dB.

Usually, the flanking constructions and joints should be detailed and constructed in such a manner that the total sound transmission around the partition does not exceed the sound transmission through the wall. With this basis, the values for R'_{w} , as specified in the tables on pages 4 and 5, can be applied. In case of doubt, an evaluation by an acoustic expert must be conducted, for instance on the grounds of calculations according to EN 12354-1:2000 with the BASTIAN software.

Calculation of sound insulation for a combined construction, e.g. a wall with a door, must be carried out in accordance with DS/EN 12354-1:2000 in order to achieve the most realistic values.

The following offers some important guidelines concerning ways to avoid undesired sound transmission. However, due to the high variation between the sound insulation of partitions, as indicated in the tables on pages 4 and 5, the guidelines do not apply to all possible situations.

All dry fixed, flanking walls and ceilings, including formworks, must be separated from the partition. The same applies to floating floors. In light roof constructions, the direction of the rafters must be parallel with the partition, unless a special kind of elastic ceiling suspension is used.

Sound proof insulation achieved for heavy, flanking walls and floors corresponds to at least the laboratory value for the dry fixed partition used.

The partition must be sealed (applies to surfaces, joints and apertures). Leaks might arise for instance in connection with pipe apertures and in fixing the partition into heavy building elements. Pipe apertures, etc. are sealed with mineral wool and elastic joint filler from both sides. Electric installation sockets, etc. are supplied from each side. The sockets can be placed on either side of the wall, provided that there are no leaks in the cladding.

Along edges against adjacent building elements, elastic joints are placed on both sides of the wall. However, with R'_{w} requirements below 44dB, a joint on one side is sufficient.



Account must be taken of the fact that radiators might transmit airborne sounds from one room to another, if they are connected with short, unbroken pipes.

Sound transmission through ventilation channels or fresh air intakes without appropriate sound reduction may decrease the sound proof insulation considerably. The risk of such reduction is greatest between fittings connected to the same ducting and between fresh air intakes with a spacing of less than 2m.

Ceilings can be sound proofed, which is adequate to avoid sound transmission via the roof space.

Sound Insulation Requirements

The sound insulation requirements in a building might be stipulated by the builder or the authorities to comply with The Building Regulations Approved Document E – Resistance to the passage of sound 2003 edition.

It is important to determine the airborne sound insulation values in conjunction with the planning of the structural design, as it will be difficult and costly to improve the values, when the building element is completed.

Guidelines for specifying impact resistant uses

Wall Dimensioning

The choice of board thickness, number of board layers and support distances depend on the load (in the form of impact load and other physical wear and tear) the boards are expected to stand. The higher the expected load, the lower the support distance and board thickness/number of layers.

The chart below provides an overview of a range of scenarios in which these factors interact. The individual boxes show typical examples of room types/activities with different loads attached as guidance.

The diagonal arrow in the chart illustrates the expected load from impacts and wear and tear.

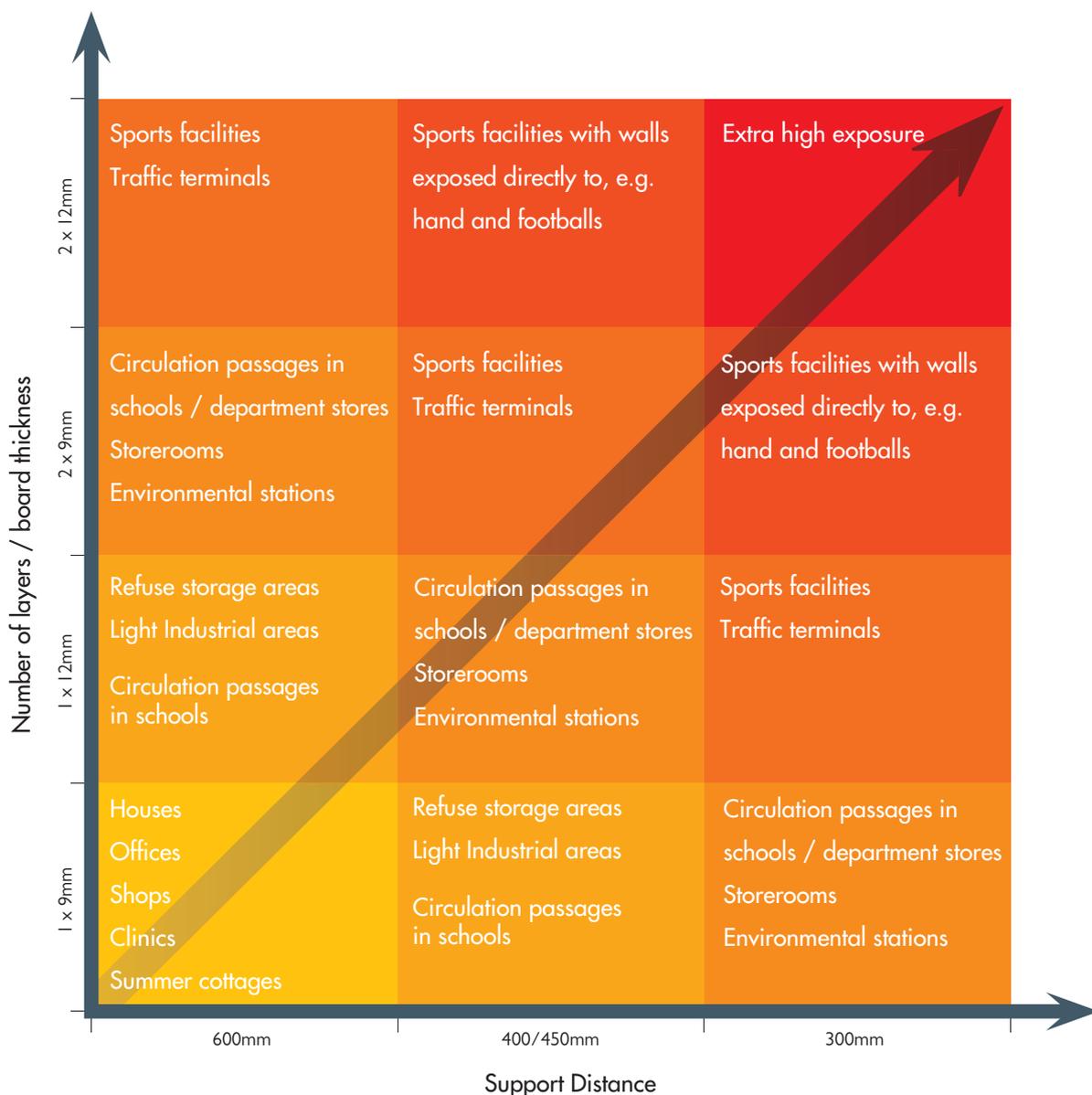
The chart is only meant as guidance and does not offer any guarantees as to individual projects. The load may vary considerably also within similar types of rooms/applications, depending on the specific activity in the room in question.

The examples in the chart do not take into consideration any requirements as to fire and sound proofing.

Decoration

Painting

Cembrit FR Building Board can be painted without any special priming, using an alkali-resistant paint or emulsion. Indentations due to nail and screw heads should be filled and all dust removed from the surface. Under normal circumstances, two coats of paint give a satisfactory finish. The following types of paint are suitable: pva, acrylics, pvc, chlorinated rubber, polyurethane, epoxy and silicate.



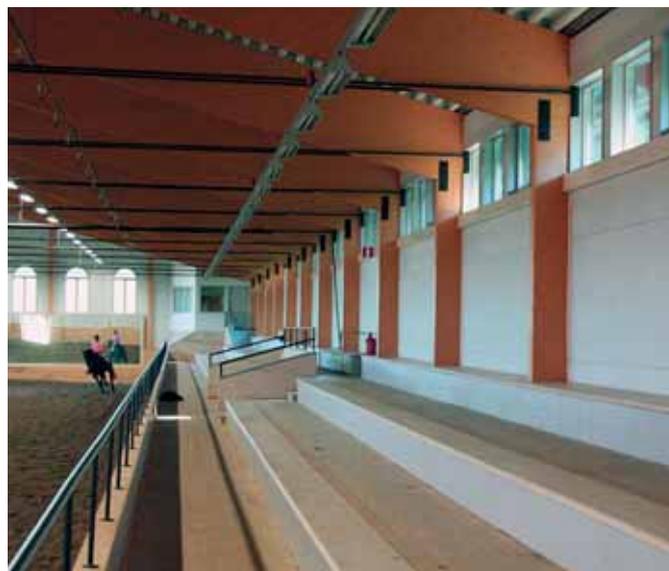
Fixings and fastenings

The Cembrit Blunn 40 x 2.3mm nail is ideal for timber studs, and the 35 x 4.2mm countersunk cutting head screws for steel studs.

Fittings are easily attached to Cembrit FR Building Board. However, satisfactory results will depend on the weight of the object and the type of fastener used. Cembrit FR Board's strength allows all kinds of attachments to be fastened. Heavy attachments should be centred on internal studwork. Alternatively, reinforce fastenings with a backing piece behind the board.

Several types of fittings and fastenings are shown in the table below. Contact the Cembrit Blunn Technical Department for advice and recommendations on specific applications.

Fastenings		Transverse Load
Thin steel nail		7.5
Hook		15.0
Plate screw		35.0
Rubber nut		60.0
Wing screw		85.0
Anchor screw		95.0

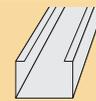


Support

Cembrit FR is installed on either a wood or steel support. In both scenarios, the maximum distance between the wall posts is 600mm. Walls that exceed the height specified in the examples on pages 3 and 4 require reinforcement and must be detailed and fire proofed individually.

Fixing

Cembrit FR is fixed with screws onto the wood or steel support. The boards have pre-punched holes for fixing screws in the longitudinal sides. Mid-board, the placing of screws is indicated. This ensures easy and quick installation and correct positioning of the fixing screws. Use self-counter-sinking screws 4.2 x 25/35/45mm for maximum 1.2mm steel with a screw distance according to the table below.

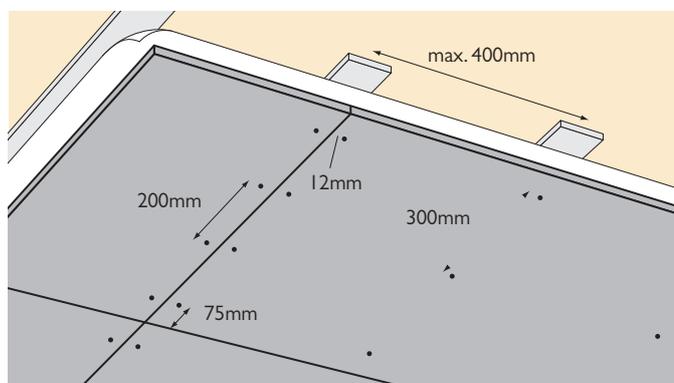
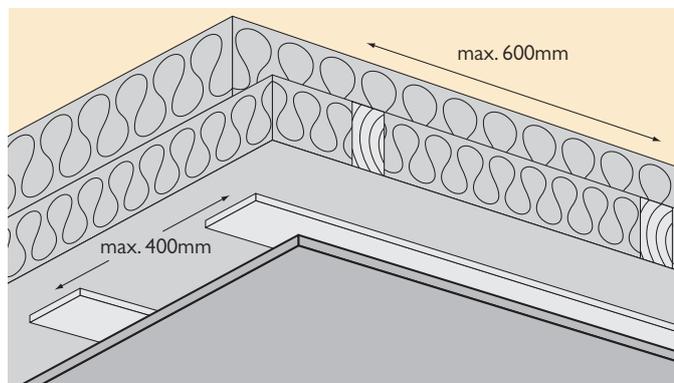
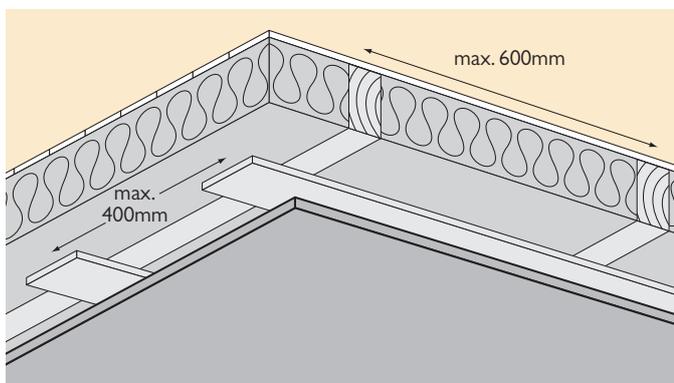
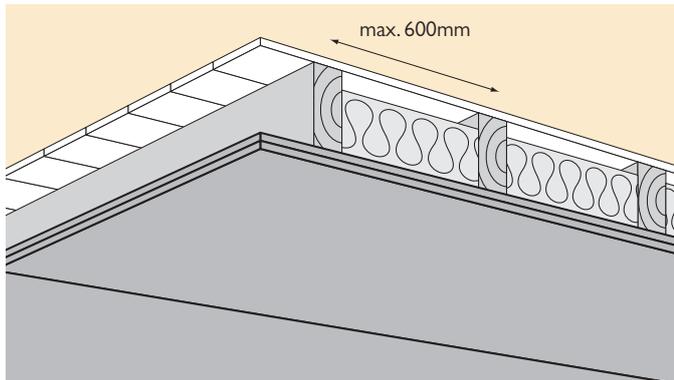
Wooden Frame	Steel Frame		
			
Dimensions	Dimensions		
45 x 45	R 45/40	SK 45/37	FR45
45 x 70	R 70/40	SK 70/37	FR70
45 x 95	R 95/40	SK 95/37	FR95
	Board thickness	Board thickness	Board thickness
	0.56mm	0.56mm	1.20mm
Application	Application		
Vertical posts	Vertical rails	Rails near ceilings, floors and floor joists	Stabilising rails for doorways

Commence the fixing from mid-board and downwards, while pressing the board against the support. Both long and short board edges must adjoin above posts, intermediate battens and other firm bases.

The boards are installed edge to edge (butt joint). The bevel edges on the boards leave a small v-joint, which is painted over. When a smooth, filled surface is desired for painting or wallpapering, chamfered Cembrit FR is the perfect choice, since this is designed for after-filling.

Foundation	Board Layer(s)	Maximum Wall Height
Wood 45 x 45	1 layer	3000mm
Steel R45	1 layer	3000mm
Wood 45 x 45	1 or 2 layers	4000mm
Steel R70	1 or 2 layers	4000mm

Installation process



Easily Processed

Cembrit FR is easy to process using the same tools as are used to process wood.

Handling and working environment

Dust is minimised when the following tools are used:

- circular saw with dust cover and collector
- keyhole saw/jigsaw for cutting large holes
- universal saw for cutting small quantities
- hole saw for drilling holes with sockets
- hand-scriber with hard metal point
- carbide tipped masonry drill
- Face masks are recommended when there is no vacuum extractor or when large areas of boards are being cut.

Despite the low weight of Cembrit FR, it takes two persons to carry boards of 1200mm width. Special tools can be used to ease the handling of the boards.

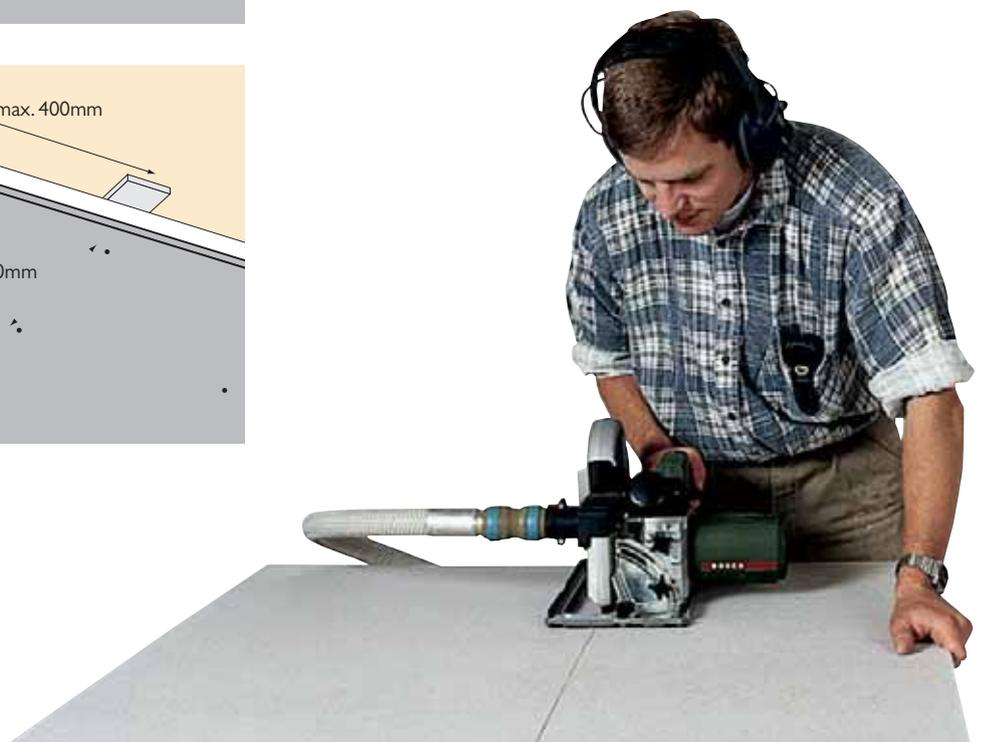
Cembrit FR must be stored in a dry environment. The boards are moisture resistant, but they may expand somewhat in wet or high humidity environments.

Cembrit FR is supplied with a plastic foil which is only for protection during transport. It must be removed on arrival. During transport and storage, the boards must be stacked on a level and stable foundation under cover of a roof or tarpaulin.

Cembrit FR contains no dangerous or harmful substances, and emission tests show that the boards do not give off any dangerous fumes. Dust created during the processing of the boards is not harmful in any way. However, we recommend that sufficient exhaust ventilation is ensured or that a dust mask is used during any processing of the Cembrit FR boards.

Health and Safety

For a health and safety data leaflet concerning the Cembrit Blunn product range, please contact the Cembrit Blunn Technical Support Department at the address below.



Technical information

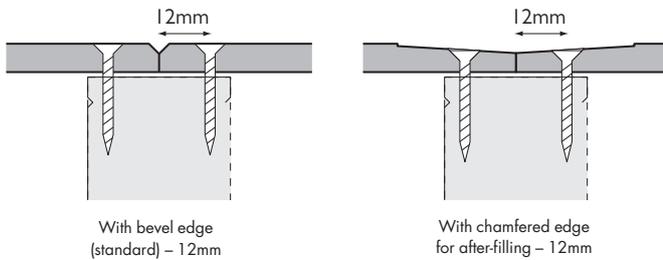
Product details

Composition: Cement, cellulose and mineral fillers in a dense matrix providing fire, impact and sound resistance.

Boards

Size	9mm	and	12mm
Weight	9.7kg/m ²		13.0kg/m ²
Density	1050kg/m ³ (± 75)		1050kg/m ³ (± 75)
Dimensions	2550 x 1200	and	3000 x 1200
m ² per board	3.06		3.60
Tolerance – Thickness	± 0.9mm		± 1.2mm
Tolerance – Width	± 3mm		± 3mm
Tolerance – Length	± 5mm		± 5mm

Boards – edge detail options



Ceiling Tiles

Size:	600x600mm [†]	600x600mm [†]
Weight:	9.7kg/m ² ,	13.0kg/m ²
Thickness:	9mm,	12mm

† other tile sizes available on request

Water absorption	32%
Moisture content	2-4%
Thermal conductivity	0.25 W/mK
Coefficiency of thermal expansion	7x10 ⁻⁶ m/m°C
Specific heat	0.9kJ/kg°C
Temperature range maximum	150°C



Moisture Resistance

Cembrit FR is not weakened considerably in wet condition. The boards are able to absorb and liberate moisture an unlimited number of times, without weakening the strength of the boards.

Cembrit FR is supplied with two types of edges. The standard type has a 2mm bevel edge on the longitudinal sides. The boards with bevel edge are installed edge to edge without any intermediate joints.

The boards are classified as NT C2 I, pursuant to EN 12467:2005

- NT – The boards contain no dangerous additives and do not give off any harmful fumes or odours.
- C – The boards are designed for indoor use and endure moisture as well as heat, but they do not stand frost.
- 2 – The boards have a minimum flexural strength of 7 MPa when in use.
- I – The boards are cut to size.

The boards are fire proof rated according to DS/EN 13501-1:2002 and DS/EN 13501-2:2003.





Applications

The unusually wide-ranging qualities and characteristics of the Cembrit FR Building Board make possible its specification and use in a variety of building types, such as:

- Offices
- Schools
- Shopping malls
- Public buildings
- Pre-fabricated units
- Warehouses
- Offshore oil rigs
- Chemical processing plants
- Off-site construction

Cembit FR is the perfect solution for partitions in rooms with much traffic such as common rooms, bicycle stores, laundry rooms, stairways, etc. With its strong surface, has a high resistance towards moisture, impacts and other mechanic influences. The boards are easily after-treated with paint or another finish.

Refuse storage areas, where the walls must be easy to clean e.g. by careful washing down, while still upholding the fire proofing requirements, are ideal for using Cembit FR.

Service

Our technical department is prepared to offer guidance in the planning phase, and our consultants nationwide are ready with advice and guidance in the drawing office as well as on the building site.

Product Warranty

Cembit FR is covered by the 10 year Cembit Blunn warranty.

Also in the range of Cembit Blunn high performance building boards and cladding panels:

- Cembonit
- Cemtone
- High pressure laminate
- Heavy duty
- Special performance
- Multi-purpose
- Incolor
- Cempanel

Cembit Blunn Limited

The information contained in this publication and otherwise supplied to users of the company's products is based on the company's general experience, best knowledge and belief. However, because of factors beyond the company's knowledge and control, which can affect the use of the products, no warranty is given or implied with respect to such information.

The company's policy is one of continuous improvement. Cembit Blunn Limited therefore reserves the right to alter specifications at any time and without notice.

As with all manufactured materials, colours and textures of slate may vary according to light and weather conditions. It is advisable to ask for samples of slate prior to specification and purchase. Owing to this and limitations of the printing process, colours of slate in this brochure may only be taken as indicative.

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Branch listings

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| 1 London | T +44 (0)20 8301 8900 |
| 2 Southampton | T +44 (0)23 8061 5631 |
| 3 Bovey Tracey | T +44 (0)1626 835722 |
| 4 Llandow | T +44 (0)1446 773777 |
| 5 Normanton* | T +44 (0)1924 890890 |

* Main cladding building board branch.



Cembit Blunn Limited

57 Kellner Road, London SE28 0AX

T +44 (0)20 8301 8900 F +44 (0)20 8301 8901

E sales@cembitblunn.co.uk W www.cembitblunn.co.uk

