Technical File

Chapter 3 - Walls and cladding of the interior walls

Cement-bonded particleboards

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This Technical File invalidates all previous technical documents.

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3. WALLS

Viroc panels can be used to make interior partition walls or interior wall cladding. When applied to interior partition walls, they can be varnished, painted or unfinished (rough). It is the installer's responsibility to check the security conditions of the support structure, in particular the distance between supports and the width of the supports for correct installation of the panels.

Viroc panels undergo small dimensional variations with changes in relative moisture and temperature. The Viroc panel can be expected to accommodate a maximum dimensional variation of -0.1% (shrinkage) to +0.05% (expansion) in an interior application.

Elements constituting the partition walls and the wall cladding

- Cladding panels;
- Support structure for the panels, which can be made of wood or metal and the respective fixing elements;
- Fasteners: Screws, rivets, nails or adhesives;
- Sound insulation.

3.1 General features

Application

Inside

Thicknesses

10 mm in dry indoor areas;

12 mm in moist interior areas such as bathrooms and kitchens.

Maximum panel size

3000x1250 mm

Any intermediate dimensions obtained by cutting the standard dimension panel are possible.

Panel thickness tolerances

Thickness: 10 mm ± 0.7 mm; 12 mm ± 1.0 mm

Cutting tolerances

Length and width: ± 3 mm

Squareness: ≤ 2 mm/m

Edge straightness: ≤ 1.5 mm/m

3.2 Fasteners

Depending on the type of structure, the panels can be fixed with screws, nails and rivets or glued with adhesive tapes or polyurethane adhesives (PU mastic).

Screws

The panel must be fixed at the distances shown in figure 3.1.

If the screws are placed too close to the edges, they can cause the panel to break.

Screws for wooden structures must have an anchoring length (depth driven into the wood) of at least 20 mm (see figure 3.2).

When the support structure is made of metal, in addition to the appropriate length of the screw body, the drill tip must be of an appropriate size to pierce the thickness of the metal it will be fastened to (see figure 3.3).

The maximum distance between screws must not exceed 600 mm.

Other types of screws can be used as long as they have the same performance and durability.

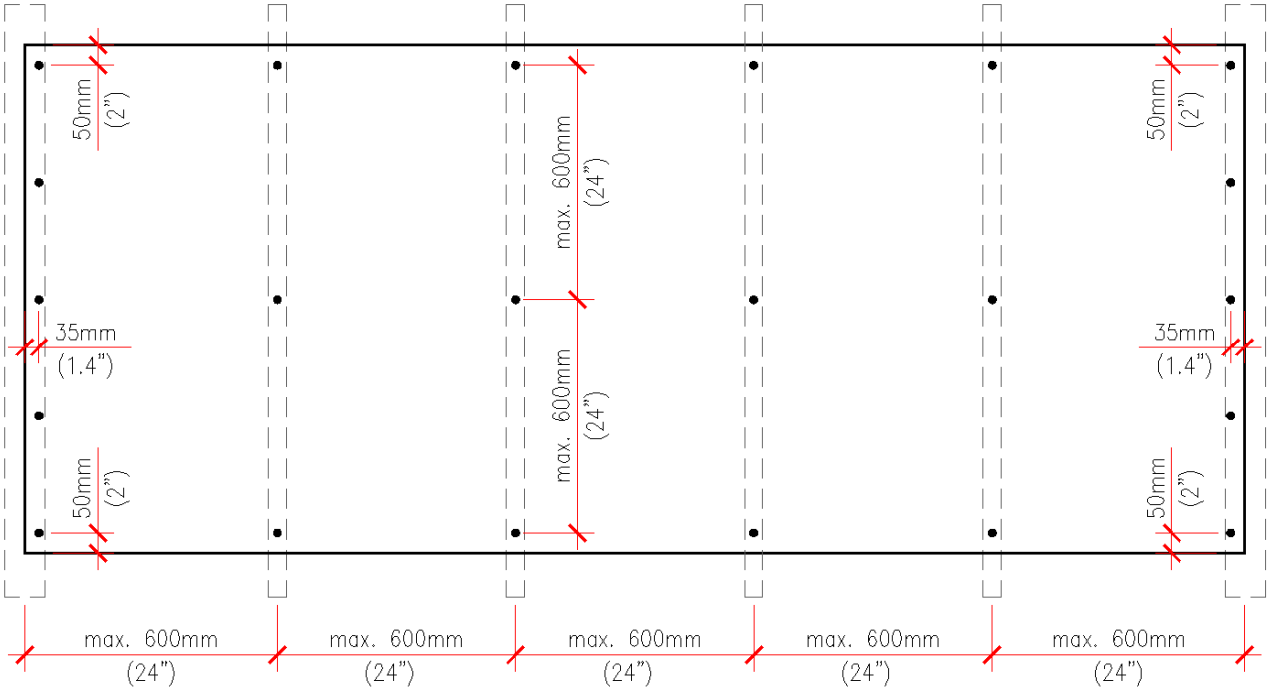


Figure 3.1 - Location of the screws

Figure 3.2 - Galvanised steel screw for wooden structure

Figure 3.3 - Galvanised steel screw for metal structure

Nails

If the structure is made of wood, galvanised steel or stainless steel nails can be used to fix the panels to the structure.

There are headless nails that are practically invisible, as shown in figure 3.4.

The nails should be applied using a suitable pneumatic gun (see figure 3.5). Before the final fixing of the panels begins, a series of tests must be carried out to set the right pressure and force for the nails to be driven in correctly.

When fixing with nails, the distance between fixings must not exceed 600 mm in the horizontal direction and 400 mm in the vertical direction (see figure 3.6).

Figure 3.4 - Headless nail

Figure 3.5 - Pneumatic nail gun

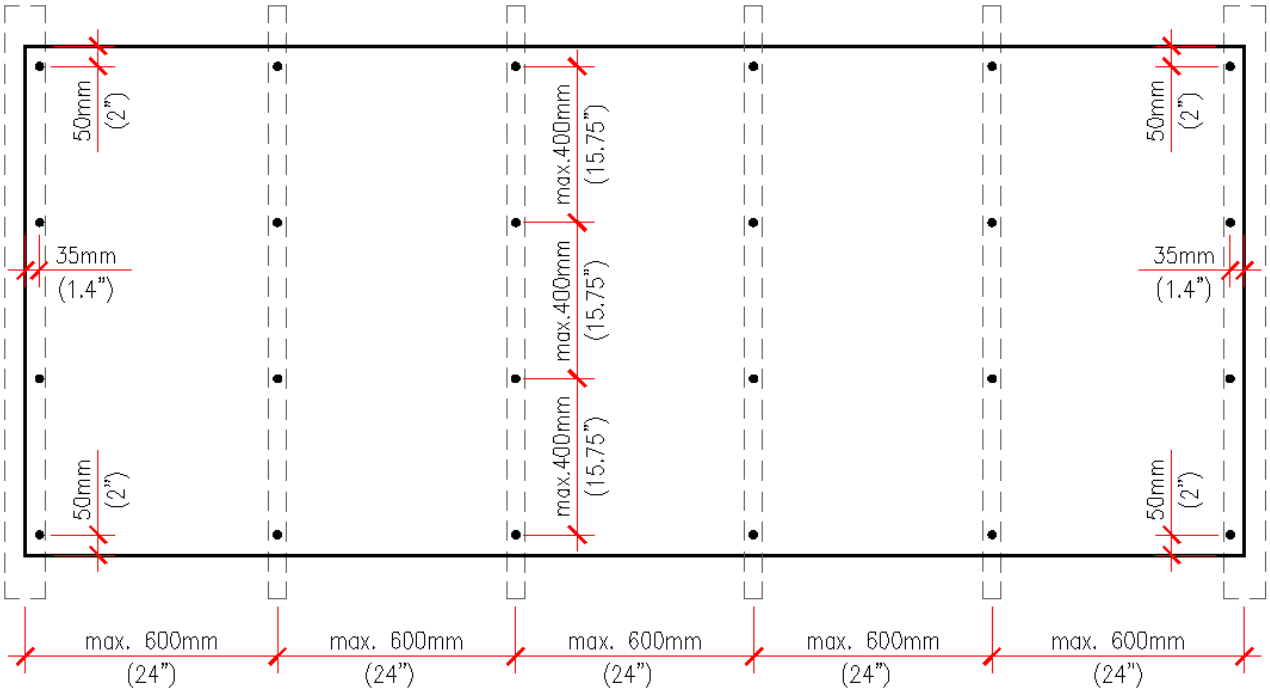


Figure 3.6 - Location of the nails

Rivets

If the structure is made of metal, rivets with an aluminium body and a stainless steel nail can be used to attach the panels to the structure (see figure 3.7).

Rivets can be applied with a manual, electric or compressed air riveting machine.

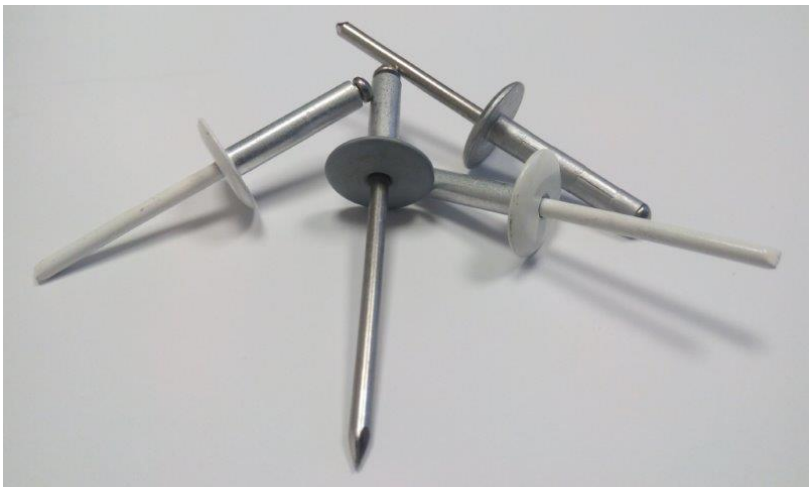


Figure 3.7 - Rivets with aluminium body and stainless steel nail.

The location of the rivets when fixing the panels should be as shown in figure 3.1, respecting the distances shown.

Mastic adhesives

Mastic bonding systems can be used to bond Viroc panels to wooden and metal structures. This type of fixing consists of:

- Adhesion primer for the support structure;
- Adhesion primer for the Viroc panel;
- Double-sided adhesive tape;
- Mastic adhesive.

The adhesive tape is 3 mm thick and its function is to fix the panels while the mastic adhesive is fresh, i.e. without resistance. This ensures that the cord is 3 mm thick without being crushed.

Sika and Bostik have mastic adhesives suitable for this application. The manufacturers of these materials should always be consulted for advice and correct application (see figure 3.8).

Figure 3.8 - System for bonding panels with mastic

VHB adhesive tape

A variant of the mastic bonding system is the use of VHB double-sided adhesive tape (see figure 3.9).

The tape must be applied according to the manufacturer's instructions so that it adheres to the surfaces without peeling off.

Figure 3.9 - VHB double-sided adhesive tape (3M)

Dual-Lock adhesive tape

For panels that need to be removable, they can be fixed with a 3M Dual-Lock adhesive tape (see figure 3.10). The tape must be applied according to the manufacturer's instructions so that it adheres to the surfaces without peeling off.

Figure 3.10 - Dual-Lock adhesive tape (3M)

3.3 Partition walls

Support structure

3.3.1 Wooden beams

The profiles supporting the panels can be made of pine wood. The strength of the wood used to make up the uprights must be at least of class C18 according to EN 338 and durability of class 2, 3 or higher according to EN 335.

When assembled on site, wooden uprights must not have a moisture level of more than 18%, with a difference between the consecutive elements of no more than 4%. The relative moisture of the wooden uprights is determined according to the method described in standard EN 13183-2, using a tip moisture metre.

The cross-section of the support profiles is generally rectangular, with a minimum dimension of 40x50 mm (see figure 3.11).

The design of these elements takes into account the deformations caused by the actions (self-weight, overloads, etc.), so that they do not jeopardise the normal functioning of the wall. Deformation due to action must not exceed the limit L/200 of the span between the support fixings.

The width of the uprights must be such that the fixings can be positioned correctly, with the capacity to absorb small positioning errors, and the screws must not be less than 15 mm from the end of the upright.

Other types of sections can be used, as long as they have the same performance and durability.

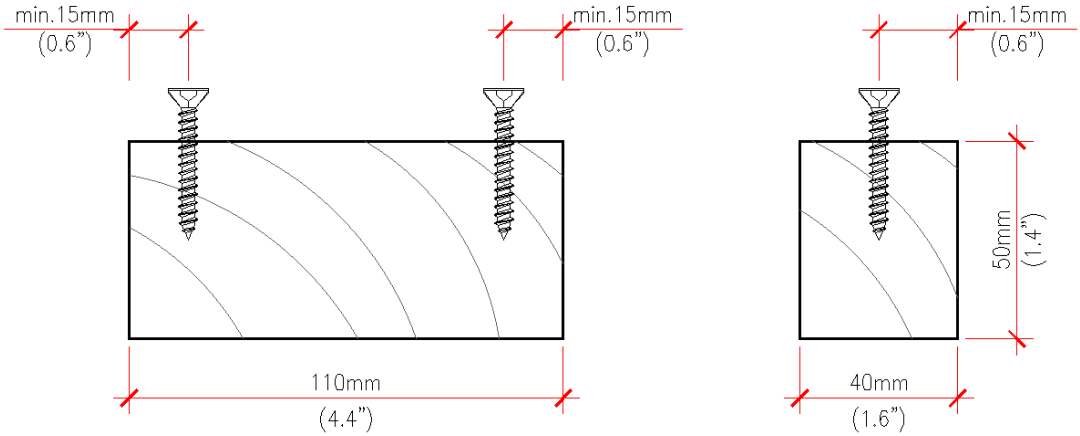


Figure 3.11 – Wooden structure type of section, minimum strength of class C18 (EN 338).

3.3.2 Galvanised steel profiles

The profiles supporting the panels can be made of galvanised steel. The minimum strength of the steel used in the upright profiles must be of class DX51D, in accordance with standard EN 10346.

The hot-dip zinc coating (Z) should be 275 g/m2 in coastal areas and 140 g/m2 in other areas.

The sections are generally C and U-shaped with a minimum thickness of 0.7 mm. Other profile shapes can be used, as long as they have the same performance and durability (see figure 3.12).

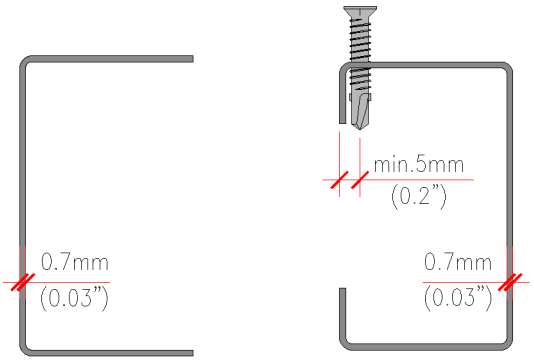


Figure 3.12 - Galvanised steel structure type section

The support structure must be wide enough to allow the fixings to be positioned correctly, respecting the minimum distances between the screws and the edge of the panels. It must also have the capacity to absorb small positioning errors.

Note that in the joint area between panels, when the structure is made of galvanised steel, it is normal to double the profiles in order to respect the distance between the screws and the edges.

The maximum distance between the axes of the supporting elements is 625 mm, and their alignment must be checked between adjacent elements and must not differ by more than 5 mm.

These elements are designed taking into account the deformations caused by their use, so that they do not jeopardise the normal functioning of the wall. The deformation must not exceed the L/300 limit of the span between the supports of these elements.

If less than the recommended thickness of steel is used, the profile used must guarantee the deformation limits indicated above and a good anchorage of the screws. The screws must be suitable for the structure used.

Horizontal section

Figures 3.13 and 3.14 show the horizontal sections of wooden and galvanised steel partition walls, respectively.

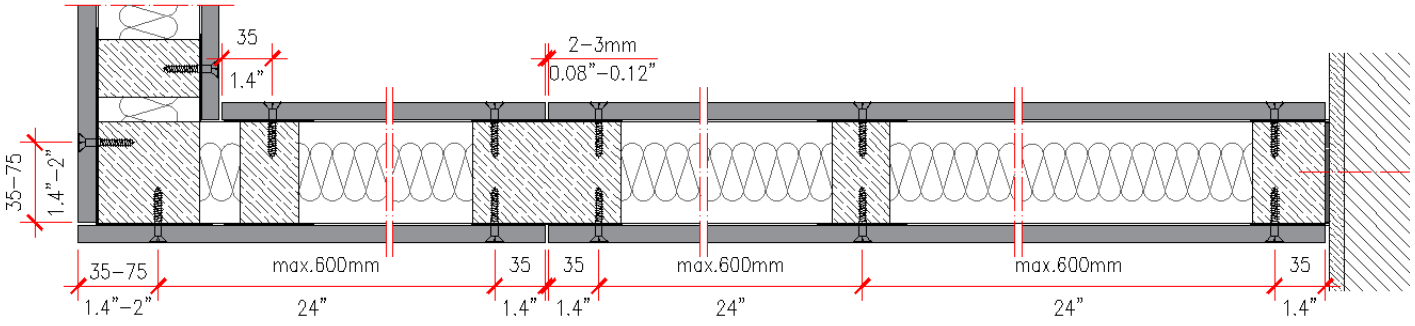


Figure 3.13 - Horizontal section of the wall, wooden structure

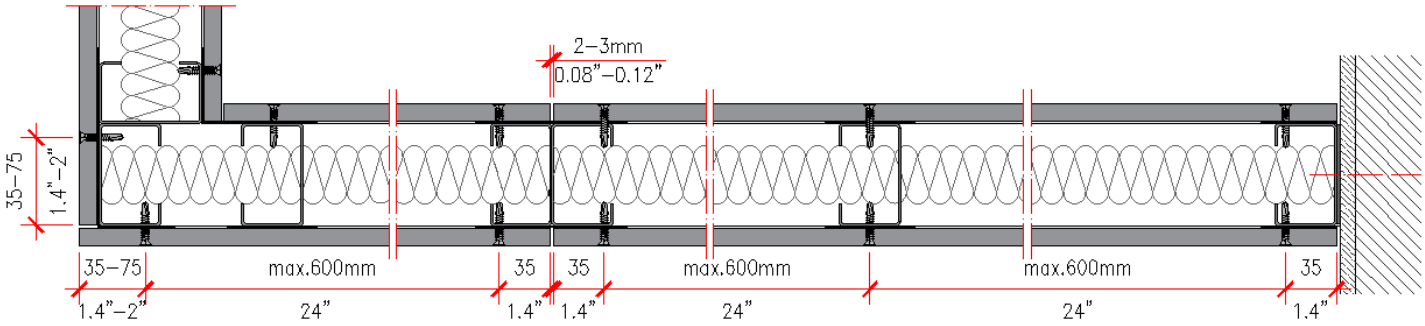


Figure 3.14 - Horizontal section of the wall, galvanised steel structure

Figure 3.15 shows a vertical section of a wooden and galvanised steel structure.

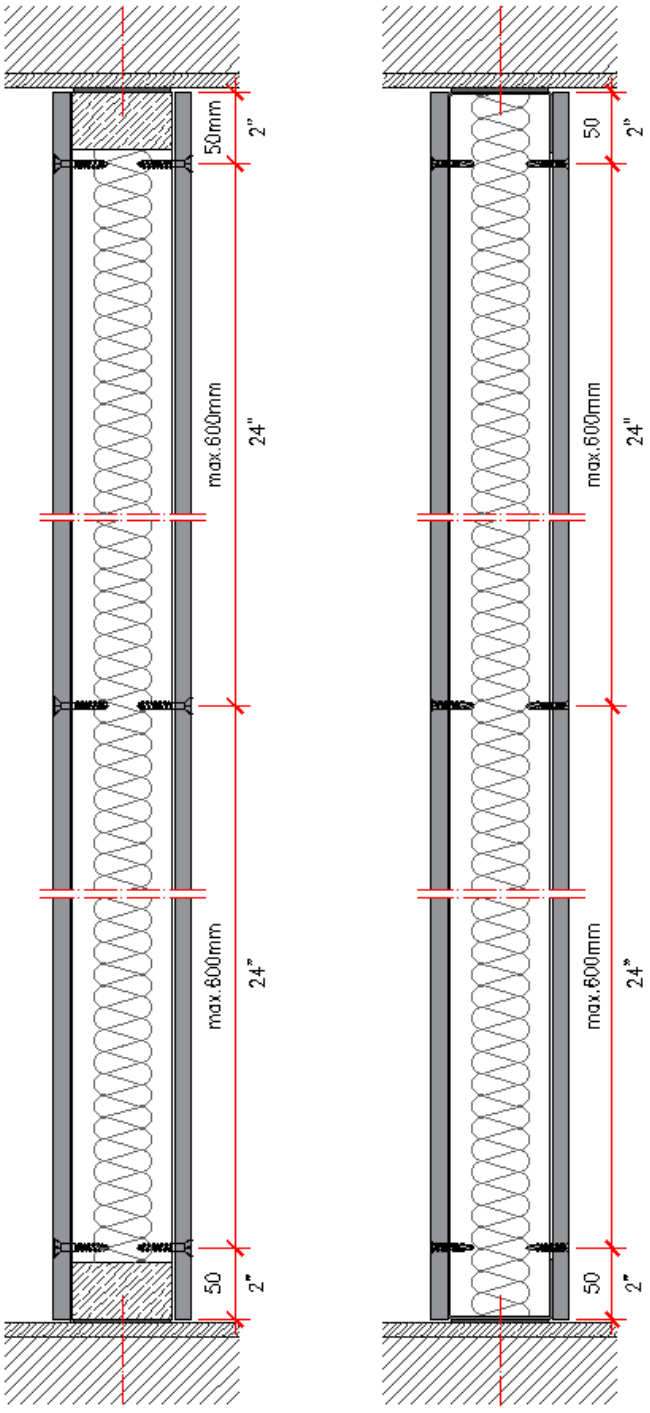


Figure 3.15 - Wall vertical section

Wooden and galvanised steel structure

3.4 Wall cladding

Support structure

The supporting structure of a wall cladding can be made of wooden profiles or galvanised steel. Figures 3.16 and 3.17 show the standard sections of the profiles used. Other profiles can be used, as long as they have the same strength and durability.

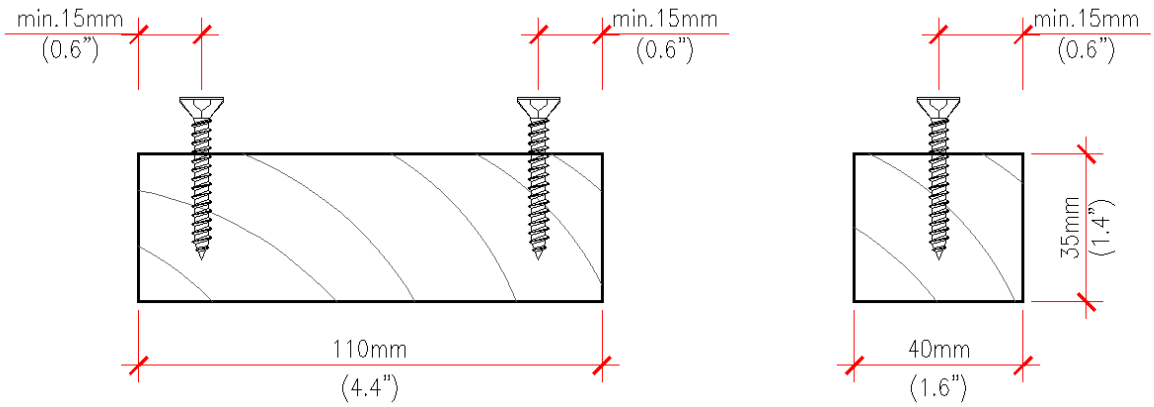


Figure 3.16 - Wooden section, minimum strength of class C18 (EN338)

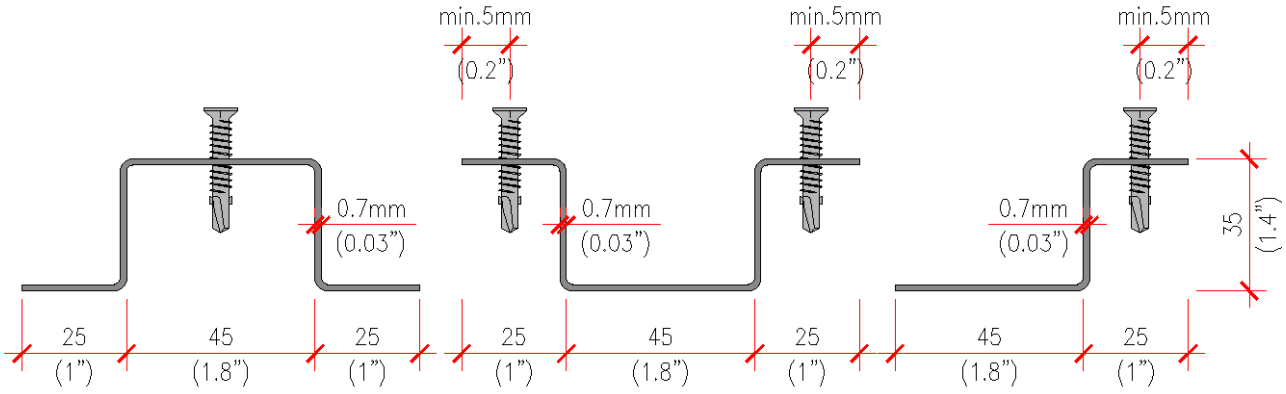


Figure 3.17 - Omega profile (min. thickness 0.7 mm), galvanised steel DX51D (Z+)

The structure that will support the Viroc panels must be aligned and properly positioned. If the wall to be clad is very misaligned, it may be necessary to straighten the supporting structure using supporting squares, forming a structure identical to the one of the ventilated façade.

The support structure must be wide enough to allow the fixings to be positioned correctly, respecting the minimum distances between the screws and the edge of the panels, and have the capacity to absorb small positioning errors.

The maximum distance between the axes of the supporting elements will be 625 mm, and their alignment must be checked between adjacent elements and must not differ by more than 5 mm.

In a wooden support structure, according to EN 338, the Resistance Class is of at least C18.

In a galvanised steel structure, and in accordance with EN 10327, the profile class is of at least DX51D (Z+) and the minimum thickness of the steel sheet is 0.7 mm.

These elements are designed taking into account the deformations caused by their use, so that they do not jeopardise the normal functioning of the wall. The deformation must not exceed the L/300 limit of the span between the supports of these elements.

If less than the recommended thickness of steel is used, the profile used must guarantee the deformation limits indicated above and a good anchorage of the screws. The screws must be suitable for the structure used.

Horizontal section

Figures 3.18 and 3.19 show horizontal sections of wooden and galvanised steel partition walls, respectively.

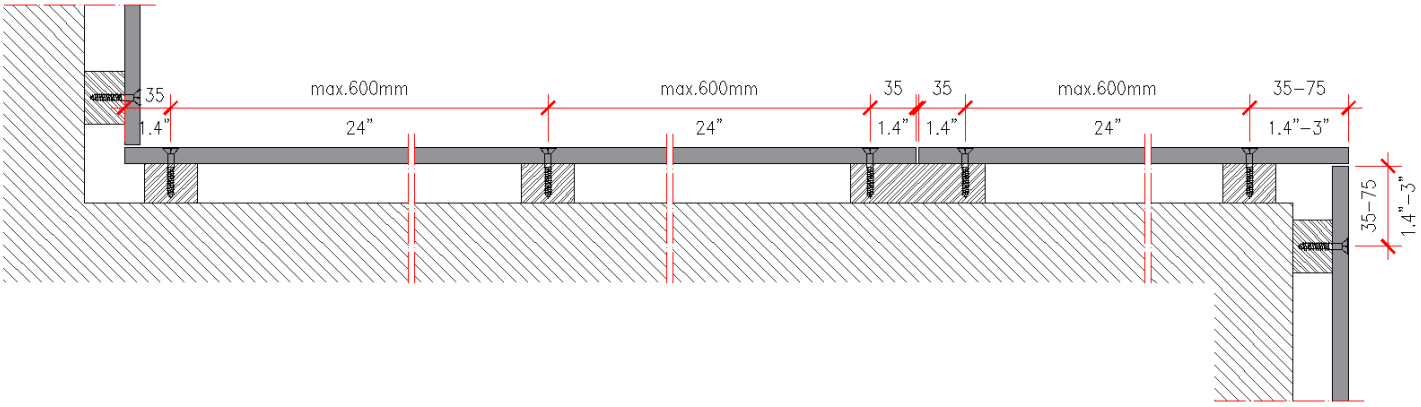


Figure 3.18 - Horizontal section of wall cladding, wooden structure

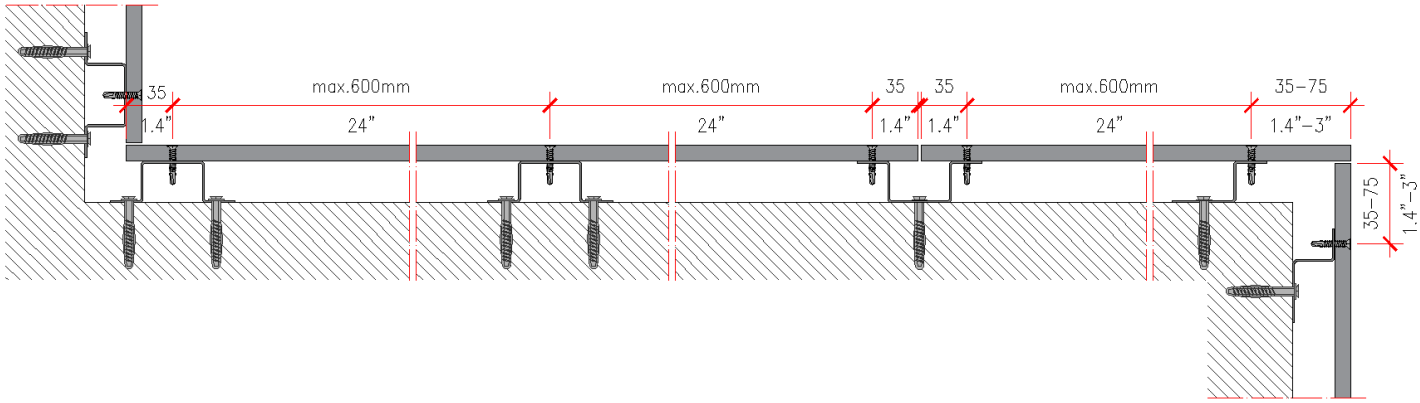


Figure 3.19 - Horizontal section of wall cladding, galvanised steel structure

Figure 3.20 shows a vertical section of a wooden and galvanised steel structure.

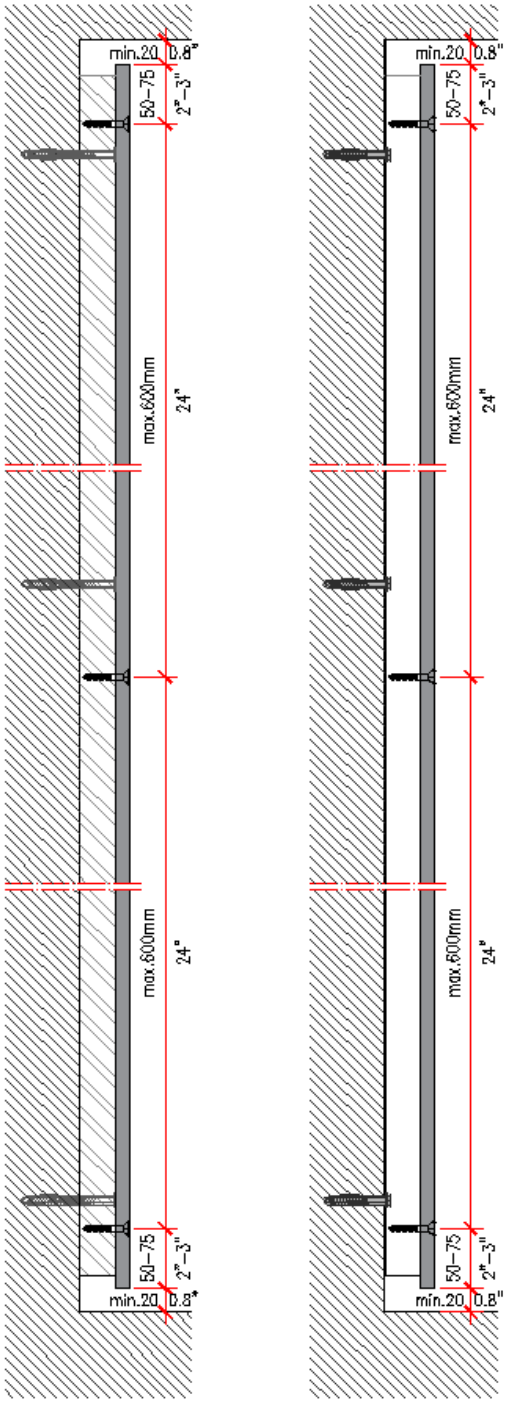


Figure 3.20 - Vertical section of wall cladding

Wooden and galvanised steel structure

3.5 Joints between panels

The joints between panels must have a gap of 2 to 3 mm and can be filled with a silicone bead or mastic (see figures 3.21 and 3.22).

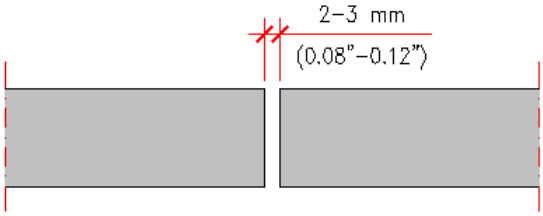


Figure 3.21 - Joints between panels

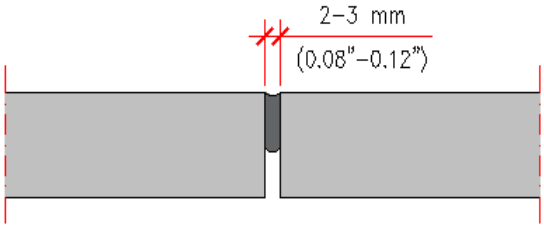


Figure 3.22 - Joints between panels filled with mastic

3.6 Panel edges

The edges of the panels can be machined in a 2 to 3 mm bevel shape (see figure 3.23).

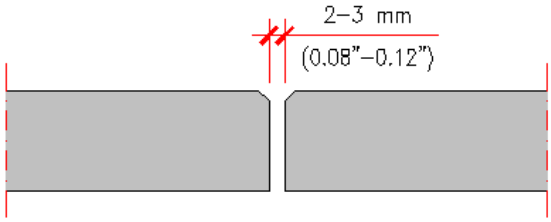


Figure 3.23 - Bevelled machined edges

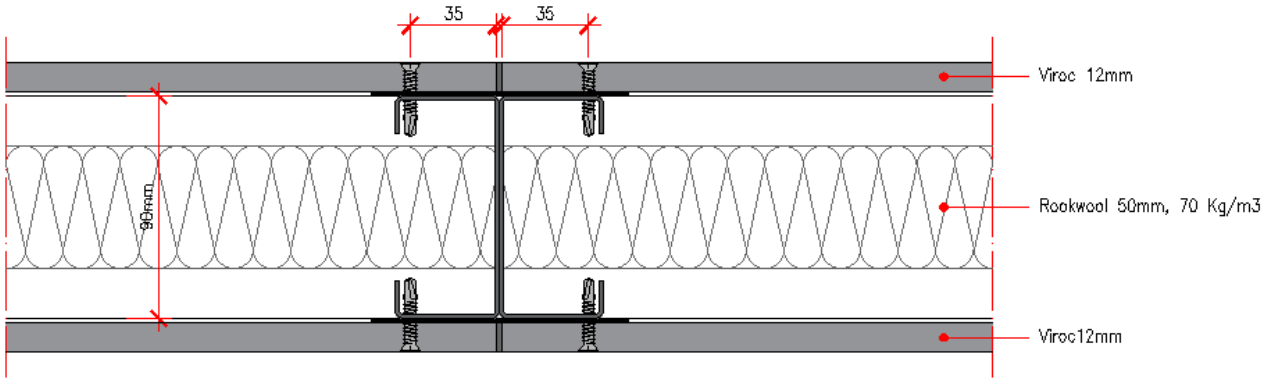
3.7 Acoustic insulation

Viroc Portugal has several partition wall solutions made with Viroc panels, which have been experimentally characterised in terms of their acoustic performance.

Figures 3.24 to 3.31 show the wall configurations tested and the results obtained, in particular the sound insulation index for airborne sounds Rw according to ISO 140-3.

Wall	Structure		Rw(C;Ctr) [dB]	Representation
1+1	Simple	C90	47(-4;-11)	Figure 3.23
2+1	Simple	C90	47(-1;-1)	Figure 3.24
2+2	Simple	C90	55(-1;-5)	Figure 3.25
2+1	Double	C70+40+C70	59(-3;-11)	Figure 3.26
2+2	Double	C70+40+C70	62(-2;-7)	Figure 3.27
3+1	Double	C70+40+C70	61(-4;-11)	Figure 3.28
3+2	Double	C70+40+C70	64(-2;-7)	Figure 3.29
3+1+2	Double	C70+40+C70	65(-2;-7)	Figure 3.30

1+1 wall with simple structure

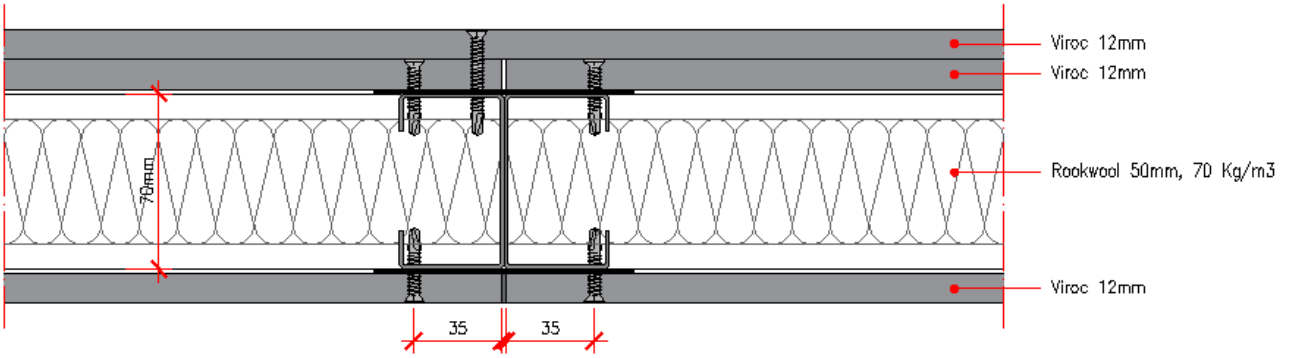


Rw(C;Ctr) = 47(−4;−11) dB; EN ISO 140−3

f (Hz)	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
R (dB)	17.5	25.3	36.2	39.7	39.3	39.9	45.4	47.0	48.0	49.7	51.2	49.7	49.1	47.5	49.1	56.7	58.8	58.5

Figure 3.24 - Wall 1+1 with simple structure

2+1 wall with simple structure

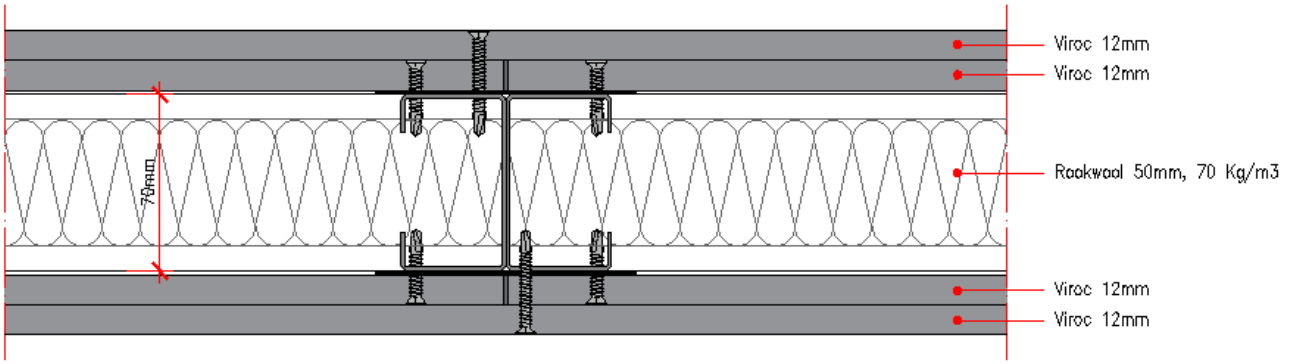


Rw(C;Ctr) = 47(−1;−1) dB; EN ISO 140−3

f (Hz)	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
R (dB)	27.5	18.9	25.5	31.1	39.8	43.0	44.2	44.9	48.6	49.2	49.9	51.3	50.8	49.0	45.3	45.7	45.6	44.9	47.5	48.1	50.8

Figure 3.25 - 2+1 wall with simple structure

2+2 wall with simple structure

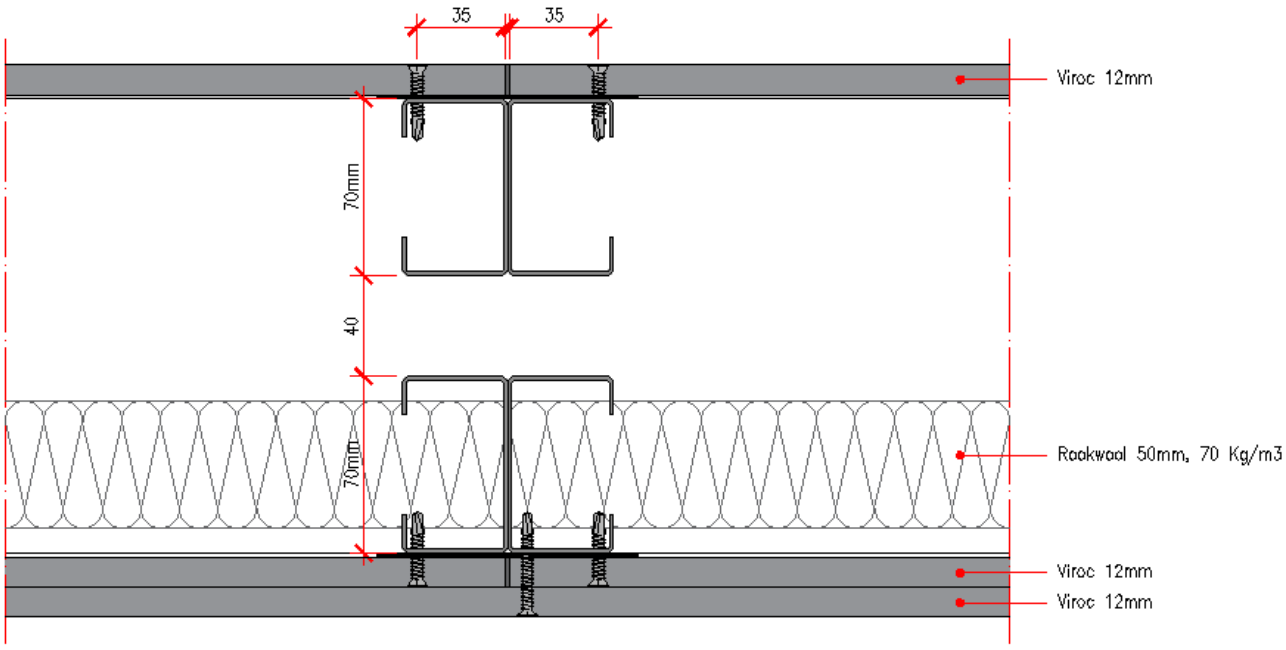


Rw(C;Ctr) = 55(−1;−5) dB; EN ISO 140−3

f (Hz)	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
R (dB)	27.5	20.6	24.0	34.6	42.5	44.5	46.8	48.1	50.6	51.8	51.1	53.0	54.4	55.2	55.8	56.6	56.2	54.1	57.0	56.4	56.2

Figure 3.26 - Wall 2+2 with simple structure

2+1 wall with double structure

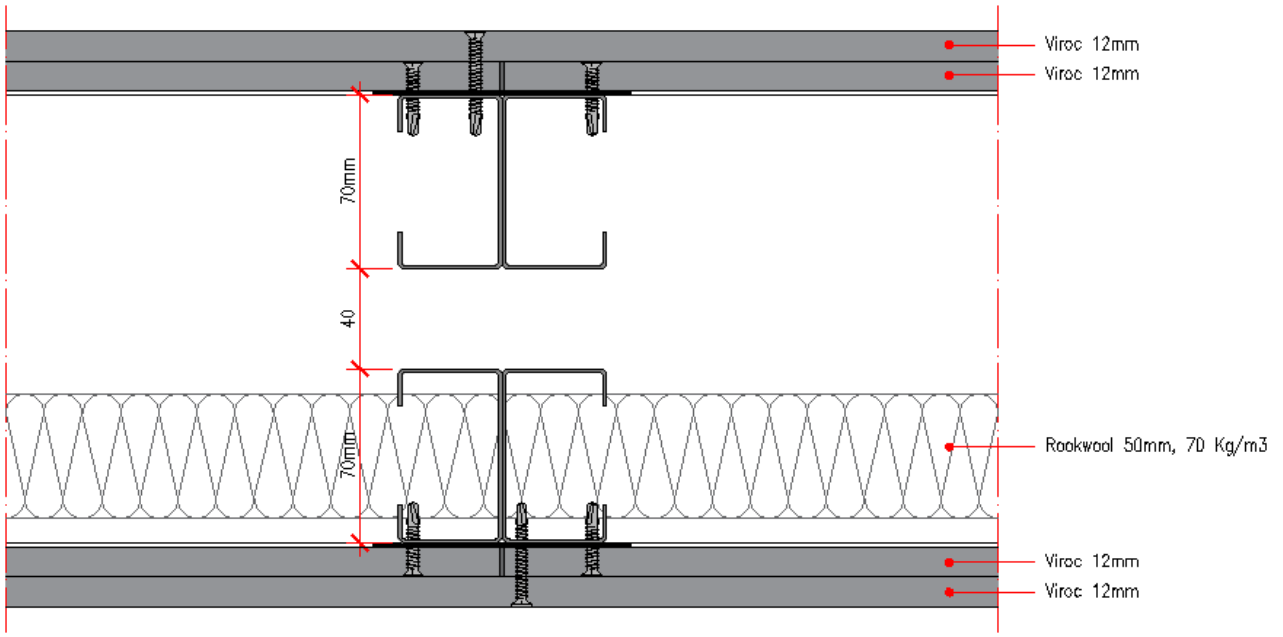


Rw(C;Ctr) = 59(−3;−11) dB; EN ISO 140−3

f (Hz)	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
R (dB)	28.2	22.9	33.1	29.1	40.7	43.7	46.4	50.7	53.3	56.8	57.3	60.3	63.4	66.5	68.8	69.2	67.2	62.4	64.2	65.4	65.2

Figure 3.27 - Wall 2+1 with double structure

2+2 wall with double structure

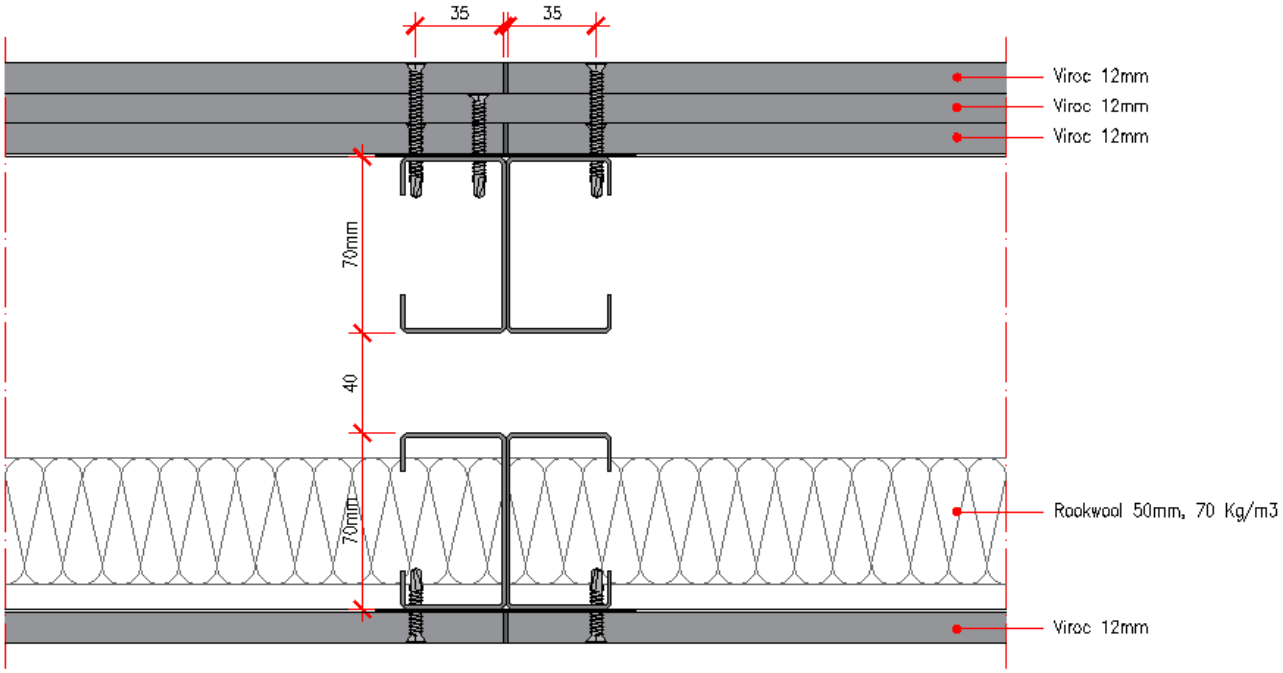


Rw(C;Ctr) = 62(−2;−7) dB; EN ISO 140−3

f (Hz)	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
R (dB)	26.6	27.6	33.4	36.9	45.1	47.5	50.8	52.9	55.9	58.8	57.6	60.4	63.9	66.7	70.7	71.7	71.9	68.6	70.4	71.2	68.7

Figure 3.28 - Wall 2+2 with double structure

3+1 wall with double structure

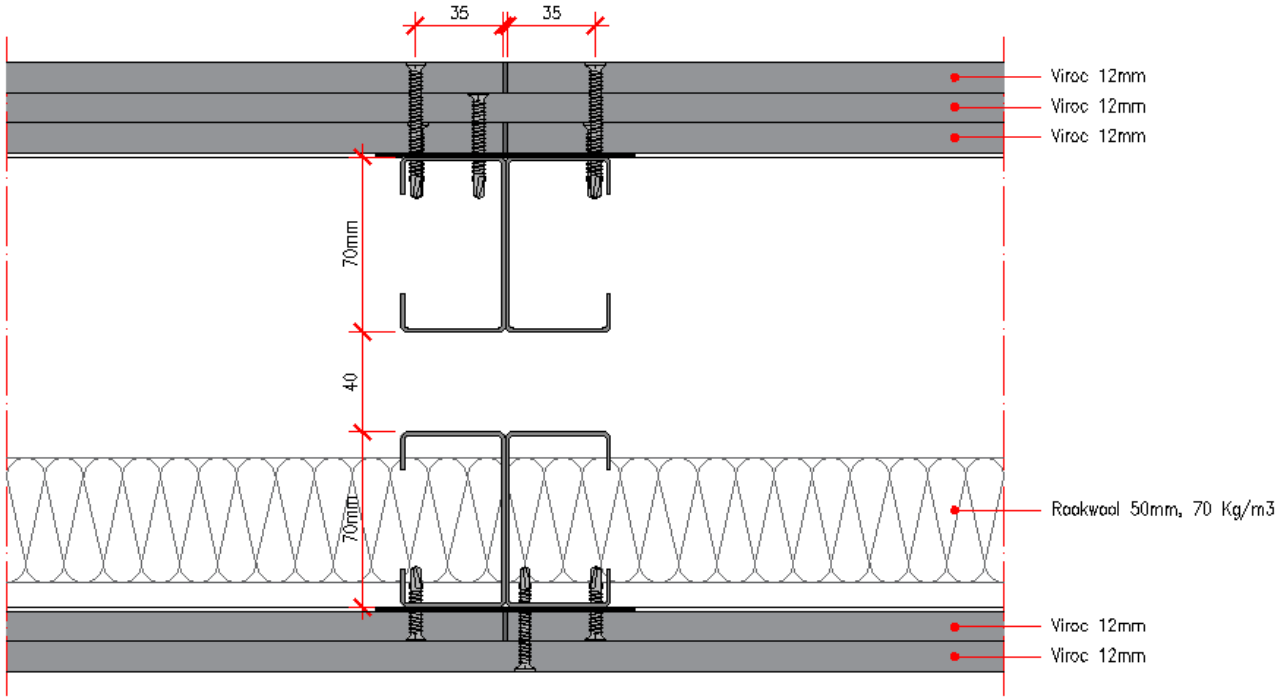


Rw(C;Ctr) = 61(-4;-11) dB; EN ISO 140-3

f (Hz)	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
R (dB)	29.2	26.9	34.9	31.6	41.3	46.0	49.6	52.0	54.3	56.9	57.4	60.5	63.6	66.8	70.3	70.9	70.1	65.1	66.9	67.2	65.5

Figure 3.29 - 3+1 wall with double structure

3+2 wall with double structure

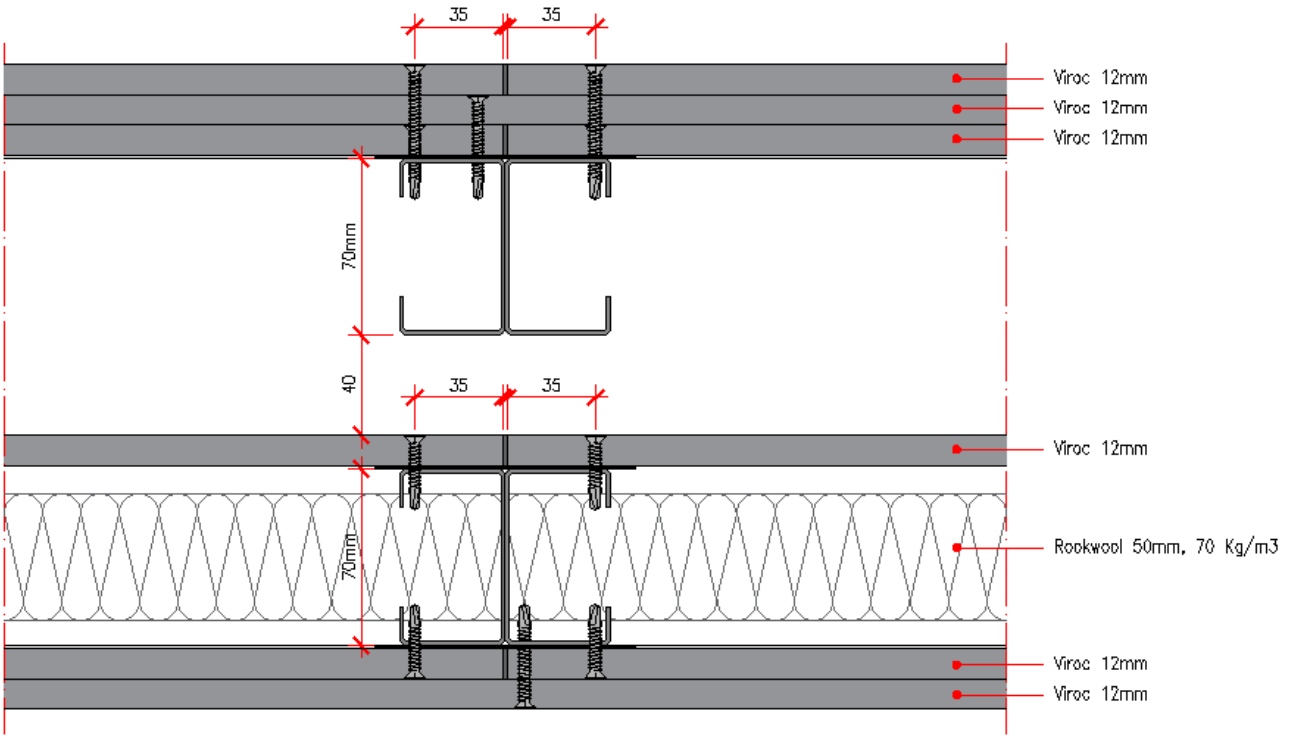


Rw(C;Ctr) = 64(-2;-7) dB; EN ISO 140-3

f (Hz)	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
R (dB)	36.0	34.8	40.9	40.6	46.9	50.4	52.9	53.7	55.9	59.3	58.4	61.1	64.1	67.2	71.8	73.0	73.9	70.8	72.2	71.9	69.4

Figure 3.30 - Wall 3+2 with double structure

3+1+2 wall with double structure



Rw(C;Ctr) = 65(−2;−7) dB; EN ISO 140−3

f (Hz)	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
R (dB)	32.8	28.8	32.6	41.7	46.5	51.0	54.6	55.4	57.6	59.5	58.4	61.8	64.8	67.2	71.8	73.0	73.3	73.5	73.6	71.3	68.2

Figure 3.31 - 3+1+2 wall with double structure

3.8 Fire resistance

Viroc Portugal has two fire-resistant wall solutions that have been experimentally tested.

Both solutions were characterised according to European standard EN 13501-2.

Figures 3.32 to 3.35 show the wall configurations tested and the results obtained.

Wall	Fire resistance	Representation
150 mm	EI90	Figures 3.32 and 3.33
200 mm	EI120	Figures 3.34 and 3.35

90 minute fire resistant wall (EI90)

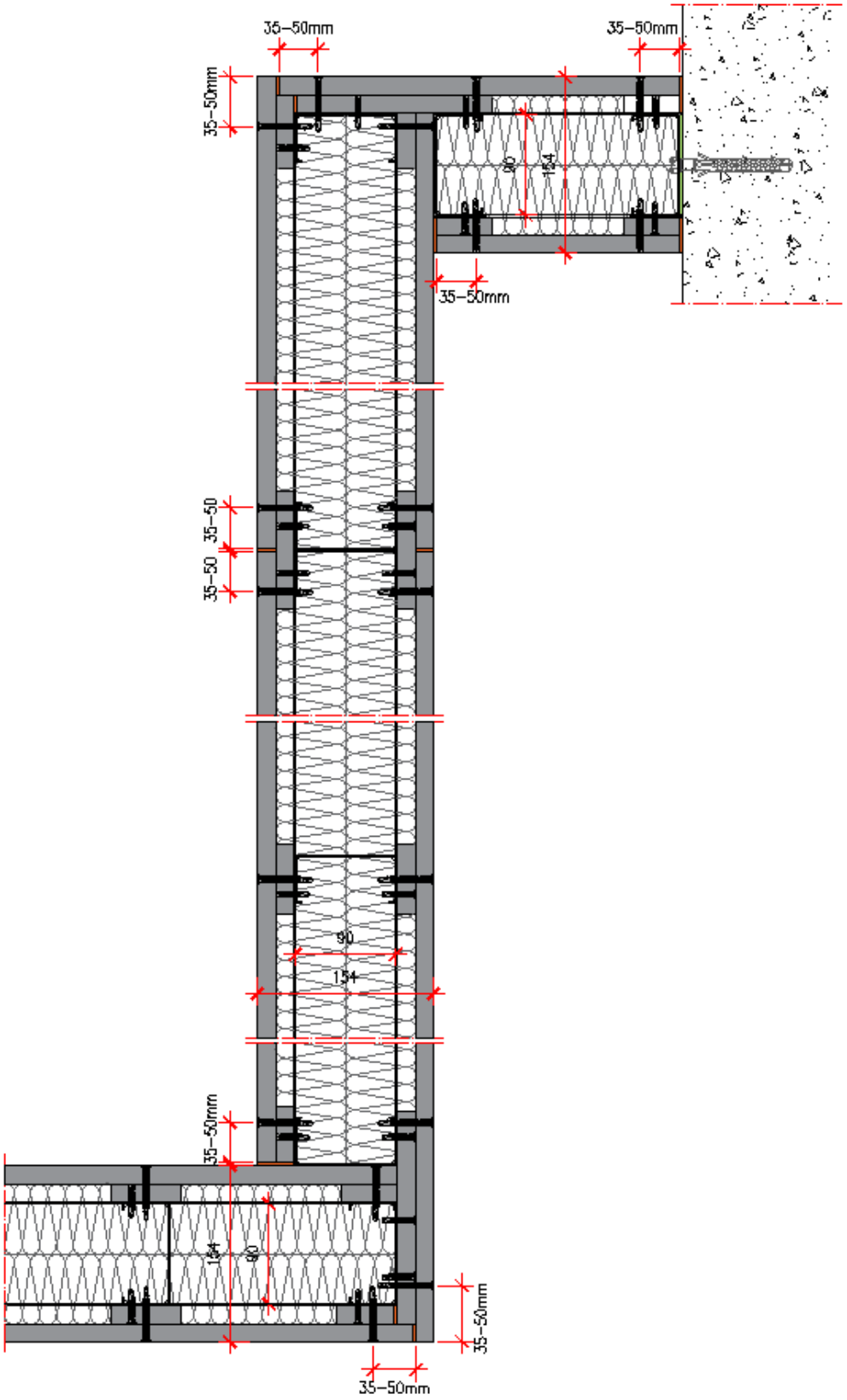


Figure 3.32 - EI90 Wall, Horizontal Section

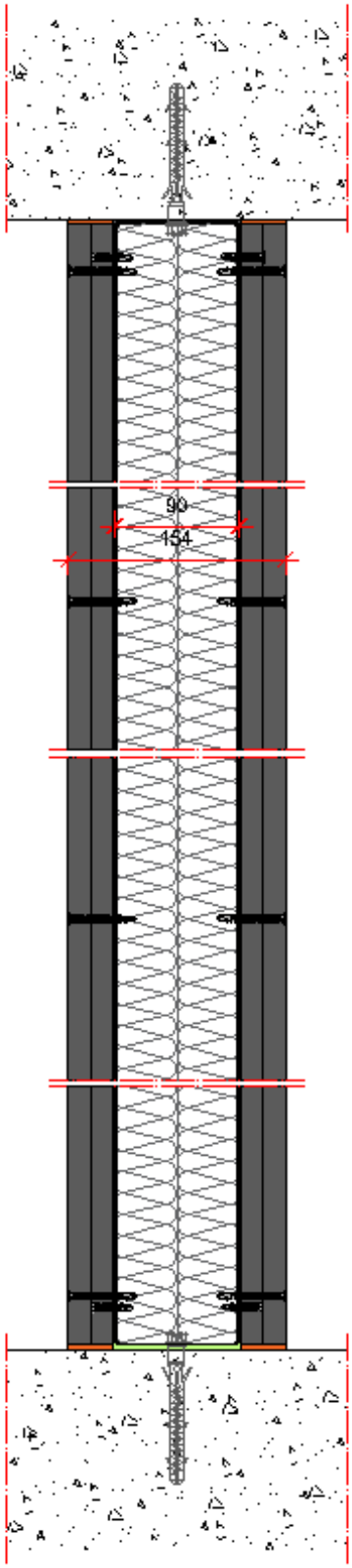


Figure 3.33 - EI90 Wall, Vertical Section

120 minute fire resistant wall (EI120)

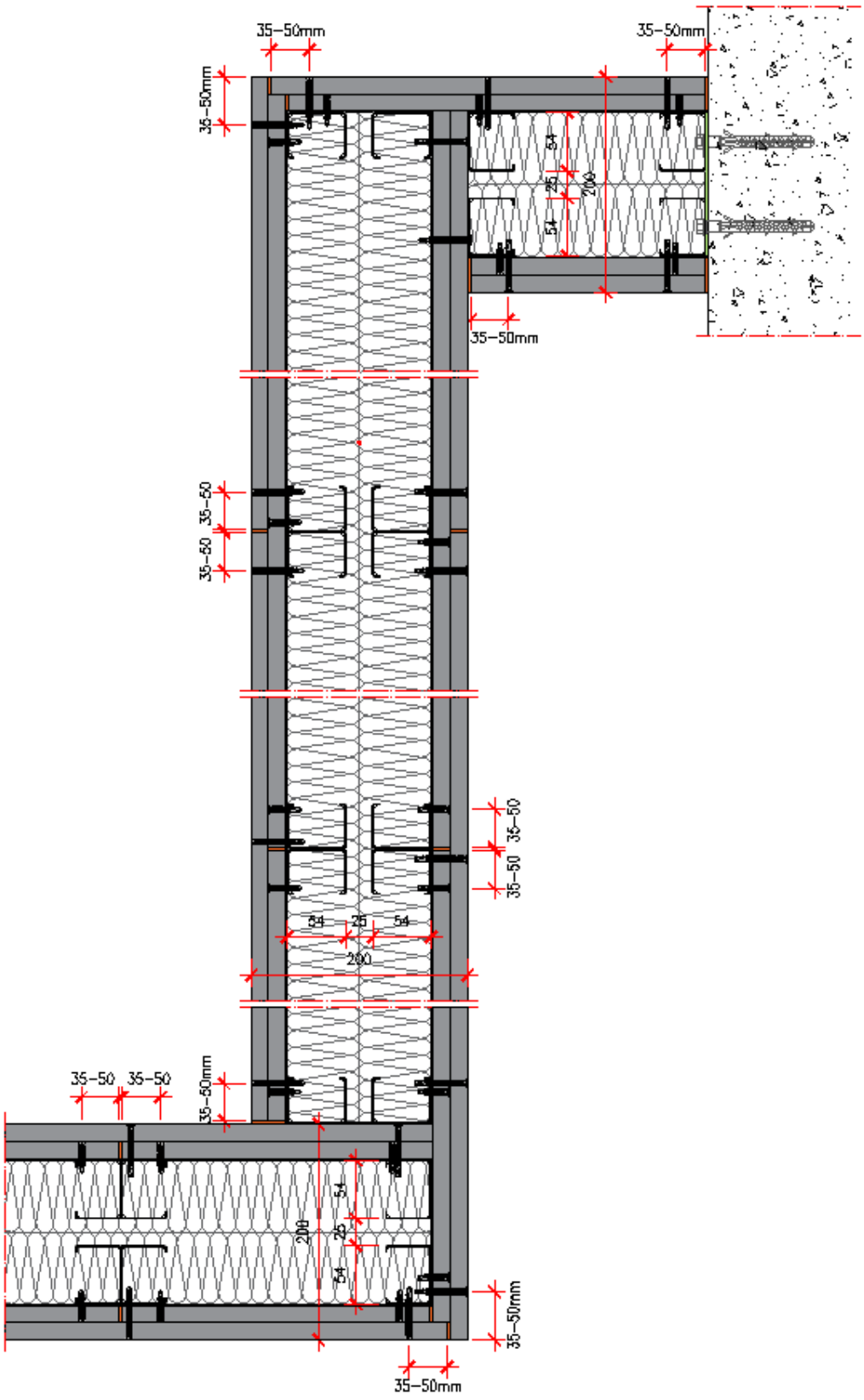


Figure 3.34 - EI120 Wall, Horizontal Section

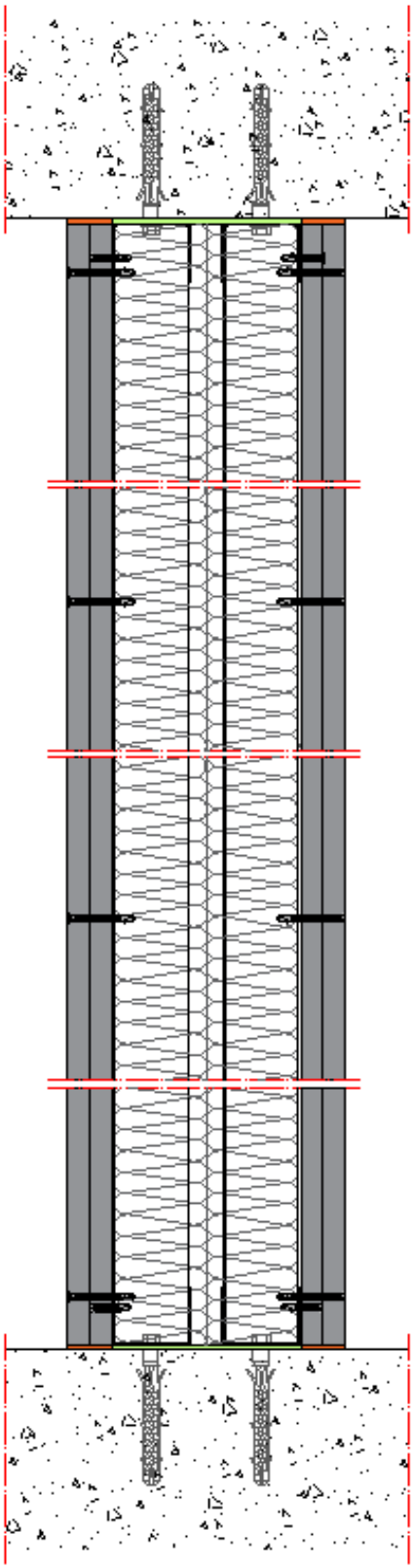


Figure 3.35 - EI120 Wall, Vertical Section

3.9 Special finishes

Partition walls and wall cladding made with Viroc panels can be barred, giving them a continuous appearance, covered with ceramic tiles or with an ETIC.

The materials used to create these types of finishes must be suitable for the dimensional variations that the panel has and must be very elastic.

There are solutions developed by SIKA, BOSTIK, MAPEI, KERAKOLL, SEIGNEURIE, GARNOTEC, which are suitable for application over the Viroc panel.