



Advanced
Building
System

Emmedue panels, accessories and tools



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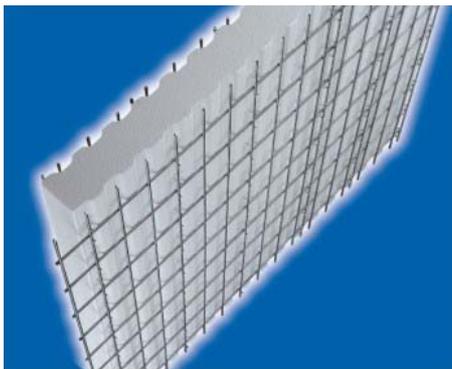
1. CLASSIFICATION OF THE EMMEDUE PANELS

The various types of Emmedue panels, their fields of application, standard sizes and complementary Emmedue products are described below.

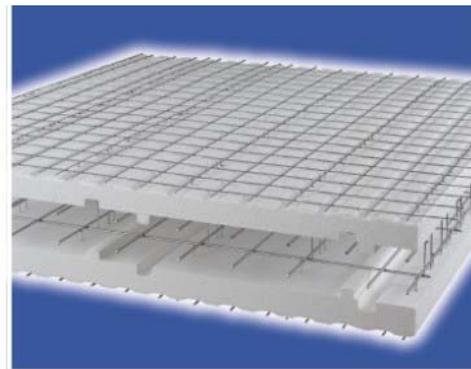
The thickness of the polystyrene sheets as well as the length of the panels may be customised, according to the different project requirements of the customers.

Generally speaking, the thickness of panels is usually determined according to its different conditions of heat insulation and structural behaviour. In the latter case, a greater moment of inertia may be achieved by increasing the interval between the two concreted or plastered surfaces.

To give some idea of the degree of heat insulation of polystyrene, a finished panel of a 10-cm thickness with a 4-cm thick polystyrene core (density 15 kg/m³) corresponds to an ordinary brick wall 64-cm thick.



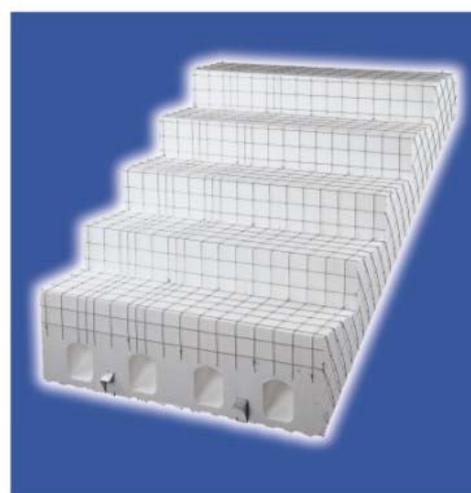
SINGLE PANEL PSME



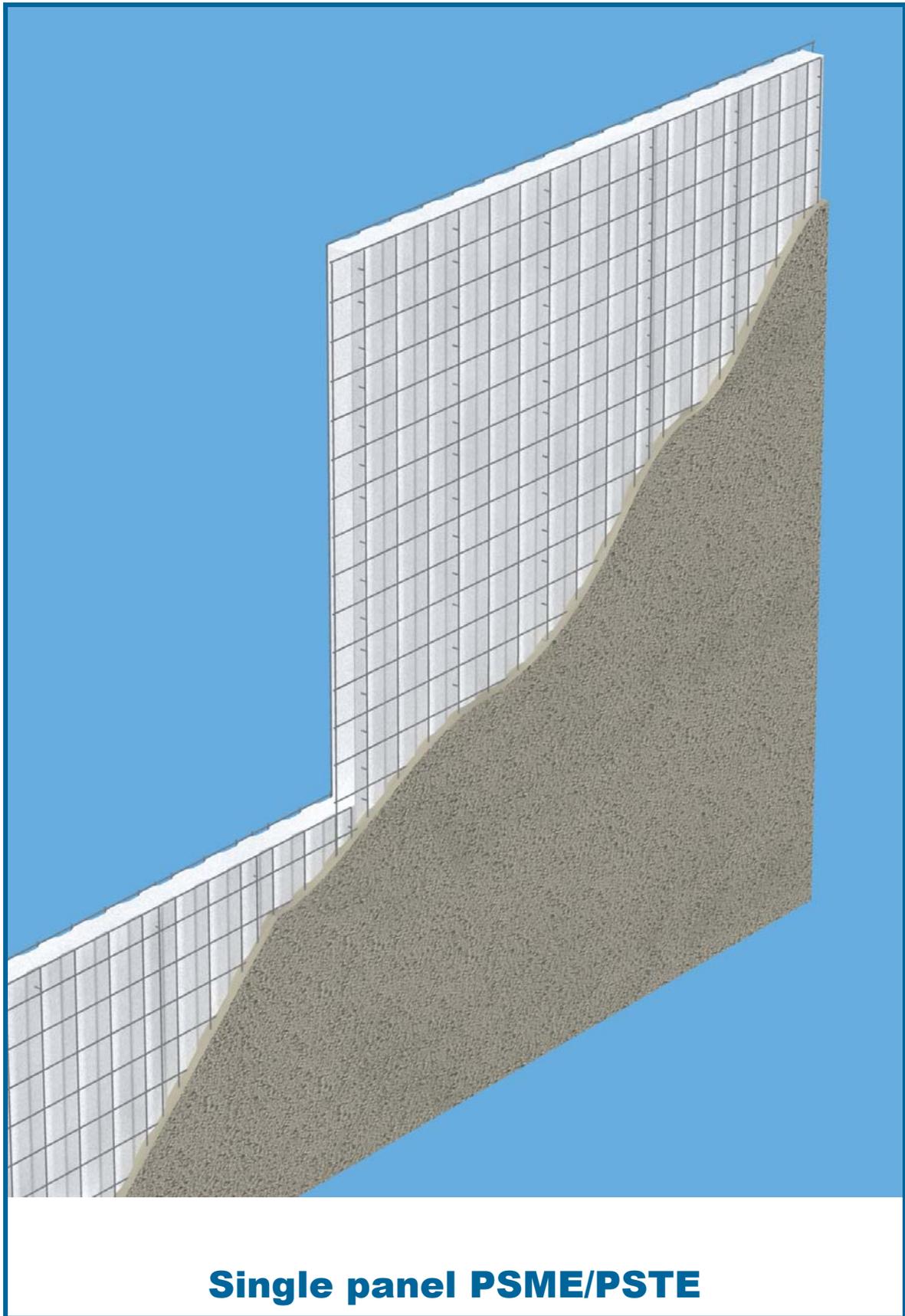
DOUBLE PANEL PDME



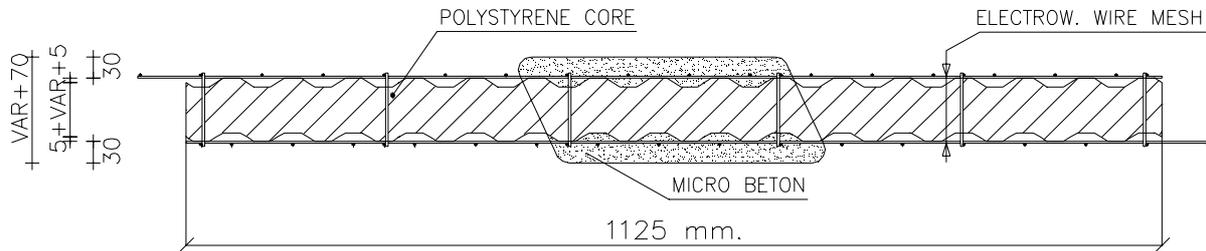
FLOOR PANEL PSSGE



STAIRCASE PANEL PSSCE



1.1 EMMEDUE SINGLE PANEL PSME



Galvanized steel wire mesh:

longitudinal wires:	Ø 2,5 or 3,5 mm every 65 mm
transversal wires:	Ø 2,5 mm every 65 mm
joint steel wire:	Ø 3,0 mm (approx. 72 per sq.m.)
steel wire yield:	$f_{yk} > 600 \text{ N/mm}^2$
steel wire fracture:	$f_{tk} > 680 \text{ N/mm}^2$

Polystyrene slab density: 15 Kg/m³

Polystyrene slab thickness: from 4 to 20 cm.

Finished masonry thickness: variable from 11 to 27 cm.

For the structural use of this panel, the polystyrene core should be at least 5 cm thick and an average quantity of plaster of about 3.5 cm (about 2.5 cm over the mesh) should be sprayed on each side having structural features of at least 250 daN/cm² of compressive strength.

This panel is generally used for buildings of no more than 4 storeys, also in seismic areas, for floor slabs and covering slabs whose spans are 4 m. at maximum. However, in such cases, the panel should be further reinforced with additional meshwork and a greater amount of concrete layer on the upper side - from 4 to 6 cm - in keeping with the calculations made.

Kind of panel	Thickness of finished masonry (cm)	Heat insulation coefficient Kt (W/m ² °C) *	Fire resistance REI	Sound proofing index
PSME40	11	0,827		41 dB (panel thickness: 11 cm) **
PSME60	13	0,585	75 ▽▽	
PSME80	15	0,453	120 ▽	46 dB (panel thickness: 18 cm) **

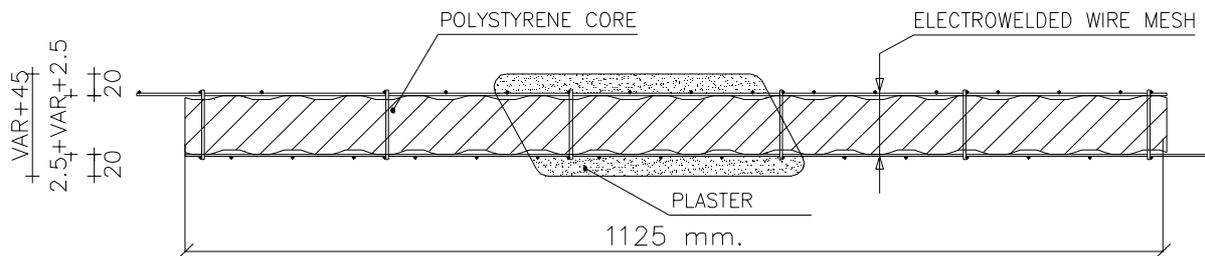
* heat insulation coefficient theoretically obtained by calculation

** test carried out at the Santiago del Chile university

▽ test carried out at Istituto Giordano, Rimini, Italy and C.S.I., Milan, Italy

▽▽ test carried out at CSIRO, Melbourne, Australia

1.2 EMMEDUE SINGLE PANEL PSTE



Galvanized steel wire mesh:

- longitudinal wires: \varnothing 2,5 mm every 65 mm
- transversal wires: \varnothing 2,5 mm every 65 mm
- joint steel wire: \varnothing 3,0 mm (approx. 72 per sq.m.)
- steel wire yield: $f_{yk} > 600 \text{ N/mm}^2$
- steel wire fracture: $f_{tk} > 680 \text{ N/mm}^2$

Polystyrene slab density: 15 Kg/m³

Polystyrene slab thickness: from 4 to 20 cm.

Finished masonry thickness: variable from 9 to 25 cm.

The PSTE panel can be employed as internal partitions, external curtain walls, insulating walls etc.

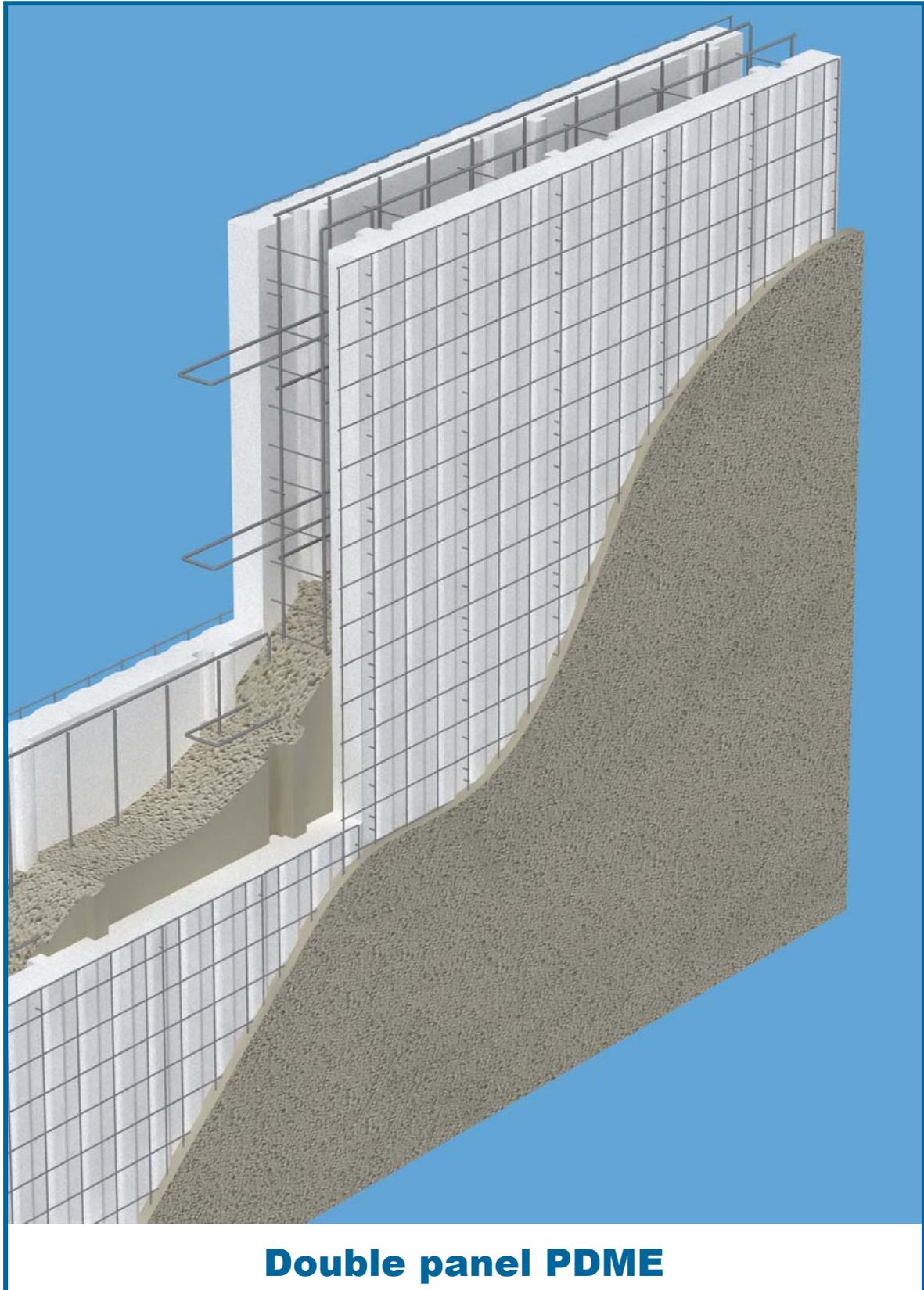
It 's similar to the PSME panel except for its polystyrene core outline that is less marked and therefore requires a less quantity of plaster to be sprayed on for its finishing.

Kind of panel	Thickness of finished masonry (cm)	Heat insulation coefficient Kt (W/m ² °C)*	Sound proofing index
PSTE40	8	0,827	43 dB (panel thickness: 9,5 cm)**
PSTE60	10	0,585	
PSTE100	14	0.369	46 dB (panel thickness: 18 cm) ▽

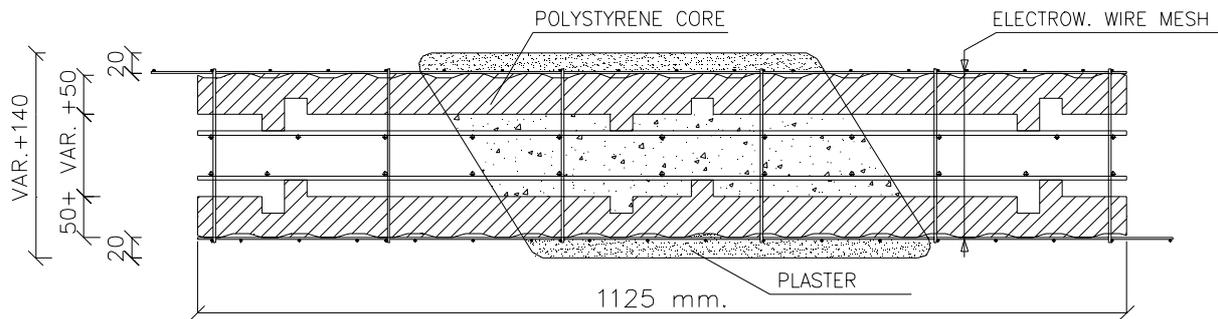
* heat insulation coefficient theoretically obtained by calculation

** test carried out at I.P.T.—Laboratorio de Acustica—Sao Paulo (Brasil)

▽ test carried out at Santiago del Chile University on the PSM90 panel



1.3 EMMEDUE DOUBLE PANEL PDME



Galvanized steel wire mesh:

longitudinal wires:	Ø 2,5 mm every 65 mm
transversal wires:	Ø 2,5 mm every 65 mm
joint steel wire:	Ø 3,0 mm (about 80 per sq.m.)
steel wire yield:	$f_{yk} > 600 \text{ N/mm}^2$
steel wire fracture:	$f_{tk} > 680 \text{ N/mm}^2$

Internal mesh:

longitudinal steel wires:	Ø 5 mm every 100 mm
transversal steel wires:	Ø 5 mm every 260 mm (in case of internal additional meshwork the pitch decreases to 130 mm)
steel proprieties:	FeB44K

Polystyrene slab density: 25 Kg/m³

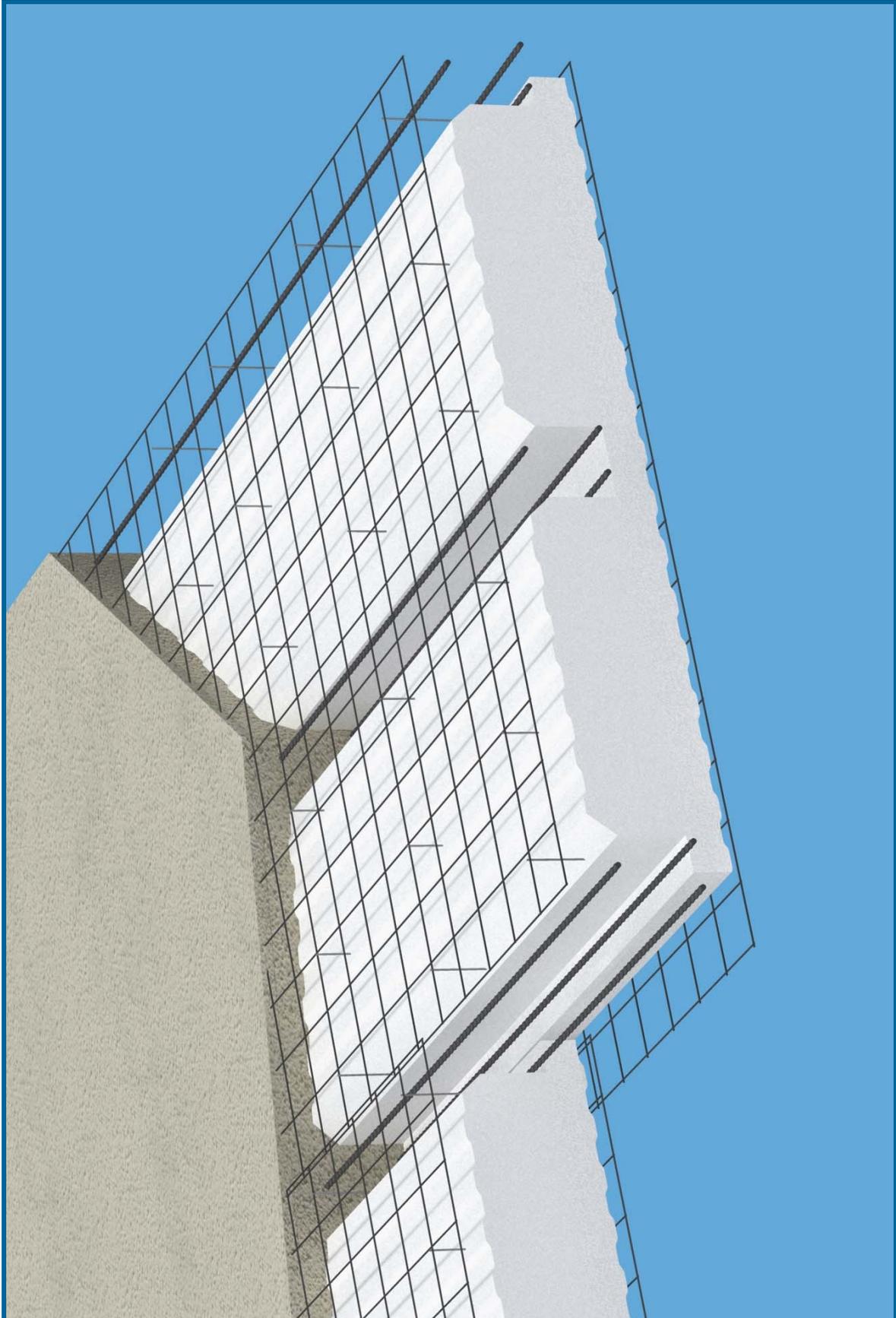
Polystyrene slab thickness: approx. 5 cm.

The double panel PDME consists of two sheets facing one other and joined by steel pins keeping them at the distance established by the static requirements to be met. The space between them is filled with cast concrete having suitable resistance strength (the panel, besides as insulating element, once aligned and fastened, works as a disposable formwork). Externally the panels must be sprayed on with plaster as the single panels or in any other way.

Kind of panel	Thickness of finished masonry (cm)	Heat insulation coefficient Kt (W/m ² °C)	Fire resistance REI	Sound proofing index
PDME80	23	0,47**	150**	34 dB (panel thickness: 11 cm) **
PSME80	23		170 ∇∇	

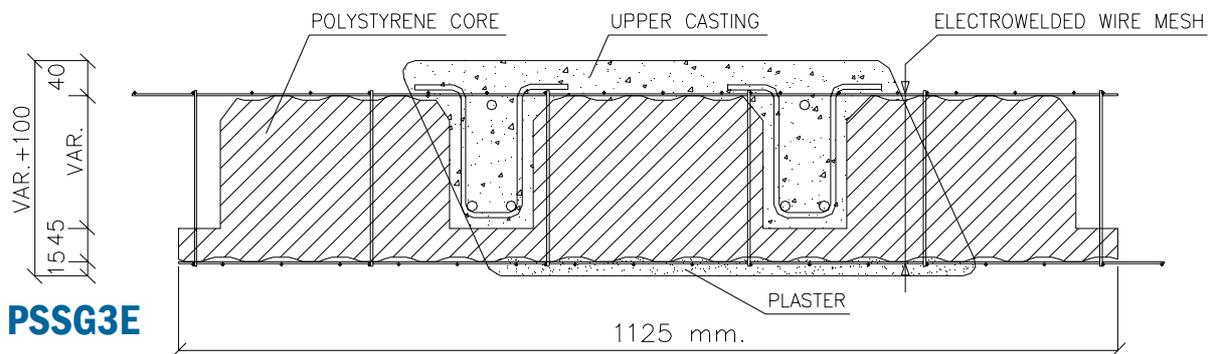
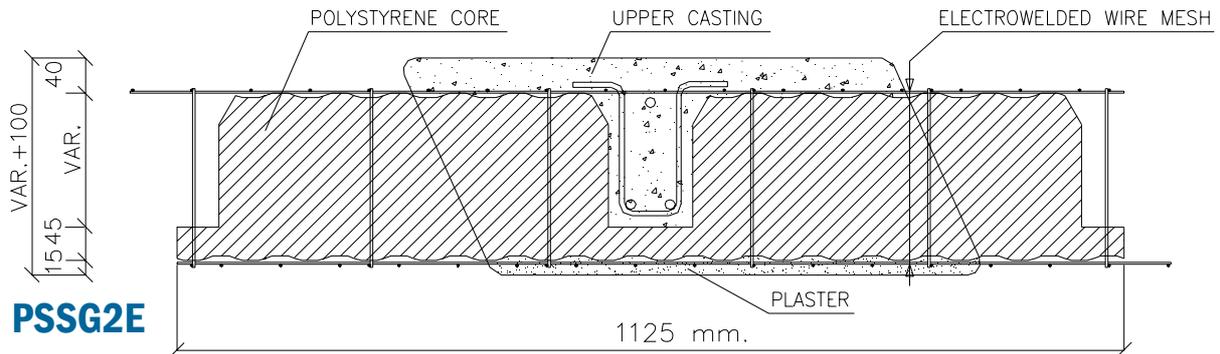
** test carried out at Istituto Giordano, Rimini, Italy

∇∇ test carried out at CSIRO, Melbourne, Australia



Floor panel PSSGE

1.4 EMMEDUE FLOOR PANEL PSSG2E and PSSG3E



Galvanized steel wire mesh:

longitudinal wires:	Ø 2,5 mm every 65 mm
transversal wires:	Ø 2,5 mm every 65 mm
joint wire:	Ø 3,0 mm
steel wire yield:	$f_{yk} > 600 \text{ N/mm}^2$
steel wire fracture:	$f_{tk} > 680 \text{ N/mm}^2$

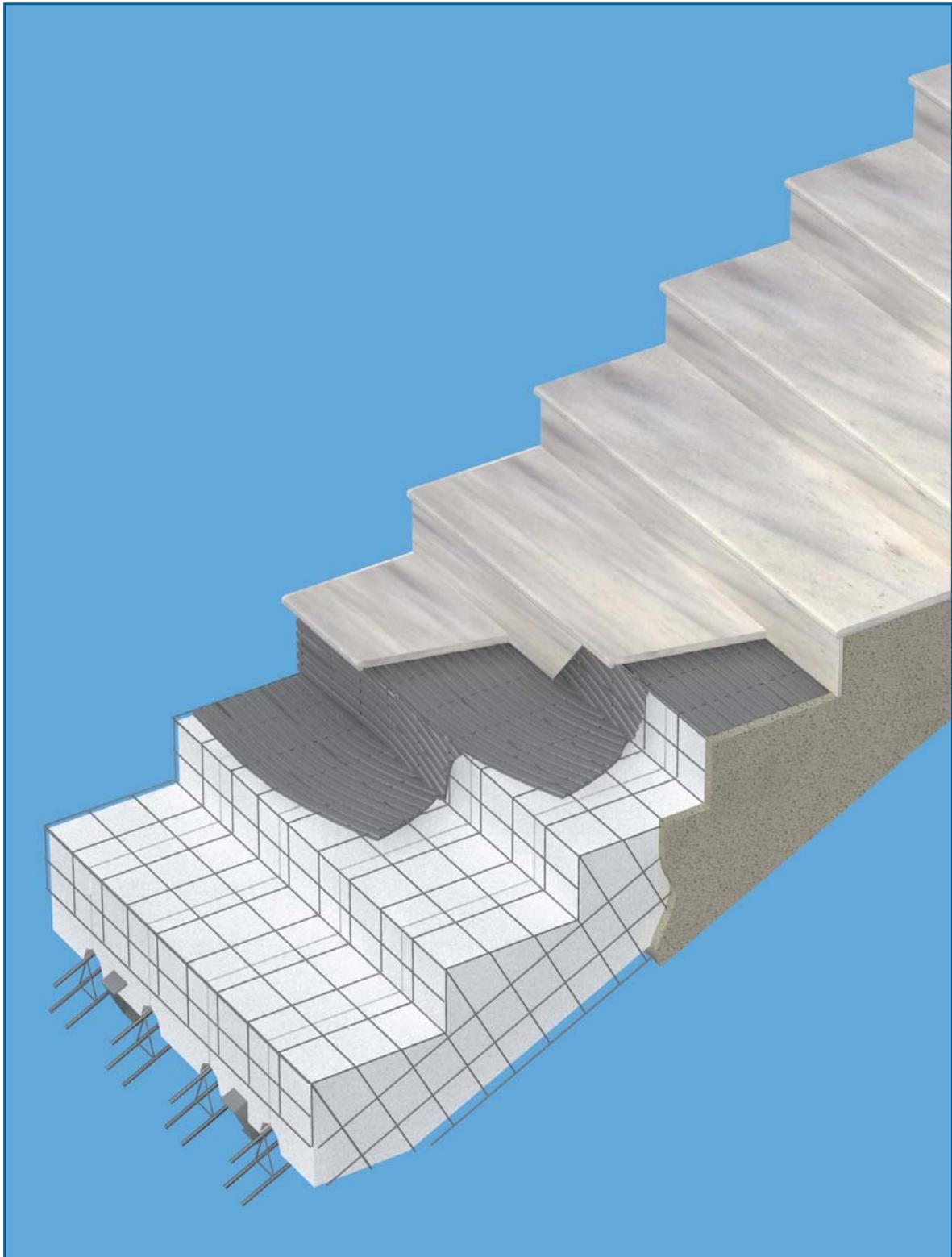
Polystyrene slab density: 15 Kg/m³

Heat insulation coefficient: $K_t < 0,366 \text{ W/m}^2 \text{ } ^\circ\text{C (min.)}$

Soundproofing index: $I > 38 \text{ dB at } 500 \text{ Hz (in frequency band between } 100 \text{ and } 3150 \text{ Hz)}$

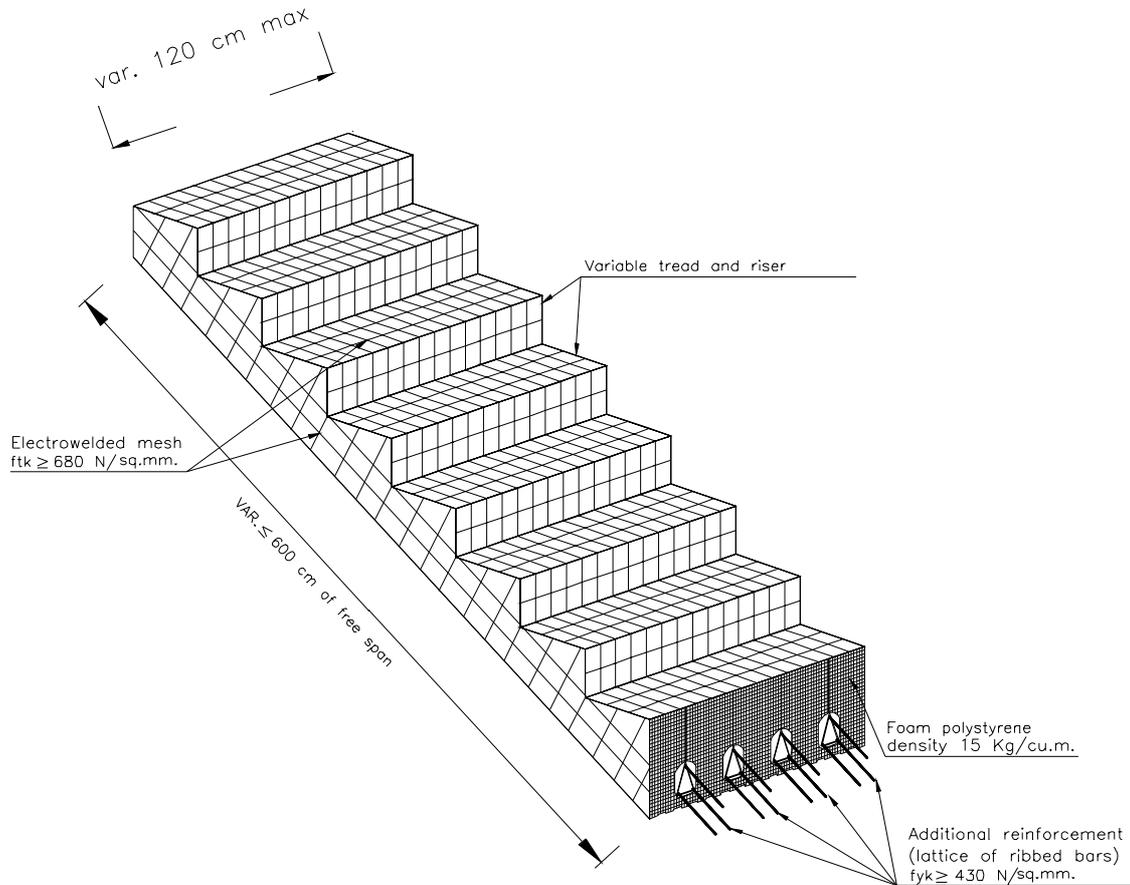
This type of panel enables the use of the Emmedue system for floors and roofs by inserting reinforced ribs in the special spaces and subsequent concrete casting on site. Infact the reinforcement of the panel is integrated during the panel assembly by the insertion of additional reinforcement bars – to be substantiated by calculations – inside the panel ribs.

It is an ideal solution for floor slabs having spans up to 6.5 m. and overloading up to 400 daN/m². Furthermore, where the assembly sequence needs to be maximised, as far as the erection schedule is concerned, it is possible to use iron stiffening ribs in the pods of the panel.



Staircase panel PSSCE

1.5 EMMEDUE STAIRCASE PANEL PSSCE



Galvanized steel wire mesh:

longitudinal steel wires:	Ø 2,5 mm
transversal steel wires:	Ø 2,5 mm
joint steel wire:	Ø 3,0 mm
steel wire yield:	fyk > 600 N/mm ²
steel wire fracture:	ftk > 680 N/mm ²

Polystyrene slab density: 15 Kg/m³

Fire resistance REI: 120 (test carried out at Santiago del Chile University)

This panel consists of an expanded polystyrene block shaped according to designing requirements and reinforced by a dual steel mesh joined by steel wire connections welded in electro-fusion across the polystyrene core.

Suitable reinforced and finished with casting on site in the suitable spaces, it is used, for the construction of flight of stairs up to a maximum span of 6 m. having an accidental overload of 400 Kg/m². The additional reinforcement to be placed inside the holes is formed by a lattice of ribbed bars.

1.6 TECHNICAL SPECIFICATIONS AND USE OF STAIRCASE PANEL

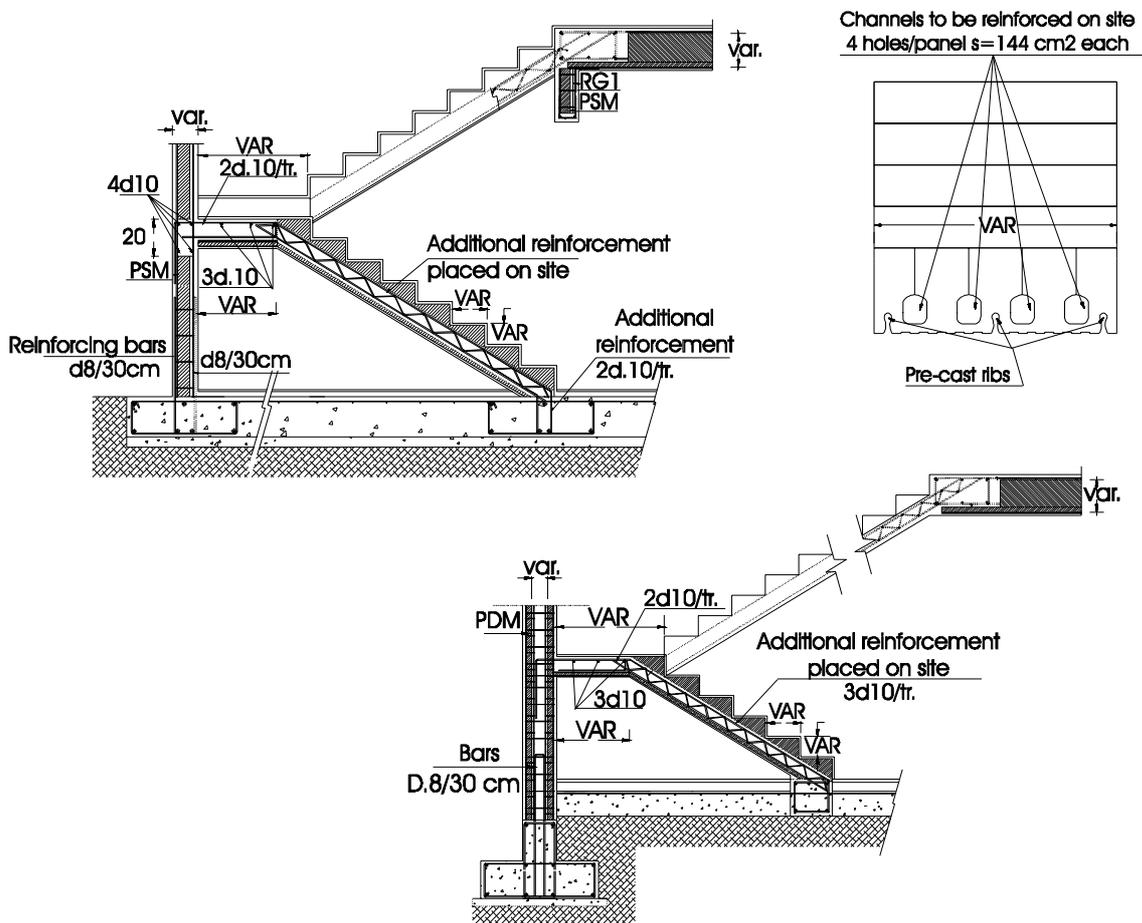
This panel is used for the construction of flight of stairs of up to 6 m. long (floors at approx. 3-m intervals) having an accidental overload of 400 Kg/m².

During construction and prior to panel assembly, the stairs panel lower channels are filled with concrete (the panel being placed upside down). This pre-cast operation confers greater stiffness to the panel during its assembly enabling in the same time a drastic reduction of the number of props used.

Once the stairs panel is assembled and the lattice is placed inside the panel internal channels, the latter are completed with gravel concrete (whose particle size is < 12 mm and its minimum strength is Rck > 250 dN/cm²

The concrete may be cast in the panel ribs contemporaneously with casting of the upper coating. In case this already exists, the concrete may be applied to both the ribs and the upper joist.

Successively, the plaster layers (2.5 cm. thick) are applied upon the flight of the stairs, first the lower side and then the upper one, in order to form the basis on which the flooring (marble, ceramic tiles, etc.) is to be laid.



1.7 BRACING MESHWORKS

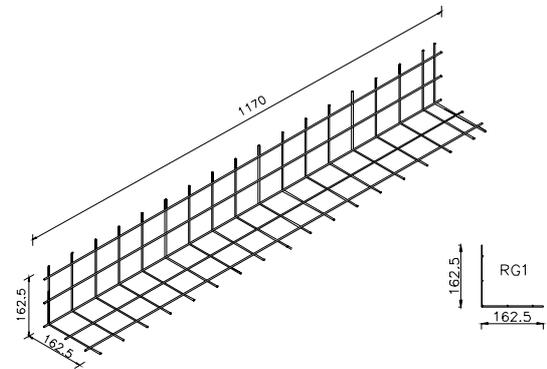
Designed with 2.5-cm galvanized steel wire, these meshworks are used to reinforce openings and angle-joints between panels so to confer continuity to the structural mesh. They are fixed to the panel by joints or cramps.

ANGULAR MESHWORK RG1:

* reinforces angle-connections.

Estimated efficiency:

4 units per angle (2 internal and 2 external) on average

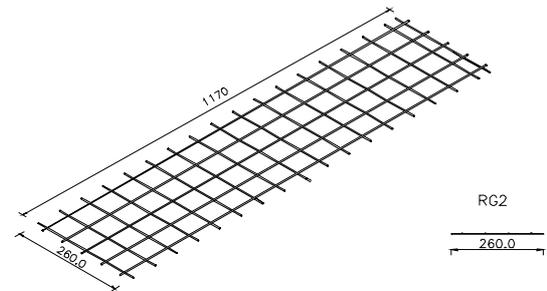


FLAT MESHWORK RG2:

- * reinforces (at 45°) openings angles
- * restores meshwork that had been previously cut
- * for any joints between panels

Estimated efficiency:

2 units per door.
4 units per window.



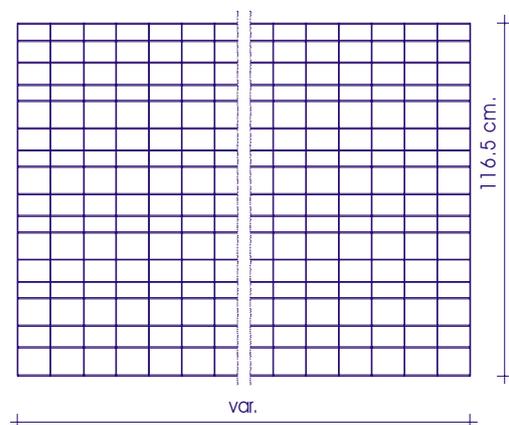
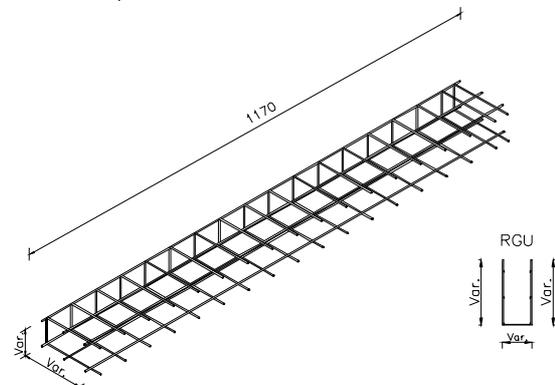
“ U ” SHAPED MESHWORK RU:

* restores the continuity of the panels along the perimeter of doors and windows

BRACING MESHWORK

- * restores the meshwork of bent panels.
- * Other applications.

Varying efficiency.



1.8. EMMEDUE PLASTER SPRAYERS FOR WALLS & CEILINGS

The use of these devices easily enables a time saving by 50% and with no need for skilled labour. Thanks to Emmedue plaster sprayers, the plaster may be applied with a degree of adherence that could not be achieved manually.

In one hour, one worker using a plaster sprayer with a continuous flow of material placed nearby can apply a plaster layer of about 1 cm. over an area of up to 60 sq. m. Emmedue plaster sprayers are available in two versions: W for walls and C for ceilings. Both models feature four holes for different types of plaster and come with all the necessary tools to clean the machine after use.

User 's instructions

1. The air pressure should be kept uniform and constant within a maximum value of 6 bars.
2. No special plastering-machines are needed, and the panel to be plastered requires no previous preparation.
3. For the plaster to be applied to the wall, the container should be placed at a distance of 5-10 cm.
4. For the plaster to be applied to the ceiling, the upper edge of the container should almost touch the panel at a maximum distance of 2-3 cm.

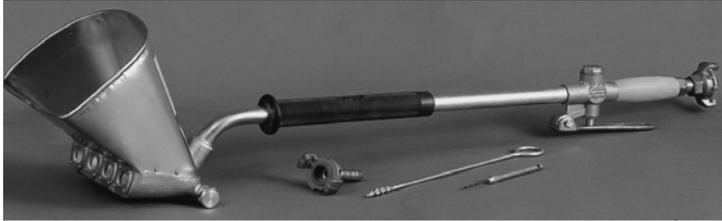
Plaster Sprayers Maintenance

1. During the usual interval between the application of two layers of plaster, we recommend to place the empty container in a bucket filled with water and make it work two or three times.
2. Remove lateral bolts and wash the inside of the machine at least once a week.

Compressors:

Either electrical or internal-combustion engine compressors may be used keeping in mind the following data:

Engine power (HP)	Air production (l/min)	No. machines
From 3 to 4	350-400	1
From 5 to 6	600-700	From 2 to 3



Plaster sprayer for ceiling



Plaster sprayer for wall

Note 1: We recommend the use of high-pressure 1/2" hoses not exceeding 30 linear metres.

Note 2: When only one plastering-machine is used, the ideal cubic capacity of the compressor container is 220 litres (not lower than 130 litres, but with pressure regulator).