CELENIT

THE SOLUTIONS

ECO-BIOCOMPATIBLE INSULATION MADE FROM
FIR WOOD-WOOL AND PORTLAND CEMENT

CELENIT
NATURAL INSULATORS

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CELENIT SOLUTIONS

Partner KlimaHaus® CasaClima

GREENBUILDING COUNCIL ITALIA SOCIO

SACERT

ANIT

promo legno Partner

CE

UNI EN ISO 9001:2008 CERTIQUALITY SISTEMA DI GESTIONE QUALITÀ CERTIFICATO

ANAB PRODOTTO CERTIFICATO PER LA BIOEDILIZIA ITALIA
Certificato n°EDIL-2009_004 Rev.01 Istituto per la Certificazione Etica e Ambientale

PEFC PEFC/18-31-168

ANAB logo refers to products: Celenit AB, Celenit ABE, Celenit N, Celenit NB, Celenit R, Biosilenzio.
The PEFC logo is referred only to panels of wood wool.

OVER 40 YEARS EXPERTISE IN DOMESTIC AND INTERNATIONAL MARKETS

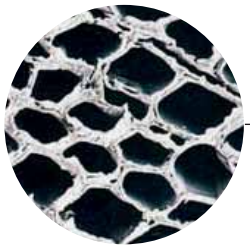
Celenit is one of Europe's leading manufacturers and suppliers of eco-biocompatible insulation made from mineralised fir wood-wool bound with Portland cement.

Company mission is to provide eco-biocompatible insulation solutions to maximize the comfort of the buildings by minimizing environmental impact. Celenit panels are certified eco-biocompatible by ANAB-ICEA (Italian National Association for Bioecological Architecture - ICEA Institution for Ethic and Environmental Certification) and the timber comes from forests certified PEFC that are sustainably managed.
Celenit is a member of GBC (Green Building Council) Italy. GBC aims to introduce an independent certification LEED (Leadership in Energy and Environmental Design) whose parameters provide accurate criteria for healthy and energy efficient buildings with low environmental impact. GBC member companies, including Celenit, constitute a network of companies operating in the segment of sustainable construction.

Celenit goals are:
- Continuous research for environmental friendly products/solutions
- Ensure best production quality

To guarantee constant production quality, Celenit has developed probably the most innovative production plant in Europe.

The panels produced are conform to European UNI EN 13168 and therefore CE marked.
The quality management system operated by Celenit is in compliance with the standard UNI EN ISO 9001:2008 (certificate No. 1351 issued by Certiquality).



Photograph, taken through an electronic microscope, showing a section of a thin layer of fir wood-wool taken from a standard panel (Padua University, 1995).

15% of Celenit is made up of calcium carbonate

50% of Celenit is made up of long, strong fir fibres.

35% of Celenit is made up of mineral binders, mainly Portland cement (grey or white).

THE CELENIT

Celenit is a company and a brand of thermal and acoustic insulation panels. Celenit panels consist of mineralized fir wood-wool coated in mineral binders, mainly Portland cement, using a low energy production process. Celenit range includes composite panels that combines the strength of different insulating materials to enhance insulation performances.

Celenit panels are composed 50% of long, strong fir fibres, 35% of mineral binders, mainly Portland cement and, the remaining 15%, made up calcium carbonate residue from marble processing, wich is considered recycled material. TUV ITALIA S.r.l. certifies that Celenit panels have been audited and found to be in accordance with the requirements of LEED for: presence of at least 15% pre-consumer recycled content in weight.

The fibres are mineralized. Mineralization procedure stops biological deterioration by making fibres completely inert and increasing their fire resistance, while retaining mechanical properties of wool. The fibres are then coated in Portland cement, bound together under pressure in order to create a stable, resistant, compact and long-lasting structure. The cellular structure of the wood provides lightness and elasticity to Celenit panels. Sound absorption and excellent ability to adhere to all forms of mortar are due to the gaps between the fibres. The combination of wood and Portland cement, joined under pressure, determines product's compactness and strength, two qualities always appreciated in the building trade.

These characteristics make Celenit a multi-purpose product of great adaptability in the building industry.
It is used for:

- sound-absorbing, false ceilings and walls
- concrete casting insulation
- the facing of wooden, metal, etc. structures
- the facing of fire resistant walls
- acoustic insulation between floors and adjacent rooms
- roofing insulation
- internal and external facings
- flooring insulation

Celenit panel's vapour permeability and lack of noxious elements identify it as a natural material that meets the principles of biological architecture. Amongst the panels made of wood-wool and mineral binders, those using Portland cement give the best levels of thermal insulation.

Furthermore, Portland cement:

- **Makes panels resistant to atmospheric agents, such as rain and frost**, making them appropriate for use in even the most severe temperature conditions. Proof of the excellent performance of panels in Portland cement is given by research carried out by the German Ministry for Public Works, which verified the cement's behaviour in humid conditions compared to that of other mineral binders. Research findings are as follows: panels with Portland cement were the only ones to demonstrate a totally intact state, with "sharp corners and fibres fully adherent to one another, thanks to the binder" (Portland cement in this case). In this regard, Padua University carried out some important studies, with excellent results, on panels subjected to freezing and defrosting cycles.
- **Resists biological degradation** by hindering the development of mould on the panels, even in the worst conditions. Indeed, such panels taken from old buildings, which had been in contact with the ground, contain less mould than healthy wood! This was the finding of research carried out in a qualified laboratory.
- **Renders the fibres fire-resistant**. Indeed, in the event of fire, they do not create toxic gases or fumes, they do not drip, and they prevent the spreading of flames. It is classified as a Euroclass B-s1, d0 (EN 13501-1) product, though strict Swiss regulations classify products in fir wood-wool and Portland cement as practically incombustible, class 6.q.3.
- **Ensures a progressive petrifaction** of the product, due to the process of carbonation of the lime contained in Portland cement, which takes place over time. This process has allowed our architectural heritage, from ancient villages to the most notable monuments, to survive until today!
- **Allows us to produce, thanks to the low temperature, all the multi-layered panels** (coupled with other insulators) that make up the most innovative products on the European market.

The combination of wood and Portland cement forms a light, porous structure made up of numerous cavities, and it is these that deaden sound waves, turning the panels into excellent sound-absorbers and acoustic insulators when placed between walls, under floors, etc.

TECHNICAL CHARACTERISTICS

ACOUSTIC INSULATION

The characteristics of the Celenit panel, such as its mass, its cellular structure, its low elasticity coefficient and its internal sound-reducing property, make this a good product both to regulate noise (noise absorption) and to reduce the transmission of sounds (acoustic insulation).

THERMAL INSULATION AND INERTIA

In a context of variable heat, as would be the norm in any building, both the insulation and heat accumulation properties of the structure are of importance. Celenit, thanks to its mass and specific heat, has 15 times more capacity for thermal accumulation than light insulators.

BIOPHYSICAL PERFORMANCE

Celenit consists of natural products:
- wood, a natural product par excellence
- mineral components, of the same composition as rocks found in nature

Therefore, there is no risk of pollution, neither at the production or implementation stage, nor at any subsequent re-cycling or waste disposal stage. There is strong evidence to confirm these statements: the product does not contain harmful metals, it does not develop harmful gases, it is not radioactive and it is not flammable. Any waste for disposal can be deposited in common dumps for building materials.
Celenit's physical characteristics, namely the ability to breath, the absence of electrostatic charges, the ability to accumulate heat and the ability to regulate humidity, ensure optimum living conditions.
Celenit has an unlimited lifespan, as it is not subject to biological or chemical degradation. Indeed, its performance improves through a process of carbonation, which occurs over time.
Celenit applies the general and specific requirements of ANAB's Standard for Eco-building Materials. This certificate (EDIL 2009_004 REV.1) covers the products: Celenit A, Celenit AB, Celenit N, Celenit NB, Celenit R, Celenit ABE and the silencer for ventilation holes. Celenit uses timber with PEFC label certifying raw material originates in sustainably managed forest. PEFC Council (Programme for Endorsement of Forest Certification schemes) is a worldwide organisation promoting sustainable forest management through forest certification and labelling of forest based products.

LIFESPAN

Its lifespan is unlimited. When restoring buildings dating back to the early 1930's, panels made of mineralised fir wood-wool bound with Portland cement were found in perfect condition, so much so that it was not considered necessary to replace them. These experimental findings have now been confirmed by research carried out by Padua University. Tests carried out by electronic microscope have proved the perfect preservation of the cell structure of wood fibres, both on recently produced panels and panels which are over 20 years old. The fact that fibres are saturated with mineralising and fire retarding substances, together with the effect of the silicates existing in Portland cement, fully protect the fibre from any biological, chemical or meteorological phenomenon. Over time, the carbonation of the lime contained in Portland cement increases the product's level of resistance.

REACTION TO FIRE

With regard to its reaction to fire, Celenit panel is classified as a Euroclass B-s1, d0 product. In the event of fire, it does not drip, does not create fumes or toxic gases and does not spread the fire. Swiss regulations classify products in mineralised fir wood-wool bound with Portland cement as practically incombustible (class 6q.3), just like mineral wools. French and German regulations allow their use to face the floorings of multi-storey car parks open to the public, as a dispensation to the use of fireproof materials. In accordance with DIN part 4, under the title "The reaction to fire of building materials and construction components", products made from wood-wool and cement are suitable for protecting construction components from fire.

Indeed, they act as a thermal shield, substantially increasing the fire resistance of such components. This is due to the insulation properties of the material, resulting from its open cellular structure, not subject to bursting and splintering, and from the structure's ability, even when in direct contact with fire, to remain unaltered for long stretches of time, thanks to the protective action of its mineral components. Fire simulations have demonstrated that Celenit combusts slowly and without flames, forming a substantial mass of ash which protects the underneath part of the panel, reducing its speed of combustion and eventually blocking it. Covering the panels in plaster or gypsum board increases its fire resistance. The same considerations can be made in relation to Celenit L3, multi-layered panels with mineral wool at their core. As regards Celenit P2, Celenit P3, Celenit E3 and Celenit G3 multi-layered panels with the self-extinguishing polystyrene or wood fibre at their core, in the event of fire the wood-cement covering prevents the polystyrene or wood fibre from coming into the direct contact with fire and air necessary for combustion. Furthermore, at the fusion stage, the polystyrene adheres to the layer of wood-wool and Portland cement, thus reducing the speed of emission of volatile flammable compounds. French regulations allow these panels to be used in any type of building, including public areas, up to a maximum height of 50 metres.

PERFORMANCE IN CONTACT WITH OTHER MATERIALS

The reaction of panels when in contact with building components is neutral. With regard to concrete in particular, when used as a permanent formwork, compression resistance and the elasticity coefficient are improved. When plastered, they do not give rise to stains or efflorescence and they do not have a corrosive effect on pipes, other metallic components or plastic materials.

RESISTANCE TO WATER AND FREEZING

Celenit is not affected by water and frost thanks to Portland cement, which makes the panels water resistant, and close adherence to the wood-wool prevents it from coming away in cases where freezing occurs. Therefore, in humid conditions, no swelling and no crumbling occurs. Celenit has passed freeze-resistance tests consisting of dipping panels into water at 35 °C for 8 hours and then placing them in conditions of -10 °C for another 8 hours. This process was repeated 20 times. At the end, the panels were perfectly intact. Indeed, they were in a better condition than when they started, due to the positive effect of water on the hydraulic binders (research carried out by Padua University). This insensitivity to water allows the panels to be used externally and in highly humid environments, as well as stored outdoor.

REGULATING HUMIDITY

Celenit panels act as hygrometric regulators. They absorb excess humidity and release it when normal conditions have been re-established, without any deformation occurring. Celenit panels keep the right level of humidity improving the living comfort of the buildings.

WHY TO USE CELENIT

- tested and certified eco-biocompatible acoustic and thermal insulation solutions;
- low environmental impact;
- safe for the health;
- strength and unlimited lifespan in harsh conditions;
- user friendly;
- good value for money.

TECHNICAL DATA according to EN 13168 (CE marking) and other technical standards

	UNITS	CELENIT N								CELENIT NB			
		15	20	25	30	35	40	50	75	15	25	35	50
Declared thermal resistance (EN 12667)	m^2K/W	0.20	0.30	0.35	0.45	0.50	0.60	0.75	1.15	0.20	0.35	0.50	0.75
Water vapour diffusion resistance factor (EN 13168 4.3.5. - EN 12086)	-	5								5			
Short term water absorption (EN 1609 method A)	kg/m^2	3.35	-	-	4.40	-	3.70	-	3.04	4.40			
Reaction to fire (EN 13501-1)	Euroclass	B-s1,d0								B-s1,d0			
Compressive stress at 10% deformation/Compressive strenght (EN 826)	kPa	≥ 200	≥ 200	≥ 200	≥ 200	≥ 200	≥ 200	≥ 150	≥ 150	≥ 200	-	≥ 200	≥ 150
Bending strength (EN 12089 method A)	kPa	≥ 1650	≥ 1250	≥ 2000	≥ 1650	≥ 1450	≥ 1250	≥ 1000	≥ 650	≥ 1650	≥ 2000	≥ 1450	≥ 1000
Compatibility with other materials (chloride content) (EN 13168)	%	≤ 0,15								≤ 0,06			
Tensile strength perpendicular to faces (EN 1607)	kPa	-								-			
Resistance to water and frost		No alteration and maintenance of bending resistance after 20 cycl											
Temperature limit of use	°C	200								200			
Capacity of absorption of room humidity	l/m^2	2 - 3,5								2 - 3,5			
Specific heat	kJ/kgK	1.81								1.81			
Capacity for thermal accumulation	kJ/m^3K	965-628								1119 - 756			
Linear dilatation coefficient	mm/mK	0.01								0.01			
Shear stress resistance	N/mm^2	0,28								0.28			
Adhesion to concrete	N/mm^2	0.05								0.05			
Bio-Ecological certification	-	Yes								Yes			
Resistance to mould and fungs attack		Inhibition of biological degradation											

CELENIT AB				CELENIT A				CELENIT P2					CELENIT P3					CELENIT L3			
15	25	35	50	15	25	35	50	30	40	50	75	100	25	35	50	75	100	35	50	75	100
0.20	0.35	0.50	0.70	0.20	0.35	0.45	0.70	0.55	0.80	1.10	1.75	2.40	0.45	0.70	1.10	1.75	2.40	0.65	1.00	1.60	2.20
5				5				43					43					3			
4.40				4.40				-					1.26	1.20	1.11	1.17	-	1.61	1.53	1.27	-
B-s1,d0				B-s1,d0				E					C-s2, d0	E				B-s1,d0			
≥ 200				≥ 200				≥ 75					≥ 75					≥ 50			
≥ 3300	≥ 2000	≥ 2150	≥ 1000	≥ 3300	≥ 2000	≥ 2150	≥ 1000	-					≥ 1000	≥ 700	≥ 1000	≥ 350	-	≥ 700	≥ 500	≥ 350	-
≤ 0,06				≤ 0,15				≤ 0,15					≤ 0,15					≤ 0,15			
-				-				≥ 40					≥ 40					≥ 20			
es of frosting and defrosting in water								-					-					-			
200				200				-					-					200			
2 - 3,5				2 - 3,5				-					-					-			
1.81				1.81				-					-					-			
1026-760				1260 - 882				-					-					-			
0.01				0.01				-					-					-			
0.28				0.28																	
0.05				0.05				0.05					0.05					0.05			
Yes				Yes				-					-					-			
prevents moulds and fungs																					

CERTIFICATIONS

- N° 1351 of 16/04/09 Certiquality (Quality system certified conforming to EN ISO 9001:2008).
- N° EDIL 2009_004 Rev.1 of 16/01/2009 ANAB-ICEA (Eco-biocompatibility).
- N ° ICILA-COCPEFC of 09/10/09 ICILA (Management system chain of custody certified PEFC - Programme for the Endorsement of Forest Certification)
- n° TUVIT-LMR-004 of 21-10-2010 TÜV Italia (presence of at least 15% pre-consumer recycled content by weight)
- N° 0021/1 of 12/11/2007 Agenzia CasaClima Srl (Certified Partner KlimaHouse)
- N ° 809 of 07/05/09 University of Bologna (Specific Heat)
- N ° P401761 of 11/10/04 SP Swedish National Testing and Research Institute (Dimensional stability)
- N ° P604823-01 D of 19/03/07 SP Swedish National Testing and Research Institute (Water vapour permeability)
- N ° P401761 B of 12/08/04 SP Swedish National Testing and Research Institute (Water vapour permeability)
- N ° P604823-01 B of 13/02/07 SP Swedish National Testing and Research Institute (Water vapour permeability)
- N ° P401761-02 of 20/09/04 SP Swedish National Testing and Research Institute (Compressive strength)
- N ° P604823-02 of 05/02/07 SP Swedish National Testing and Research Institute (Compressive strength)
- N ° P604823-01 C of 13/02/07 SP Swedish National Testing and Research Institute (Dimensional stability).
- N ° P4 01761-03 of 04/10/04 SP Swedish National Testing and Research Institute (Release of corrosive substances)
- N ° P4 0176-03C of 05/10/04 SP Swedish National Testing and Research Institute (Release of dangerous substances)
- N ° P6 04823-03 of 10/07/07 SP Swedish National Testing and Research Institute (Release of dangerous substances)
- N ° 22567 of 09/07/04 Padua University (Bending strength)
- N ° 22568 of 09/07/04 Padua University (Bending strength)
- N ° 22569 of 09/07/04 Padua University (Bending strength)
- N ° 22570 of 09/07/04 Padua University (Bending strength)
- N ° 33189-33190-33191-33192 of 2/12/2010 Padua University (Tensile strength)
- N ° 162359 of 21/09/94 Padua University (Freezing)
- N ° 141775 of 11/12/87 Padua University (Adhesion Celenit-concrete)
- N ° 139124 of 24/02/87 Padua University (Compressive strength and elastic module of concrete formwork matured Celenit)
- N ° 039 - 040 - 041 - 042 - 043 of 02/10/00 Padua University (Sound insulation)
- N ° 077 - 080 - 082 of 27/09/01 Padua University (Sound insulation)
- N ° 090 - 091 - 092 - 093 - 094 - 096 of 03/12/01 Padua University (Sound insulation)
- N ° 175 - 176 - 177 - 178 - 179 - 180 - 181 - 182 - 183 - 184 - 184 - 185 - 186 - 187 - 190 - 192 - 193 - 195 - 196 - 197 - 201 of 15/02/05 Padua University (Sound insulation)
- N ° 300 - 301 - 302 - 303 - 304 - 305 - 307 - 308 - 309 - 310 - 311 - 312 - 313 - 316 - 317 - 319 - 320 - 321 - 322 - 323 - 324 - 325 - 326 - 328 - 329 - 330 - 331 - 332 - 333 - 334 of 20/11/06 Padua University (Sound insulation)
- N° 459 - 460 - 461 - 466 - 467 - 468 - 469 - 470 - 471 - 472 - 474 - 475 - 476 of 18/08/06 Padua University (Sound insulation)
- N° 526 - 527 - 531 - 532 of16/12/08 Padua University (Sound insulation)
- N° 414-415 of 28/08/07 Padua University (Sound insulation)
- N° 523-525-526-528-530-531 of 16/12/08 Padua University (Sound insulation)
- N° 597 of 16/07/09 Padua University (Acoustic isolation of small element)
- N° 601 - 602 - 605 - 606 - 607 of 28/09/09 Padua University (Sound insulation)
- N° 3112 of 24/12/82 Istituto Giordano (Soundproofing against impact sound)
- N° 188467 of 15/11/04 Istituto Giordano (Ball blow resistant)
- N° 200535 of 22/08/05 Istituto Giordano (Ball blow resistant)
- N° 37255 of 05/07/95 University IUAV of Venice (Floor load-bearing test Celenit Mixlam).
- N° 332 of 19/11/94 Almat (Inhibition to biological degradation)
- N°1686-1687.0DC0050/10, 1691-1692.0DC0050/10, 1693-1694.0DC0050/10, 1695-1696.0DC0050/10 of 09/12/2010 LAPI (Reaction to fire)
- N°1688-1689.0DC0050/10, 1690.0DC0050/10 of 15/12/2010 LAPI (Reaction to fire)
- N°275946/3240FR of 17/11/2010 Istituto Giordano (Floor fire resistance)
- N°276156/3244FR of 23/11/2010 Istituto Giordano (Wall fire resistance)

CELENIT N

ECO-BIOCOMPATIBLE
Conforming to EN 13168

Description: panel consisting of mineralized fir wood-wool bound with Portland cement. Timber comes from sustainably managed forests PEFC certified.

Use: elimination of thermal bridges in pillars, beams, inter-storey facings, radiator niches; acoustic insulation of walls; insulation from floor noise; insulation of flat and sloping roofs; permanent formwork to concrete; fire resistant coverings; inter-pole Celenit Mixlam.

Dimensions in cm	Thickness in mm	Weight kg/m^2	R m^2 K/W
240x60	15	8	0,20
120x60	15	8	0,20
200x60	20	10	0,30
200x60	25	11,5	0,35
240x60	25	11,5	0,35
200x60	30	13	0,45
200x60	35	14	0,50
240x60	35	14	0,50
200x60	40	16	0,60
200x60	50	18	0,75
240x60	50	18	0,75
200x60	75	26	1,15

CELENIT R

ECO-BIOCOMPATIBLE
Conforming to EN 13168

Description: panel consisting of mineralized fir wood-wool bound with Portland white cement, reinforced with three laths of stabilised wood.
Timber comes from sustainably managed forests PEFC certified.

Use: breathable coverings, resistant to fire with facing finish; support for gypsum board slabs and other coverings.

Dimensions in cm	Thickness in mm	Weight kg/m^2	R m^2 K/W
200x60	50	18	0,75
240x60	50	18	0,75
200x60	75	26	1,15

CELENIT NB

ECO-BIOCOMPATIBLE - WHITE CEMENT
Conforming to EN 13168

Description: a decorative panel for acoustic suspended ceilings and walls consisting of mineralized fir wood-wool bound with white Portland cement. Timber comes from sustainably managed forests PEFC certified.

Use: false ceilings and natural wall coverings, sound absorbing, breathable, fire resistant, unaffected by humidity.

Dimensions in cm	Thickness in mm	Weight kg/m^2	R m^2 K/W
240x60	15	8	0,20
120x60	15	8	0,20
60x60	15	8	0,20
240x60	25	11,5	0,35
200x60	25	11,5	0,35
120x60	25	11,5	0,35
60x60	25	11,5	0,35
240x60	35	14	0,50
120x60	35	14	0,50
60x60	35	14	0,50
240x60	50	18	0,75
200x60	50	18	0,75
120x60	50	18	0,75

CELENIT A

ECO-BIOCOMPATIBLE - GREY CEMENT
Conforming to EN 13168

Description: panel consisting of thin mineralized fir wood-wool bound with Portland grey cement, for acoustic suspended ceilings and walls with fine wood-wool.
Timber comes from sustainably managed forests PEFC certified.

Use: false ceilings and natural wall coverings, sound absorbing, breathable, fire resistant, unaffected by humidity.

Dimensions in cm	Thickness in mm	Weight kg/m^2	R m^2 K/W
240x60	15	8,5	0,20
120x60	15	8,5	0,20
60x60	15	8,5	0,20
200x60	25	12	0,35
240x60	25	12	0,35
120x60	25	12	0,35
60x60	25	12	0,35
200x60	35	15	0,45
240x60	35	15	0,45
120x60	35	15	0,45
60x60	35	15	0,45

CELENIT ABE

ECO-BIOCOMPATIBLE - WHITE CEMENT
Conforming to EN 13168

Description: a decorative panel for acoustic suspended ceilings and walls consisting of extra-fine mineralized fir wood-wool bound with Portland white cement.
Timber comes from sustainably managed forests PEFC certified.

Use: false ceilings and natural wall coverings, sound absorbing, breathable, fire resistant, unaffected by humidity.

Dimensions in cm	Thickness in mm	Weight kg/m^2	R m^2 K/W
240x60	15	9	0,20
120x60	15	9	0,20
60x60	15	9	0,20
240x60	25	13	0,30
120x60	25	13	0,30
60x60	25	13	0,30
240x60	35	16	0,45
200x60	35	16	0,45
120x60	35	16	0,45
60x60	35	16	0,45

CELENIT AB

ECO-BIOCOMPATIBLE - WHITE CEMENT
Conforming to EN 13168

Description: a decorative panel for acoustic suspended ceilings and walls consisting of fine mineralized fir wood-wool bound with Portland white cement.
Timber comes from sustainably managed forests PEFC certified.

Use: false ceilings and natural wall coverings, sound absorbing, breathable, fire resistant, unaffected by humidity.

Dimensions in cm	Thickness in mm	Weight kg/m^2	R m^2 K/W
240X60	15	8,5	0,20
120X60	15	8,5	0,20
60X60	15	8,5	0,20
200X60	25	12	0,35
240X60	25	12	0,35
120X60	25	12	0,35
60X60	25	12	0,20
200X60	35	15	0,50
240X60	35	15	0,50
120X60	35	15	0,50
60X60	35	15	0,50
200X60	50	21	0,70
240X60	50	21	0,70
120X60	50	21	0,70

CELENIT P2

CELENIT - EXPANDED POLYSTYRENE
Conforming to EN 13168

Description: panel consisting of a layer of mineralized fir wood-wool bound with Portland cement coupled to a layer of expanded polysterene of a guaranteed quality.
Timber comes from sustainably managed forests PEFC certified.

Use: insulation of attic and loft floors; insulation of flat and sloping roofs; insulating wall covering for basements and arcades, light and highly insulated false ceilings.

Dimensions in cm	Thickness in mm	Weight kg/m^2	R m^2 K/W
200X60	30 (10/20)	6,5	0,55
200X60	40 (10/30)	6,7	0,80
200X60	50 (10/40)	7,0	1,10
200X60	75 (10/65)	7,2	1,75
200x60	100 (10/90)	7,5	2,40

CELENIT P3

CELENIT - EXPANDED POLYSTYRENE
Conforming to EN 13168

Description: composite panel consisting of two layers (5mm thickness each) in mineralized fir wood-wool bound with Portland cement coupled to an internal layer of expanded polysterene of a guaranteed quality. Timber comes from sustainably managed forests PEFC certified.

Use: elimination of thermal bridges in pillars, beams, inter-storey facings, radiator niches; insulating wall covering for basements and arcades; insulation of roofs above and below the beams; acoustic insulation of walls.

Dimensions in cm	Thickness in mm	Weight kg/m²	R m² K/W
200X60	25 (5/15/5)	8,0	0,45
200X60	35 (5/25/5)	8,2	0,70
200X60	50 (5/40/5)	8,5	1,10
200X60	75 (5/65/5)	9,0	1,75
200x60	100 (5/90/5)	9,4	2,4

CELENIT E3

CELENIT - EXTRUDED POLYSTYRENE
Conforming to EN 13168

Description: composite panels consisting of two layers (5 mm thickness each) in mineralized fir wood-wool bound with Portland cement coupled to an internal layer of extruded polystyrene of a guaranteed quality. Timber comes from sustainably managed forests PEFC certified.

Use: elimination of thermal bridges in pillars, beams, inter-storey facings, radiator niches; insulating wall covering for basements and arcades; insulation of roofs above and below the beams.

Dimensions in cm	Thickness in mm	Weight kg/m²	R m² K/W
200x60	35 (5/25/5)	8,5	0,80
200x60	50 (5/40/5)	9,0	1,25
200x60	75 (5/65/5)	9,8	1,90
200x60	100 (5/90/5)	10,5	2,45

CELENIT G3

ECO-BIOCOMPATIBLE - CELENIT - SILVER-GREY EXPANDED POLYSTYRENE
Conforming to EN 13168

Description: composite panels consisting of two layers (5 mm thickness each) in mineralized fir wood-wool bound with Portland cement coupled to an internal layer of silver-grey expanded polystyrene of a guaranteed quality.
Timber comes from sustainably managed forests PEFC certified.

Use: elimination of thermal bridges in pillars, beams, inter-storey facings, radiator niches; insulating wall covering for basements and arcades; insulation of roofs above and below the beams.

Dimensions in cm	Thickness in mm	Weight kg/m^2	R m^2 K/W
200x60	25 (5/15/5)	8,0	0,50
200x60	35 (5/25/5)	8,2	0,85
200x60	50 (5/40/5)	8,5	1,35
200x60	75 (5/65/5)	9,0	2,15
200x60	100 (5/90/5)	9,4	2,95

CELENIT L3

CELENIT - MINERAL WOOL
Conforming to EN 13168

Description: composite panel consisting of two layers (5mm thickness each) in mineralized fir wood-wool bound with Portland cement coupled to an internal layer of high density oriented mineral wool fibres. Timber comes from sustainably managed forests PEFC certified.

Use: acoustic insulation of walls; insulation of flat and sloping roofs; false ceilings and wall coverings, sound absorbing.

Dimensions in cm	Thickness in mm	Weight kg/m^2	R m^2 K/W
200X60	35 (5/25/5)	11	0,65
200X60	50 (5/40/5)	12	1,00
200X60	75 (5/65/5)	14,5	1,60
200x60	100 (5/90/5)	16,5	2,20

CELENIT CG/F

CELENIT - GYPSUM BOARD - FIRE RESISTANT
Conforming to EN 13168

Description: Celenit N panel combined with a layer of gypsum board.
Timber comes from sustainably managed forests PEFC certified.

Use: covering of walls; walls in double layers on metallic structure; internal finish for ceilings and walls; transpiring coverings, fire resistant with facing finish.

Dimensions in cm	Thickness in mm	Weight kg/m^2	R m^2 K/W
200x60	37,5	21,8	0,40
200x60	47,5	24,3	0,55
200x60	62,5	28,3	0,80
200x60	87,5	36,3	1,20

On request P2, P3, L3, E3, G3, F3 and R type panels can be combined with fire-proof sheets of gypsum board.

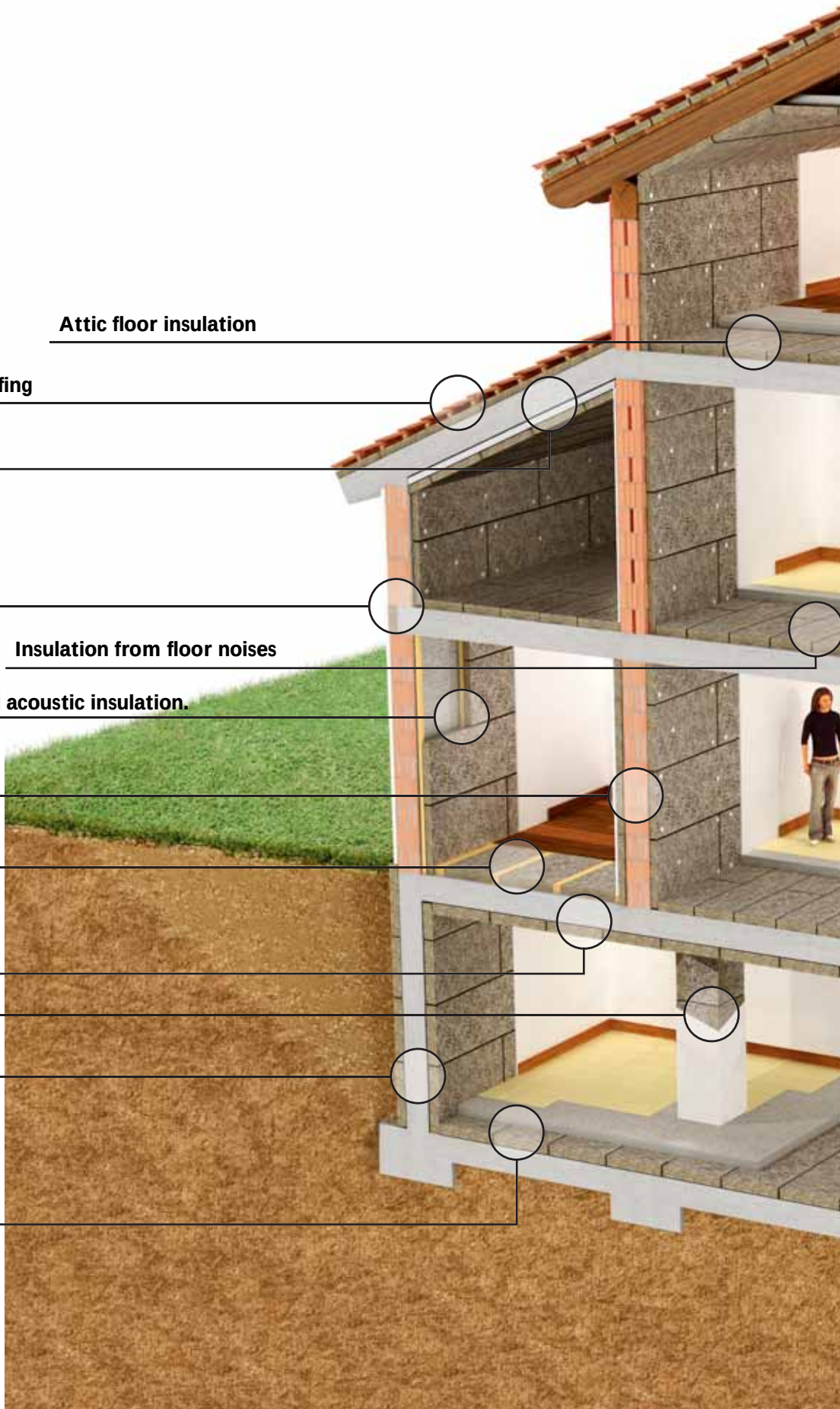
BIOSILENZIO

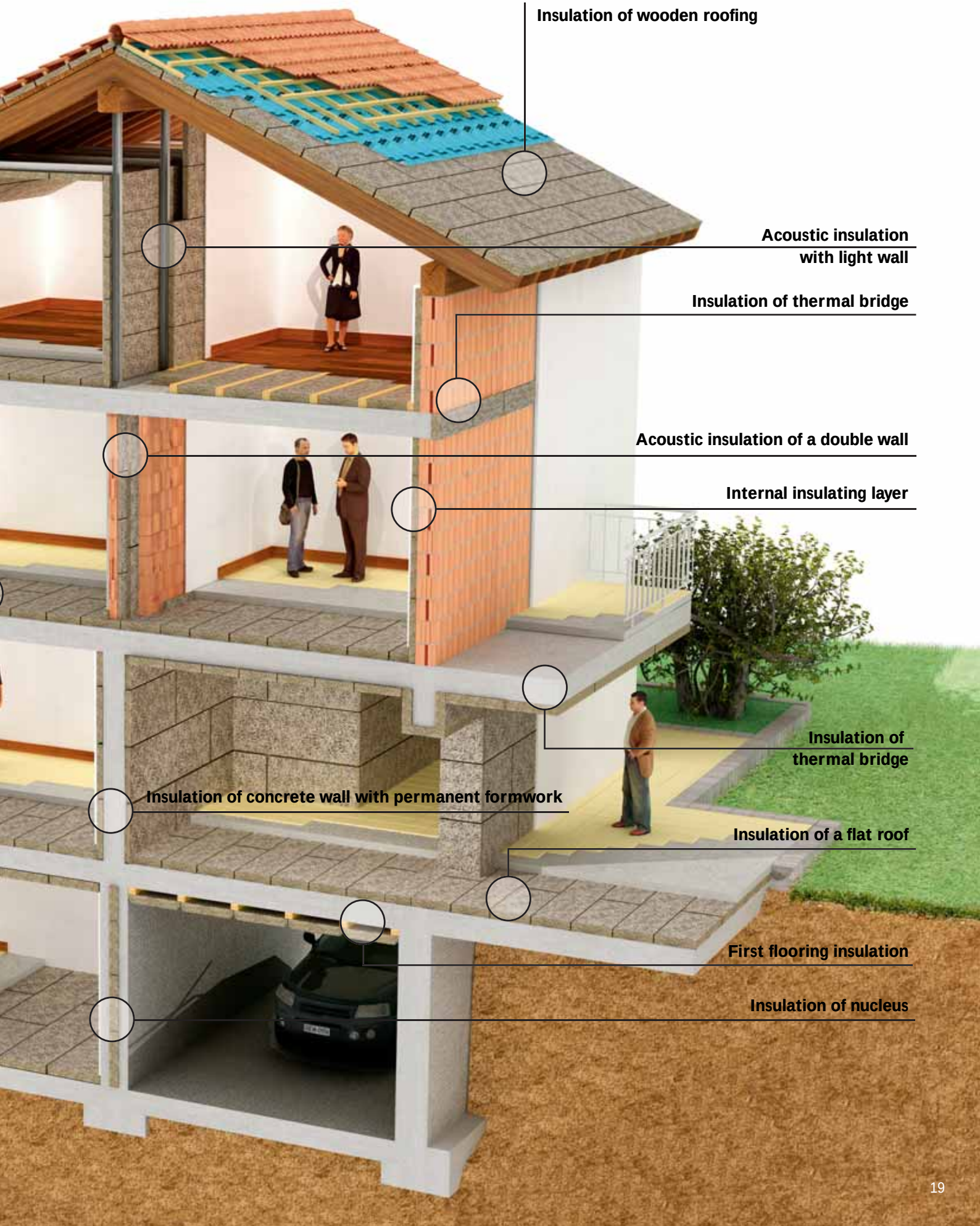
ECO-BIOCOMPATIBLE

Description: silencer for ventilation holes composed by external insulating material of mineralised fir wood-wool bound with Portland cement, internally covered with insulating materials made of maize fibre.
The silencer is provided with two white ventilation grids.
Timber comes from sustainably managed forests PEFC certified.

Use: sound insulation of ventilation holes.

Dimensions in cm	High in cm	Acustic insulation of small element $D_{n,e,w}$ dB
64x16	34	59


Attic floor insulation
Insulation of brick cement roofing
Insulation under roofing
Insulation of thermal bridges
Insulation from floor noises
Panels over fillets, thermal and acoustic insulation.
Recovery of damp wall
Acoustic insulation of a single
wall covering on both sides
Acoustic insulation
of wooden floor
Frist flooring insulation
Insulation of thermal bridge
Insulation of concrete
against earth wall
permanent form work
Floor insulation


Insulation of wooden roofing
Acoustic insulation with light wall
Insulation of thermal bridge
Acoustic insulation of a double wall
Internal insulating layer
Insulation of thermal bridge
Insulation of concrete wall with permanent formwork
Insulation of a flat roof
First flooring insulation
Insulation of nucleus

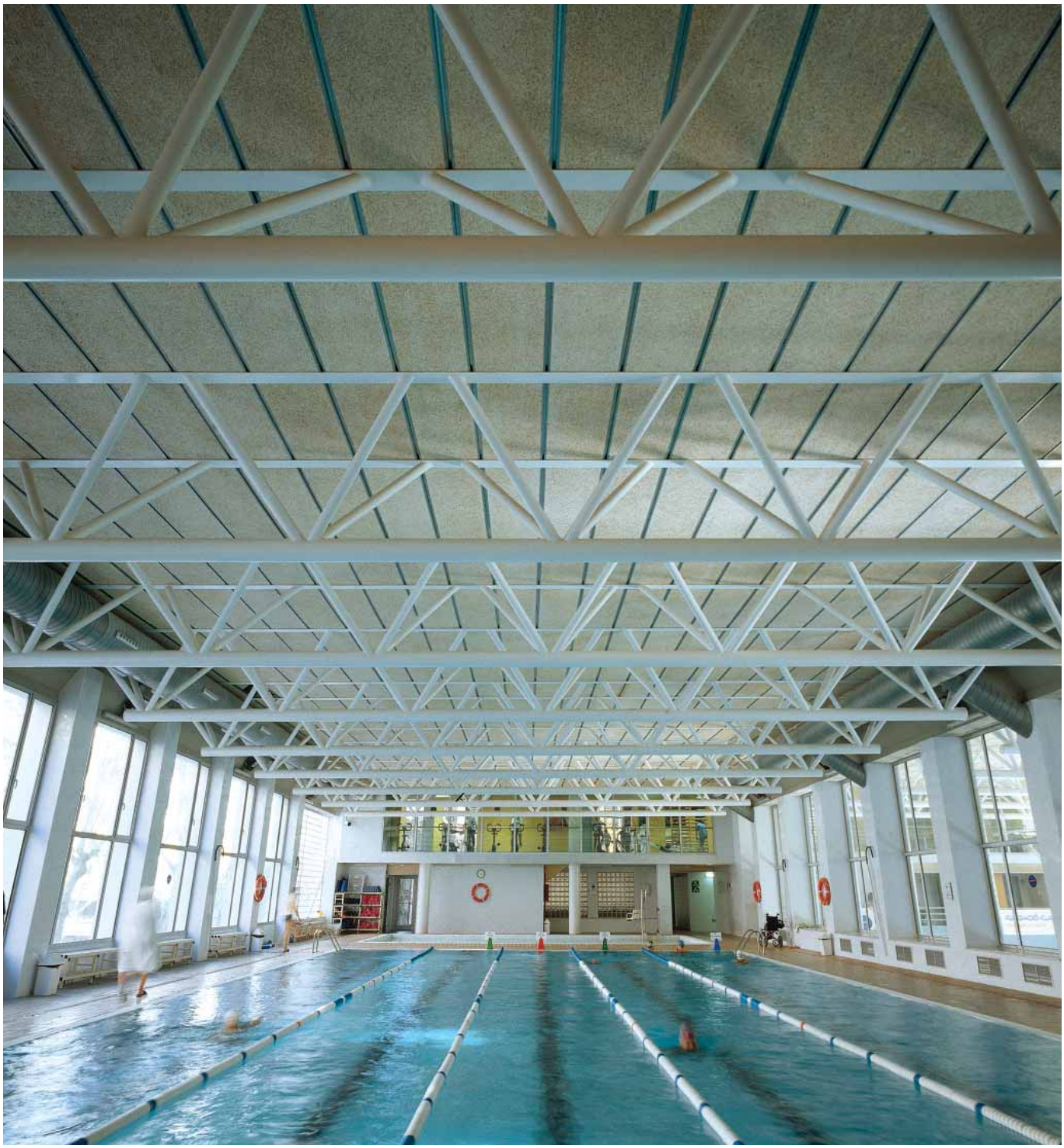


Figure 1
Gymnasium of Zamet Centre - Rijeka (Croatia)
Celenit AB, 15 mm thick, without painting, for baffles and false ceilings. Chamfered on all sides.

Figure 2
Kindergarten - Cittadella (Italy)
Celenit AB, 25 mm thick. For visible T- shaped profiles.

Figure 3
Swimming pool - Granada (Spain)
Celenit NB, 25 mm thick. Chamfered edges, omega shaped metal profiles.

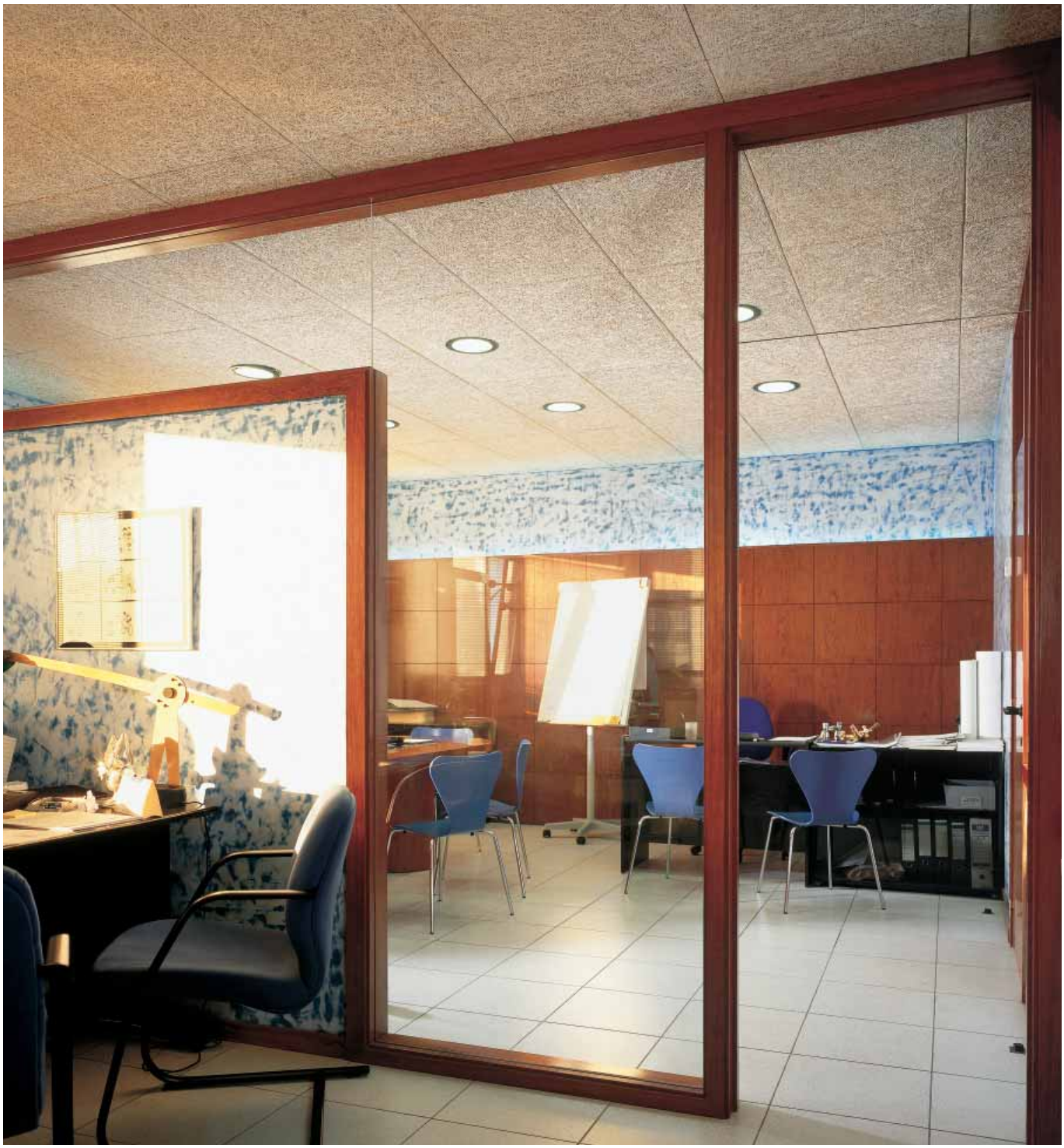


Figure 1
Cavour Gallery - Padua (Italy)
Celenit AB, 25 mm thick. Chamfered on length side. Adhering false ceilings.

Figure 2
Gymnasium - Seville (Spain)
Celenit AB, 25 mm thick, for wall coverings. Chamfered on all sides. Adhering wall coverings.

Figure 3
Office - Salamanca (Spain)
Celenit AB, 25 mm thick. Chamfered on all sides. Adhering false ceilings.

Figure 1
Restaurant - Barcelona (Spain)
Celenit AB, 25 mm thick, without painting. Chamfered edges, omega-shaped metal profiles.

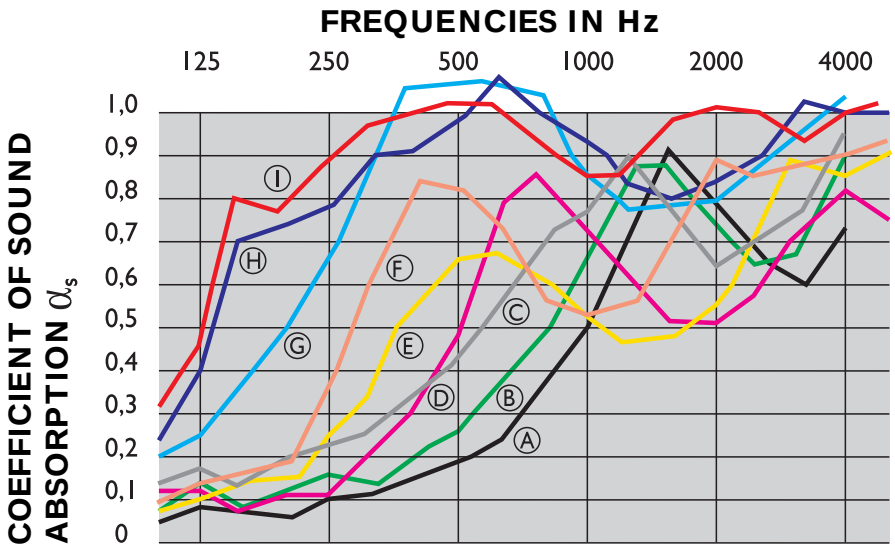
Figure 2
Swimming pool - Girona (Spain)
Celenit AB, 25 mm thick. Chamfered edges, omega-shaped metal profiles.

Figure 3
Kindergarten – Cittadella (Italy)
Celenit AB, 25 mm thick. For visible T- shaped profiles.

Celenit acoustic false ceilings and walls combine high sound-absorbing values with pleasant and colourful interior design solutions.

SOUND ABSORBING

Celenit panels can be classified as natural sound absorbers. The open cellular structure of Celenit panels progressively reduces sound energy transforming it into heat. They offer a high level of sound-absorption, particularly at higher frequencies (shrill sounds), which are the most common. Absorption increases with greater thickness and when coupled with a layer of mineral wool. A good level of absorption at lower frequencies (medium-low tones) is obtained by using two layered panels with polystyrene (CELENIT P2).



Line	Panel thick	125	250	500	1000	2000	4000	α_m
A	25 mm adhering	0,08	0,11	0,18	0,50	0,80	0,72	0,40
B	35 mm adhering	0,13	0,15	0,25	0,65	0,74	0,90	0,47
C	50 mm adhering	0,17	0,22	0,42	0,78	0,65	0,95	0,53
D	25 mm with cavity ≥ 24 mm	0,12	0,11	0,48	0,72	0,51	0,82	0,46
E	35 mm with cavity ≥ 50 mm	0,10	0,25	0,67	0,55	0,56	0,86	0,50
F	50 mm with cavity ≥ 50 mm	0,13	0,39	0,82	0,53	0,89	0,90	0,61
G	25 mm with cavity ≥ 40 mm and mineral wool ≥ 40 mm	0,25	0,67	1,08	0,86	0,81	1,04	0,79
H	35 mm with cavity ≥ 50 mm and mineral wool ≥ 40 mm	0,40	0,78	0,98	0,93	0,84	1,00	0,82
I	50 mm with cavity ≥ 50 mm and mineral wool ≥ 40 mm	0,45	0,89	1,02	0,86	1,01	1,00	0,87

Coefficients of sound absorption α_s and average α_m interval values 125-4000 Hz (Frequencies in Hz)

Figure 1
Entrance of primary school – Mestrino (Italy)
Celenit AB, 25 mm thick, painted in various colours.
For visible T- shaped profiles.

Figure 2
Gymnasium - Breganze (Italy)
Celenit AB, 25 mm thick.
Chamfered edges, omega-shaped metal profiles.

MAIN APPLICATIONS

The product also offers further features that are important for sound absorbing facings:
- thermal inertia, breathability and ability to absorb excess humidity, to guarantee a high standard of living conditions;
- absolute harmlessness and absence of dripping, dense fumes and toxic gases in the event of fire, which makes it a safe material;
- non-deformability (even in the presence of high levels of humidity), strength and unlimited duration, which make it suitable for use in severe conditions, such as in swimming pools, gyms, schools and industrial buildings.

The panels are used to adjust sound in gyms, schools, discotheques, concert halls, studios, etc. The many projects carried out have always given excellent results. Furthermore, panels used to cover walls and ceilings reduce noise levels in industrial buildings. The panels are resistant to shock and dynamic impacts (hit by balls, EN 13964).
Panel used for sound absorbing false ceilings and walls are available in three different versions:
- Type NB with wood-wool fibre approximately 3,5 mm thick;
- Type AB with wood-wool fibre approximately 2 mm thick;
- Type ABE with wood-wool fibre approximately 1 mm thick.

The thinner the wood-wool fibre the nicer is the appearance of panels to create outstanding interior design project.
Celenit acoustic panels can be easily installed using T-profiles or gypsum board profiles.

CELENIT ACOUSTIC CEILINGS BENEFITS

- High sound absorption performance;
- breathability;
- summer heat protection;
- humidity regulation;
- safety in case of fire (Class B-s1, d0);
- dimensional stability (according to UNI EN 13168) in the presence of very high humidity;
- strength and durability that are ideal for severe conditions such as in swimming pools, gyms, schools, industrial buildings;
- eco-biocompatibility, the panels are certified by ANAB-ICEA and timber comes from forests certified PEFC;
- security, panels are safe against ball shocks;
- available in various edges and colours (potassium silicate biological colours, photocatalytic colours).

STANDARD WATER BASED COLOUR CHART


Cream
Code S13/15


Light Green
Code S02/14


Dark Green
Code S01/14

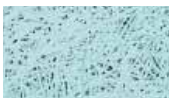

Light Ochre
Code S08/15


Yellow Ochre
Code S07/15


Light Brown
Code S11/14

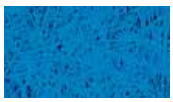

Dark Brown
Code S07/14


Black
Code S08/14


Sky Blue
Code S06/15


Light Azure
Code S15/15


Azure
Code S01/15


Dark Azure
Code S14/15


Sea Blue
Code S02/15


Light Yellow
Code S12/14


Medium Yellow
Code S06/14


Dark Yellow
Code S09/14


Orange
Code S04/14

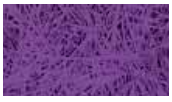

Red Code
Code S03/14


Light Pink
Code S10/15


Medium Pink
Code S09/15


Dark Pink
Code S11/15


Fuchsia
Code S03/15


Purple
Code S05/14


White
Code S05/15


Light Grey
Code S12/15


Medium Grey
Code S16/15


Dark Grey
Code S04/15


Anthracite Grey
Code S10/14

Other colours are available on request

Celenit proposes on the market two new colours chart:

SILICATE NATURAL COLOUR CHART

Celenit panels painted with potassium silicate biological colours, natural certified by natureplus®.


Grey
Code B30006


Light Grey
Code B30007


Azure
Code B30008


Light Blue
Code B30009


Green
Code B30011


Light Green
Code B30012


Nidian Red
Code B30014


Pink
Code B30015


Siena
Code B30016


Yellow
Code B30017


White
Code B30093

PHOTOCATALYTIC COLOUR CHART

Celenit panels painted with the photocatalytic colours, thanks to the photocatalytic process, are able to remove pollutants such as cigarette smoke, harmful emissions from households and furniture or carpets, grease dirt, bacteria and fungal spores.

Anthracite Grey
Code F28355

Ultramarine
Code F28345

Light Blue
Code F28366

Olive
Code F28352

Green
Code F28353

Light Green
Code F29013

Red
Code F28351

Marron
Code F28357

Yellow
Code F28350

Gold
Code F29012

White
Code F43081

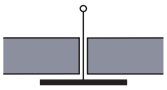
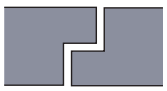
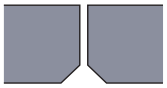
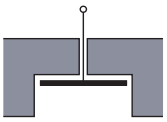
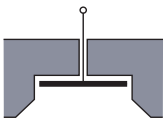
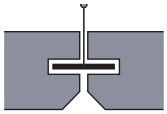
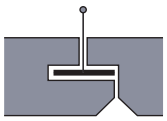
The colours shown here, while as close as possible to the original, must be considered approximate

Figure 1
Particular of a false ceilings
Celenit ABE, 25 mm thick, painted in various colours. For visible T- shaped profiles.

Figure 2
Kindergarten - Valencia (Spain)
Celenit AB, 25 mm thick. Chamfered on all sides. Adhering false ceilings.

Figure 3
Office - Celenit headquarter - Tombolo (Italy)
Celenit AB with two suspended stripes of Celenit ABE, 25 mm thick. Chamfered on all sides.

EDGE DETAILS

Code	Description	Thickness mm	Scheme
D	Straight edges (90° angle) Panel dimensions (mm): 2400 x 600 – 2000 x 600 – 1200 x 600 – 600 x 600	≥ 15	
DT	Straight edges only for visible T- shaped profiles (90° angle) Panel dimensions (mm): 2395 x 595 – 1995 x 595 – 1195 x 595 – 595 x 595	≥ 15	
BL **BC** **B4**	Leaf edges length side only Leaf edges width side only Leaf edges both sides	≥ 35	
SL **SC** **S4**	Chamfered on length side only Chamfered on width side only Chamfered on both sides	≥ 20	
RD	Lowered edges mounted on T- shaped profiles	≥ 25	
RS	Lowered and chamfered on all sides for visible T- shaped profiles	≥ 25	
PS	Chamfered edges mounted on foldaway profiles	≥ 25	
PM	Chamfered edges mounted foldaway profiles with mobile panels	> 35	

FALSE CEILINGS

ADHERING FALSE CEILINGS

Concrete slab cast on Celenit panels

Adhering false ceiling flooring in brick cement covered with Celenit panels, fixed to wooden laths or gypsum profiles

"Predalle" flooring underlay, cast on Celenit panels

INDUSTRIAL FALSE CEILINGS

Acoustic and thermal insulation of prefabricated concrete roofings

Acoustic and thermal insulation of metal structural roofings

SUSPENDED FALSE CEILINGS

Panels mounted on omega-shaped metal profiles

Panels mounted on T-shaped profiles

Suspended false ceiling lowered edges panels mounted on T-shaped profiles

Suspended false ceiling panels mounted on T-shaped profiles, on top of which a thin mineral wool mattress is placed

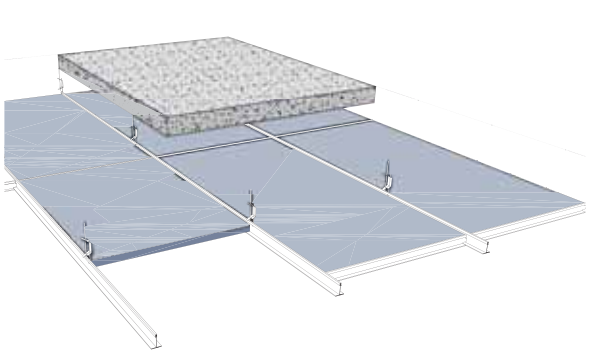
Suspended false ceiling chamfered edges panels mounted on foldaway profiles

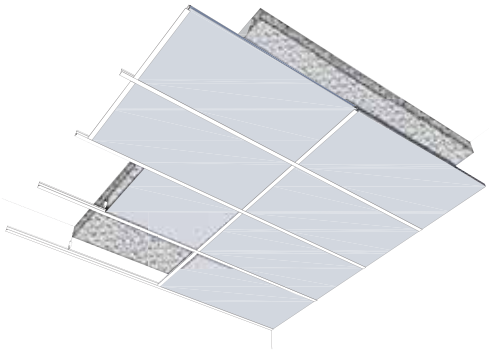
Suspended false ceiling chamfered edges panels mounted on foldaway profiles with mobile panels

MAIN INSTALLATION SCHEMES

FALSE CEILINGS

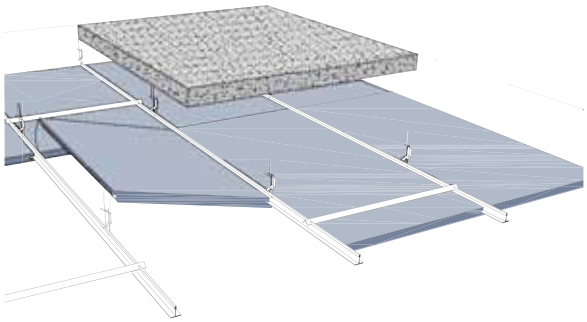
Visible T- shaped profiles

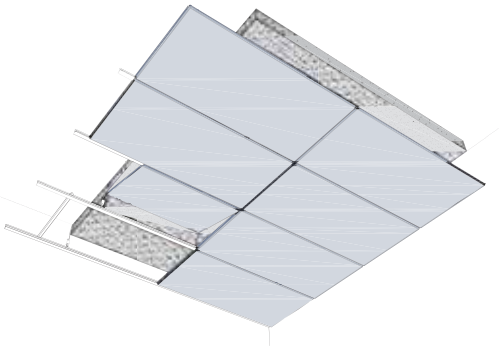




FALSE CEILINGS

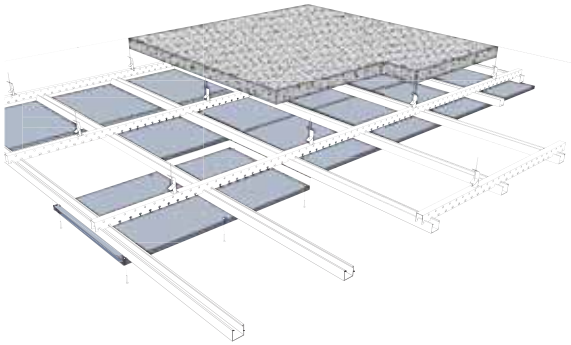
T-shaped foldaway profiles

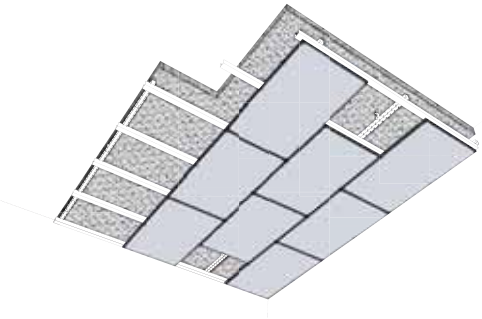




FALSE CEILINGS

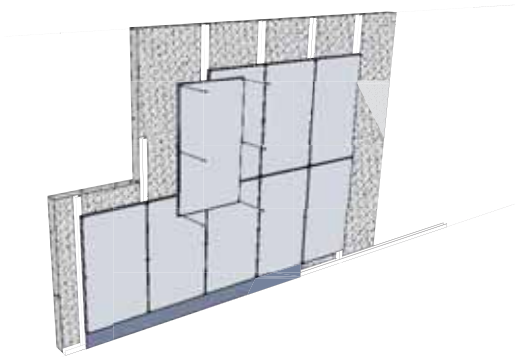
C-shaped profiles for ceilings

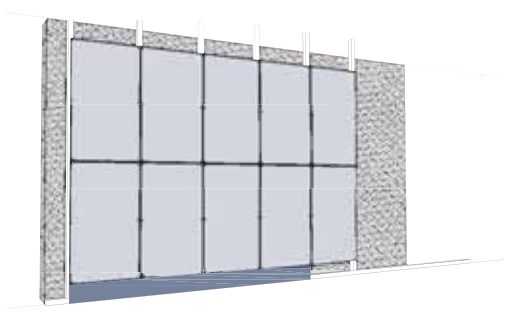




WALL COVERINGS

C-shaped profiles for walls





For more information: **www.celenit.com** or write an e-mail to: **techsupport@celenit.com**

Figure 1
Thermal bridges insulated with Celenit N panels, 35 mm thick.

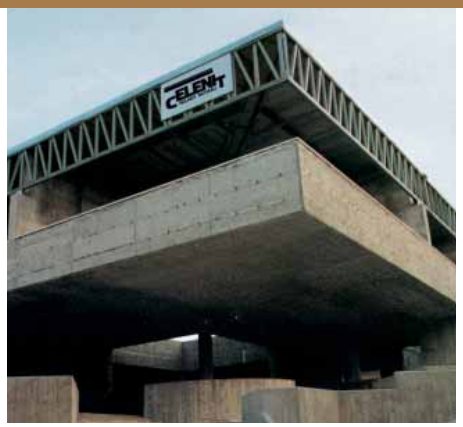


Figure 2
Celenit floorings cast on site are used for the horizontal structure, while for the vertical parapet is used a permanent formwork made with Celenit N panels, 50 mm thick. This adjusts the substantial heat loss of this particular overhanging architectural component.

Figure 3
To insulate this thermal bridge, Celenit P3 panels, 35mm thick, were used fixed with plastic anchorages.

INSULATION OF PILLARS, ARCHITRAVES, INTER-FLOOR BEAMS, OVERHANGING COMPONENTS AND RADIATOR NICHES

The loss of heat through the structural components of a building, thermal bridges, can reach and exceed 20% of the total dispersion, and is the cause of interior condensates, stains and mould, with subsequent deterioration of the building parts. The adjustment of thermal bridges, as set out by regulations on energy efficiency, is obtained by placing Celenit panels within the formwork which contains the casting. These will then remain permanently connected with the casting itself. In this way, a balance is obtained between the insulating properties of the wall and the concrete sections. It is suggested that plastic or metal fasteners be used with multi-layered panels (Celenit P3, Celenit E3, Celenit G3). These will remain incorporated in the casting. Then, plaster reinforced with a glass fibre net is applied.

Figure 4
Thermal bridges on inter-floor beams and pillars can be adjusted, at the casting stage, by inserting Celenit N or Celenit P3, Celenit E3 or Celenit G3 panels in the formwork. For this specific use, made-to-measure strips are supplied by the company.

Figure 5
An arcade insulated with Celenit P3 panels, 50 mm thick, placed on the containment formwork before the casting - this operation produces particularly economic results with regard to the reduction in energy consumption and the protection of the structures.

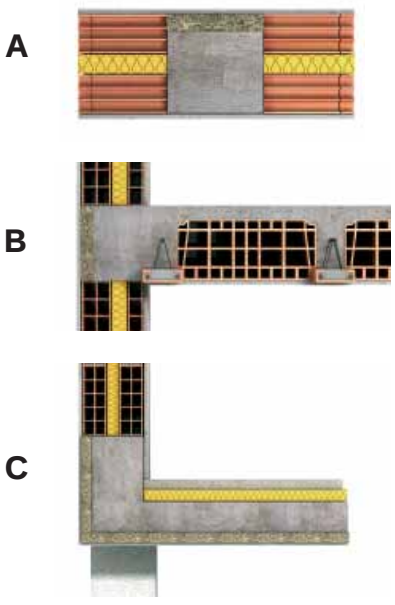


Figure 6
A - Insulation of pillars
B - Insulation of inter-floor beans
C - Insulation of overhanging components

INSULATION OF CONCRETE WALLS WITH PERMANENT FORMWORK

The system consists in building bearing walls with concrete castings inside two parallel Celenit panels made from mineralised fir wood-wool bound with Portland cement. The panels are then fixed as appropriate (using large formworks, spacers or brackets).
In this way, the insulation panels are incorporated in the casting, forming a single monolithic block. In this, the concrete nucleus, cast simultaneously along all the longitudinal and partition walls, determines the box effect characterised by high levels of rigidity and lateral stability.

This system can play a leading role in seismic zones.

The system has the following advantages:
- quick and economic construction;
- thermal inertia;
- the desired level of thermal insulation, by using Celenit panels of appropriate thickness and type;
- up to a 30% improvement in the compression resistance and elasticity coefficient of concrete;
- a significant recovery of useful space, through reduced wall width;
- acoustic insulation also from external noises;
- resistance, even without plaster, against severe weather conditions, such as beating rain, freezing temperatures and sun radiation;
- fire resistance;
- elimination of thermal/acoustic bridges, always important in concrete buildings;
- elimination of condensates and relating damage to structures and systems;
- excellent surface for any type of plaster.

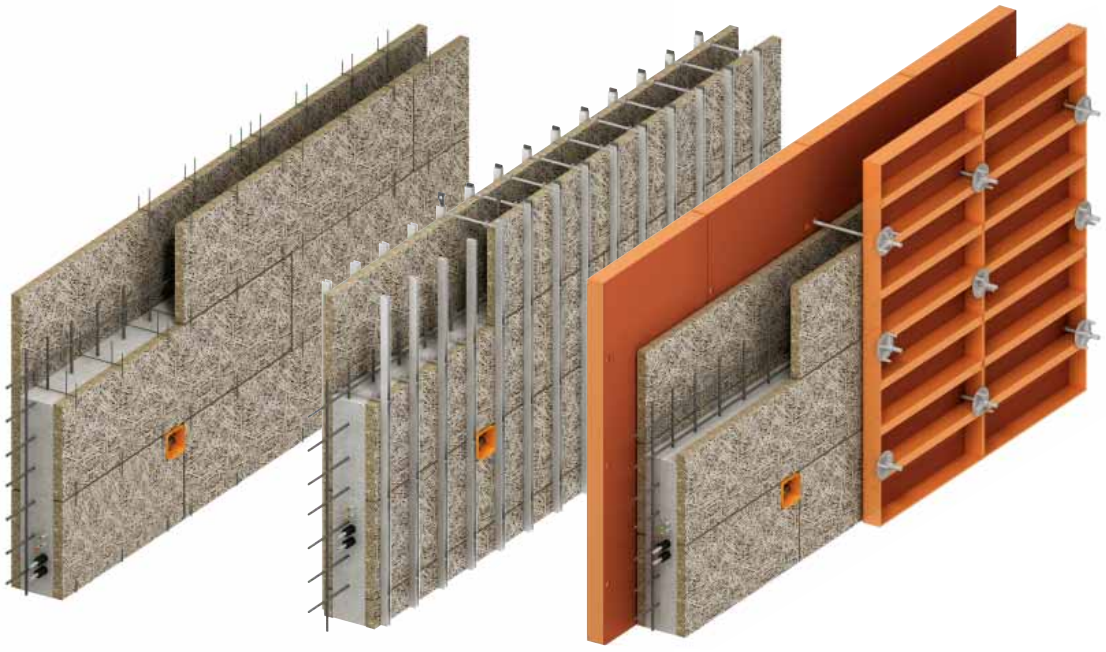


Figure 1
Insulation of concrete walls using brackets.

Figure 2
Insulation of concrete walls using spacers.

Figure 3
Insulation of concrete walls using large formworks.

Figure 4
Plastic anchorage to increase the adhesion of Celenit panels to the concrete casting.

Figure 1
Attic floor insulation using leaf-edged Celenit P2 panels.

Figure 2
Insulation under beams using Celenit P3 panels.

Figure 3
Insulation above steel beams using Celenit AB panels.

Roof insulation provides the greatest means of saving energy. Furthermore, it is often simple to install and DIY friendly.

ATTIC FLOOR INSULATION

If the attic is not used, it is useful to insulate its floor (A in Figure 7). The insulation product is simply laid down. In this way, a surface on which to walk occasionally is created.
To be noted is the correct position of the insulating product, which allows the flooring's thermal inertia to be maximised. The panels can be laid over other insulating materials such as panels, rolls or loose insulating products. Celenit also provides boards that can be walked on (B in Figure 7).

ROOF PITCH INSULATION

Wooden roofing

Panels are placed above the beams to form a board structure which substitutes the wooden planks or the hollow tiles (C in Figure 7). This has many advantages: it does not cost more, it insulates more, it is a barrier against fire and it transpires, thus contributing to the removal of humidity and to maintaining a healthy structure. Due to their mass and specific heat, the panels have a great capacity for heat accumulation, an important fact which is particularly appreciated in the summer months. The panels can be supplied in two sizes, 200x60 and 240x60 cm, in order to adapt better to the distances between the beams. Celenit R panels reinforced with wooden fillets are used for larger distances. The Celenit panels are either left visible, plastered or covered with gypsum board (in the latter case, panels already prepared with Celenit CG/F fire resistant gypsum board can be used). If a matchboard finish is used, the panels are placed above the matchboard surface, thus obtaining a continuous layer of insulation without thermal bridges (D in Figure 7). The compression resistance feature of Celenit panels means that the support purlins of the roof structure can be applied directly onto the panels.
In existing buildings, panels are placed beneath the beams. In this way, extra insulation can be placed between the beams. Thus, an optimal result is obtained: thermal inertia is increased, humidity regulation is improved, the level of fire resistance is increased and the impact of external sounds, including weather noises (rain, wind, hail) is reduced, ensuring optimum living conditions.

Brick cement roofing

The panels are applied to the upper surface of the roof flooring either during or after the final casting. They are fixed with mortar, bitumen or plugs. Then, a waterproof, non vapour-proof membrane is laid out, and above that the roof structure. In ventilated roofs, either the support elements of the roof structure or under-tiling products such as corrugated plates, polystyrene, etc are placed above the panels.

Celenit roof flooring

In new buildings and when rebuilding roofs, it is suggested that the roof flooring be cast on site on a board structure of Celenit panels, for use as a permanent formwork.
Lightening elements would consist of polystyrene blocks or common brick pot forms (see false ceilings). In this way, a light roof flooring which is acoustically and thermally insulated as well as highly fire resistant could be obtained in a single step.

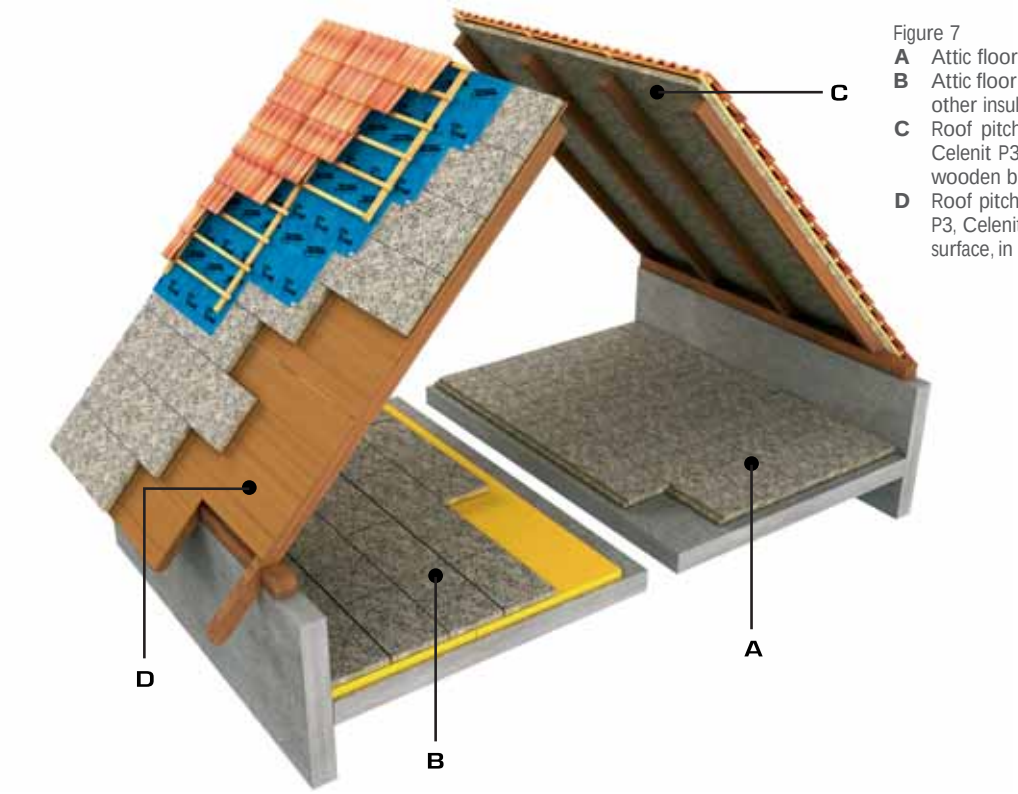


Figure 7
A Attic floor insulation using leaf-edged Celenit P2 panels.
B Attic floor insulation using Celenit N panels over a layer of other insulators.
C Roof pitch insulation using panels Celenit N, Celenit R, Celenit P3, Celenit G3, Celenit E3, Celenit AB instead of wooden board structures or hollow tiles.
D Roof pitch insulation using Celenit N, Celenit P2, Celenit P3, Celenit L3, Celenit F3 panels above the matchboard surface, in order to eliminate thermal bridges completely.

INSULATION UNDERLAY WATERPROOFING SHEETS

The panels are laid joggled and fitted closely next to one another along the roofing.
Leaf-edged panels can be used in order to improve thermal insulation, by eliminating thermal bridges and relating condensates. Alternatively, insulation could be carried out in crossed layers, firstly using expanded or mineral-fibre materials and secondly using Celenit panels, which are more stable in the event of thermal and mechanical stress. The panels can be fixed in various ways, according to the existing support: with oxidized bitumen melted on either key-patterned pressed steel sheet or on any other support; dry, with screw anchors in the proportion of 6 plugs per square metre; with common mortar; with binders.
The bituminous sheets are applied directly onto the panels without the need for a primer, as they adhere strongly and permanently.
There is no need for slide-layers, given the concrete-like high level of dimensional stability of the panels (see Technical Characteristics). In multi-layered panels, the wood and cement layer contributes to spreading the weight, which makes the roofing accessible for maintenance operations. Furthermore, due to its heat accumulation property, this layer protects the polystyrene layer and the waterproofing layer by limiting thermal excursion. The roofing is guaranteed against sagging and subsequent cracking, thanks to the mechanical characteristics of the panels together with their stability over time and the fact that they do not suffer degrading, even in the presence of water seepages.

Timber building provide highly effective insulation and excellent living standards by minimizing the impact on the environment. However fire protection, sound insulation and thermal summer inertia are points of weakness that need to be addressed. Celenit panels can provide wooden houses with certified sound insulation, fire protection and summer heat insulation. Beside plaster and mortar have good adhesion on Celenit panels. Celenit proposals refer to the two main systems of construction: cross laminated timber boards (X-Lam) or timber beam framing.

X-LAM PARTITION WALL

THICKNESS

21,5 cm

AREA DENSITY

118,7 kg/m^2

SPECIFICATIONS

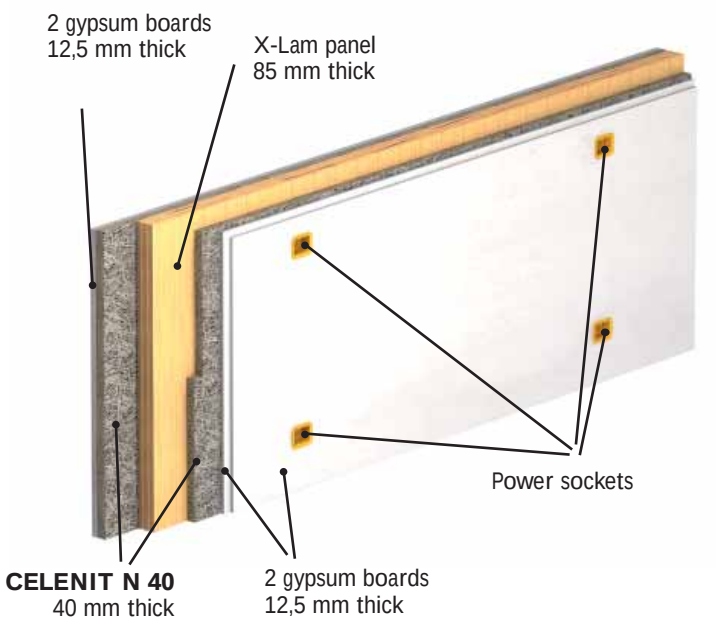
- Celenit N
- X-Lam panel
- Gypsum board
- Power sockets

SOUND INSULATION INDEX:
Calculation method according to UNI EN ISO 717-1 based on laboratory data (UNI EN ISO 140-3)

R_w= 56 dB

THERMAL TRASMITTANCE

0,42 W/m^{2}K



X-LAM EXTERNAL WALL

THICKNESS

27,5 cm

AREA DENSITY

143,0 kg/m^2

SPECIFICATIONS

- Celenit N
- Celenit FL/150
- X-Lam panel
- Gypsum board
- Plaster

SOUND INSULATION INDEX:
Calculation method according to UNI EN ISO 717-1 based on laboratory data (UNI EN ISO 140-3)

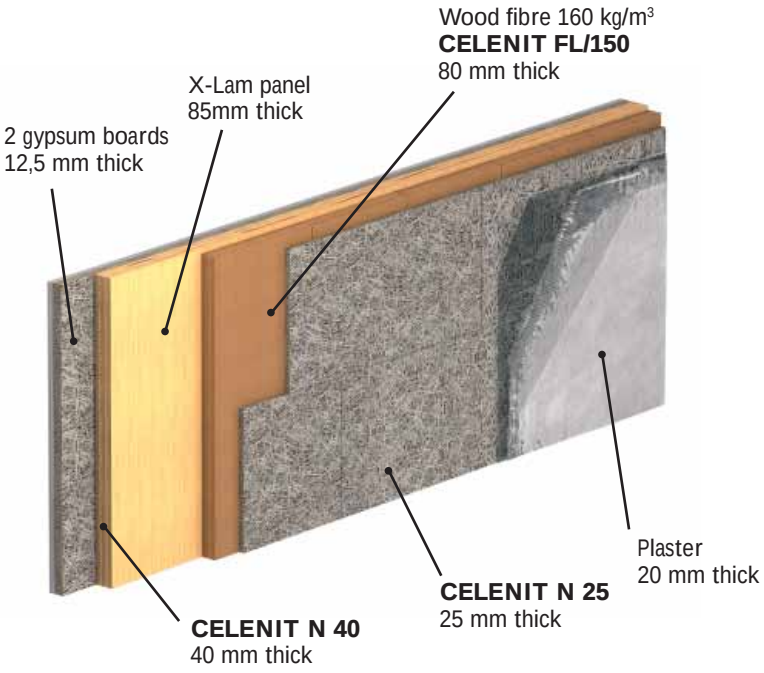
R_w= 54 dB

THERMAL TRASMITTANCE

0,25 W/m^{2}K

TIME LAG

14h 37'



EXTERNAL TIMBER BEAM FRAMING WALL

THICKNESS
23,5 cm

AREA DENSITY
76,3 kg/m^2

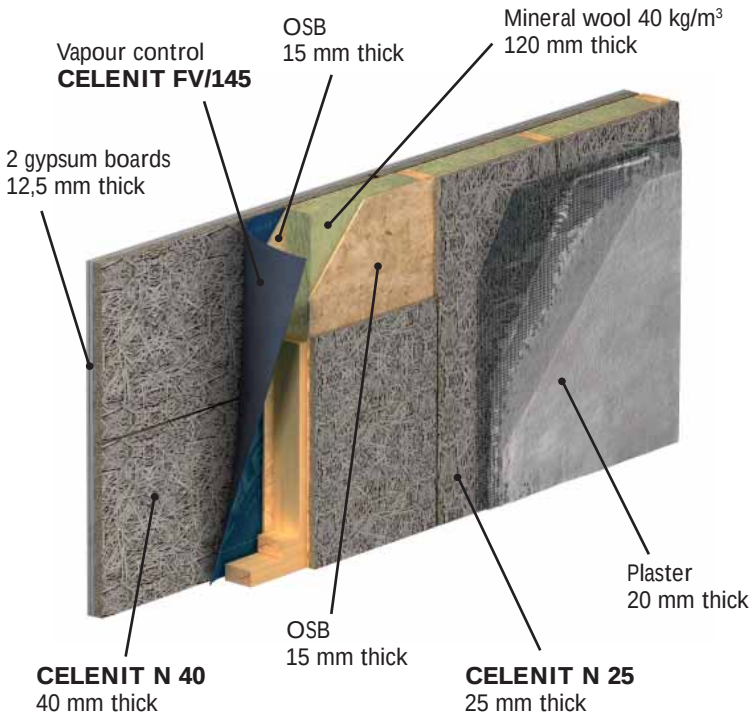
SPECIFICATIONS
- Celenit FV/145
- Mineral wood
- OSB
- Gypsum board
- Plaster

SOUND INSULATION INDEX:
Calculation method according to UNI EN ISO 717-1
based on laboratory data (UNI EN ISO 140-3)

R_w= 57 dB

THERMAL TRASMITTANCE
0,20 W/m^{2}K

TIME LAG
10h 00’



ROOF INSULATION

AREA DENSITY
151 kg/m^2

SPECIFICATIONS
- DuPont™ Tyvek® Enercor® Roof
- Celenit N
- Hemp fibre (Celenit LC/30)
- DuPont™ AirGuard®

SOUND INSULATION INDEX:
Calculation method according to UNI EN ISO 717-1
based on laboratory data (UNI EN ISO 140-3)

R_w= 50 dB (2 Gypsum boards)

THERMAL TRASMITTANCE
0,16 W/m^{2}K

TIME LAG
12h 19’

Figure 1
Acoustic insulation of a double wall 8 + 8 cm thick or 8 + 12 cm thick, plastered on both sides.

Figure 2
Acoustic insulation of a single wall in hollow brickwork 12 cm thick, plastered on one side.

Figure 3
Acoustic insulation of wall made of Poroton®
8 cm thick.

The characteristics that differentiate Celenit from light insulators and which make it an effective sound-insulating material are: high mass, open cell structure, low resistance to flexion, high internal damping factor.

ACOUSTIC INSULATION BETWEEN BRICKWORK PARTITIONS

Brickwork partitions give considerable problems for acoustic insulation and do not normally reach the values imposed by the existing regulations. The wall covering or insulation in the cavity of such walls, with Celenit panels of various types and thicknesses, offers a considerable increase in sound insulation even at low and medium frequencies, which prove to be the most disturbing since they are the ones corresponding to music and conversation, typical noises in living spaces; the insulation easily conforms to the requirements of the laws in force, even in the most severe conditions. For covering, the panels are applied dry and fixed with expansion plugs at a ratio of 4 plugs/m2 and then covered with plasterboard sheets. The data for different applications are shown in table 1 for double walls and in tables 2, 3, 4 and 5 for single walls.

Table 1 - Acoustic insulation of a double wall 8 + 8 cm thick or 8 + 12 cm thick, plastered on both sides (figure 1)

	Wall thickness mm	Weight kg/m^2	Sound insulation Rw (dB)
Walls in hollow brickwork 8+8 cm thick insulated in the cavity with Celenit N panels 50 mm thick	260	212	53
Walls in hollow brickwork 8+8 cm thick insulated in the cavity with two overlapping layers of Celenit N panels 20 mm thick	240	206	53
Walls in hollow brickwork 8+12 cm thick insulated in the cavity with two overlapping layers of Celenit N panels 20 mm thick	280	242	55
Walls in hollow brickwork 8+12 cm thick insulated in the cavity with Celenit L3 panels 35 mm thick	270	231	55
Walls in hollow brickwork 8+12 cm thick insulated in the cavity with a layer of Celenit N panels 20 mm thick and a layer of Celenit LC/30 panels (hemp) 40 mm thick	290	231	55
Walls in **Poroton**® blocks 8+8 cm thick insulated in the cavity with two overlapping layers of Celenit N panels 20 mm thick	230	239	53
Walls in **Poroton**® blocks 8+12 cm thick insulated in the cavity with Celenit L3 panels 50 mm	280	287	55
Walls in **Poroton**® blocks 8+12 cm thick insulated in the cavity with a layer of Celenit N panels 20 mm thick and a layer Celenit LC/30 panels (hemp) 40 mm thick	290	287	56

Table 2 - Acoustic insulation of a single wall in hollow brickwork 12 cm thick, plastered on one side (figure 2)

	Wall thickness mm	Weight kg/m^2	Sound insulation Rw (dB)	Δ(dB)*
Non-insulated wall	135	144	40	-
Wall covering with Celenit P3 panels 50 mm thick and plasterboard sheets	210	166	54	14
Wall covering with Celenit N panels 25 mm thick and plasterboard sheets	180	169	55	15
Wall covering with Celenit N panels 50 mm thick and plasterboard sheets	210	174	57	17
Wall covering with two overlapping layers of Celenit N panels 20 mm thick and plasterboard sheets	200	178	58	18
Wall covering with Celenit L3 panels 50 mm thick and plasterboard sheets	210	172	59	19

*Increase in sound insulation properties with Celenit panels.

Table 3 - Acoustic insulation of wall made of Poroton® 8 cm thick (figure 3)

	Wall thickness mm	Weight kg/m^2	Sound insulation Rw (dB)	Δ(dB)*
Non-insulated wall	80	97	32	-
Wall covering on both sides with Celenit N panels 20 mm thick and double layer of plasterboard sheets	200	165	61	29

*Increase in sound insulation properties with Celenit panels.

Table 4 - Acoustic insulation of wall made of Poroton® 12 cm thick (figure 4)

	Wall thickness mm	Weight kg/m^2	Sound insulation Rw (dB)	Δ(dB)*
Non-insulated wall	120	107	36	-
Wall covering on both sides with Celenit N panels 20 mm thick and plasterboard sheets	210	150	55	19
Wall covering on both sides with Celenit L3 panels 35 mm thick and plasterboard sheets	240	150	62	26
Wall covering on both sides with Celenit N panels 20 mm thick and double layer of plasterboard sheets	240	176	62	26
Wall covering on both sides with Celenit L3 panels 35 mm thick and double layer of plasterboard sheets	270	176	65	29
Non-insulated wall plastered on one side	135	137	41	-
Wall covering on one side with plaster and on the other side with Celenit N panels 25 mm thick and plasterboard sheets	185	158	53	12
Wall covering on one side with plaster and on the other side with two overlapping layers of Celenit N panels 20 mm thick and plasterboard sheets	200	163	55	14
Wall covering on one side with plaster and on the other side with Celenit L3 panels 35 mm thick and plasterboard sheets	195	159	55	14
Wall covering on one side with plaster and on the other side with Celenit N panels 50 mm thick and plasterboard sheets	210	162	56	15
Wall covering on one side with plaster and on the other side with Celenit L3 panels 50 mm thick and plasterboard sheets	210	160	57	16

*Increase in sound insulation properties with Celenit panels.

Figure 4
Acoustic insulation of a wall in Poroton® blocks 12 cm thick.

Figure 5
Acoustic insulation of a wall in Poroton® blocks 17 cm thick.

Figure 6
Partition wall insulated with a strip of Celenit N panels. A simple but effective way of interrupting noise transmission to lower floors and adjacent rooms.

Table 5 - Acoustic insulation of a wall in Poroton® blocks 17 cm thick (figure 5)

	Wall thickness mm	Weight kg/m²	Sound insulation Rw (dB)	Δ(dB)*
Non-insulated wall	170	256	47	-
Wall covering on both sides with Celenit panels N 20 mm thick and plasterboard sheets	260	300	60	13
Wall covering on both sides with Celenit N panels 35 mm thick and plasterboard sheets	290	306	62	15
Wall covering on both sides with Celenit L3 panels 35mm thick and plasterboard sheets	290	299	64	17
Wall covering on both sides with Celenit N panels 20 mm thick and double layer of plasterboard sheets	290	326	66	19
Wall covering on both sides with Celenit N panels 35 mm thick and double layer of plasterboard sheets	320	332	67	20
Wall covering on both sides with Celenit L3 panels 35 mm thick and double layer of plasterboard sheets	320	325	68	21

*Increase in sound insulation properties with Celenit panels.

Table 6 - Acoustic insulation of a wall in autoclaved aerated concrete, 8 cm thick

	Wall thickness mm	Weight kg/m²	Sound insulation Rw (dB)	Δ(dB)*
autoclaved aerated concrete wall – non insulated	80	58	35	-
Wall covering on both sides with Celenit panels N 40 mm thick and plasterboard sheets	205	115	53	18
Wall covering on both sides with Celenit panels N 40 mm thick and double layer of plasterboard sheets	230	135	60	25
Wall covering on both sides with Celenit panels N 40 mm thick and plasterboard sheets. 4 electrical boxes on both sides of the wall	205	115	52	17
Wall covering on both sides with Celenit panels N 40 mm thick and double layer of plasterboard sheets. Four electrical boxes on both sides of the wall	230	135	58	23

Figure 7
Insulation from floor noises. A continuous layer of Celenit N panels placed between the floor structure and the floor interrupts both noises transmitted through the floor and overhedad noises transmitted through the partition wall.

Figure 8
Acoustic insulation of a light wall in Celenit panels and plasterboard on metal structures.

Figure 9
Acoustic insulation of double metallic structure with Celenit N panels and plasterboard.

ACOUSTIC INSULATION BETWEEN FLOORS

Insulation of partition walls

The rigid contact between partition walls and floorings creates an acoustic bridge where noise is transmitted to lower floors and adjacent rooms. These transmissions can be interrupted by building partition walls on strips of 20 mm thick Celenit panels capable of supporting the weight of the partition without sagging, due to the strength and compression resistance of the panels (figure 6).
By building partitions over a continuous layer of panels, insulation can simultaneously be achieved against overhead and floor noises.

Insulation from floor noises

Floating floors on Celenit panels. The reduced level of floor noises for a 25 mm panel is equal to 22 dB (figure 7). By placing a layer of mineral wool under the layer of 25 mm Celenit panels, noise is reduced by 37 dB (DIN 4109), the highest possible level of reduction. However, a strip must be applied along the perimeter of the floor, measuring 20-25 mm in thickness and as high as the floor itself, in order to hinder the lateral transmission of impact noises.
Placing a continuous layer of Celenit panels between the floor structure and the floor does not only interrupt the transmission of sounds to lower floors, but also renders the floor temperature similar to that of the room, resulting in an increased sense of comfort.

ACOUSTIC INSULATION WITH LIGHT WALLS IN CELENIT - PLASTERBOARD

In the making of light walls, the combination of Celenit panels with plasterboard was shown to be very effective from the acoustic point of view. The Celenit panels are applied horizontally as covering on the load bearing structure and fixed with screws.
Between the uprights of the load bearing structure it is possible to place a further layer of Celenit panels or mineral wool. This is the solution that gives the best performance in terms of acoustic, thermal and fire resistance properties. The data for the different applications are shown in table 6.

Table 7 - Acoustic insulation of a light wall in Celenit panels and plasterboard on metal structures (figure 8)

	Wall thickness mm	Weight kg/m^2	Sound insulation Rw (dB)
Metallic structure covered on both sides with Celenit N panels 25 mm thick and plasterboard with cavity filled with mineral wool. Fire resistance of wall 2 hours	165	54	59
Metallic structure covered on one side with Celenit N panels 25 mm thick and plasterboard, and on the other side with Celenit N panels 50 mm thick and plasterboard with cavity filled with mineral wool. Fire resistance of wall 2 hours	190	60	59
Metallic structure covered on both sides with Celenit N panels 35 mm thick and plasterboard with cavity filled with mineral wool. Fire resistance of wall 2 hours	185	60	60
Metallic structure covered on both sides with Celenit N panels 50 mm thick and plasterboard with cavity filled with mineral wool. Fire resistance of wall 2 hours	215	65	61
Metallic structure covered on one side with Celenit N panels 25 mm thick and plasterboard, and on the other side with Celenit L3 panels 50 mm thick and plasterboard	190	54	56
Double metallic structure covered on both sides with Celenit N panels 25 mm thick and plasterboard with cavity filled with mineral wool and metal sheet. Anti-intrusion wall	200	63	59
Metallic structure covered on one side with two overlapping layers of Celenit N panels 20 mm thick and double layer of plasterboard, and on the other side with Celenit N panels 35 mm thick and double layer of plasterboard with cavity filled with mineral wool	235	87	65
First metallic structure covered on one side with two overlapping layers of Celenit N panels 25 mm thick and double layer of gypsum board, and on the other side with Celenit N panels 25 mm thick with cavity filled with mineral wool. Second metallic structure covered on one side with Celenit N panels 25 mm thick and double layer of plasterboard with cavity filled with mineral wool.	205	78	64
First metallic structure covered on one side with two overlapping layers of Celenit N panels 20 mm thick and double layer of plasterboard, and on the other side with Celenit N panels 20 mm thick with cavity filled with mineral wool. Second metallic structure covered on one side with Celenit N panels 50 mm thick and double layer of plasterboard with cavity filled with mineral wool. The distance between the two structures is 300 mm (figure 9)	645	108	70

Table 8 - Acoustic insulation of a double wall in autoclaved aerated concrete, 8+12 cm thick

	Wall thickness mm	Weight kg/m^2	Sound insulation Rw (dB)
Wall in autoclaved aerated concrete, 8+12 cm thick, insulated in the cavity with two overlapping layers of Celenit N panels 20 mm thick	260	191	55
Wall in autoclaved aerated concrete, 8+12 cm thick, insulated in the cavity with two overlapping layers of Celenit N panels 20 mm thick. Electrical groove and tree electrical boxes on both sides of the wall	260	191	55

Figure 1
Insulation of arcades in residential buildings using Celenit P2 facing panels mounted on metal profiles in adherence to the flooring.

Figure 2
Cellar of a one-family house: the first flooring is a predalle, insulated with 35mm Celenit N panels: acoustic and thermal insulation, some amount of finishing required. The wall was subsequently insulated with 35 mm Celenit P3 panels applied with screw anchors.

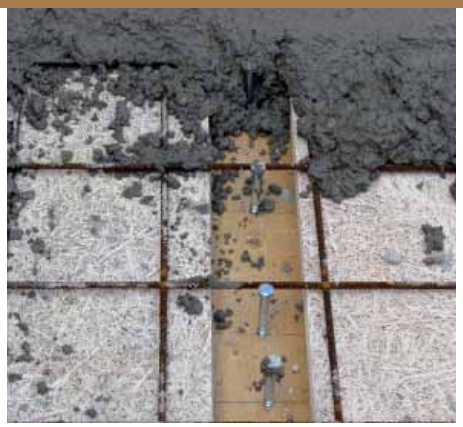


Figure 3
Celenit panels used as bottom formwork.

FLOORING INSULATION OVER CELLARS, ARCADES AND NON - HEATED AREAS IN GENERAL

This type of flooring disperses heat coming from heated rooms above. The correct form of insulation, from a physical point of view, is on the surface beneath. This avoids condensates, keeps the floor above warm and maintains the cellar cool.

In New Buildings

Celenit panels are used as a permanent formwork in on-site flooring casting or in the insulation of Predalle-type prefabricated floorings. When used this way, the panels can be left visible. Furthermore, the ceiling is ready after the dismantling stage, and can be painted or left its natural colour. The non-plastered panels carry out their function to the full as insulators against sounds produced on site (cars, boilers, noisy games, etc) and as fire retardants. They allow the user to save on the cost of plaster while still obtaining a pleasant visual effect.

In Existing Buildings

a) the panels are fixed with screws or nails to wooden laths fixed to the ceiling, spacing being equal to the width of the panel. The space between the laths can be filled with other insulators;
b) the panels are fixed directly onto the ceiling using screw anchors;
c) as regards open spaces, such as arcades in residential buildings, car parks, etc, where excessive flooring heat dispersion and low floor temperatures can create discomfort to those living in the apartments above, acoustic and thermal insulation is achieved by mounting the panels on a framework of metal profiles.

Heated Cellars - Wall Insulation

The walls of a cellar, which are generally made of reinforced concrete, must be insulated if the room is to be used. A very advantageous method of insulation consists in using panels as a permanent formwork on the internal and external surfaces, or even just on the internal surface if the room is only used occasionally. The external panels are to be treated with waterproofed mortar and covered with waterproofing membranes. Furthermore, it is advisable to use a layer of panels in order to prevent loose earth from scattering towards the scree placed as a protection of the wall. In existing buildings, the panels are fixed to the walls from the inside, using screw anchors.

Floor Insulation

In order to avoid excessive dispersion groundwards, the floor along the ground must be insulated. The panels are sunk in the floor casting or, in existing buildings, are placed on the floor with joggled joints and treated directly with the floor setting mortar.

CUTTING - STORING - USE

The panels are cut with a handsaw or a circular saw. They can be stored in the open. They must, however, be used dry and laid close to one another, pressing slightly, and with joggled joints. It is advisable to acclimatise the panels to room temperature by opening the stacks of panels and keeping them in the room for a few days before laying them. In the case of false ceilings and facings, keep some openings in order to balance the thermal-hygrometric state of both sides of the panels. Avoid overheating immediately after fitting the panels.

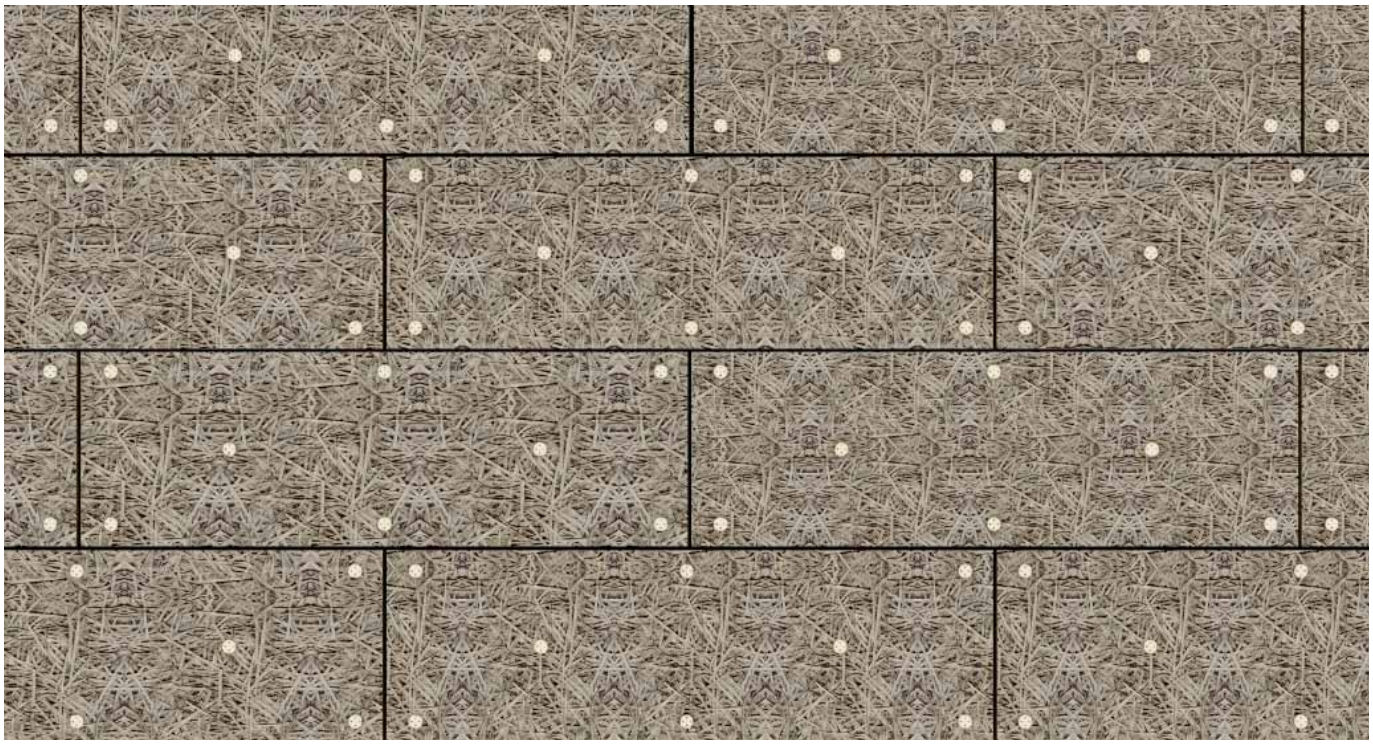
METHODS OF SECURING THROUGH ADHESION

Permanent formworks

The panels are placed inside the formworks and adhere to the concrete casting. Multi-layered Celenit P3, Celenit L3, Celenit G3, Celenit E3, Celenit F3 panels are laid on site with plastic and metal anchorage, 6 per panel, particularly when applied horizontally. The length of the anchorage is 40 mm greater than the panel depth.

Fixing with anchorages

The surface on which the panels are to be fixed (walls and floorings) must be flat and be able to carry a certain amount of weight. The panels are applied both internally and externally, using 8 anchorages per square meter which, in the case of plastic anchorages, penetrate the support by 50 mm and, in the case of metal anchorages, by 30 mm. Inside, if the panels are visible, the number of anchorages used can be reduced.

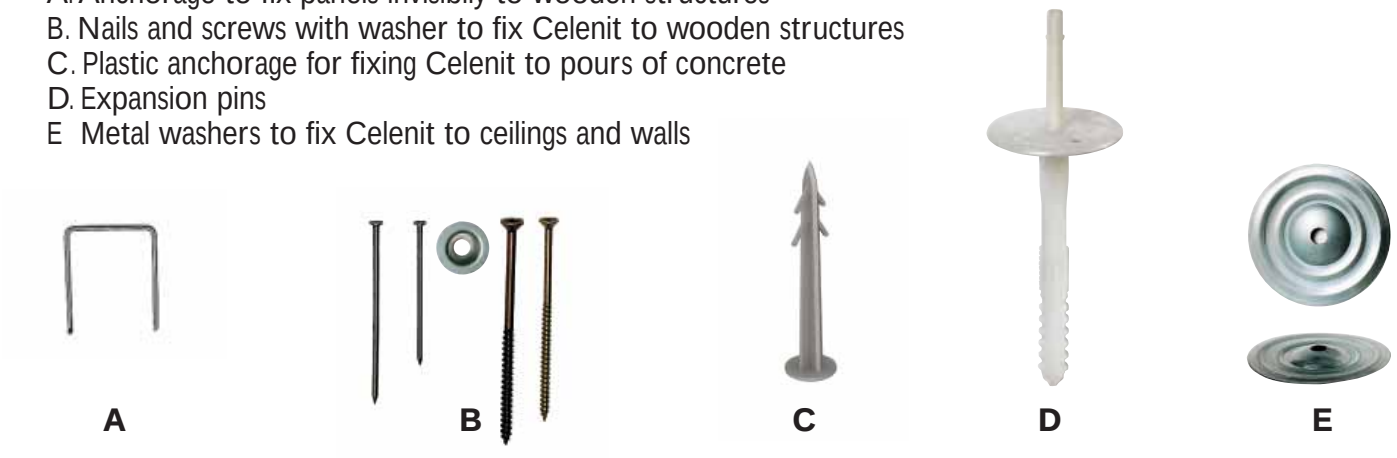


Fixing with mortar and binders

The panels can be fixed using cement mortar and sand and, inside, with binders for gypsum board. The mortar is applied to the panels in crosswise strips parallel to the short side, either 30 - 50 cm apart or per point (15 per square meter). The panels are then applied to the wall with a light pressure and, if necessary, fixed at the first fastening stage with 4 nails, one in each corner. The panels externally also need to be fixed with plugs. If the panels are then to be plastered, in order to avoid tension, a good consistency rendering of coarse-grained sand and cement must be applied as soon as the binding mortar dries.

PANEL FIXING PRODUCTS

A. Anchorage to fix panels invisibily to wooden structures
B. Nails and screws with washer to fix Celenit to wooden structures
C. Plastic anchorage for fixing Celenit to pours of concrete
D. Expansion pins
E Metal washers to fix Celenit to ceilings and walls



FIBERGLASS MESH

Fiberglass mesh, h: 100 cm for plaster

FIXING SYSTEMS ON PROFILES AND FRAMEWORKS

False ceilings and facings

The panels are inserted by their long side on metal profiles, which are fixed to the ceiling and walls according to the supplier's instructions. The crosswise joints are supplied rounded edges or covered with a metal profile.

Application on a wooden framework

The panels are fixed to the wooden structure using nails or screws with washers, 4 per bearing. In the absence of washers, the nails are applied crossways.
The size of the laths and the distance between them can be found in the table below.

Panels thickness mm	Laths mm	Intervening distance in walls mm	Intervening distance in ceilings mm
Celenit N, NB, A, AB			
20	50x30	400	400
25	50x30	500	500
30	50x30	670	500
35	60x40	670	500
40	60x40	670	500
50	60x40	1000	670
Celenit P3, G3, E3, F3			
35	50x30	670	500
50	60x40	1000	500

Application on metal structures

The intervening spaces and the number of fixing points are the same as for wooden structures (see table).

PANELS FINISHING

Visible panels
In false ceilings, in sound-absorbing facings and in floorings for cellars, garages, attics and mansards, the panels are left visible. This allows their sound-absorption and thermal-hygrometric regulation characteristics to be exploited to the full. The panels are supplied with different types of edges: square-edged, round-edged, leaf-edged and with particular processes for suspended false ceilings.

Gypsum board facings
This offers many advantages from a practical point of view and from the point of view of acoustic insulation and fire protection. Gypsum boards adhere to normal and multi-layered panels as they do to masonry walls. Therefore, the rules for fixing to walls apply for them. When Celenit R panels are used, the gypsum boards are fixed to the panel laths with screws.

Plaster facings
If plaster is to be applied, please note the following:
- panels with joggled joints must adhere perfectly to the support, and any cracks must be filled in with insulating foams, mineral wool or other similar products.
- the plaster must be applied to dry panels at the appropriate temperature ranges, in other words the temperature must not fall below
5 °C nor exceed 25-30 °C, in order to avoid cracking. Furthermore, the plaster must be protected from freezing temperatures and from direct sunlight.
- every layer of plaster must be dry and have fully set before the next layer is applied.

External plaster
As soon as they have been laid, the panels are covered, joints and all, with a coarse-grained sand and cement rendering (8mm deep). Then, it is necessary to wait until the rendering has fully set and slight signs of cracking appear (2-4 weeks). Then, the base layer of plaster, with a low content of cement (one shovel per concrete mixer), is applied to a thickness of at least 15mm. When the plaster has dried (a couple of weeks), a layer of plastic plaster, reinforced with fiber-glass mesh, is applied. In order to reduce heat tension, it is advisable to paint the finished structure a light colour.

Internal plaster
After a coarse-grained sand and cement rendering has been applied, wait until it has fully set and for slight signs of cracking to appear (2-4 weeks). The rendering (8 mm deep) must cover the entire surface, particularly the joints.
• Gypsum-based plaster: apply a 15 mm thick layer of gypsum-based plaster, reinforced on the surface with a glass-fibre net, to the dry rendering.
• Lime-based plaster: the same procedure as for external plaster applies - a layer of plastic plaster, reinforced with a glass-fibre net, is applied to the dried out base layer of plaster.

Premixed plaster
It is always advisable to apply premixed plaster, both for exteriors and interiors possessing the characteristics suitable for use on insulating materials. Please contact the company for further information in this regard.

Facing with tiles
Normal and multi-layered panels are fixed to the wall with 8 plugs. Next, they are covered all over with a galvanised metal net, and then with a 10mm thick coarse-grained sand and cement rendering. The tiles are applied when the rendering is dry.

Ventilated walls
A wooden lathing, fixed to the support, is placed on the panels. 25 mm panels are fixed to the strip and then plastered. This results in a traditional external appearance, considerable flexibility of adaptation, acoustic insulation and protection from fire.

OTHER APPLICATIONS

Recovery of damp walls

Celenit panels provide the most suitable solution to this problem for their transpiring and non-decaying properties. Intervention depends on the extent of the phenomenon:

- *Slightly damp walls*: covering of the walls with panels fixed with plugs;
- *Very damp walls*: fix the panels to a frame of treated wood or better a galvanised metal frame. Ventilation holes in the cavity are recommended.

The plaster applied to the panels must be highly transpiring.

Figure 1
Slightly damp wall

Figure 2
Very damp wall

Thermal and acoustic insulation covering for bath tubs and bathrooms

The panels are used as a covering on the surface of the supporting wall of the tub and as tiling to fill the rest of the exposed surface. For tubs sunk into the floor, the casing for the tub is covered in panels. Celenit panels act as thermal insulators and reduce the noise caused by water and plumbing. An effective acoustic insulation from the adjacent rooms can be obtained by covering the entire wall against which the tub is placed with Celenit panels, or even better covering all the walls and flooring to reduce transmission of noise to the lower floors.

FKDesign

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CELENIT NATURAL INSULATORS

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