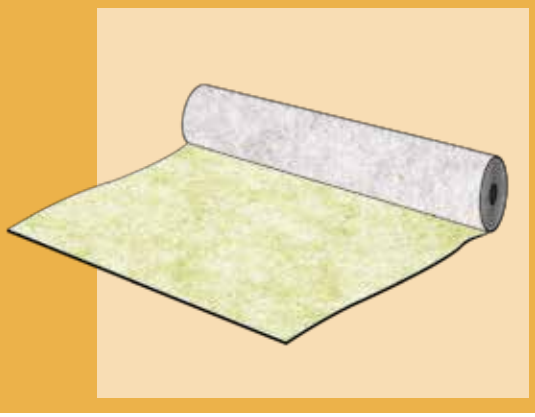


FONOSTOPBar

ACOUSTIC INSULATION FOR FOOT TRAFFIC NOISE REDUCTION, TWO LAYER, MULTIFUNCTIONAL, WITH HIGH PHONO-RESILIENCE AND MECHANICAL STRENGTH, FOR INDOORS AND OUTDOORS FLOATING FLOORS AND TO PROTECT AND SEGREGATE THE WATERPROOF COATING OF TERRACES

GRANTS *LEED* CREDITS

CHARACTERISTICS	ENVIRONMENTAL		
ACOUSTIC INSULATION	ECO GREEN	RECYCLABLE	SAFE WASTE

1 PROBLEM

The installation of resilient material between a floating screed, on which any type of flooring can be laid, and the load-bearing floor slab, reduces the spreading of impact noise or foot traffic noise (ΔL_w) and increases insulation against airborne noise (ΔR_w). It also represents the most flexible and effective insulation technique available. The levels of insulation against foot traffic noise imposed by DPCM dated 5th December 1997 (Premier's Decree) determine the need to avail of insulating materials of maximum efficiency but that are thin enough to be compatible with the parameters usually foreseen in the plans of the building. Furthermore, seeing as the acoustic specifications are measured on site, such insulation materials must also not move while laying the floorings. If these are then laid on rough supports or lightened yielding foundations, they must also be particularly resistant to the typical situations of major building sites where the material is subject to heavy traffic with little attention paid by the various builders.

2 SOLUTION

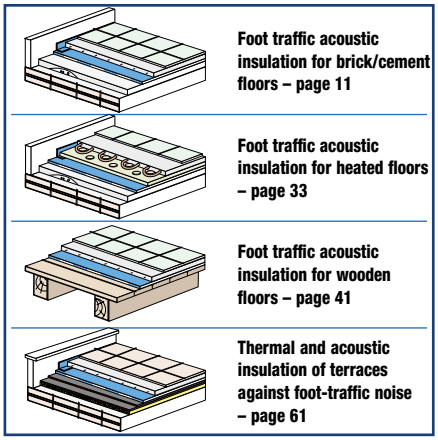
The need to increase perforation resistance of materials for insulating floor slabs against foot traffic noise with the "floating floor technique" is particularly strong in major work sites, but this often translates into an increase of the material's dynamic stiffness, which consequently leads to a reduction in the insulating properties.

INDEX has designed a new insulation product against foot traffic noise, named **FONOSTOPBar**. It is light (about 1 kg/m^2), but offers high mechanical resistance, privileging resistance to punching. Moreover, in addition to increasing resistance to static punching, in order also to increase resistance to dynamic punching, the elasticity of the material had to be increased. This simultaneously resulted in the beneficial effect of achieving an optimum dynamic stiffness to such an extent to also obtain high acoustic insulation performance, superior to most of the rival materials on the same market section.

FONOSTOPBar is INDEX's new acoustic insulation product against foot traffic noise. It is supplied in rolls. Its top face consists of a thin protective foil in non-woven thermally fixed polyester fabric. This foil is a protective barrier against stress caused by site traffic and laying procedures of the screed on lightened, yielding foundations, but is also a shield against perforation caused by the roughness of the floor slab if laying in a double face-opposite-face layer. The bottom face is made up of a sound-resilient layer in non-woven polyester fabric with special "elastic needling", being an exclusive INDEX project, which guarantees that thickness is maintained under load and also an excellent elastic reaction.

The fibres are not irritant, they are flexible and

(See following)



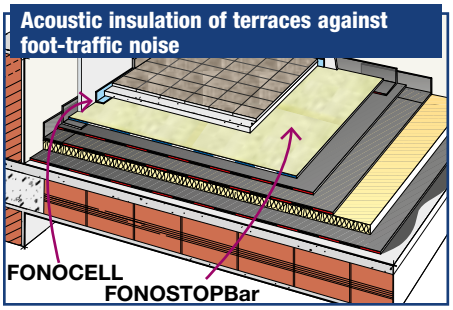
Foot traffic acoustic insulation for brick/cement floors – page 11

Foot traffic acoustic insulation for heated floors – page 33

Foot traffic acoustic insulation for wooden floors – page 41

Thermal and acoustic insulation of terraces against foot-traffic noise – page 61

Acoustic insulation of terraces against foot-traffic noise



METHOD OF USE AND PRECAUTIONS

SINGLE LAYER APPLICATIONS. The rolls of **FONOSTOPBar** are to be unrolled in their natural unrolling direction with the bottom face covered with softer non-woven fabric facing the laying surface. The **FONOSTOPBar** sheets should not be overlapped, but should be brought close to each other and the joining lines must always be sealed with adhesive SIGILTAPE. The sheets will cover the whole floor slab and are to be blocked and trimmed-off at the foot of the perimeter walls of the room to be insulated.

To insulate the floating screed from perimeter walls, the latter are to be lined with 10 cm of the extruded polyethylene separation self-adhesive FONOCELL strip, to limit the thickness of the screed, which will be turned over by 5 cm and glued on the insulation material laid on the floor slab where it will be further secured with adhesive SIGILTAPE.

Note. Make sure you lay FONOCELL on terraces only after the waterproof coat has been protected by a layer of plaster mortar reinforced with a metal net and make sure to seal the gap between the flooring and the skirting board with a flexible sealant.

DOUBLE LAYER APPLICATIONS. If you are installing **FONOSTOPBar** in a double layer, the first layer will be laid on site in the opposite direction to the natural unrolling direction of the roll, with the bottom face covered with softer non-woven fabric facing upwards.

The **FONOSTOPBar** sheets should not be overlapped, but should be brought close to each other. The sheets of the first layer will cover the whole floor slab and are to be blocked and trimmed-off at the foot of the perimeter walls of the room to be insulated but not sealed. The second layer will then be unrolled parallel with the first layer, in its natural unrolling direction, making sure to offset it to lay it over the joining lines of the first layer. The laying and sealing methods of the second sheet will be those already explained for the system laid in a single layer.

		FONOSTOPBar	
Average thickness under load of 200 kg/m² (3)	UNI 9947	approx. 4.5 mm	
Roll size		1.00 x 15.0 m	
Mass per unit area		1.1 kg/m²	
Impermeability	EN 1928	Passes the test	
Aqueous vapour diffusion coefficient (phonoresilient foil)		μ 30 000	
Thermal conductivity λ – of the non-woven fabric - of the phonoresilient foil		 0.045 W/mK 0.170 W/mK	
Specific heat.		1.30 KJ/kgK	
Thermal resistance R (1)		0.115 m² K/W	
Dynamic stiffness under a load of 200 kg/m² • FONOSTOPBar single layer • FONOSTOPBar double layer (2)	UNI EN 29052 p. 1°	Apparent dynamic stiffness s't = 9 MN/m³ s't = 5 MN/m³	Dynamic stiffness s' = 29 MN/m³ s' = 18 MN/m³
Compression tests under constant load of 200 kg/m² • FONOSTOPBar single layer • FONOSTOPBar double layer (2)	EN 1606	Reduced thickness ≤ approx. 1 mm ≤ approx. 1 mm	
Compressibility (determination of the thickness) • FONOSTOPBar single layer • FONOSTOPBar double layer (2)	EN 12431:2000	 ≤2 mm ≤3 mm	
Resistance to static loading	EN 13501-1	35 kg	
Resistance to impact		20 cm	

(1) Value established on the material subjected to a load of 1 KPa (100 kg/m²). (2) FONOSTOPBar laid in double layer with opposing white faces.
(3) Any variations in the thickness of the rolled product have no effect on its performance when installed.
The dynamic rigidity was calculated in their applied acoustics laboratory by INDEX after measurement of the dynamic rigidity and permeability to air.
✱ ***ATTENTION.*** Only the dynamic rigidity values marked in red are of value in making the calculation pursuant to EN 12354-2 and solely the transparent expression of both the apparent dynamic rigidity s't and the dynamic rigidity s' allow the designer to make a proper evaluation.

(See previous)

do not crumble when compressed or folded. **FONOSTOPBar** also has a high ultimate elongation rating, which enables it to adapt to uneven laying surfaces without breaking. **FONOSTOPBar** is supplied in rolls of 1×15 meters. The lining of the top face of the product prevents the liquid mortar - when the screed is laid - from encapsulating the fibres of the elastic non-woven fabric underneath. This would eliminate its insulating properties, while the free fibres of the fabric underneath adhere to the foundations and prevent the sheet from moving when the upper layers are being laid, thus guaranteeing the certainty of correct laying on site.

THEORETICAL ESTIMATE OF THE REDUCTION LEVEL IN FOOT TRAFFIC NOISE

Example of simplified calculation method TR UNI 11175 - (Guide to the UNI EN 12354 standards for predicting the acoustic performance of buildings) for 20+4 FLOOR SLAB IN CLAY CEMENT 300 kg/m² + LIGHTWEIGHT SCREED OF DENSITY 300 kg/m³ (thickness 10 cm): Total mass per unit area m'=330 kg/m²

$L_{n,w\,eq}$ = 164 - 35 log m = 76 dB

		FONOSTOPBar single layer	FONOSTOPBar double layer
SCREEDS WITH SURFACE DENSITY m'=100 kg/m²	$f_o = 160\sqrt{\frac{s'}{m'}}$	= 86 Hz	= 68 Hz
Calculation of the f_o resonance frequency of the floating screed system, resilient layer:	$\Delta L_w = 30\ \mathrm{Log}\left(\frac{f}{f_o}\right) + 3$ where f = 500 Hz (of reference)	= 26 dB	= 29 dB
	$L_{n,w} = L_{n,w\,eq} - \Delta L_w + K$ where K = 3	**$L_{n,w}$ = 53 dB**	**$L_{n,w}$ = 50 dB**

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