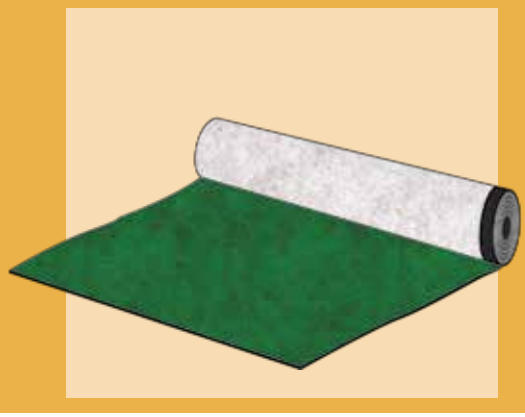


FONOSTOPAct

ACOUSTIC INSULATION FOR FOOT TRAFFIC NOISE REDUCTION, TWO LAYER, WITH HIGH PHONO-RESILIENCE, FOR INDOORS AND OUTDOORS FLOATING FLOORS

GRANTS *LEED* CREDITS

CHARACTERISTICS	ENVIRONMENTAL		
ACOUSTIC INSULATION	ECO GREEN	RECYCLABLE	SAFE WASTE

1 PROBLEM

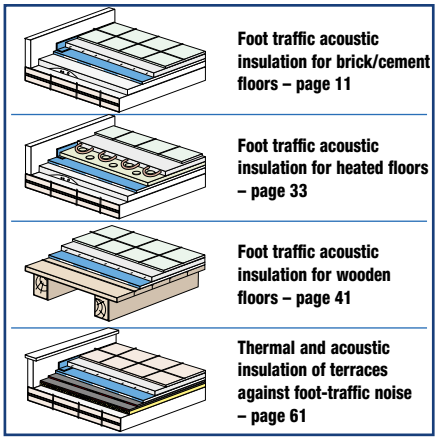
The installation of resilient material between a floating screed, on which any type of flooring can be laid, and the load-bearing floor slab, reduces the spreading of impact noise or foot traffic noise (ΔL_w) and increases insulation against airborne noise (ΔR_w). It also represents the most flexible 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 be compatible with the real situation of the building site; they consequently must be resistant to the noise of men and equipment and they must not move while the floorings are laid.

2 SOLUTION

FONOSTOPAct is an acoustic insulation product against foot traffic noise made up of a sound-resistant foil coupled with a sound-resilient non-woven polyester fabric obtained with a special "elastic needling" procedure, being an exclusive INDEX project. The sound-resistant foil is a seamless waterproof and airtight element, which optimises acoustic performance by filling-in pores that may occur in the building work, through which airborne noise would spread, consequently re-establishing continuity, being an appreciated feature especially in discontinuously laid floors. The foil also stops the fresh cement grout, spread over the insulation material when creating the screed, from encapsulating the fibres of the non-woven fabric, which would consequently eliminate its elastic properties. The non-woven fabric is an elastic separation layer between rigid elements, screed and floor slab, which reduces the transmission of vibrations caused by foot traffic on the paved floating screed and also vibrations of the screed induced by airborne noise deriving from various sound sources such as voices, radios, televisions, etc. The fibrous nature of the non-woven fabric, even if very thin, represents another element that favours the insulating capacities of the material also against airborne noise that closed cell insulating materials do not offer. The fibres are not irritant, they are flexible and do not crumble when compressed or folded. The sound-resilient non-woven fabric acts as a spring in the physical "spring-mass" system model, in which a mass, being the floating screed, is loaded on a spring, being the sound-resilient fabric, resting on a rigid support, being the load-bearing floor slab. The relatively low unit load of the floating screed (0.008÷0.012 kg/cm^2) means that materials commonly defined to be elastic, such as rubber sheeting, in the specific case, have excessive dynamic stiffness, making them inadequate to absorb vibrations generated by foot traffic on the screeds whereas, within specifically defined limits of non-excessive compressibility, softer materials such as **FONOSTOPAct** have the just dynamic stiffness which is proportioned with the low unit load of the screed.

FONOSTOPAct is resistant to both site traffic during laying and to the perforating action of rough parts of irregular foundations under the load of the floating

(See following)



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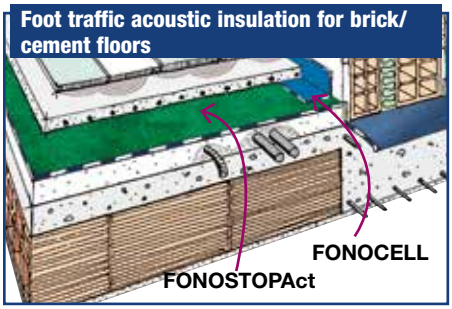
Foot traffic acoustic insulation for heated floors – page 33

Foot traffic acoustic insulation for wooden floors – page 41

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

Foot traffic acoustic insulation for brick/cement floors



METHOD OF USE AND PRECAUTIONS

SINGLE LAYER APPLICATIONS. The rolls of **FONOSTOPAct** are to be unrolled in their natural unrolling direction with the top green face facing upwards and are to be overlapped at the sides by arranging the overlap wing on the adjacent sheet and carefully matching-up the non-woven fabric of the faces underneath. On the short side, the sheets are not overlapped but carefully brought together end-to-end. 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. All the longitudinal overlapping lines and the transversal joining lines of the sheets are then to be carefully sealed with the special adhesive SIGILTAPE, stuck over the same. 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 **FONOSTOPAct** in a double layer, make sure the first layer will be laid on site in the opposite direction to the natural unrolling direction of the roll, with the top green face facing the floor slab and the white face facing upwards. Overlap the sheets lengthwise along the overlap strip and bring the ends of the sheets together without overlapping them; 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, with the top green face facing upwards, 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 system A laid in a single layer.

FONOSTOPAct

Average thickness under load of 200 kg/m² (3)	UNI 9947	approx. 5 mm	
Roll size		1.05 x 10.0 m	
Mass per unit area		1.2 kg/m²	
Impermeability	EN 1928	1 KPa	
Aqueous vapour diffusion coefficient (phonoresilient foil)		μ 100 000	
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)		0.130 m² K/W	
Dynamic stiffness under a load of 200 kg/m² • FONOSTOPAct single layer • FONOSTOPAct double layer (2)	UNI EN 29052 p. 1°	Apparent dynamic stiffness s't = 7 MN/m³ s't = 4 MN/m³	Dynamic stiffness s' = 27 MN/m³ s' = 14.5 MN/m³
Compression tests under constant load of 200 kg/m² • FONOSTOPAct single layer • FONOSTOPAct double layer (2)	EN 1606	Reduced thickness ≤ approx. 1 mm ≤ approx. 1 mm	
Compressibility (determination of the thickness) • FONOSTOPAct single layer • FONOSTOPAct 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) FONOSTOPAct 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)

screed in the work phase. Even if it is light in weight, it is heavy enough and has such a strong "grip" (adherence to the laying surfaces) that it does not move under site traffic. **FONOSTOPAct** is the outcome of research activities of Index in the field of acoustic insulation. It is designed meticulously for the specific purpose for which it is to be used and does not derive from rejects of other production cycles or from the adaptation of materials conceived for other applications. The waterproofing and air-tightness of the sound-resistant foil, the elasticity of the non-woven sound-resilient fabric, gauged based on the weight of the screed, the mass per unit area of the just weight, the grip of the fabric on the laying surface, combined with a good resistance to static and dynamic punching, are all features of **FONOSTOPAct**, which added to correct laying on site, contribute in satisfying the limits imposed by the Italian Premier's Decree dated 5th December 1997. **FONOSTOPAct** is produced in rolls of 10×1.05 meters. The sound-resistant foil of the top face, which is lined with a green textile finish, is 5 cm longer than the white non-woven sound-resilient fabric of the bottom face; this is done to create an overlap wing, which protects the side joining line of the sheets against the intrusion of cement mortar of the screed, which would otherwise create an acoustic bridge once it sets hard.

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

		FONOSTOPAct single layer	FONOSTOPAct double layer
SCREEDS WITH SURFACE DENSITY m'=100 kg/m²	$f_o = 160\sqrt{\frac{s'}{m'}}$	= 83 Hz	= 61 Hz
Calculation of the f_o resonance frequency of the floating screed system, resilient layer:	$\Delta L_w = 30 \log\left(\frac{f}{f_o}\right) + 3$ where f = 500 Hz (of reference)	= 26 dB	= 30 dB
	$L_{n,w} = L_{n,w\,eq} - \Delta L_w + K$ where K = 3	$L_{n,w}$ = 53 dB	$L_{n,w}$ = 49 dB

index Construction Systems and Products
Via G. Rossini, 22 - 37060 Castel D'Azzano (VR) - Italy - C.P.67
T. +39 045 8546201 - F. +39 045 518390
Internet: www.index-spa.com
Informazioni Tecniche Commerciali tecom@indexspa.it
Amministrazione e Segreteria index@indexspa.it
Index Export Dept. index.export@indexspa.it

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