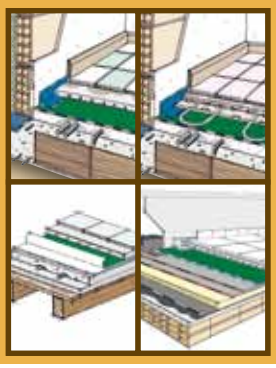
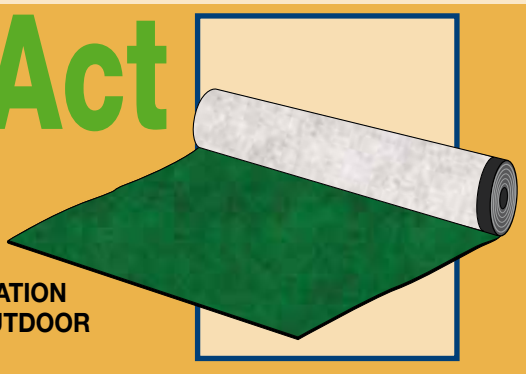


FONOSTOPAct



DOUBLE LAYER HIGHLY RESILIENT ACOUSTIC INSULATION AGAINST FOOT TRAFFIC NOISE FOR INDOOR AND OUTDOOR FLOOR SLABS WITH FLOATING FLOOR

CHARACTERISTICS	IMPACT ON THE ENVIRONMENT		
ACOUSTIC INSULATION	ECO GREEN	RECYCLABLE	NON-DANGEROUS WASTE

PROBLEM

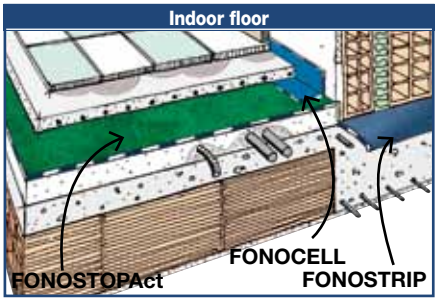
The installation of resilient material between the floating screed, on which any type of flooring can be laid, and the load-bearing floor slab, reduces the spreading of impact noise or foot traffic noise (ΔL_w) and increases insulation against airborne noise (ΔR_w). It also represents the most flexible and effective insulation technique available.

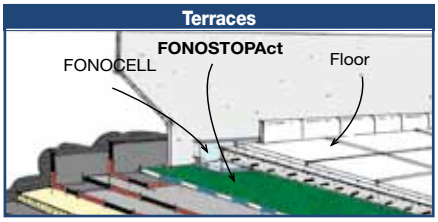
The levels of insulation against foot traffic noise imposed by DPCM dated 5th December 1997 (Premier's Decree) determine the need to avail of insulating materials of maximum efficiency but that are thin enough to be compatible with the parameters usually foreseen in the plans of the building. Furthermore, 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.

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 air-tight 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/cm²) 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 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 1,05×10 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.





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 are 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

Thickness	7,5 mm approx	
Roll size	1,05×10,00 m	
Mass per unit area	1,5 kg/m² approx	
Heat capacity per unit area (1)	1,620 KJ/m²K	
Thermal resistance **R**	0,130 m² K/W (2)	
Dynamic stiffness • FONOSTOPAct monostrato • FONOSTOPAct doppio strato (3)	Apparent dynamic stiffness s'_t = 7 MN/m³ s'_t = 4 MN/m³	Dynamic stiffness s' = 27 MN/m³ s' = 14,5 MN/m³
Theoretical estimate of the reduction level in foot traffic noise (4) • FONOSTOPAct single layer • FONOSTOPAct double layer	 ΔL_w = 26 dB ΔL_w = 30 dB	
Compression tests under constant load of 200 kg/m² (EN 1606) • FONOSTOPAct single layer • FONOSTOPAct double layer (3)	Reduction of thickness ≤1 mm ca. ≤1 mm ca.	
Compression capability (EN 12431:2000 - Determination of thickness) • FONOSTOPAct single layer • FONOSTOPAct double layer (3)	 ≤2 mm ≤3 mm	
Resistance • to impact (EN 12730) • to static loading (EN 12691)	 35 kg 20 cm	
Impermeability (EN 1928)	1 KPa	
Aqueous vapour diffusion coefficient	μ = 80.000	
Thermal conductivity coefficien λ • Non-woven fabric • phonoresilient foil	 0,045 W/mK 0,170 W/mK	

(1) Apparent value obtained by calculating values of every component expressed per unit area of whole product (m²) (2) Value established on the material subjected to a load of 1 KPa (100 kg/m²) (3) FONOSTOPAct laid in a double layer with white faces set opposite each other. (4) Simplified calculation method TR UNI 11175 (Guide to the Standards of the UNI EN 12354 series for predicting the acoustic performance of buildings) for screeds with surface density of 100 kg/m²

WARNING: only the dynamic stiffness values **s'**, ringed in red, are values useful for an estimate calculation conforming to standard EN 12354-2.

The dynamic stiffness was calculated in the Applied Acoustics Laboratory of INDEX S.p.A., after measuring dynamic stiffness and air permeability.

MODULAR ACOUSTIC INSULATION AGAINST FOOT TRAFFIC NOISE

With rigid cement floor slabs, in the most frequently encountered cases, just one layer of **FONOSTOPAct** is sufficient to respect the limits imposed by the decree for residential buildings and hotels, whereas for superior requirements, the insulation effectiveness can be increased by laying two layers of **FONOSTOPAct**.

THEORETICAL ESTIMATE OF THE REDUCTION LEVEL IN FOOT TRAFFIC NOISE

Example of simplified calculation method
TR UNI 11175 - (Guide to the Standards of UNI EN 12354 series for predicting the acoustic performance of buildings) for
FLOOR SLAB of 20+4 IN CLAY-CEMENT MIX OF 300 kg/m²
LIGHTENED FOUNDATION WITH DENSITY OF 300 kg/m³
thickness 10 cm ($L_{n,w,eq}$ = 76 dB)
SCREEDS WITH SURFACE DENSITY **m'**=100 kg/m²

Calculation of the **fo** resonance frequency of the floating screed system, resilient layer:

FONOSTOPAct single-layer

$$fo = 160\sqrt{\frac{s'}{m'}} = 160\sqrt{\frac{27}{100}} = 83 \text{ Hz}$$

$$\Delta L_w = 30 \text{ Log } (\frac{f}{fo}) + 3 = \mathbf{26\ dB}$$

where **f** = 500 Hz (of reference)

$$L_{n,w} = L_{n,w,eq} - \Delta L_w + K \quad \text{where } K = 3$$

$$L_{n,w} = \mathbf{53\ dB}$$

FONOSTOPAct double-layer

$$fo = 160\sqrt{\frac{s'}{m'}} = 160\sqrt{\frac{14,5}{100}} = 61 \text{ Hz}$$

$$\Delta L_w = 30 \text{ Log } (\frac{f}{fo}) + 3 = \mathbf{30\ dB}$$

where **f** = 500 Hz (of reference)

$$L_{n,w} = L_{n,w,eq} - \Delta L_w + K \quad \text{where } K = 3$$

$$L_{n,w} = \mathbf{49\ dB}$$

ANIT Associated

The data in this publication is the result of laboratory tests or observations on site and this does not guarantee the repeatability of the results in equivalent systems.

• FOR ANY FURTHER INFORMATION OR ADVICE ON PARTICULAR APPLICATIONS, CONTACT OUR TECHNICAL OFFICE • IN ORDER TO CORRECTLY USE OUR PRODUCTS, REFER TO INDEX TECHNICAL SPECIFICATIONS •

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Internet: **www.indexspa.it**
e-mail Index Export Dept.: **index.export@indexspa.it**

Via G. Rossini, 22 - 37060 Castel D'Azzano (VR) - Italy - C.P.67 - Tel. (+39)045.8546201 - Fax (+39)045.512444