VALIDATION REPORT No. 380919

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issued by Istituto Giordano

Customer

AERCEL MATERIALI ESPANSI CELLULARI S.p.A.

Via Gaetano Giordani, 2 - 40054 BUDRIO (BO) - Italy

Item*

resilient insulation blanket named "FONOSPHERA PV50"

Activity

evaluation of the impact sound pressure level reduction capability

(*) according to that stated by the customer.

Bellaria-Igea Marina - Italy, 17 March 2021

Chief Executive Officer
(Dott. Arch. Sara Lorenza Giordano)

Firmato digitalmente da SARA LORENZA GIORDANO

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87267

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Istituto Giordano S.p.A. - Blocco 3 - Via Verga, 19 - 47043 Gatteo (FC) - Italy

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Description of item*

The item under examination is a resilient insulation blanket called "FONOSPHERA PV50", having a studded surface placed in direct contact with the floor, maximum nominal thickness 10 mm, minimum nominal thickness 5 mm, a composite laminate formed by closed-cell cross-linked polyethylene, density 30 kg/m³, and non-woven fabric, grammage 120 g/m².

Photo of some test specimens

Criteria provided by the normative references

Standard UNI EN 12354-2:2002 dated 01/11/2002 "Building acoustics - Estimation of acoustic performance of buildings from the performance of elements - Impact sound insulation between rooms" contains a method for estimating the reduction of the impact sound pressure for floors covered with a floating floor.

The simplified version of this calculation model predicts the weighted normalized impact sound pressure level on the basis of weighted values of the elements involved, determined in accordance with the weighting procedure of standard UNI EN ISO 717-2:2007 dated 19/07/2007 "Acoustics - Rating of sound insulation in buildings and of building elements - Part 2: Impact sound insulation". Its application is restricted to rooms above each other and a homogeneous basic floor construction.

The weighted normalized impact sound pressure level "$L'_{n,w}$" is obtained by using the following relation:

$$L'_{n,w} = L'_{n,w}\,(\text{floor}) - \Delta L_w + K\ [\text{dB}]$$

where: $L'_{n,w}$ (floor) = Sound pressure level of floor without improvement measures, in dB;

ΔL_w = weighted reduction of impact sound pressure level due to insertion of the resilient material, in dB;

K = correction for the impact sound transmission over the homogeneous flanking constructions in dB.

The term "ΔL_w", weighted reduction of impact sound pressure level of a floating floor, depends on the mass per unit area of the floating mass and the dynamic stiffness of the resilient layer.
Standard UNI EN 12354-2:2002 includes an empirical estimate of this term as a function of the mass per unit area of the floating mass "m'", in kg/m², and dynamic stiffness of the resilient layer "s'", in MN/m³.

Calculation procedure

In September 2008, a set of experimental measurements were carried out on the test specimen, leading to the publication of the following documents.

- test report No. 246461 issued by this Institute on 10/10/2008 that provides the results of the apparent dynamic stiffness measurement carried out on the material; the measurement was carried out after preloading the specimen with approx. 100 kg/m², providing an average apparent dynamic stiffness value of 20 MN/m³;
  the item under examination is a closed-cell plastic and therefore its airflow resistivity is greater than 100 kPas/m². Under these circumstances, the normative reference UNI EN 29052-1:1993 dated 30/11/1993 "Acoustics. Determination of dynamic stiffness. Materials used under floating floors in dwellings" ensures that the measured apparent dynamic stiffness is equivalent to the total dynamic stiffness of the installed resilient material, this last-named physical quantity being useful for estimating the impact sound reduction.
- test report No. 246464 issued by this Institute on 13/10/2008 that gives the results of impact sound insulation measurements carried out on two different configurations of a separating floor covered with fired tiles between two unfurnished rooms above each other fitted with doors and windows and intended for use as living accommodation. The results will be used to assess the effects of installing on the existing floor a dry-laid gypsum fibreboard covering, surface density approx. 40 kg/m² , following insertion of the resilient material in question;
  the following results were obtained:
  - sound pressure level "$L'_{n,w}$" of existing floor without covering = 79 dB;
  - sound pressure level "$L'_{n,w}$" of floor after installation of dry-laid covering = 57 dB.

In the case in question the input variables are:

- dynamic stiffness of the resilient layer = 20 MN/m³;
- mass per unit area of the dry floor = 40 kg/m².

In this respect, the empirical estimate of standard UNI EN 12354-2:2002 provides a value for ΔL_w of approx. 25 dB:

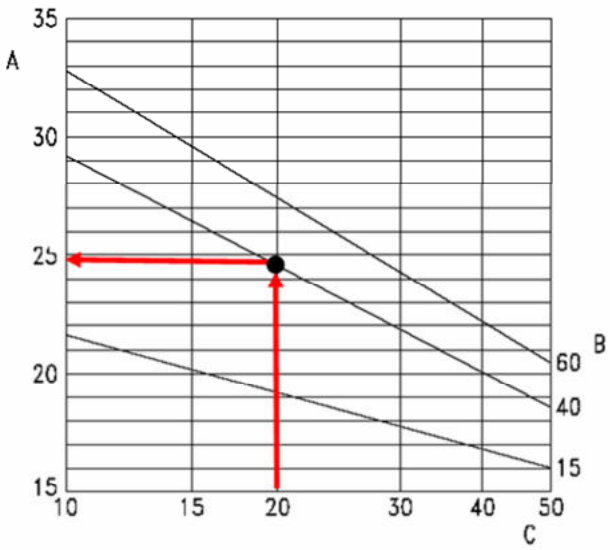
Weighted reduction of impact sound pressure level for asphalt floating floors or dry floating floor constructions

Legend

A Weighted impact sound reduction index ΔL_W in dB

B Mass per unit area of the floating floor in kg/m^2

C Dynamic stiffness per unit area *s'* of the resilient layer in MN/m^3



Assuming a realistic correction for impact sound transmission to be 3 dB, the measurement taken as part of test report No. 246464 issued by this Institute on 13/10/2008 fully supports the previous estimate.

$L'_{n,w} = L'_{n,w}$ (floor) - ΔL_w +K			
$L'_{n,w}$	**$L'_{n,w}$ (floor)**	**ΔL_w**	**K**
57 dB	79 dB	25 dB	+3 dB

Having obtained the model's empirical validation, we can predict the effectiveness of the resilient layer if covered by a standard cement screed of thickness 50 mm and mass per unit area approx. 100 kg/m²:

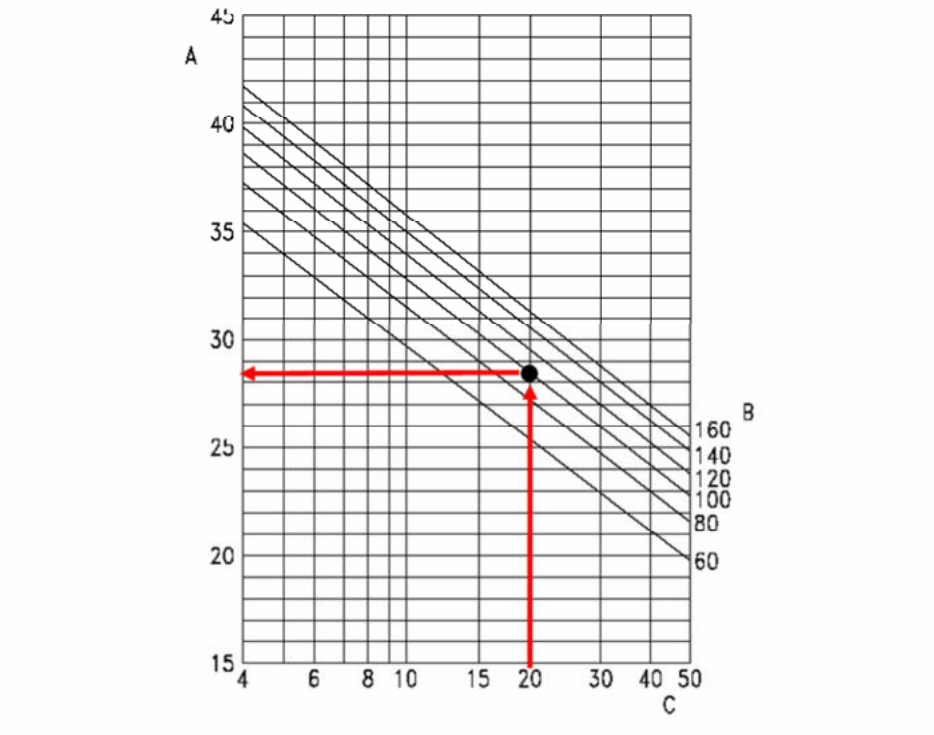
Weighted reduction of impact sound pressure level for floating floor screeds made of sand/cement or calcium sulfate

Legend

A Weighted impact sound reduction index ΔL_W in dB

B Mass per unit area of the floating floor in kg/m^2

C Dynamic stiffness per unit area *s'* of the resilient layer in MN/m^3



If using a cement screed of approx. thickness 50 mm, the empirical estimate proposed by the simplified method of standard UNI EN 12354-2:2002 assigns the resilient layer a weighted reduction of impact sound pressure level "ΔL_w" of approx. 28 dB.