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SPECIALISTI IN RICERCA E CERTIFICAZIONE DAL 1959

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RICONOSCIMENTI UFFICIALI:

- MINISTERO LAVORI PUBBLICI: Legge 1086/71 con D.M. 27/11/82 n. 22913 "Prove sui materiali da costruzione".
- MINISTERO INDUSTRIA COMMERCIO ARTIGIANATO: D.M. 09/11/89 "Certificazione CE per le unità da dipinto".
- MINISTERO INDUSTRIA COMMERCIO ARTIGIANATO: D.M. 31/10/91 "Certificazione CEE delle emissioni sonore di macchine da cantiere".
- MINISTERO INDUSTRIA COMMERCIO ARTIGIANATO: D.L. 27/01/92 N. 135 "Certificazione CEE delle emissioni sonore di macchine di movimento terra".
- MINISTERO INDUSTRIA COMMERCIO ARTIGIANATO: D.M. 08/07/93 "Certificazione CEE concernente la sicurezza dei giocattoli".
- MINISTERO INDUSTRIA COMMERCIO ARTIGIANATO: D.M. 30/07/97 "Certificazioni ed attestati di conformità CEE per il rendimento delle caldaie ad acqua calda alimentare con combustibili liquidi o gassosi".
- MINISTERO INDUSTRIA COMMERCIO ARTIGIANATO: Notifica n. 75780 del 15/12/98 "Certificazione CEE per gli apparecchi a gas".
- MINISTERO INDUSTRIA COMMERCIO ARTIGIANATO e MINISTERO LAVORO E PREVIDENZA SOCIALE: D.M. 09/07/93 "Certificazione CEE in materia di recipienti semplici a pressione".
- MINISTERO INDUSTRIA COMMERCIO ARTIGIANATO e MINISTERO LAVORO E PREVIDENZA SOCIALE: D.M. 04/08/94 "Certificazione CEE sulle macchine".
- MINISTERO INDUSTRIA COMMERCIO ARTIGIANATO: "Incarchi di verifica della sicurezza e conformità dei prodotti nell'ambito della sorveglianza sul mercato e tutela dei consumatori".
- MINISTERO INDUSTRIA COMMERCIO ARTIGIANATO: D.M. 02/04/98 "Rilascio di attestazioni di conformità delle caratteristiche e prestazioni energetiche dei componenti degli edifici e degli impianti".
- MINISTERO INTERNO: Legge 81/84 e D.M. 26/03/85 con autorizzazione del 21/03/86 "Prove di reazione al fuoco secondo D.M. 26/06/84".
- MINISTERO INTERNO: Legge 81/84 e D.M. 26/03/85 con autorizzazione del 10/07/86 "Prove di resistenza al fuoco secondo Circolare n. 91 del 14/09/81".
- MINISTERO INTERNO: Legge 81/84 e D.M. 26/03/85 con autorizzazione del 03/07/82 "Prove di resistenza al fuoco secondo Circolare n.7 del 02/04/91 e norma CNVVF/CCI UNI 9725".
- MINISTERO INTERNO: Legge 81/84 e D.M. 26/03/85 con autorizzazione del 12/04/88 "Prove su estintori d'incendio portatili secondo D.M. 20/12/82".
- MURST (MINISTERO UNIVERSITÀ E RICERCA SCIENTIFICA E TECNOLOGICA): Legge 46/82 con D.M. 09/10/85 "Immissione nell'elenco dei laboratori autorizzati a svolgere ricerche di carattere applicativo a favore delle piccole e medie industrie".
- MINISTERO PUBBLICA ISTRUZIONE: Protocollo n. 116 del 27/03/87 "iscrizione allo Schedario Anagrafe Nazionale delle ricerche con codice N. E949019".
- SINCERT (Accreditamento Organismi Certificazione): Accredimento n. 057A del 19/12/00 "Organismo di certificazione di sistemi qualità".
- SINAI (Sistema Nazionale per l'Accreditamento di Laboratori): Accredimento n. 0021 del 14/11/91.
- SIT (Servizio di Taratura in Italia): Accredimento n. 20 "Centro SIT di taratura per grandezze termometriche ed elettriche".
- ICI (Istituto di Certificazione Industriale per la Meccanica): "Prove di laboratorio nell'ambito degli schemi di Certificazione di Prodotto".
- IMQ (Istituto per il Marchio Qualità): "Prove di laboratorio nell'ambito degli schemi di Certificazione di Prodotto per carne fumata".
- UNCSAAL (Unione Nazionale Costruttori Serramenti Alluminio Acciaio Leghe): Riconoscimento del 26/03/85 "Laboratorio per le prove di certificazione UNCSAAL su serramenti e facciate continue".
- UNI (Ente Nazionale Italiano di Unificazione - Settore Certificazione): "Prove di laboratorio nell'ambito degli schemi di Certificazione di Prodotto per termocammetti a legna con fluido a circolazione forzata e serramenti esterni".

PARTECIPAZIONI ASSOCIATIVE:

- AIA: Associazione Italiana di Acustica.
- AICARR: Associazione Italiana Condizionamento dell'Aria Riscaldamento Refrigerazione.
- AICO: Associazione Italiana per la Qualità.
- AIPND: Associazione Italiana Prove non Distruttive.
- ALF: Associazioni Laboratori Italiani Fuoco.
- ALPI: Associazione Laboratori di Prova Independenti.
- ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning Engineers Inc.
- ASSINDUSTRIA: Associazione degli industriali di Rimini.
- ASTM: American Society for Testing and Materials.
- ATG: Associazione Tecnica Italiana del Gas.
- CTE: Collegio dei Tecnici della Industrializzazione Edilizia.
- CITI: Comitato Termotecnico Italiano.
- EARMA: European Association of Research Managers and Administrators.
- EARTO: European Association of Research and Technology Organisation.
- EGOLF: European Group of Official Laboratories for Fire Testing.
- UNI: Ente Nazionale Italiano di Unificazione.

CLAUSOLE

Il presente documento si riferisce solamente al campione o materiale sottoposto a prova.
"Il presente documento non può essere riprodotto parzialmente, salvo approvazione scritta del laboratorio".

TEST REPORT No. 185445

(this test report nullifies and replaces test report No. 179478 issued by Istituto Giordano on 23/01/2004)

Place and date of issue: Bellaria, 15/07/2004

Customer: SA.ME. S.r.l. - Via dell'Artigianato, 14 - 06083 BASTIA UMBRA (PG)

Date test requested: 05/12/2003

Order number and date: 26203, 15/07/2004

Date specimen received: 01/08/2003

Date test effected: 03/10/2003

Purpose of test: Determination of sound insulation of a wall in accordance with standards ISO 140 part 3, dated 1995 and ISO 717 part 1, dated 1996

Test site: Istituto Giordano S.p.A. - Blocco 3 - Via Verga, 19 - 47030 Gatteo (FC)

Specimen origin: supplied by Torninova S.r.l. - Via dell'Artigianato, 18/20 - 06083 Bastia Umbra (PG)

Specimen name *

The test specimen comprises a double masonry wall with interposed insulation, constructed using:

- hollow blocks size 19×29,5×18,5;



(*) according to data stated by the Customer

This test report consists of 9 sheets.

This document is the English translation of the test report No. 185445 of 15/07/2004 issued in Italian.

Date of translation: 08/11/2004.

Sheet
1 of 9



- "ISOLIVING" insulation;
- hollow blocks size 25×25×8.

Description of specimen*

The test specimen is a double masonry wall with interposed layer of "ISOLIVING" insulation.

The size specifications of the test specimen are as follows:

- overall nominal width = 3600 mm;
- overall nominal height = 3000 mm;
- overall nominal thickness = 350 mm;
- effective acoustic surface = 10,8 m².

More specifically, starting from the face exposed to the noise, the specimen consists of:

- conventional layer of cement-mortar plaster, thickness 15 mm;
- wall built from lightweight hollow blocks of size 19×29,5×18,5, with 54 perforations arranged as 12 stretcher courses, with the perforations pointing in the vertical plane and bonded with straight horizontal and vertical cement-mortar joints, having the following specifications:
 - nominal length = 295 mm;
 - nominal height = 185 mm;
 - nominal thickness = 190 mm;
 - percentage of hollow core = 40 - 45 %;
 - weight = approx. 9,5 kg;
- deal battens, size 25 × 50 mm, arranged lengthwise with centre-to-centre distance of 1200 mm and secured to the wall of hollow blocks size 19×29,5×18,5 by means of steel nails;
- "ISOLIVING" semi-rigid insulation formed by 2 sheets of externally-bonded air-bubble film, each of which is covered by aluminium foil and polyethylene applied by means of thermal lamination. More specifically, each sheet is formed by:
 - internal low-density polyethylene film, thickness 60 µm;
 - external low-density polyethylene film, thickness 90 µm;

(* according to that stated by the Customer)





- aluminium foil, thickness 25 μm , with an LDPE bonding layer, thickness 17 μm ;

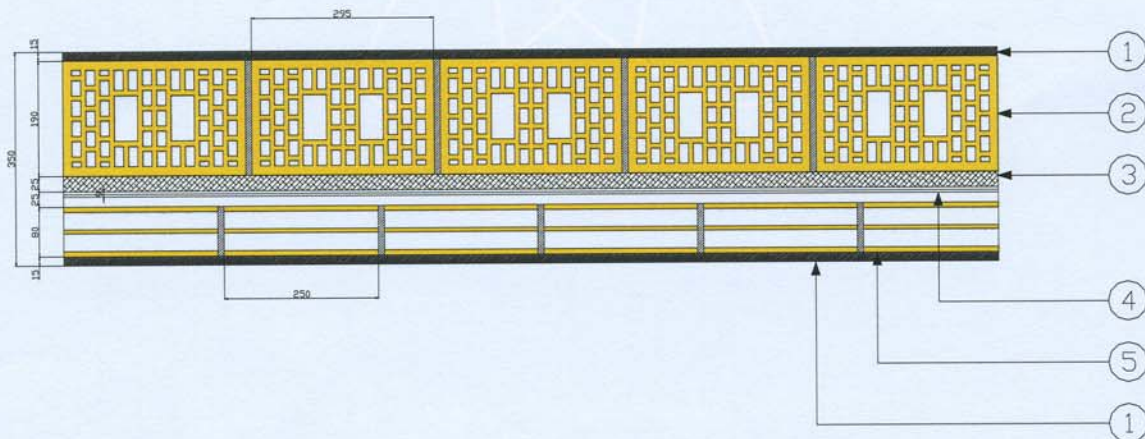
The size specifications of the insulation are as follows:

- nominal height of insulating layer = 1200 mm;
- overall nominal thickness = 9 mm;
- surface mass = approx. 500 g/m^2 ;

The semi-rigid insulation sheets are secured to the deal battens by means of steel staples and subsequently sealed together with aluminium tape;

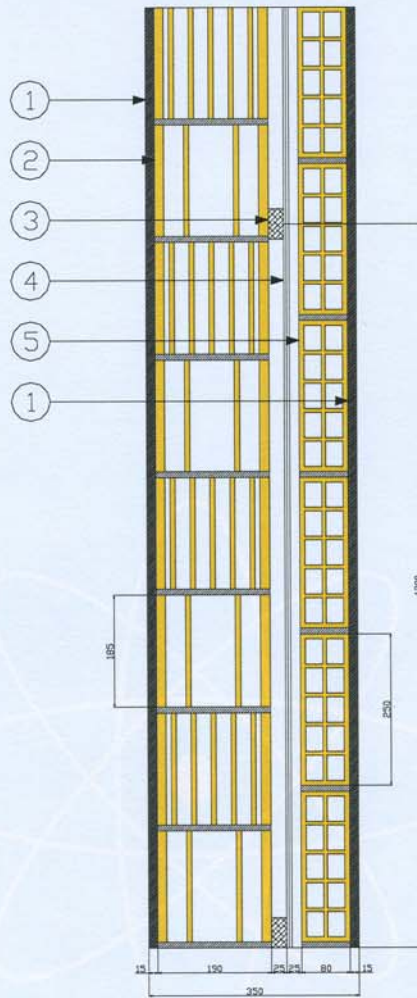
- wall built from upended hollow blocks of size 25 \times 25 \times 8, with 10 perforations arranged as 5 courses, with the perforations pointing in the horizontal plane and bonded with horizontal and vertical cement-mortar joints, having the following specifications:
 - nominal length = 250 mm;
 - nominal height = 245 mm;
 - nominal thickness = 80 mm;
 - weight = approx 3,0 kg;
- conventional layer of cement-mortar plaster, thickness 15 mm;

HORIZONTAL SECTION OF TEST SPECIMEN





VERTICAL SECTION OF TEST SPECIMEN



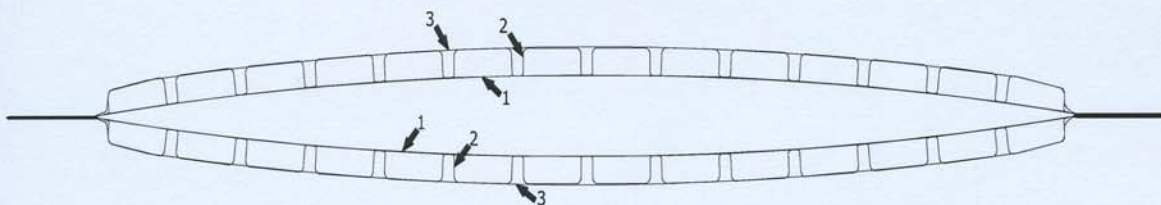
Symbol	Description
1	Conventional cement-mortar plaster, thickness 15 mm
2	Wall of hollow blocks of size 19×29,5×18,5, thickness 190 mm
3	Deal battens, size 25 × 50 mm
4	“ISOLIVING” insulation, thickness 9 mm
5	Wall of hollow blocks of size 25×25×8, thickness 80 mm



AB



CLOSE-UP OF INSULATION



Symbol	Description
1	Internal low-density polyethylene film, thickness 60 μm
2	External low-density polyethylene film, thickness 90 μm
3	Aluminium foil, thickness 25 μm , with an LDPE bonding layer, thickness 17 μm



Photo of test specimen during mounting



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Normative references

The test was carried out in accordance with the requirements of the following standards:

- ISO 140 part 3 dated 1995 "Acoustics. Measurement of sound insulation in buildings and of building elements. Part 3: Laboratory measurements of airborne sound insulation of building elements";
- ISO 717 part 1 dated 1996 "Acoustics. Rating of sound insulation in buildings and of building elements. Part 1: Airborne sound insulation in buildings and of interior building elements".

Test apparatus

The following equipment was used to carry out the test:

- LEM 1000 W power amplifier, model "ENERGY 2";
- omnidirectional acoustic diffuser;
- acoustic diffusers in receiving room;
- Applied Research & Technology Inc. 1/3-octave equaliser, model "HD-31";
- Brüel & Kjær 1/2" microphones - type "4192";
- Brüel & Kjær microphone preamplifiers - type "2669";
- 01 dB-Stell real-time analyser, model "Symphonie";
- Brüel & Kjær amplifier-signal conditioner, model "Nexus";
- Brüel & Kjær calibrator for microphone calibration - type "4231";
- complementary accessories.

Test method

The test environment consists of two rooms, one of which, known as "source room", contains the noise source, whilst the other, known as "receiving room", is characterised acoustically by the equivalent sound absorption area.





Having positioned the specimen in the opening between the two rooms of the test environment, the sound pressure level was measured at various frequencies within the range 100 Hz and 5000 Hz in both source and receiving room and the latter's reverberation times in the same operating range were recorded.

The single-number rating "R_w" of sound insulation "R" is equal to the value in dB of the reference curve at 500 Hz in accordance with the procedure laid down by standard ISO 717 part 1.

Sound insulation "R", equal to 10 times the common logarithm of the ratio between sound power incident on the specimen and sound power transmitted through the specimen, was calculated using the following formula:

$$R = L_1 - L_2 + 10 \cdot \log \frac{S}{A}$$

where: R = sound insulation, expressed in dB;

L₁ = average level of sound pressure in the source room, expressed in dB;

L₂ = average level of sound pressure in the receiving room, expressed in dB;

S = effective measuring surface of test specimen, expressed in m²;

A = equivalent sound absorption area of receiving room, expressed in m², in turn calculated using the following formula:

$$A = \frac{0,16 \cdot V}{T}$$

where: V = receiving room volume, expressed in m³;

T = reverberation time, expressed in seconds.

Furthermore, as proposed by standard ISO 717 part 1, 2 adaptation terms have been calculated in dB that take account of the characteristics of certain source sound spectra, more specifically:

- adaptation term "C" to be added to single-number rating "R_w" with source spectrum for A-weighted pink noise;
- adaptation term "C_{tr}" to be added to single-number rating "R_w" with source spectrum for A-weighted traffic noise;





Environmental conditions during test

Average ambient temperature = 9 °C

Relative humidity = 40 %

Test results

Receiving room volume "V"	88,0 m ³
Effective measuring surface of test specimen "S"	10,8 m ²
Microphone positions	Moving microphone and boom with sweep radius 1 m
Generation of sound field	Mobile speaker with straight-line path, length 1,6 m × 2 (round trip)

Frequency [Hz]	L ₁ [dB]	L ₂ * [dB]	T [s]	R [dB]	Reference curve [dB]
100	96,1	46,6	1,93	51,2	42,0
125	91,6	46,7	1,44	45,3	45,0
160	94,5	47,3	1,35	47,4	48,0
200	97,9	49,8	1,10	47,4	51,0
250	96,5	45,4	1,19	50,7	54,0
315	95,2	40,9	1,13	53,7	57,0
400	94,0	38,7	1,08	54,5	60,0
500	93,8	37,7	1,10	55,4	61,0
630	92,4	34,2	1,19	57,8	62,0
800	91,7	29,7	1,18	61,6	63,0
1000	93,3	28,3	1,11	64,3	64,0
1250	96,1	29,7	1,11	65,7	65,0
1600	95,2	29,3	1,12	65,2	65,0
2000	94,6	29,4	1,12	64,5	65,0
2500	92,3	28,1	1,10	63,5	65,0
3150	93,1	28,6	1,02	63,4	65,0
4000	92,5	27,3	0,92	63,7	//
5000	91,8	24,6	0,80	65,1	//

(*) Values not affected by flanking and background noise.





Effective measuring surface of specimen:

10,8 m²

Source room volume:

57,0 m³

Receiving room volume:

88,0 m³

Type of noise:

Pink

Type of filter:

1/3 -octave

Result of test:

Single-number rating at 500 Hz in the frequency band ranging between 100 Hz and 3150 Hz:

R_w = 61 dB

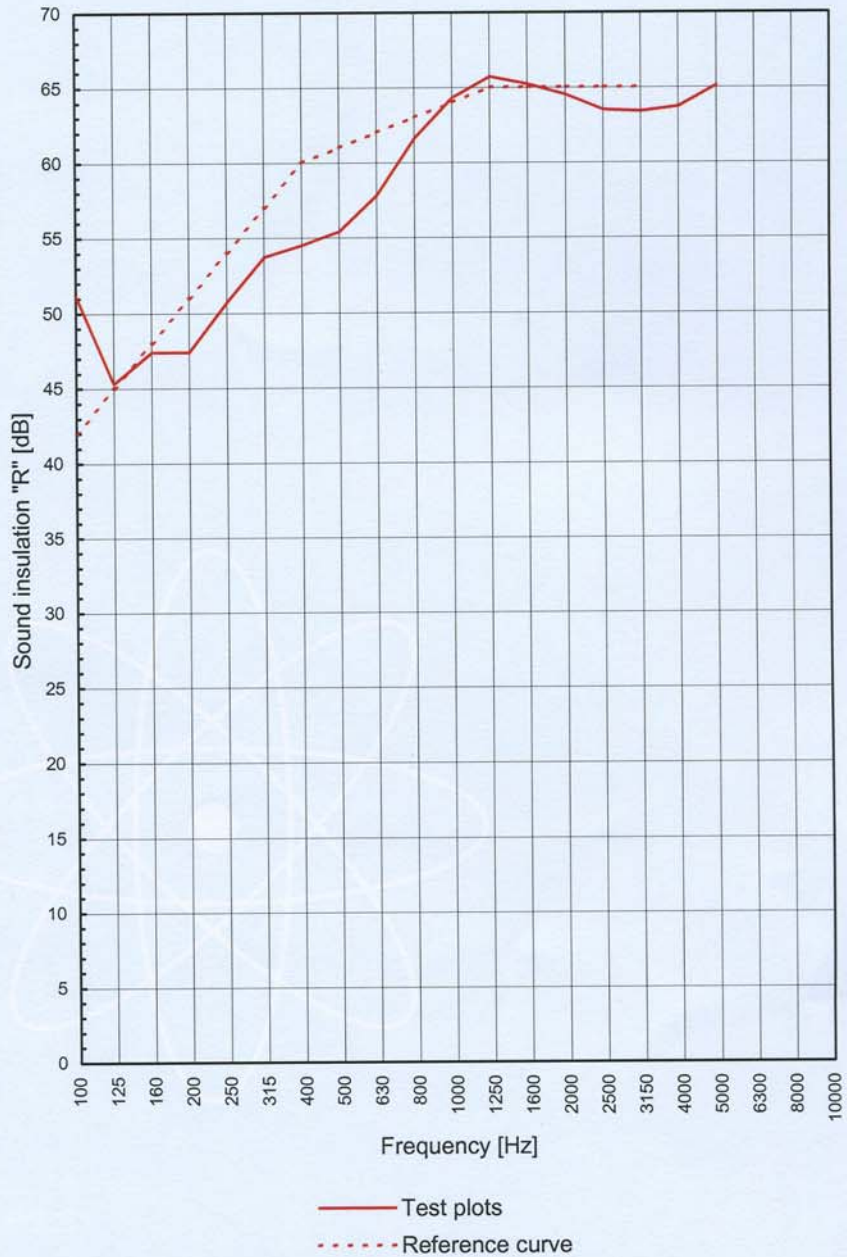
Frequency bands with negative deviation exceeding 8 dB:

// Hz

Adaptation terms:

C = -2 dB

C_{tr} = -5 dB



Test Technician
(Geom. Omar Nanni)

Omar Nanni

Manager, Acoustics and Vibrations Laboratory
(Dott. Andrea Bruschi)

Andrea Bruschi

Chairman or
Managing Director

Dott. Ing. Vincenzo Iommi

Vincenzo Iommi