TEST REPORT

MEASUREMENT OF FOOTSTEPS-NOISE INSULATION PROPERTIES IN FLOOR INSTALLATION
Technical regulation UNI EN ISO 140-7 (2000)

Date of issue:	October, 13th 2006
Place of issue:	Perugia
Customer:	SA.Me. Srl Via dell'Artigianato, 14 – 06083 Bastia Umbra PG
Date of Measurement:	October, 5Th 2006
Place of Measurement:	Loc. Villa Marina – Via Litorale Marina, 233/a – Cesenatico FC
Partition tested:	Horizontal partition (floor) consisting in 1 cm plaster in the intrados, 20+4 cm brick-cement floor, 7/8 lightened concrete and polystirene slab, 1,1 cm thermal-acoustic insulating Thermoliving 3B, 5cm sand and concrete slab, 1 cm parquet flooring with double component glue, no baseboard.
Tested floor surface:	14,3 m^2
Test Setting volume:	38,5 m^3
Tester Technician:	Pelucchi Francesco Antonio (professional acoustic technician)

1. Premise

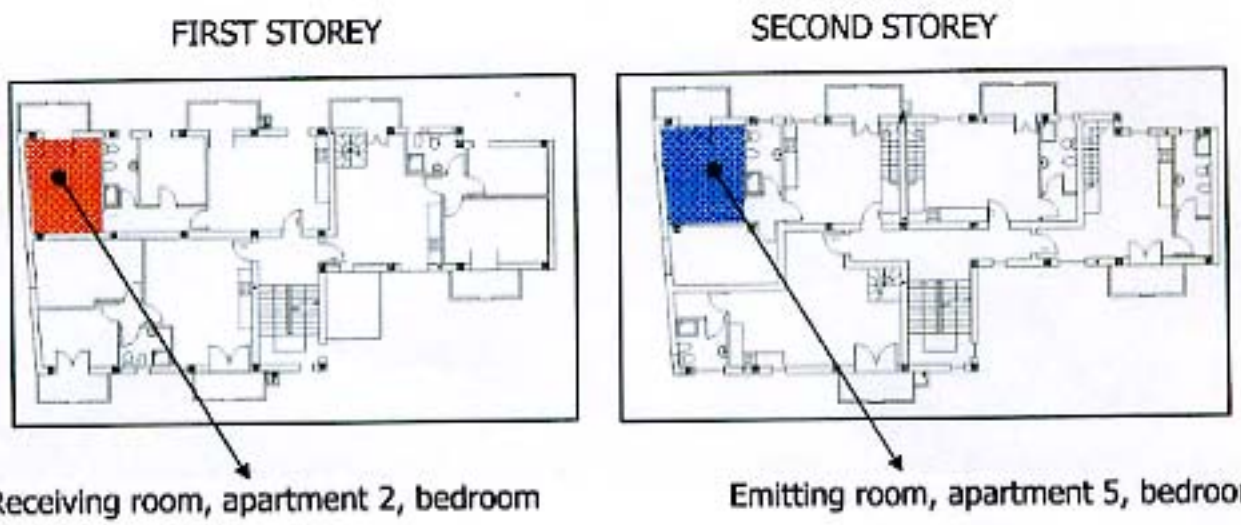
On customer's request we performed a measurement of footsteps-noise insulation properties in a floor installation created in a residential building in Cesenatico (FC). Measurements were performed following the technique described in the UNI EN ISO 140-7 regulation.
The test aim is to determine the standardized footsteps-noise acoustic pressure level $L'_{n,w}$ according to the UNI EN ISO 717-2 regulation.

2. Place of measurement description

The building where the test took place is located in Loc.Villa Marina -Via Litorale Marina, 233/a – Cesenatico FC (pict.1). The Building, divided in 7 apartments, is constituted by three storeys above the ground and an attic (pict.2).
The tested floor, located between the first (apartment 2) and the second storey (apartment 5), according to the statement of the responsible in charge of the building enterprise TRIO Srl consists in:
1 cm plaster in the intrados, 20+4 cm brick-cement floor, 7/8 lightened concrete and polystirene slab, 1,1 cm thermal-acoustic insulating Thermoliving 3B, 5cm sand and concrete slab,1 cm parquet flooring with double component glue, no baseboard.
Pict. 3 shows the emitting room and the receiving room of the tested partition, while *Pict.4* presents the photographic documentation.

Pict.1 – Building location. Villa Marina -Via Litorale Marina, 233/a – Cesenatico FC

Pict.2 – Building exterior



Pict.3 – Planimetry of the first and second storey showing the tested horizontal partition

Emitting room, apartment 5, bedroom

Receiving room, apartment 2, bedroom

Pict.4 – View of the Emitting room and of the Receiving room

Floor located between the first and the second storey	
Emitting room	**Bedroom in apartment 5 second storey**
Floor surface	**14,3 m^2**
Receiving room	**Bedroom in apartment 2 first storey**
Receiving room surface	**38,5 m^3**

Table 1 – Geometric data of the test area

3. Regulation references

Measurements were performed according to the following regulations:

a. UNI EN ISO 140-7:2000	"Measurement of acoustic insulation in buildings or buildings partitions - Measurement of footsteps-noise insulation properties in floor installation."
b. UNI EN ISO 140-14:2004	"Measurement of acoustic insulation in buildings or buildings partitions – Guidelines for particular installation situations."
c. UNI EN ISO 717-2:1996	"Evaluation of acoustic insulation in buildings or buildings partitions – Footsteps-noise insulation."
d. UNI EN ISO 3382	"Measurement of the time of reverberation in interiors with reference to other acoustic parameters."
e. UNI EN ISO 354	"Measurement of the acoustic absorbance in reverberation-chamber."
f. D.P.C.M. 5/12/97	"Determination of the passive acoustic requirements in buildings." Effective document of the Law 447/95 "Outline law on the acoustic pollution.".

4. Test equipment used

Measurements and data processing were performed using the following equipment:

- Symphonie double-channel system 01 db matriculation n. 00882
- Aclan preamplifier type PRE 12 H matriculation n. 00881
- GRAS microphonic capsule type 40HQ matriculation n. 38143
- 2 Zeta footsteps-noise machine matriculation n. 102
- Impulse sound source
- Electric wire extension m.10
- Aclan caliber CAL01 matriculation n. 11308
- Acer Travelmate Notebook
- HP color laserjet 2600N printer

The measuring system fulfills the requirements of class 1 EN 60651/1994 and EN60804/1994 regulations, the filters fulfill the requirements of EN 61260/1995, the microphones fulfill the requirements of EN 61094-1/1994, EN 61094-2/1993, EN 61094-3-4/1995, the caliber fulfill the requirements of CEI 29-14. The measurement-system line and the caliber were adjusted by the SIT Center n. 164 of the USL 7 of Siena on January, 4th 2006 and on October, 14th 2004; the related certificates n. F0127_06 and C0028_04 are in possession of the undersigned.

The system adjustment was performed before and after the measurements, with a registered variation lower than 0.2 db

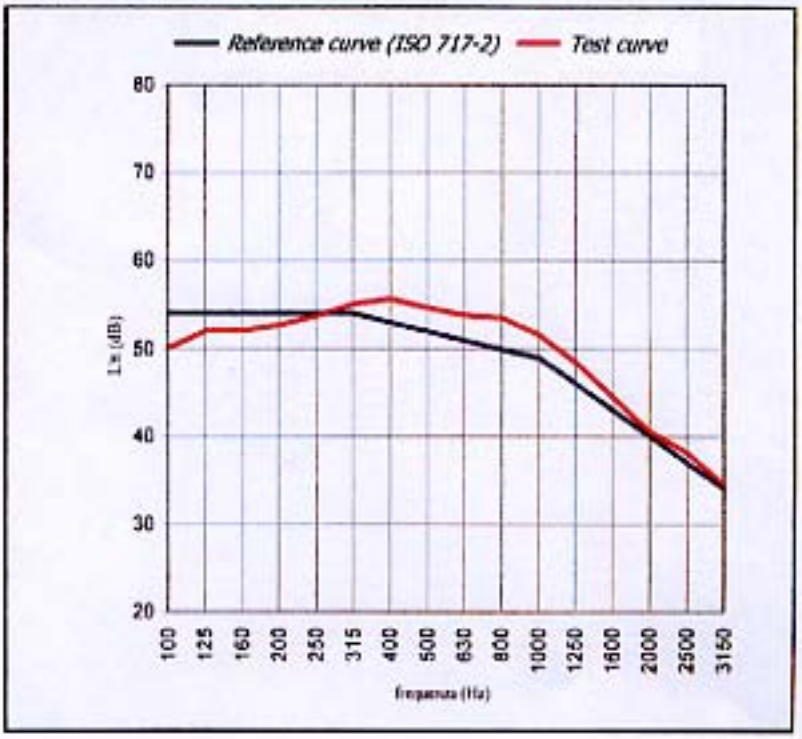
5. Measurements results

Table 2 reports the above-mentioned measured values and calculations. The diagram provides a synthesis of the determined insulation curve and the reference curve established by the ISO 717-2 necessary for the individuation of the $L'_{n,w}$.

Frequency hz	Imput level (Li) db	Background level (Lf) db	ΔL (Li-Lf) UNI EN ISO 140-7 db	Reverberation time s	L'n db
100	57,5	23,2	34,3	3,4	50,1
125	61,0	23,9	37,1	4,9	52,0
160	59,9	24,0	35,9	3,7	52,1
200	59,6	26,2	33,4	3,0	52,7
250	60,1	21,1	39,0	2,7	53,7
315	61,3	27,5	33,8	2,6	55,1
400	61,6	21,9	39,7	2,4	55,6
500	60,4	20,1	40,3	2,3	54,7
630	59,0	20,7	38,3	2,1	53,8
800	58,6	18,0	40,6	2,0	53,5
1000	56,4	17,7	38,7	1,8	51,7
1250	52,9	18,3	34,6	1,7	48,4
1600	48,9	14,7	34,2	1,7	44,5
2000	44,7	13,6	31,1	1,6	40,5
2500	42,0	14,0	28,0	1,5	38,1
3150	38,0	13,3	24,7	1,4	34,4

Table 2 – Acoustic measured data and calculations

Frequency f (hz)	L'n 1/3 octave (db)
50	-
63	-
80	-
100	50,1
125	52,0
160	52,1
200	52,7
250	53,7
315	55,1
400	55,6
500	54,7
630	53,8
800	53,5
1000	51,7
1250	48,4
1600	44,5
2000	40,5
2500	38,1
3150	34,4
4000	-
5000	-



Evaluation according to UNI EN ISO 717-2:

$L'_{n,w}$ = **52 db** C_i= **-3 db**

Evaluation based on results of measurement conducted on installed products obtained by a technical project method

6. Conclusions

The evaluation index of the standardized footsteps-noise acoustic pressure level $\mathbf{L'_{n,w}}$ obtained by the measurement in installation (52db) is in compliance with the requirements of the D.P.C.M. 5/12/97. In fact such value is below the maximum limit (63db) required by the law for class A "residential buildings and similars".

The tester