Z Lab Srl

Via Pisa, 7 – 37053 Cerea (VR) – Italy
Tel. +39 0442 410280 – Fax +39 0442 418090
info@zeta-lab.it – www.zeta-lab.it
C.F./P.IVA 02984950788 – Cap. Soc. € 80.000 i.v.
R.E.A. c/o C.C.I.A.A. Verona 376649

REPORT N.134-2022-IAP Eng

UNI EN ISO 10140-2:2021

LABORATORY MEASUREMENT OF SOUND INSULATION OF BUILDING ELEMENTS

MEASUREMENT OF AIRBORNE SOUND INSULATION

Issue place and date: Cerea (VR), 26/01/2023

Customer: Centrufficio Spa .

Customer address: Viale Andrea Doria, 17 20124 Milano

Sample delivery date: 12/12/2022

Sample provenance: Centrufficio Spa

Sample installation date: 14/12/2022

Sample installed in laboratory by: Customer (sampling made by the committee)

Test date: 14/12/2022

Test location: Z Lab S.r.l. – Via Pisa, 7 – 37053 Cerea (VR) – Italy

Sample denomination: Jaleed Double glazed glass 662A partition wall

LAB N° 1416 L

PREPARED	VERIFIED	APPROVED
Sabato Di Filippo	Antonio Scofano	Antonio Scofano

This test report consists of n. 7 pages and cannot be reproduced, but in full, without the written permission of Z Lab Srl. The results reported in this document refer only to the sample and the materials to be tested as well as received. The laboratory decline all responsibility for the data provided by the customer. The samples are kept for 30 days after the end of the test.

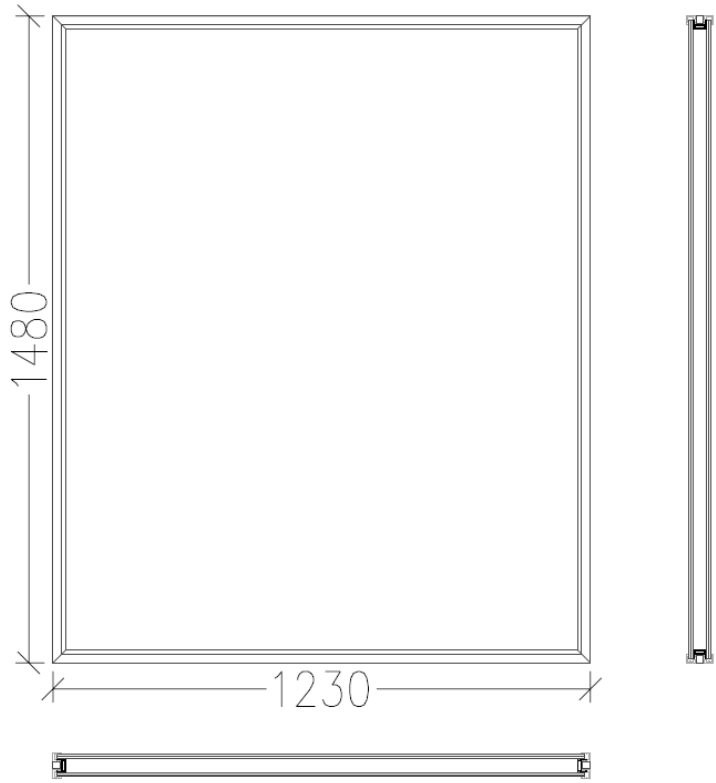
Sample description

The sample under test consists of(1):

- a 60 x 20 mm section aluminium perimeter profile, with an adhesive anti-vibration seal applied, and on which an additional glazing-stopper profile that defines the “DOUBLE GLASS” wall type and houses the main glass seal.
- MDF filling with damping function is inserted in the central slot of perimeter profiles
- 2 glasses 662A laminated with acoustic pvb.

The sample made and assembled by Centroufficio SpA has the following characteristics:

Width(2) [mm]	1480
Height(2) [mm]	1230
Thickness(2) [mm]	61
Sample surface(2) [m^2]	1,82
Sample weight(2) [Kg]	115,6



This test report consists of n. 7 pages and cannot be reproduced, but in full, without the written permission of Z Lab Srl. The results reported in this document refer only to the sample and the materials to be tested as well as received. The laboratory decline all responsibility for the data provided by the customer. The samples are kept for 30 days after the end of the test.

Test sample illustrations

The specimen is mounted inside the test opening according to the indications provided by the UNI EN ISO 10140-1 standard.

After installation the sample was conditioned within the measuring environment before the test was carried out

Sealing waS performed between the frame and the masonry by applying glazing stucco.

This test report consists of n. 7 pages and cannot be reproduced, but in full, without the written permission of Z Lab Srl. The results reported in this document refer only to the sample and the materials to be tested as well as received. The laboratory decline all responsibility for the data provided by the customer. The samples are kept for 30 days after the end of the test.

Standards references

UNI EN ISO 10140-1:2021	*Acoustics - Laboratory measurement of sound insulation of building elements Application rules for specific products*
UNI EN ISO 10140-2:2021	*Acoustics - Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation.*
UNI EN ISO 10140-4:2021	*Acoustics - Laboratory measurement of sound insulation of building elements Measurement procedures and requirements*
UNI EN ISO 10140-5:2021	*Acoustics - Laboratory measurement of sound insulation of building elements Measurement - Part 5 Requirements for test facilities and equipment*
UNI EN ISO 717-1:2021	*Acoustics – Acoustic insulation verification in buildings and in building elements Part 1: Airborne sound insulation.*

Test environment description

The test environment structure is made of reinforced concrete, wholly insulated from the laboratory through anti-vibration supports. In particular, this environment consists of a source room and a receiving room, both characterized by an irregularly-shaped volume, free of any parallel partition. The rooms are separated by a 100 cm thick test frame.

The dimensional data and Environmental data during the testare:

	Source room	Receiving room
Average dimensions (L x W x H)	770 X 560 X 370 cm	700 X 500 X 330 cm
Volume	119,0 m^3	164,2 m^3
Average temperature	20 ± 0,2 °C	20 ± 0,2 °C
Average relative humidity	51 ± 0,9 %	51 ± 0,9 %
Atmospheric pressure	100,6 kPa± 1 kPa	
Separation Surface	10.73 m^2	
Area S. of the free test opening	1,88 m^2	

Test equipment and instruments

Instrument	Model	Serial number
Sound Level Meter	SINUS GmbH EXPANDER	9154
Microphone	GRAS 146AE	357193
Calibrator	Bruel&Kjaer 4231	2583667
Omnidirectional source	Bruel&Kjaer 2716 + 4292	2571776+14012
Omnidirectional source	Lookline D301 + DL301	AO900163+DO900159
Temperature and humidity sensor	DeltaOHM HD35ED1NTV	16037652
Temperature, humidity and pressure sensor	HD35EDL14bNTV.E	20014238
Tape	Stanley 33 - 442	13/946

This test report consists of n. 7 pages and cannot be reproduced, but in full, without the written permission of Z Lab Srl. The results reported in this document refer only to the sample and the materials to be tested as well as received. The laboratory decline all responsibility for the data provided by the customer. The samples are kept for 30 days after the end of the test.

Measurement method

The airborne sound insulation test between two rooms is based on the difference between the average sound pressure level in the source room (L_1) and the one detected in the receiving room (L_2). The acoustic source (which produces pink noise) has been operated within the source room in 3 different positions.

The microphone is located in 5 different positions, both in the source room and in the receiving room. A measurement for each source-microphone combination has been performed, for a total of 15 measurements in the source room and 15 in the receiving room. The integration time, for each measure, has been at least 15 s.

Having detected the average level of sound pressure in the receiving environment, the source is switched off, in order to allow the background noise level measurement, L_b. The spectrum corrections, L_2, which need to be calculated for each spectrum frequency component, are equal to:

$$L_2 = L_2 - 1.3 \text{ [dB]if } L_2 - L_b \leq 6 \text{ dB}$$

$$L_2 = 10 \cdot \log(10^{(L_2/10)} - 10^{(L_b/10)}) \text{ [dB] if } 6 < L_2 - L_b < 10 \text{ dB}$$

The reverberation time calculation, T allows to determinate the sound reduction index, R.

$$R = L_1 - L_2 + 10 \cdot \log(S/A) \text{ [dB]}$$

where:
S: is the free test area opening in which the test element is installed, expressed in m^2;
A: equivalent sound absorption area in the receiving room, calculated by the Sabine equation:

$$A = 0.16 \cdot (V/T) \text{ [m}^2\text{]}$$

where V is the volume of the receiving environment, in m^3.

The experimental curve has been evaluated and compared with the reference one,which is provided within the standard UNI EN ISO 717-1.Then, the curves comparison method is applied, up to the point where the sum of the unfavorable differences between relative curves values is on the reference curve less than or equal to 32 dB.The value corresponding to the 500 Hz frequency has subsequently been evaluated: this value is the index of evaluation of the sound reduction index R_w.
The spectrum adaptation terms are also calculated. The resulting spectrum adaptation term is an integer by definition and shall be identified in accordance with the spectrum used, as follows: C when calculated with A-weighted pink noise and Ctr when calculated whit A-weighted urban traffic noise.
These values, "C" and "Ctr" are to be added to the Rw index.

This test report consists of n. 7 pages and cannot be reproduced, but in full, without the written permission of Z Lab Srl. The results reported in this document refer only to the sample and the materials to be tested as well as received. The laboratory decline all responsibility for the data provided by the customer. The samples are kept for 30 days after the end of the test.

Measured values

f [Hz]	L_1 [dB]	L_2 [dB]	L_b [dB]	T [s]	R [dB]
Frequency	*Source room level*	*Receiving room level*	*Background noise*	*Reverberation time*	*Sound reduction index*
50	80,5	46,9	22,5	6,54	30,7
63	79,2	54,8	24,9	4,70	19,7
80	75,9	51,5	19,6	2,96	17,7
100	80,3	32,8	19,6	3,41	41,6
125	80,4	33,3	14,4	2,89	40,3
160	81,9	38,2	16,6	2,38	35,9
200	83,9	37,8	15,9	2,62	38,8
250	86,3	40,9	11,0	2,73	38,3
315	86,5	39,2	13,4	2,37	39,6
400	87,6	37,2	15,8	2,34	42,6
500	87,1	36,8	18,2	2,50	42,8
630	87,2	33,8	19,6	2,54	46,2
800	86,6	30,8	12,0	2,34	48,0
1000	85,2	26,0	6,2	2,24	51,2
1250	85,2	23,6	8,3	2,25	53,7
1600	87,3	24,0	5,8	2,31	55,4
2000	91,4	26,3	5,8	2,11	56,8
2500	88,9	19,7	5,7	1,99	60,9
3150	86,2	14,8	6,0	1,80	63,0
4000	87,7	14,2	6,7	1,62	64,9
5000	84,3	10,2	7,1	1,45	65,8[(b)]

[(b)] *Applied correction for background noise according to UNI EN ISO 10140-4, §4.3.*

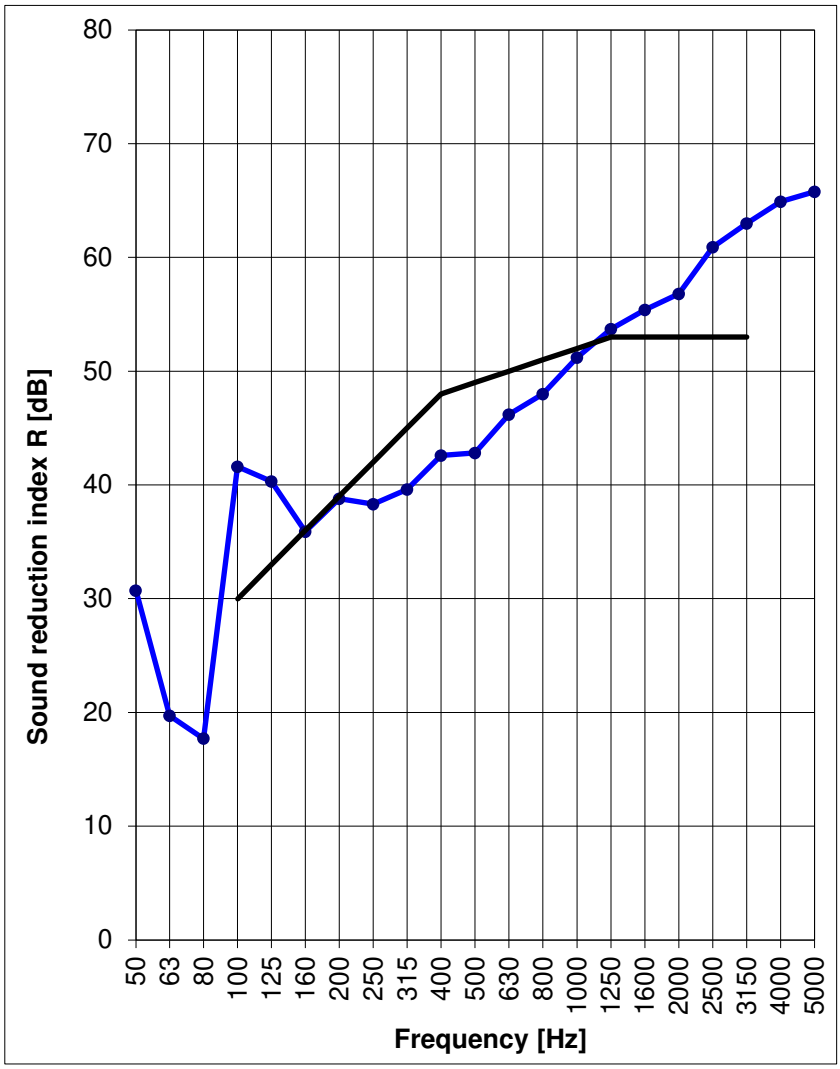
This test report consists of n. 7 pages and cannot be reproduced, but in full, without the written permission of Z Lab Srl. The results reported in this document refer only to the sample and the materials to be tested as well as received. The laboratory decline all responsibility for the data provided by the customer. The samples are kept for 30 days after the end of the test.

LAB N° 1416 L

Sound reduction index, R, according to UNI EN ISO 10140-2

Sample denomination: Jaleed Double glazed glass 662A partition wall
Area S, of the test opening: 1,88 m^2
Rooms volume: Emitting 119,0 m^3 Receiving 164,2 m^3

f	R
[Hz]	[dB]
50	30,7
63	19,7
80	17,7
100	41,6
125	40,3
160	35,9
200	38,8
250	38,3
315	39,6
400	42,6
500	42,8
630	46,2
800	48,0
1000	51,2
1250	53,7
1600	55,4
2000	56,8
2500	60,9
3150	63,0
4000	64,9
5000	65,8



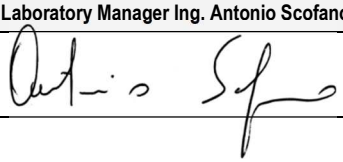
Evaluation of conformity according to UNI EN ISO 717-1

Rw (C;Ctr) = 49 (-1 ; -4) dB $C_{50\text{-}3150}$ =-3 dB; $C_{50\text{-}5000}$ = -2 dB; $C_{100\text{-}5000}$ = 0 dB

Evaluation based on laboratory measurement results by means of a technical method.

$C_{tr,50\text{-}3150}$ = -12 dB; $C_{tr,50\text{-}5000}$ = -12 dB; $C_{tr,100\text{-}5000}$ =-4 dB

Evaluation of sound reduction index, elaborated by steps of 0.1 dB: 49,3 dB

Laboratory Manager Ing. Antonio Scofano


----------END OF TEST REPORT----------

This test report consists of n. 7 pages and cannot be reproduced, but in full, without the written permission of Z Lab Srl. The results reported in this document refer only to the sample and the materials to be tested as well as received. The laboratory decline all responsibility for the data provided by the customer. The samples are kept for 30 days after the end of the test.