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LAB N° 0699

Test report n° 17-688-002/E

Notified Body *CPR n. 2384*
Date of issue, 20/02/2017

Sample description	**Door with double glasses mod. "DOUBLE GLASS SOLUTIONS". glasses: 4 mm (0.76 mm "acoustic" PVB) 4 mm / 44 mm air / 4 mm (0.76 mm "acoustic" PVB) 4 mm.**
Client	**AD SOLUTIONS S.r.l. Via L. da Vinci, 4 30020 Torre di Mosto (VE) Italy**
Origin	**Factory of Torre di Mosto (VE) Italy**
Kind of sample	**Door**
Sampling by	**Client**
Sampling date	**n.d.**
Sampler	**Client**
Reciving sample date	**31/01/2017**
Acceptance number	**17-688**
Acceptance date	**06/02/2017**
Test started on	**06/02/2017**
Test ended on	**06/02/2017**
Object	**UNI EN ISO 10140-1:2014 + UNI EN ISO 10140-2:2010 + UNI EN ISO 10140-4:2010 + UNI EN ISO 717-1:2013** **Laboratory measurement airborne sound insulation of building elements**

Thermo-Acoustic sector Director: **Ing. Cristian Rinaldi**

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LABORATORY MEASUREMENT AIRBORNE SOUND INSULATION OF BUILDING ELEMENTS (STANDARD SERIES ISO 10140)

1. SAMPLE DESCRIPTION#

Framed door with extruded aluminum case frame, mod. "GLASS SOLUTIONS". Door composed of perimeter profile in extruded aluminum dimensions 40/56 mm x 80 mm. Concealed hinges, equipped with triple adjustment (height, depth and inclination). A gasket is inserted in the lower profile of the door.
Test opening size: 2780 mm x 980 mm.
Glasses: 4 mm (0.76 mm "acoustic" PVB) 4 mm / 44 mm air / 4 mm (0.76 mm "acoustic" PVB) 4 mm.

Perimeter sealing made by silicone sealant.
Test specimen mounted by Client.

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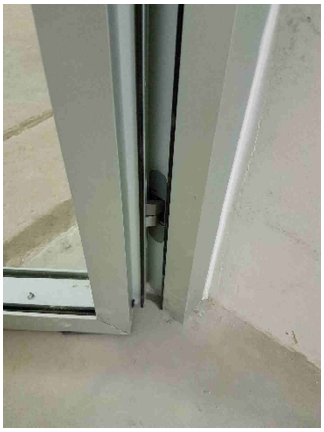
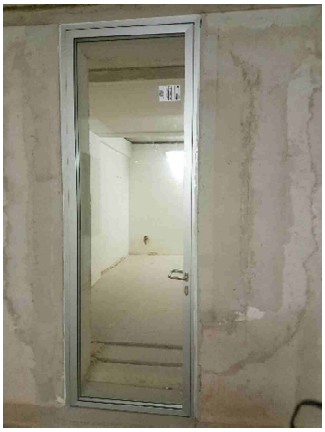
Photo:

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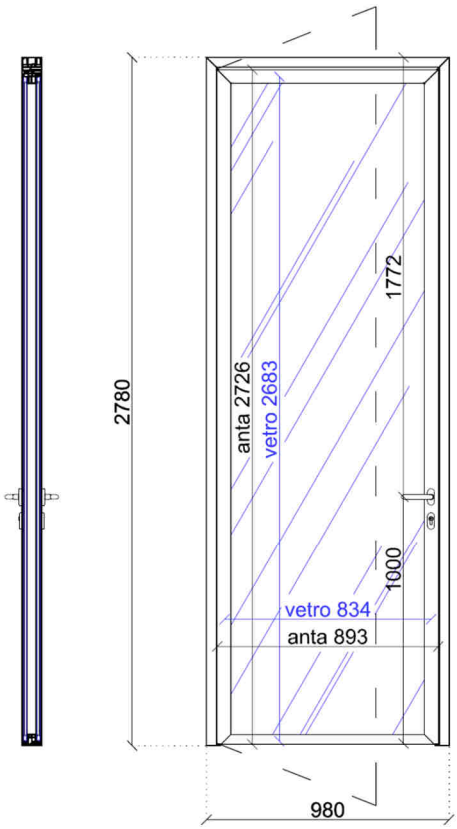
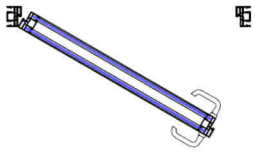
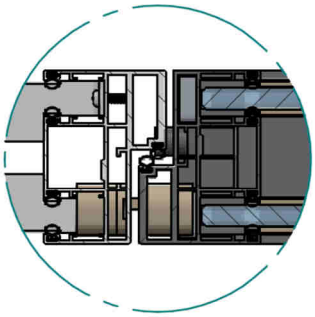
Costruction drawing:







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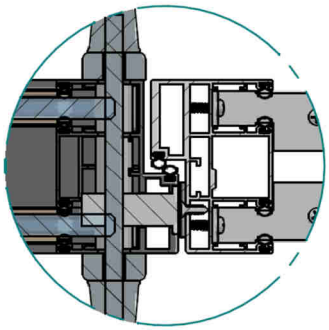

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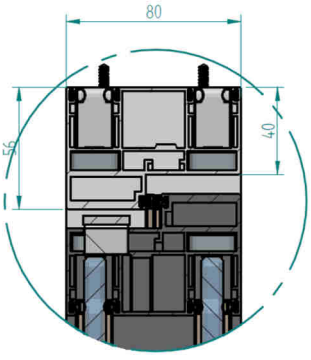

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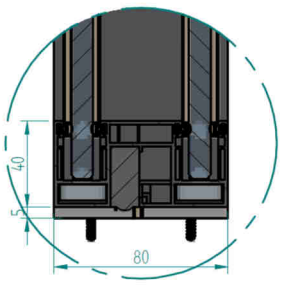

DETTAGLIO F

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2. REFERENCE STANDARDS

For the technical methods of measurement and determination of the indices that define the performance of building elements must be referred to the following ISO standards:

- ISO 10140-1:2014 Acoustics. Laboratory measurement of sound insulation of building elements. Part 1: Application rules for specific products.
- ISO 10140-2:2010 Acoustics. Laboratory measurement of sound insulation of building elements. Part 2: Measurement of airborne sound insulation.
- ISO 10140-4:2010 Acoustics. Laboratory measurement of sound insulation of building elements. Part 4: Measurement procedures and requirements.
- ISO 10140-5:2014 Acoustics. Laboratory measurement of sound insulation of building elements. Part 5: Requirements for test facilities and equipment.
- ISO 717-1:2013 Acoustics. Rating of sound insulation in buildings and of building elements. Part 1: Airborne sound insulation.

3. STRUMENTAZIONE UTILIZZATA

Le misurazioni sono state eseguite utilizzando la seguente strumentazione:

- sound level meter Larson&Davis 824 (S. N. 2925), preamplifier Larson&Davis PRM 902 (S. N. 3051), microphone Bruel & Kjaer 4190 (S. N. 2490853) (LAT tarature certificate n° 224 18/10/2016 n° 16-3535-FON and 16-3536-FIL);
- calibrator Larson&Davis CAL 200 (S. N. 4057) (LAT tarature certificate n° 224 del 18/10/2016 n° 16-3537-CAL);
- omnidirectional source Svantek;
- amplifier/ preamplifier with generator of pink noise Svantek;
- tape measure IDF (S. N. 10/317) (LAT tarature certificate n° 51 of 31/08/2015 n° C115161920);
- thermohygrometer Oregon Scientific ICE ALERT (S. N. 09A14) (LAT tarature certificate n° 51 of 31/08/2015 n° CT-IGRO-0500-2015);
- barometer Delta Ohm S.r.l. mod. HD9908TBARO (S. N. 05020942) (LAT tarature certificate n° 124 del 27/10/2014 n° 14002652).

All the equipment and the measurement chain is to meet the requirements in class 1 of EN, we proceeded to the calibration of equipment before and after each series of measurements.

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4. AMBIENTE DI PROVA

4. TEST ROOMS

The test environment consists of a source room that contains the noise source and a receiving room characterized acoustically by the equivalent sound absorption area.

At the source room was produced "pink noise" and were recorded sound pressure levels at various frequencies for bands 1/3 octave in the range between 100 and 5000 Hz in both the source room and in the receiving room.

At the receiving room were measured levels of residual noise and we proceeded to evaluate the acoustic characteristics of the room reverberation.

The filler wall consists of a double wall made of clay blocks. Plaster thickness of 1.5 cm on either side. R_w=70 dB.

The measurements were made with reference to the procedure and test modes defined by the set of rules ISO 10140.

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5. RESULTS

The sound reduction index is evaluated from:

$R'_M = L_1 - L_2 + 10\lg(S/A)$ [dB]

where:

c is the sound speed in the receiving room $= 331+0,6t$ [m/s];
t is the average temperature in the receiving room [°C];
L_1 is the average sound pressure level in the source room [dB];
L_2 is the average sound pressure level in the receiving room [dB];
S is the area of the free test opening in which the test specimen is installed [m^2];
A is the equivalent sound absorption area in the receiving room = $(55,3/c)(V/T)$ [m^2];
V is the receiving room volume [m^3];
T is the reverberation time in the receiving room [s];

The resulting values R'_M of the measurements of the window must be compared with the apparent sound reduction index R'_F measured with the construction of the filling and calculated in relation to the opening of the free trial. If the difference is greater than or equal to 6 dB but less than 15 dB, the result of measurement R'_M must be corrected by the influence of the transmission side by calculating R as follows:

$R = -10\lg(10^{-R'_M/10} - 10^{-R'_F/10})$ [dB]

where:

R is the correct sound reduction index of the specimen [dB];
R'_M is measured in decibels, with the sample into the test [dB];
R'_F is measured in decibels, with the filling element in the opening test [dB].

If the difference between R'_M and R'_F is less than 6 dB in any of the frequency bands, the correction must be 1.3 dB, which corresponds to a difference of 6 dB. The evaluation index of the sound reduction index R_w is calculated according to the ISO 717-1.
C e C_{tr} are the spectrum adaptation terms according to ISO 717-1.

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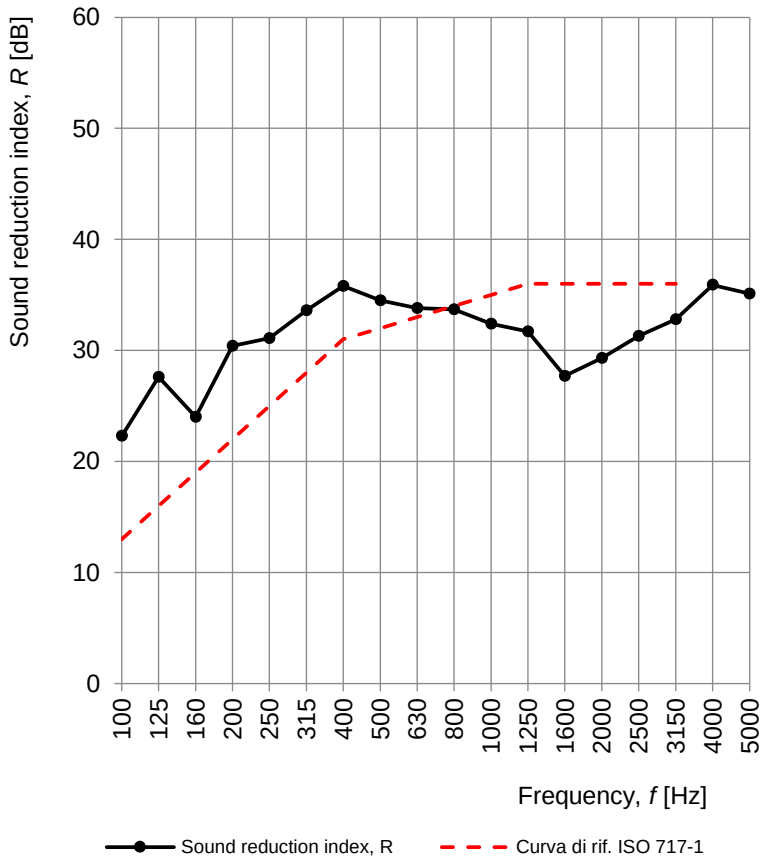
Area of test specimen = 2,7244 m^2
Transmitting test room temperature = 17,5 °C ± 0,4 °C. Receiving test room temperature = 17,5 °C ± 0,4 °C
Transmitting test room relative umidity = 64 % ± 2 %. Receiving test room relative umidity = 64 % ± 2 %
Static pressure = 100,00 kPa ± 0,06 kPa
Transmitting room volume = 76,0 m^3
Receiving room volume = 65,5 m^3

Frequenza *f* [Hz]	*R* One third octave band [dB]
100	22.3
125	27.6
160	24.0
200	30.4
250	31.1
315	33.6
400	35.8
500	34.5
630	33.8
800	33.7
1000	32.4
1250	31.7
1600	27.7
2000	29.3
2500	31.3
3150	32.8
4000	35.9
5000	35.1



Rating according to ISO 717-1 Standard:
R_w (C;C_{tr}) = 32 (-1;-1) dB
Evaluation based on laboratory measurement results obtained by an engineering method.

$C_{100\text{-}5000}$ = 0 dB
$C_{tr,100\text{-}5000}$ = -1 dB

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