

TEST REPORT No. 112780-781 A-E

CLIENT: **SUSENSIONES ELÁSTICAS DEL NORTE, S.L. (SEÑOR)**
Polígono industrial El Garrotal, Parcela 10 - Módulos 4 y 5
14700 Palma del Río, Córdoba, España

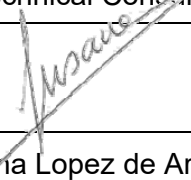
AIM: **Laboratory measurement of airborne sound insulation**

STANDARD: **EN ISO 10140-2:2021**

TEST SPECIMEN: **SEÑOR+PLACO high-performance acoustic partition with double structure EI180**

ORIGINAL REPORT ISSUE DATE: **17/03/2025**

TRANSLATION DATE: **24/06/2025**

Technical Consultant

Susana Lopez de Aretxaga



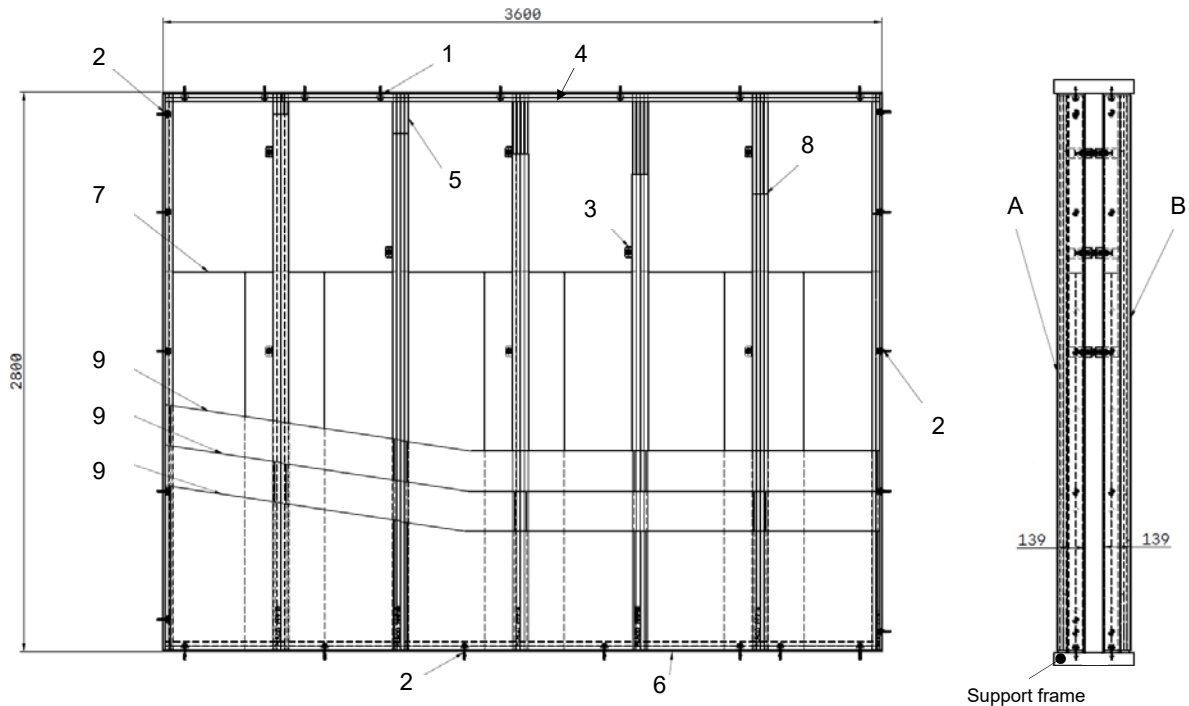
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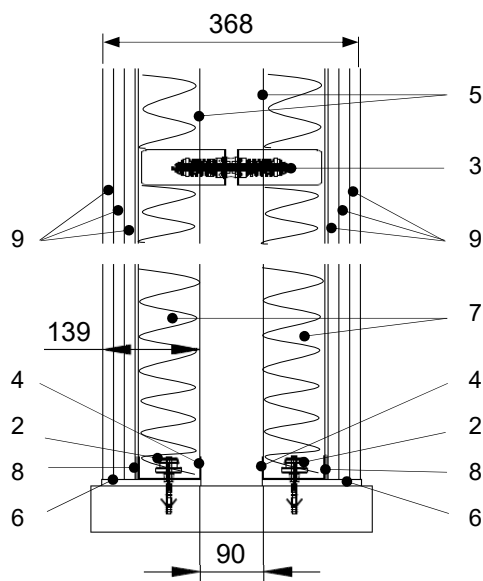
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- The results of the current report concern only and exclusively the test specimen.
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- Uncertainty related to the tests is available to the client, if required.
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1. TEST SPECIMEN DESCRIPTION

The test specimen consists of a self-supporting partition 15+15+15/90+90+90/15+15+15, with laminated gypsum board and mineral wool, with the following composition according to information provided by the client.

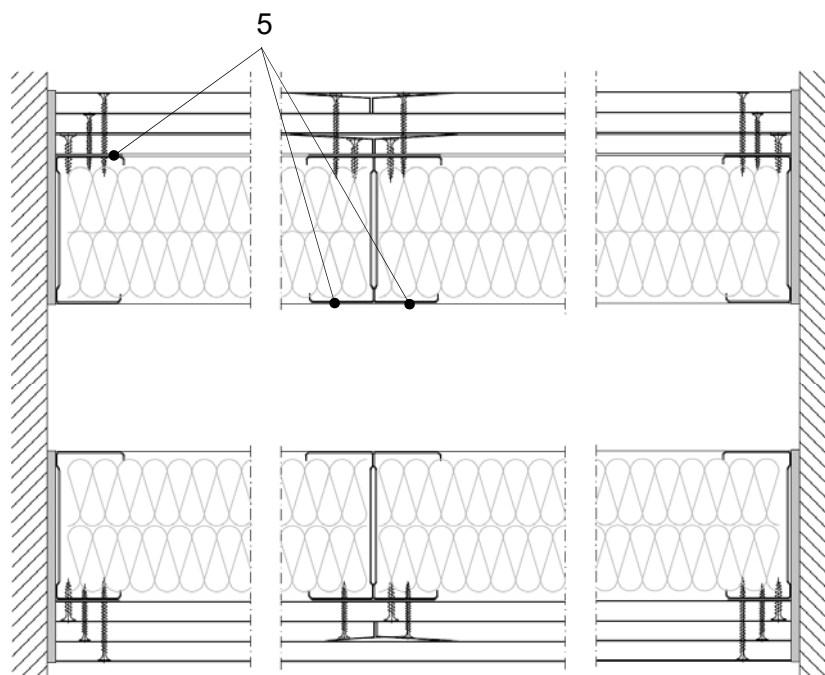


Sketch 1 – Elevation of test specimen. Cotes in mm

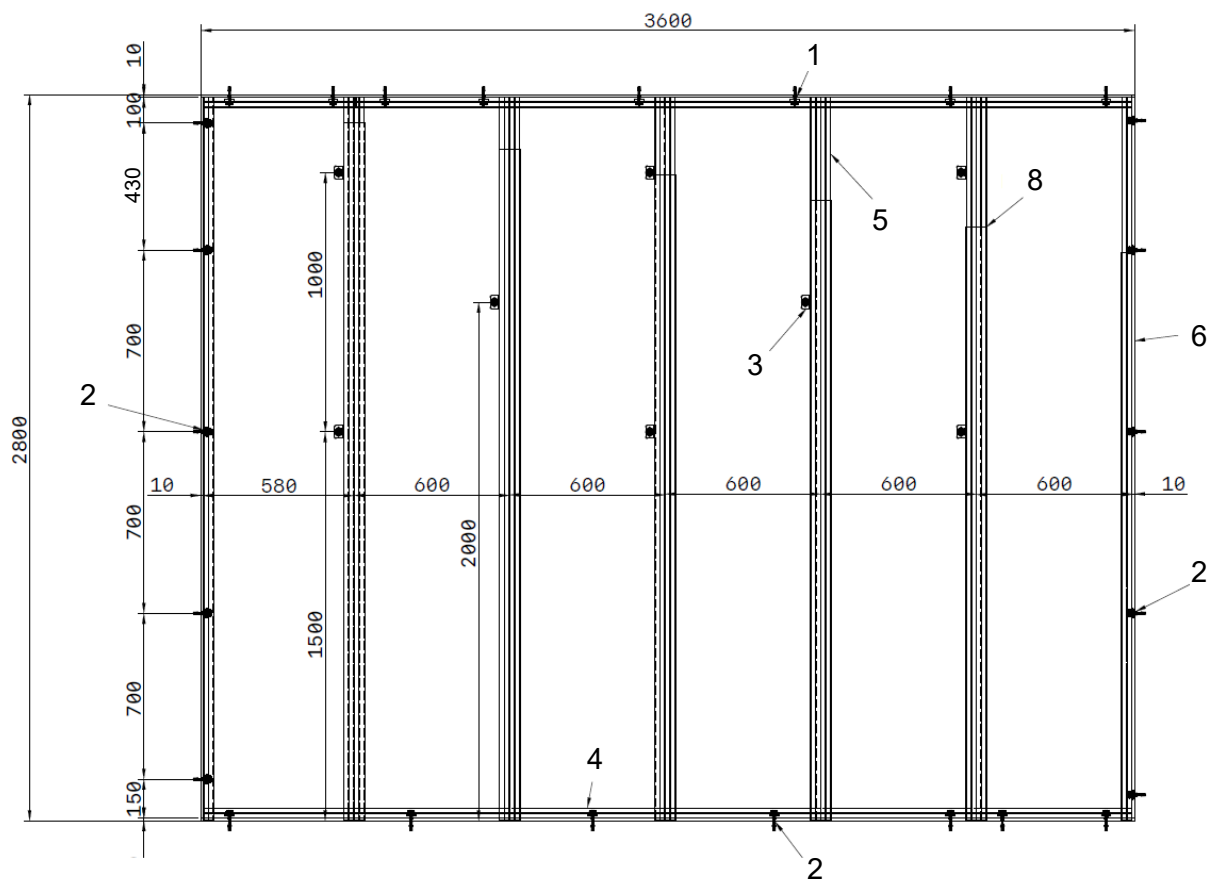


1. SE-TAV-500/11R (red) acoustic insulator – SENOR
2. SE-TAV-500/11A (blue) acoustic insulator – SENOR
3. SE-9600-TBM2 acoustic dumper – SENOR
4. PLACO R-90 CHANNEL
5. PLACO M-90 STUD
6. SE-BEC acoustic strip – SENOR
7. 90 mm ARENA APTA mineral wool – ISOVER
8. SE-MONT-BICAPA-40 desolidarizing strip – SENOR
9. 15 mm PPF plasterboard - PLACO

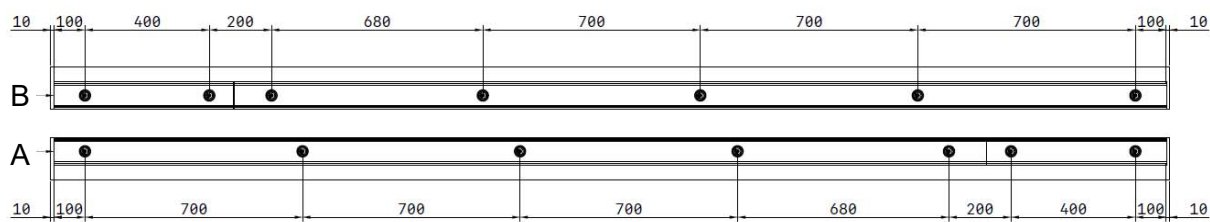
Sketch 2 – Vertical section of test specimen. Cotes in mm



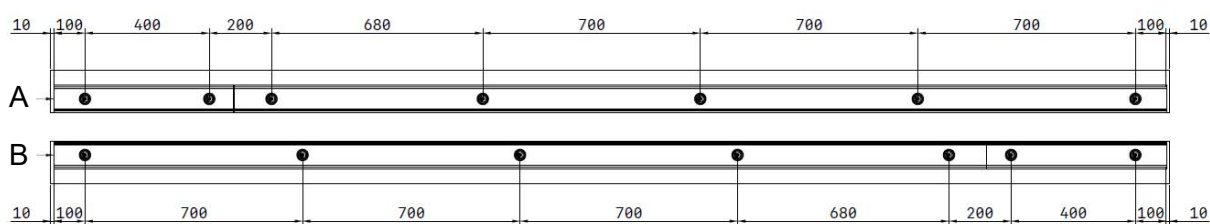
Sketch 3 – Horizontal section of test specimen



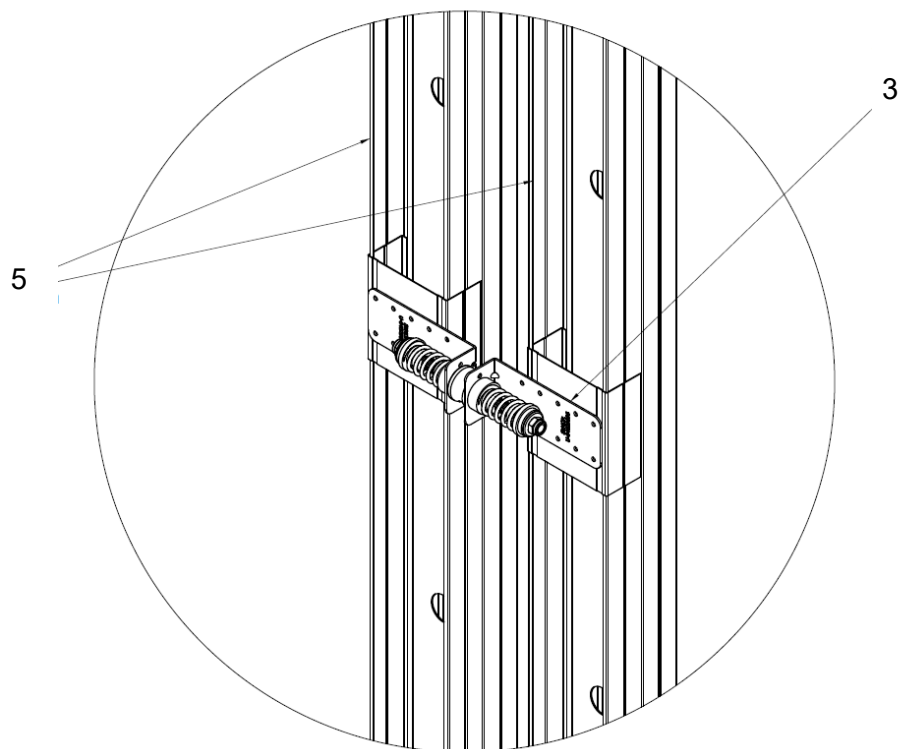
Profile fastening



Lower channels fastening

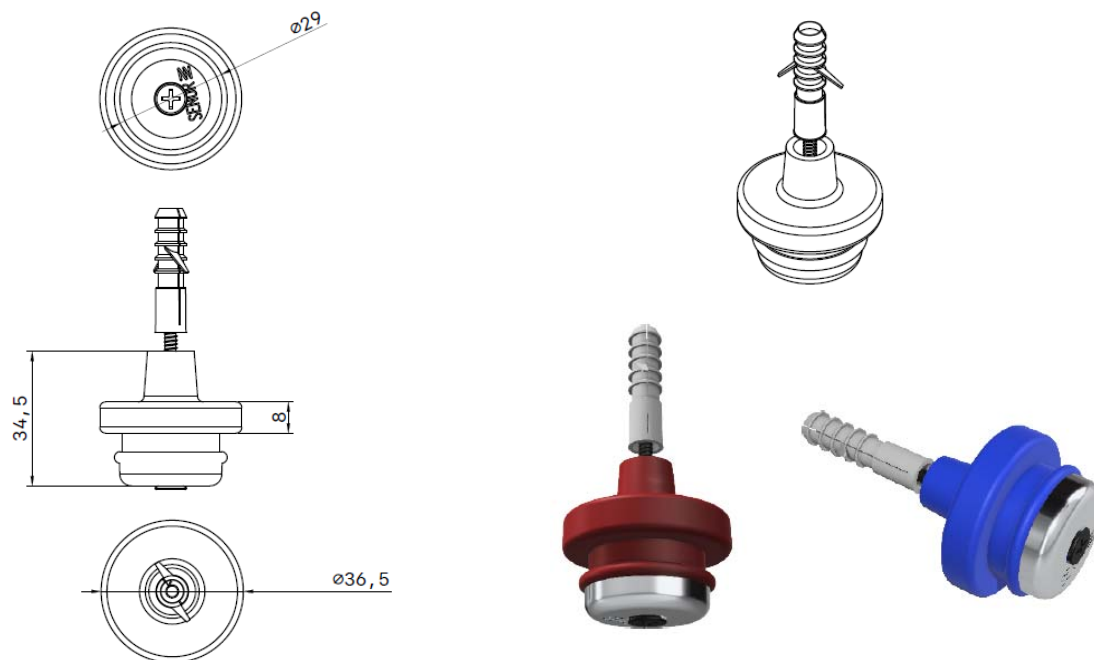


Upper channels fastening

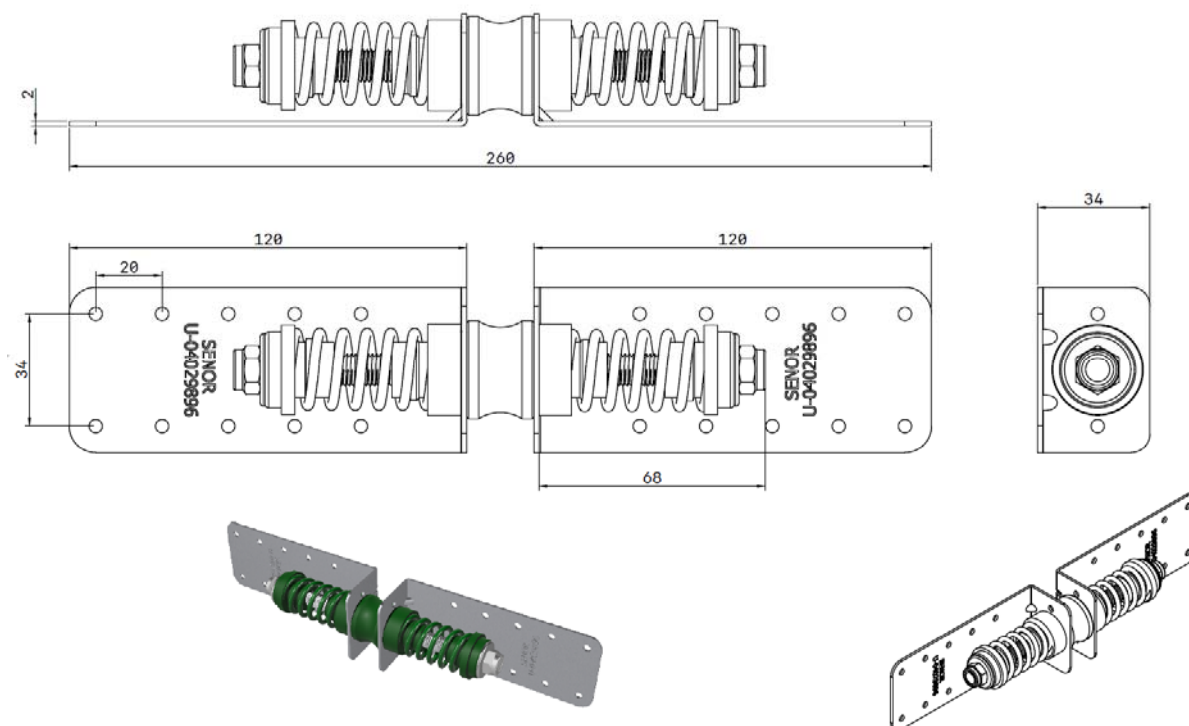


Fastening of studs of two structures



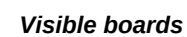


SE-TAV-500/11 R (red) and SE-TAV-500/11 A (blue) acoustic insulators



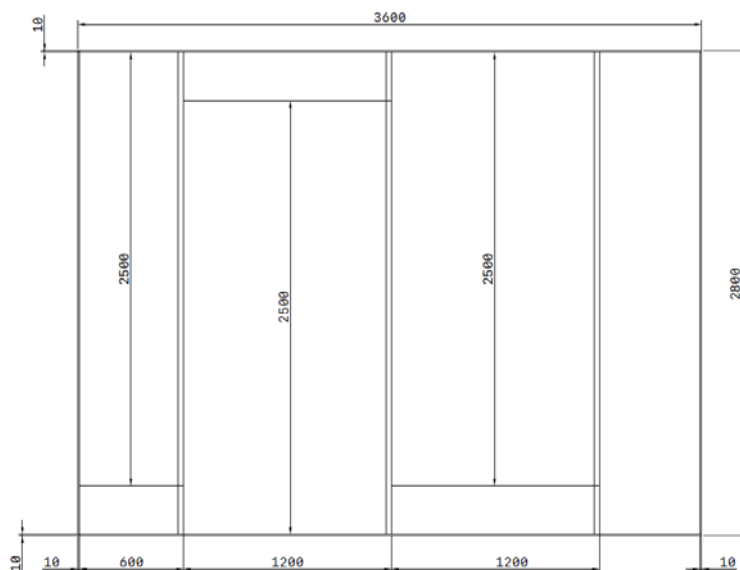
SE-9600-TBM2 acoustic dumper

Sketch 4 – Structure assembly details. Cotes in mm

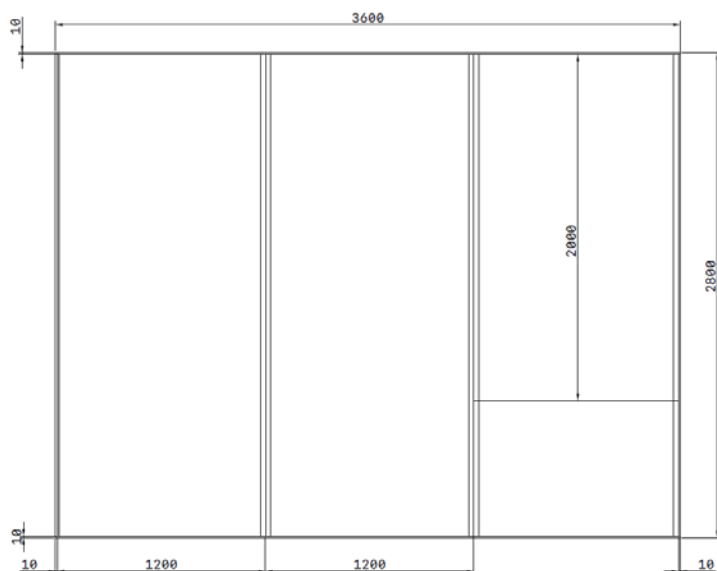


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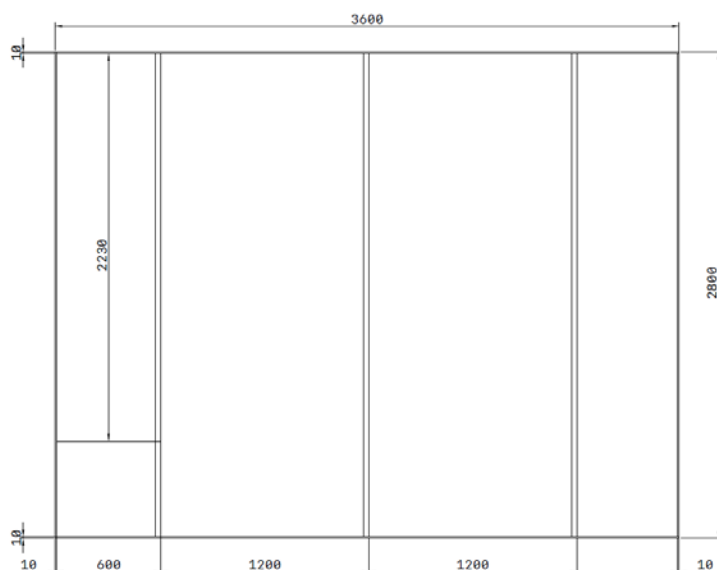




Boards against profile



Intermediate boards



Visible boards

Sketch 6 – Arrangement of laminated gypsum boards, face B. Cotes in mm





Description of materials:

1. SE-TAV-500/11R (red) - SENOR: Acoustic insulator for mechanical-elastic fixation of the upper channel to frame
2. SE-TAV-500/11A (blue) - SENOR: Acoustic insulator for mechanical-elastic fixation of the lower channel and studs to frame
3. SE-9600-TBM2 - SENOR: Acoustic dumper for mechanical-elastic fixation of studs from one structure to those of the other structure
4. PLACO R-90 CHANNEL: Galvanized steel channel, 90x30 mm and 0,55 mm thick
5. PLACO M-90 STUD: Galvanized steel stud, 88,5x39 mm and 0,6 mm thick
6. SE-BEC - SENOR: EPDM CR-130 Microcellular self-adhesive acoustic strip, 10 mm thick x 135 mm wide
7. 90 mm ARENA APTA mineral wool – ISOVER: 90 mm thick and 22 kg/m³
8. SE-MONT-BICAPA-40 - SENOR: Self-adhesive desolidarizing strip, 5,5 mm thick x 40 mm wide, composed of EPDM of 2,5 mm of thickness + cross-linked polyethylene of 3 mm of thickness
9. 15 mm PPF plasterboard – PLACO: 15 mm thick and 12,4 kg/m²

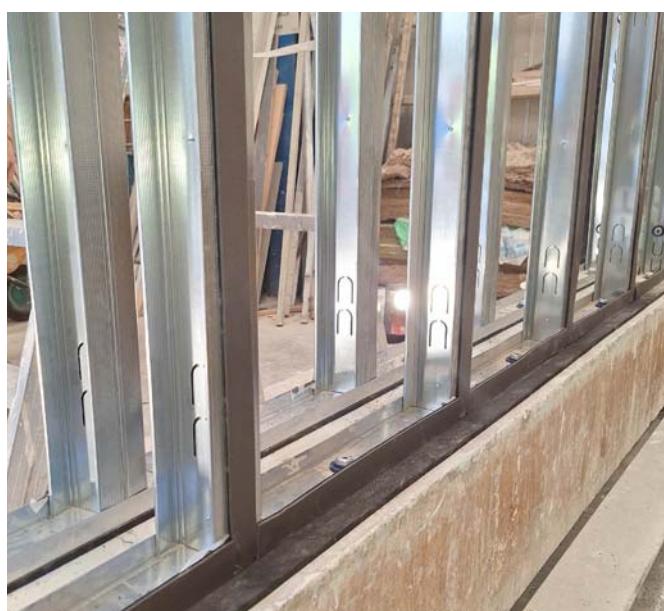
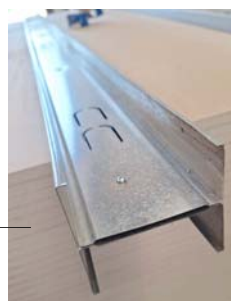
Sample mounting details:

- SE-BEC adhered to the perimeter of the frame.
- Perimeter profiles mechanically fixed to the frame using acoustic insulators. Studs inserted into channels, without mechanical fixation. 'H' shaped studs fixed together at six points.
- SE-9600-TBM2 acoustic dumpers fixed to studs using pieces of channel screwed to studs.



- SE-MONT-BICAPA-40 adhered to channels and studs on the side against plasterboard.
- Each other butt jointed boards and against SE-BEC strip. Mechanically fixed to the profiles every 750 mm for layers against profiles, every 500 mm for intermediate layers and every 250 mm for visible layers.
- Joint sealing between boards and perimeter sealing between board and SE-BEC strip using joint tape and PR1 joint compound.







Photos of assembly of the test specimen





Photos of the test specimen in the acoustic rooms

Material delivered by: SENOR (acoustic insulators, acoustic dampers and acoustic strips) and SAINT GOBAIN PLACO S.A. (remaining material).

Mounting of test specimen in the test opening:

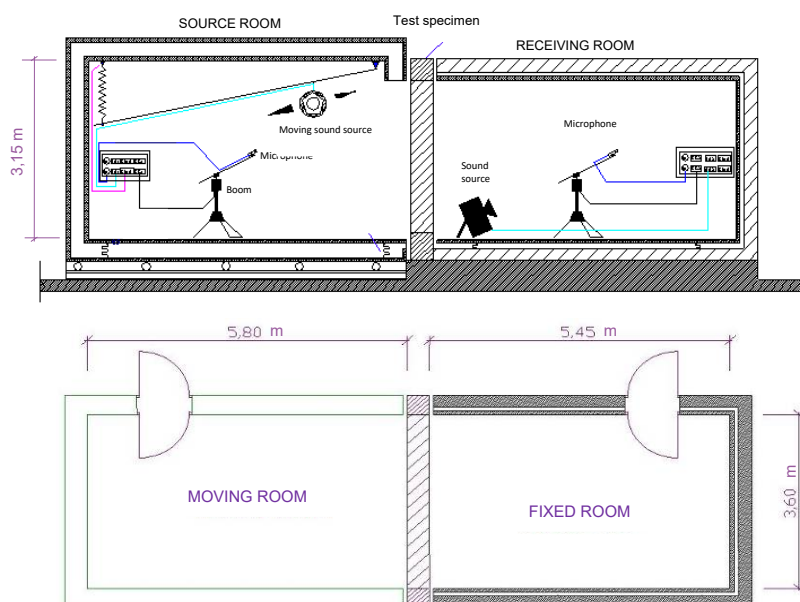
Test specimen installed in a prefabricated concrete frame, 40 cm thick and with internal dimensions of 2,8 m high x 3,6 m long.

Assembly performed by: SAINT GOBAIN PLACO S.A. and SENOR, S.L.

Assembly end date: 26/06/2024

2. LABORATORY TEST FACILITIES

The test is performed in the horizontal transmission rooms, composed of a source and a receiving room. The receiving room is formed by a concrete outer enclosure 20 cm thick and a concrete inner enclosure 10 cm thick, both acoustically disconnected. The source room, 40 cm of thickness, is formed by a double enclosure of metal profile and gypsum board, both acoustically disconnected. The mobility of the source room allows the assembly of the test specimens outside and its later movement into the test room. The rooms comply with the requirements of EN ISO 10140-5:2021.



Sketch of horizontal transmission acoustic rooms



3. EQUIPMENT AND TEST CONDITIONS

Microphones	Brüel&Kjær 4943; Serial No. 3188436	Brüel&Kjær 4943; Serial No. 3188435
Preamplifiers	Brüel&Kjær 2669; Serial No. 1948764	Brüel&Kjær 2669; Serial No. 2025844
Sound sources	Brüel&Kjær 4296; Serial No. 2071420	CERWIN VEGA; No. 012446
Booms	Brüel&Kjær 3923; Serial No. 2036584	Brüel&Kjær 3923; Serial No. 2036591
Analyzer	Nor850-MF1; Serial No. 8501186	
Amplifier	LAB 300; Serial No. 970-967	
Equalizer	Sony, SRP-E100; Serial No. 400238	
Calibrator	Brüel&Kjær 4231; Serial No. 2061477	
Atmospheric conditions meter	Source room: Rotronic BL-1D; Serial No. A21050029 Measurement uncertainty: T ($\pm 0,7$ °C), H (± 4 %), P (± 2 mbar) T: Air temperature; H: Relative humidity; P: Static pressure	Receiving room: Rotronic BL-1D; Serial No. A19060062 Measurement uncertainty: T ($\pm 0,7$ °C), H (± 4 %), P (± 5 mbar)

4. TEST PROCEDURE AND EVALUATION

The sound reduction index, R, for the one-third octave frequency bands from 100 Hz to 5 kHz is obtained according to EN ISO 10140-2:2021 using the following formula:

$$R=L_1-L_2+10*\text{Log } S/A$$

L_1 : Average sound pressure level in the source room

L_2 : Average sound pressure level in the receiving room

S: Test specimen area

A: Equivalent sound absorption area in the receiving room

The measurement of the average sound pressure levels L_1 and L_2 , is performed by emitting equalized white noise using a moving omnidirectional sound source. The sound field in the source and receiving rooms is sampled using six fixed positions of the microphone. Background noise in the receiving room is measured according to the same measurement process of sound field in the receiving room.

The equivalent sound absorption area is evaluated from the reverberation time measured in the receiving room, using Sabine's formula:

$$A=0,16*V/T$$

A: Equivalent sound absorption area in the receiving room

T: Reverberation time in the receiving room

V: Receiving room volume

Reverberation time in the receiving room is determined by using two positions of the sound source and three fixed microphone positions for each source position distributed at 120° in the microphone path.

Measuring chain is verified just before and after the execution of the test.

The guidelines indicated in the applicable internal procedures have been followed:





- PE.CM-AA-61-E: "Procedure for the determination of the airborne sound insulation into the horizontal and vertical transmission rooms".
- PE.MC-AA-06-M: "Procedure to manage the test specimens for acoustic tests in laboratory".

5. RESULTS

The following results are presented for the test specimen:

- Sound reduction index, R , for the one-third octave band from 100 to 5000 Hz, in table and graph.
- Weighted sound reduction index, R_w , calculated according to EN ISO 717-1:2020, from the sound reduction index, R .
- C y C_{tr} : Spectrum adaptation terms from 100 to 3150 Hz, calculated according to EN ISO 717-1:2020, which are the values, expressed in decibels, to be added to the global magnitude value R_w to consider the characteristics of the pink noise spectrum (C) and traffic noise spectrum (C_{tr}), respectively.
- The following Global indices calculated according to the expression of *Documento Básico "DB-HR Protección frente al ruido" - Código Técnico de la Edificación (CTE)*, from the sound reduction index, R , obtained by laboratory measurement:
 - A-weighted sound reduction index, R_A , from 100 to 5000 Hz, expressed to one decimal place.
 - A-weighted sound reduction global index for exterior traffic noise, from 100 to 5000 Hz, expressed to one decimal place.

The R value marked with * means that is greater than or equal to the indicated value, due to the approximation in less than 15 dB for the R'_{max} of the test facilities. The global index marked with ** means that is greater or equal to the indicated value, due to the limit values in frequencies marked with *.

F(Hz)	100	125	160	200	250	315	400	500	630
R'_{max} (dB)	59,8	65,3	66,6	67,5	76,9	80,8	87,1	90,0	90,5
F(Hz)	800	1000	1250	1600	2000	2500	3150	4000	5000
R'_{max} (dB)	92,0	89,8	97,3	102,2	103,1	102,4	101,2	96,9	94,1



Airborne Sound Insulation according to EN ISO 10140-2:2021 Laboratory Measurements

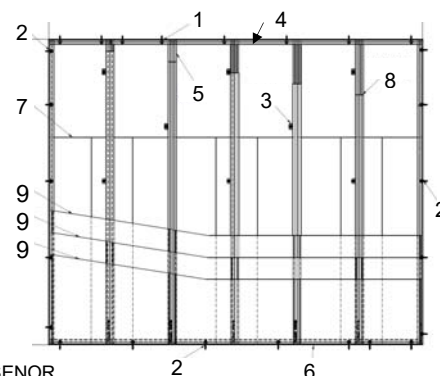
CLIENT: **SUSPENSIONES ELÁSTICAS DEL NORTE, S.L. (SEÑOR)**

TEST DATE: 11/07/2024

RESULT No.: 112780-781

TEST SPECIMEN:

SEÑOR+PLACO high-performance acoustic partition with double structure EI180



Estimated superficial mass: 78 kg/m²

Test specimen area: 10,08 m²

V_{src}: 65,2 m³ V_{rec}: 55,2 m³

T_{src}: 21,2 °C T_{rec}: 21,4 °C

H_{src}: 66 % H_{rec}: 67 %

P_{src}: 958 mbar P_{rec}: 958 mbar

V: volume; src: source room;

rec: receiving room

1. SE-TAV-500/11R (red) acoustic insulator – SEÑOR

2. SE-TAV-500/11A (blue) acoustic insulator SEÑOR

3. SE-9600-TBM2 acoustic dumper – SEÑOR

4. PLACO R-90 CHANNEL

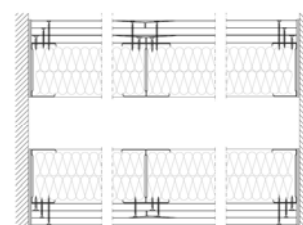
5. PLACO M-90 STUD

6. SE-BEC acoustic strip – SEÑOR

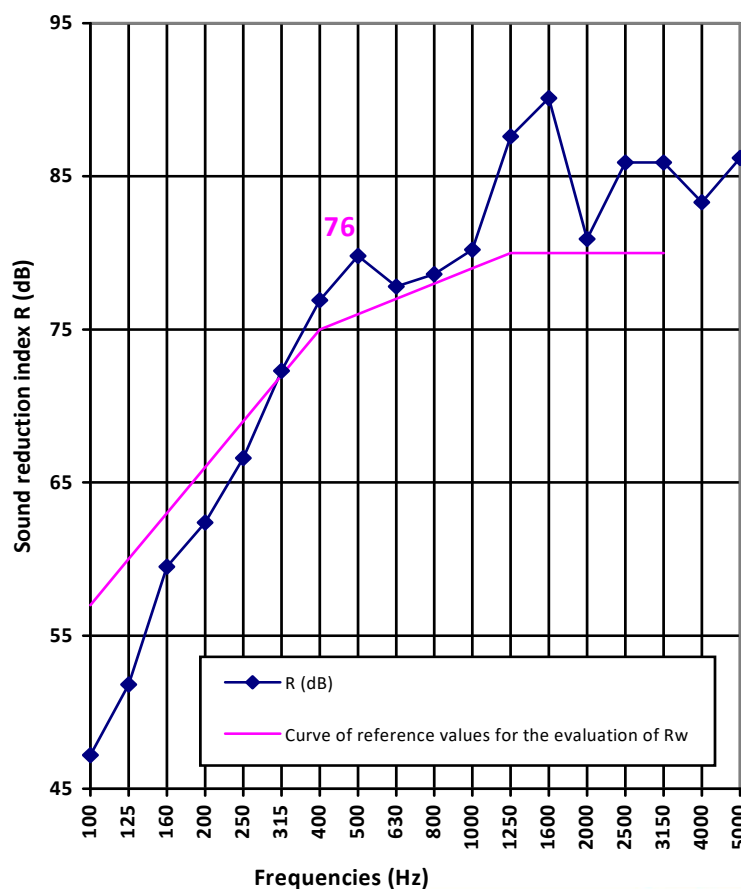
7. 90 mm ARENA APTA mineral wool – ISOVER

8. SE-MONT-BICAPA-40 desolidarizing strip – SEÑOR

9. 15 mm PPF plasterboard – PLACO



f (Hz)	R (dB)
100	47,2 *
125	51,8 *
160	59,5 *
200	62,4 *
250	66,6 *
315	72,3 *
400	76,9 *
500	79,8 *
630	77,8 *
800	78,6 *
1000	80,2 *
1250	87,6 *
1600	90,1 *
2000	80,9
2500	85,9
3150	85,9
4000	83,3 *
5000	86,2 *



Rating according to EN ISO 717-1:2020: **R_w (C;C_{tr}): 76 (-4; -11) dB ****

Rating according to CTE DB-HR: **R_A: 73,1 dBA ****

R_{A,tr}: 65,1 dBA **

* R' ≥ indicated value (measurement limit by approx. R'_{max}). ** Global index ≥ indicated value

Evaluation based on laboratory measurement results obtained by an engineering method

