Audiotec
INGENIERÍA ACÚSTICA

LABORATORY ACOUSTIC TEST REPORT

AMC
MECANOCAUCHO

Industrialdea Zona A. Pab 35.
Asteasu E-20159, Gipuzkoa

System: Concrete reference slab, 14 cm + "Akustik + Sylomer® 25 Floor Mount" with 50 x 50 mm wooden battens with 45 mm mineral wool between the battens + Rigidur Flooring Element 20 mm + Rigidur H BR 13 mm plasterboard

Ref: CAM20090054-3/IMP-MEJ

Date of issue:
October 30th, 2020

AUDIOTEC INGENIERÍA ACÚSTICA S.A.
CENTRO TECNOLÓGICO DE ACÚSTICA
C/Juanelo Turriano, 4.
Parque Técnológico de Boecillo.
47151 Boecillo (Valladolid)
Tlf: 902 37 37 99
e-mail: mediciones@audiotec.es

TEST REPORT

TEST LOCATION	**CÁMARAS DE ENSAYO NORMALIZADAS DE AUDIOTEC. C/JUANELO TURRIANO, 4. PARQUE TECNOLÓGICO DE BOECILLO. BOECILLO. (VALLADOLID) ESPAÑA**
TEST	Laboratory measurement of the improvement of airborne sound insulation of a horizontal enclosure
SAMPLE	**Supporting enclosure:** Concrete reference slab, 14 cm thick. **Covering:** "Akustik + Sylomer® 25 Floor Mount", made by AMC, with 50 x 50 mm wooden battens with 45 mm mineral wool between them + Rigidur Flooring Element 20 mm + Rigidur H BR 13 mm plasterboard
TEST METHOD	**UNE EN ISO 10140-1:2016. Annex H** **UNE EN ISO 10140-3:2011**
CUSTOMER	**AMC Mecanocaucho** Industrialdea Zona A. Pab 35. Asteasu E-20159, Gipuzkoa
TEST DATE:	**October 14th and 19th, 2020**

Technician

Firmado digitalmente por ARENAZ GOMBAU ANGEL MARIA - 11954820H
Nombre de reconocimiento (DN): c=ES, serialNumber=IDCES-11954820H, givenName=ANGEL MARIA, sn=ARENAZ GOMBAU, cn=ARENAZ GOMBAU ANGEL MARIA - 11954820H

Signed: Ángel Arenaz Gombau
Laboratory Technical Director

CONTENT

1.- TEST OBJECT

Evaluation in standardized test rooms of the impact sound reduction, ΔL_w, transmitted through a floor covering over a heavy standardized slab of 140 mm.

Construction system identification: Sistema horizontal compuesto por:

- **Supporting enclosure:** Concrete reference slab, 14 cm thick.
- **Covering:** "Akustik + Sylomer® 25 Floor Mount", made by AMC, with 50 x 50 mm wooden battens with 45 mm mineral wool between them + Rigidur Flooring Element 20 mm + Rigidur H BR 13 mm plasterboard

The covering of the floor, due to its characteristics, belongs to Category II, according to paragraph H.2.2.2 of Annex H of the standard UNE EN ISO 10140-1:2016.

The test has been carried out in AUDIOTEC's standardized test rooms in Boecillo Technology Park (Valladolid).

2.- TEST PROCEDURE

2.1- Procedures and standards used

The test has been carried out taking into account the following laboratory standards and procedures:

- *UNE-EN ISO 10140-3:2011. Acoustics. Laboratory measurement of impact sound insulation.*
- *Annex H of UNE-EN ISO 10140-1:2016 (Floor coverings. Improvement of impact sound insulation).*
- *Annexo C of UNE-EN ISO 10140-5:2016 (Standard floors for measuring the improvement of impact sound insulation of floor coverings.)u*
- *Measurement procedure and calculations presented in specific procedures PE-37 and PE-39 of AUDIOTEC's Acoustics Laboratory.*

2.2.- Methodology and test parameters

The rooms where the test was carried out comply with the regulations and requirements established in the UNE EN ISO 10140-5:2011 Standard. They are vertically adjacent rooms. One of them, the lower one or receiving, is fixed and sits under the floor level. The other one, the upper one or source room, is mobile and is placed over the slab to be tested. Both have the shape of irregular 6-faced prisms without parallel corners. The walls of the receiving room are 30 cm concrete walls and inner acoustic claddings covered with 15 mm plasterboard. It's volume is 52,8 m^3. Upper chamber's walls are made of a 15 cm sandwich metal structure on the outside, reinforced with acoustic insulating and absorbing materials and an inside acoustic cladding.

Two tests were performed; the first one with the complete system, being the supporting element and the covering, and, afterwards, the supporting element alone was tested. The methodology is the same for each of the tests and is described below:

For each of the tests, a standardized tapping machine was placed successively in five positions distributed on the tested surface.

For each position of the machine, three measurements were made with a rotating microphone in the diffuse field area of the receiving room. The microphone stayed at a minimum distance of 0.7 m from the side walls and 1 m from the sample under test. The scanning radius of the microphone was of 1 m with a minimum inclination of 10º.

The time of each measurement was 48 seconds (3 full sweeps), enough time for the signal to stabilize.

The measurements were made in each of the 1/3 octave bands between 100 and 5000 Hz.

Afterwards, the background noise in the receiving room was measured with no tapping machine.

In order to measure the reverberation time, 2 loudspeaker positions were used in the receiving room with a separation of more than 3 m between them.
For each loudspeaker position, 3 microphone positions were used in the receiving room to measure the reverberation. All of them were at a distance of more than 1 m from the side walls, 1.8 m between them and 2 m from the loudspeaker. Two measurements were taken in each position and the respective averages were obtained. The TR20 was measured.

2.3.- Instrumentation used

The instrumentation used in this test was the following:

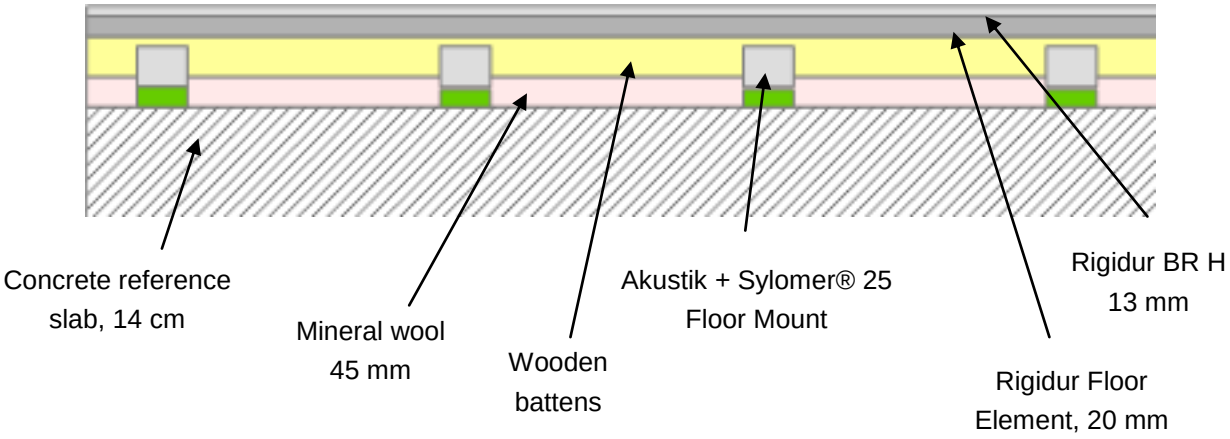
- Standardized tapping machine Brüel & Kjaer, type 3207, serial number 2705758.
- Brüel & Kjaer Sound source type 4292, serial number 004007.
- PULSE Analyzer, model B&K 3560-B-030, serial number 2538701.
- PHONIC MAX 860 Amplifier, serial number ABA2GBA171.
- Third octave band equalizer BEHRINGER model DEQ2496.

- B&K Microphone 4189, serial number 2534182, and B&K preamp 2669, serial number 2532870.
- B&K Microphone 4189, serial number 2345614, and B&K preamp 2669, serial number 2532823.
- B&K Sound calibrator type 4231, class 1, serial number 2136530.
- BARIGO Thermoanemometer, model num. 525.

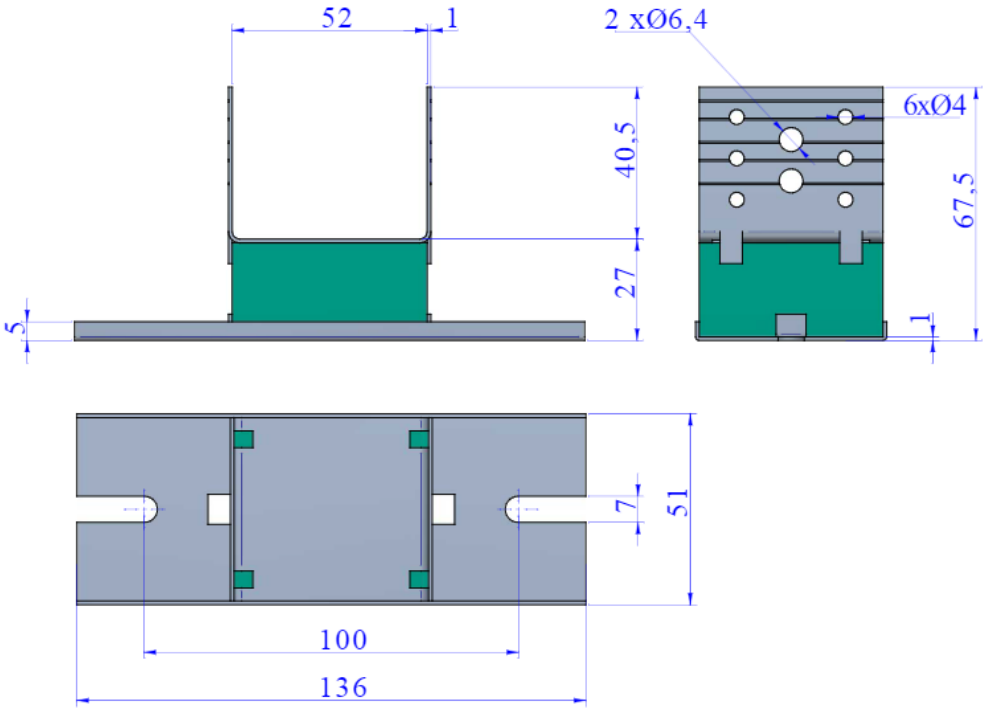
2.4.- Product identification and sample description

PRODUCT	DIMENSIONS	BRAND/MODEL	ESSENTIAL PROPERTIES	
Concrete reference slab (supporting closing)	400 x 440 cm	--	Mass per unit area	351 kg/m^2
			Surface	17.6 m^2
Floor mount	--	Akustik + Sylomer® 25 Floor Mount	Maximum load	25 kg
				55 lbs
Sylomer	--	SR11	Thickness	12 mm
Wooden battens	50 x 50 mm	--	--	--
Mineral wool	--	--	Thickness	45 mm
Rigidur Flooring Element 20	150 x 50 mm (length x width)	--	Thickness	20 mm
Rigidur H BR 13 plasterboard	2400 x 1200 mm (length x width)	--	Thickness	13 mm
Rigidur glue	--	--	--	--
Screws	--	--	--	--
Silicone	--	--	--	--
Fast fix adhesive	--	--	--	--

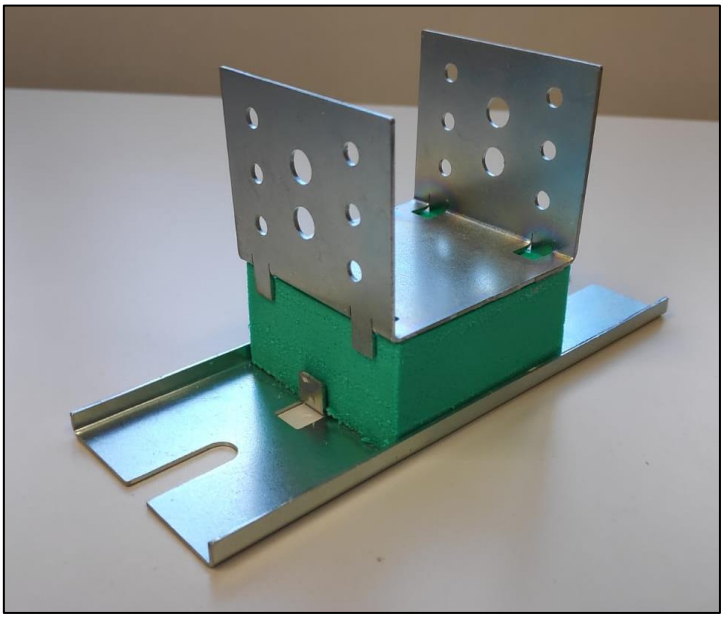
Sample sketch:



Mount sketch (dimensions in millimeters):



Mount picture:



2.5.- Sample installation process

The standardized reference slab was installed between the receiving and the source room.

Over the slab, the mounts “Akustik + Sylomer® 25 Floor Mount” were fixed using fast fix adhesive. 8 mount rows were installed, with a separation of 50 cm between them, and a separation of 50 cm between the mounts of each row. Next, the wooden battens were placed and screwed over each mount row.

After that, Sylomer SR11 was installed in the whole perimeter in order to avoid direct contact between the floating floor and the chamber. In the gaps between the battens, strips of 45 mm thick mineral wool were installed. Rigidur Flooring Element 20 mm boards with rebate edges were installed on the battens. The boards were fixed using special glue and screws. Over this first board floor, another plasterboard was installed, using as well glue and screws to fix them. Last, joints between boards were sealed with joint paste, and the perimeter was sealed with silicone.

2.6.- Test characteristics and conditions

Approximate nominal thicknes of the system: 25 cm (slab, 14 cm + mounts, 2.7 cm + battens, 5 cm + flooring element board, 2 cm + second plasterboard, 1.3 cm). Mass per unit area of the system: 396.1 kg/m^2 (slab, 351 kg/m^2 + mounts, 0.6 kg/m^2 + battens, 5.5 kg/m^2 + flooring element board, 24.1 kg/m^2 + second plasterboard, 15 kg/m^2).

Dimensions of the measurement aperture are 3.3 m wide per 3.675 m long. Common surface between the chambers is 12.12 m^2.

Approximate sample surface is 14,58 m^2.

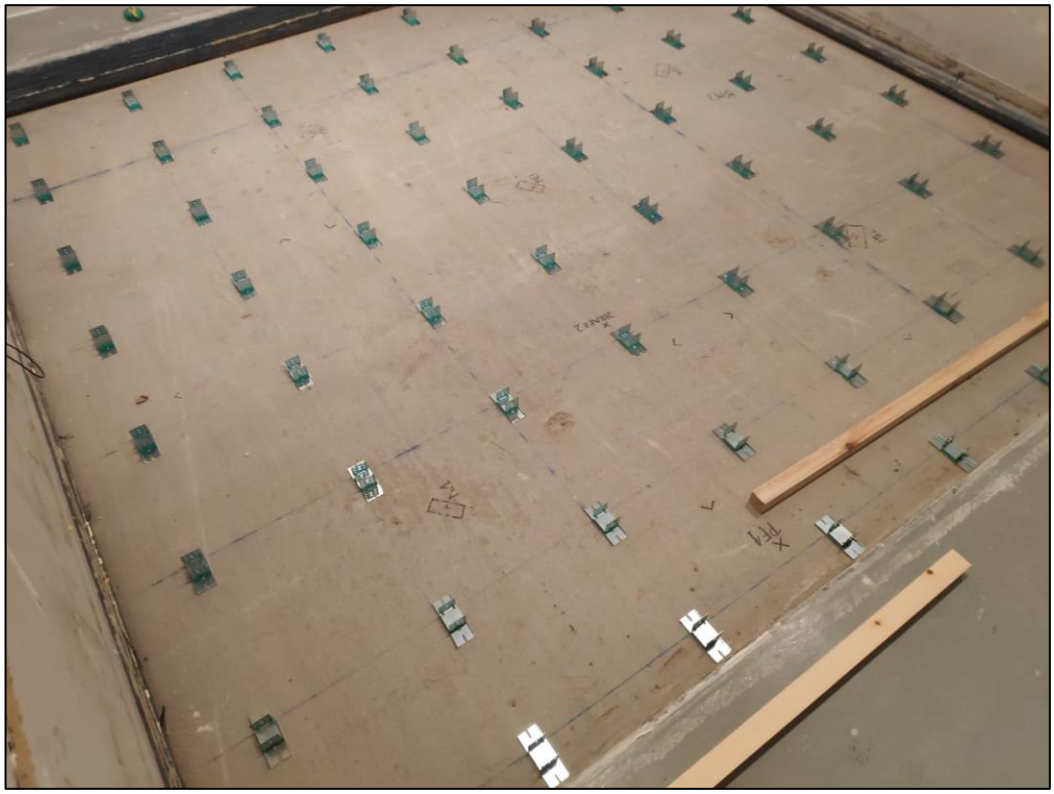
The tested sample was installed by operators outsourced by AUDIOTEC.

Upper room volume is 58,35 m^3 and lower room volume is 52,83 m^3.

For the test of the supporting slab:
In the source room temperature was 22.15 ºC ± 0,1; relative humidity was 48.5 % ± 1,4; and static pressure was 960 hPa ± 0.
In the receiving room temperature was 21.55 ºC ± 0,1; relative humidity was 47.5 % ± 0; and static pressure was 960 hPa ± 0.

For the test of the complete system:
In the source room temperature was 21,0 ºC ± 0,1; relative humidity was 46,1 % ± 0; and static pressure was 1022 hPa ± 0.
In the receiving room temperature was 21,6 ºC ± 0,1; relative humidity was 45,8 % ± 0; and static pressure was 1022 hPa ± 0.

2.7.- Pictures of assembly



3.- TEST RESULTS.

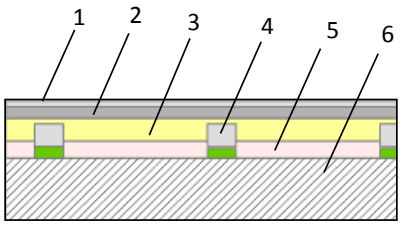
For the tested system, a page is shown containing:

- A brief description of the tested sample.
- A chart and a graphic with the values of the impact sound reduction provided by the floor covering, ΔL.
- A chart with the standardized impact sound pressure level of the heavy slab used in the test, L_{n0}.
- A global value of the weighted impact sound reduction, ΔL_w, as well as the global value of L_{nwr} and L_{nw0}, calculated according to the standard UNE EN ISO 717-2.

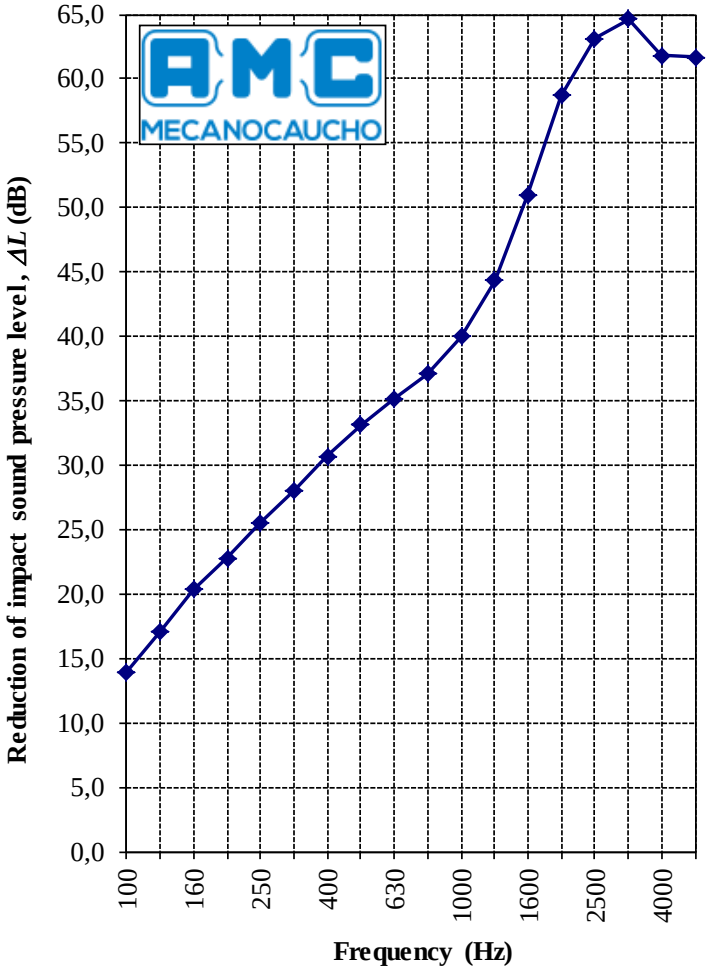
Notes:

- The results of this test only concern the tested elements and in the moment and conditions in which the measurements were made.
- Measurement uncertainty is available to the customer in AUDIOTEC Acoustics Laboratory.
- This report must not be reproduced by any means unless it is made entirely and with the AUDIOTEC S.A. Acoustics Laboratory authorization.
- The standard UNE EN ISO 10140-3:2011 replaces UNE EN ISO 140-6:1999.
- Annex H of UNE EN ISO 10140-1:2016 replaces Annex H of UNE EN ISO 10140-1:2011, which in turn replaces UNE EN ISO 140-8:1998.

Customer: AMC Mecanocaucho
Identification of the sample:
(1) Rigidur H BR plasterboard, 13 mm
(2) Rigidur Flooring Element, 20 mm
(3) Wooden battens, 5 cm
(4) **A**kustik + Sylomer® 25 Floor Mount
(5) Mineral wool, 45 mm
(6) Concrete reference slab, 14 cm
Test method: UNE-EN ISO 10140-1, Annex H. Category II sample
Thickness: 25 cm; **Mass per unit area:** 396,1 kg/m2



Freq *f* *Hz*	$L_{n,0}$ dB	ΔL dB
100	58,8	13,9
125	58,6	17,1
160	63,1	20,3
200	64,7	22,8
250	68,4	25,5
315	70,0	28,1
400	71,7	30,7
500	72,8	33,1
630	73,4	35,2
800	72,9	37,1
1000	71,1	40,0
1250	70,5	44,3
1600	70,5	50,9
2000	69,3	58,7
2500	68,9	63,1
3150	69,5	64,7
4000	68,4	61,8
5000	68,1	61,7



Weighted reduction of impact sound pressure level according to the standard ISO 717-2:2013

ΔL_w = 38 dB CIΔ = -13 dB Ln w,r = 40 dB CI,r = 2 dB
Ln w,0 = 76 dB CI,0 = -9 dB

Test date:
October 14th and 19th, 2020

Technician:
Firmado digitalmente por ARENAZ GOMBAU ANGEL MARIA - 11954820H
Nombre de reconocimiento (DN): c=ES, serialNumber=IDCES-11954820H, givenName=ANGEL MARIA, sn=ARENAZ GOMBAU, cn=ARENAZ GOMBAU ANGEL MARIA - 11954820H

Signed: Ángel Arenaz

Audiotec

INGENIERÍA ACÚSTICA

902 37 37 99

www.audiotec.es

laboratorio@audiotec.es

ISO 9001

ISO 14001

efr pyme empresa familiarmente responsable

000 / 02-2008 / CERTIF

ENAC

ENSAYOS

Nº149/LE367

ÓPTIMA CONCILIACIÓN