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Sample ID: IRON

	TEST	METHOD	RESULT
*	Acoustics — Measurement Of Sound Insulation In Buildings And Of Building Elements — Part 3: Laboratory Measurement Of Airborne Sound Insulation Of Building Elements	ISO 140-3	See result table



Seal

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Environment

The requirements and standards apply to equipment intended for use in :

X	Residential (domestic) environment
X	Commercial and light-industrial environment
X	Industrial environment
X	Medical environment
X	Used in outdoor environments



**ISO 140-3 : Acoustics — Measurement Of Sound Insulation In Buildings And Of Building Elements
— Part 3: Laboratory Measurement Of Airborne Sound Insulation Of Building Elements****Scope**

This part of ISO 140 specifies a laboratory method of measuring the airborne sound insulation of building elements such as walls, floors, doors, windows, façade elements and façades, except those classified as small building elements . The results obtained can be used to design building elements with appropriate acoustic properties, to compare the sound insulation properties of building elements and to classify such elements according to their sound insulation capabilities.

Test Procedure And Evaluation**- Generation of sound field in the source room**

The sound generated in the source room shall be steady and have a continuous spectrum in the frequency range considered. If filters are used, use those with a bandwidth of at least one-third octave. If broad-band noise is used, the spectrum may be shaped to ensure an adequate signal-to-noise ratio at high frequencies in the receiving room. In either case, the sound spectrum in the source room shall not have differences in level greater than 6 dB between adjacent one-third-octave bands.

The sound power should be sufficiently high for the sound pressure level in the receiving room to be at least 15 dB higher than the background level in any frequency band.

If the sound source enclosure contains more than one loudspeaker operating simultaneously, the loudspeakers shall be driven in phase or it shall be assured in other ways that the radiation is uniform and omnidirectional. It is permissible to use multiple sound sources simultaneously, provided that they are of the same type and are driven at the same level by similar, but uncorrelated, signals. Continuously moving loudspeakers may be used. When using a single sound source, it shall be operated in at least two positions. They shall be in the same room or the measurements shall be repeated in the opposite direction by changing source and receiving room with one or more source positions in each room. If one surface of the test object is significantly more absorbent than the other, the measurements shall be made in one direction only.

Place the loudspeaker enclosure so as to give a sound field as diffuse as possible and at such a distance from the test specimen that the direct radiation upon it is not dominant. The sound fields in the rooms depend strongly on the type and on the position of the sound source. Guidance for the use of continuously moving loudspeakers.

- Measurement of average sound pressure level**--General**

Obtain the average sound pressure level by using a single microphone moved from position to position, or by an array of fixed microphones, or by a continuously moving microphone, or by swinging the microphone.

The sound pressure levels at the different microphone positions shall be averaged on an energy basis for all sound source positions.

--Microphone positions

As a minimum, five microphone positions shall be used in each room; these shall be distributed within the maximum permitted space throughout each room, spaced uniformly.

The following separating distances are minimum values and shall be exceeded where possible:

0,7 m between microphone positions;

0,7 m between any microphone position and room boundaries or diffusers;



1,0 m between any microphone position and the sound source;

1,0 m between any microphone position and the test specimen.

When using a moving microphone, the sweep radius shall be at least 1 m. The plane of the traverse shall be inclined in order to cover a large proportion of the permitted room space and shall not lie in any plane within 10° of a room surface. The duration of a traverse period shall be not less than 15 s.

-- Averaging time

At each individual microphone position, the averaging time shall be at least 6 s at each frequency band with centre frequencies below 400 Hz. For bands of higher centre frequencies, it is permissible to decrease the time to not less than 4 s. Using a moving microphone, the averaging time shall cover a whole number of traverses and shall be not less than 30 s.

- Frequency range of measurements

The sound pressure level shall be measured using one-third-octave band filters having at least the following centre frequencies, in hertz:

100	125	160	200	250	315
400	500	630	800	1000	1250
1600	2000	2500	3150	4000	5000

- Measurement of reverberation time and evaluation of the equivalent sound absorption area

The correction term of equation containing the equivalent sound absorption area is evaluated from the reverberation time measured according to ISO 354 and determined using Sabine's formula

$$A = \frac{0,16V}{T}$$

A is the equivalent sound absorption area, in square metres;

V is the receiving room volume, in cubic metres;

T is the reverberation time in the receiving room, in seconds.

Following ISO 354, the evaluation of the reverberation time from the decay curve shall begin about 0,1 s after the sound source has been switched off, or from a sound pressure level a few decibels lower than that at the beginning of the decay. The range used shall not be less than 20 dB, and should not be so large that the observed decay cannot be approximated by a straight line. The bottom of this range shall be at least 10 dB above the background noise level.

The minimum number of decay measurements required for each frequency band is six. At least one loudspeaker position and three microphone positions with two readings in each case shall be used.

Moving microphones which meet the requirements of may be used but the traverse time shall be not less than 30 s.



Manufacturer : AGENCIA DE ENERGIA ALTERNATIVA 2020SL

Client : -

Test specimen mounted by : -

Description of test facility, test specimen and test arrangement : liquid insulation sample

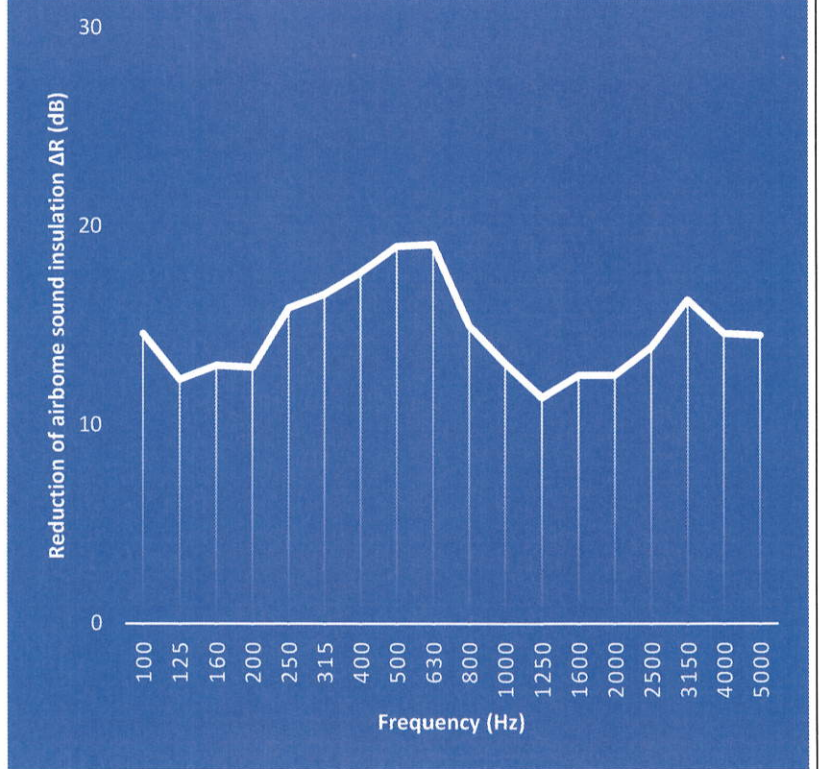
Area S of test specimen : 1.28 m²

Air temp. in the test rooms : 24°C

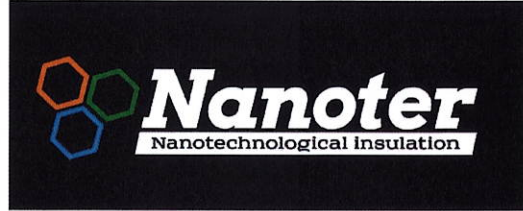
Air humidity in the test rooms : %55

Sample : IRON

f (Hz)	R _{with} (dB)	R _{without} (dB)	ΔR (dB)
100	50,1	35,5	14,6
125	54,6	42,3	12,3
160	55,8	42,8	13,0
200	58,5	45,6	12,9
250	62,1	46,2	15,9
315	64,9	48,3	16,6
400	68,1	50,4	17,7
500	70,7	51,7	19,0
630	72,2	53,1	19,1
800	72,5	57,5	15,0
1000	72,9	59,8	13,1
1250	72,6	61,2	11,4
1600	74,3	61,8	12,5
2000	78,2	65,7	12,5
2500	83,1	69,2	13,9
3150	88,6	72,3	16,3
4000	89,1	74,5	14,6
5000	90,7	76,2	14,5



IMAGE



END OF REPORT

