

All tests in this report are executed according to the ISO 9001
 certified Quality management system of the BBRI

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TEST REPORT

Laboratory	ACOUSTICS (AC)	O/References	DE631xB253 AC6716bis-E Page 1 / 8
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Requested by	INSULCO Rue Buisson aux Loups, 1a B-1400 NIVELLES		
Date of the order	03-12-2013	Nr. Test element	2015-25-2
Date of the test	17-06-2015	Receipt of the test element	15-06-2015
Remark(s)	<i>This report cancels and replaces the report AC6716-E of 01/07/2015.</i>	Drafting date of the report	17-09-2015
Test carried out	Laboratory measurement of impact sound insulation of floors and of the reduction of impact noise by linings on a timber floor construction		
Product tested	INSULWOOD		
References	EN ISO 10140:2010 Acoustics – Measurement of sound insulation in buildings and of building elements - Part 1: Application rules for specific products - Part 3: Measurement of impact sound insulation - Part 5: Requirements for test facilities and equipment EN ISO 717-2:2013 Acoustics - Rating of sound insulation in buildings and of building elements - Part 2: Impact sound insulation (ISO 717-2:2013)		

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 Each page of the original report has been stamped (in red) by the laboratory and initialised by the head of laboratory.
 The results and findings are only valid for the tested samples.*

- No sample
 Sample(s) submitted to a destructive test
 Sample(s) to be removed from our laboratories 10 calendar days after sending of the report, unless a written request is received by the demander of the test



The engineer in charge of the test,
ing. M. Gehu



Technical responsible,
F. Corbugy



Head of the Laboratory,
ir. D. Wuyts

Technical Assistant: /



NORMALIZED IMPACT SOUND PRESSURE LEVEL

NIVEAU DU BRUIT DE CHOC NORMALISÉ / GENORMALISEERD CONTACTGELUIDNIVEAU

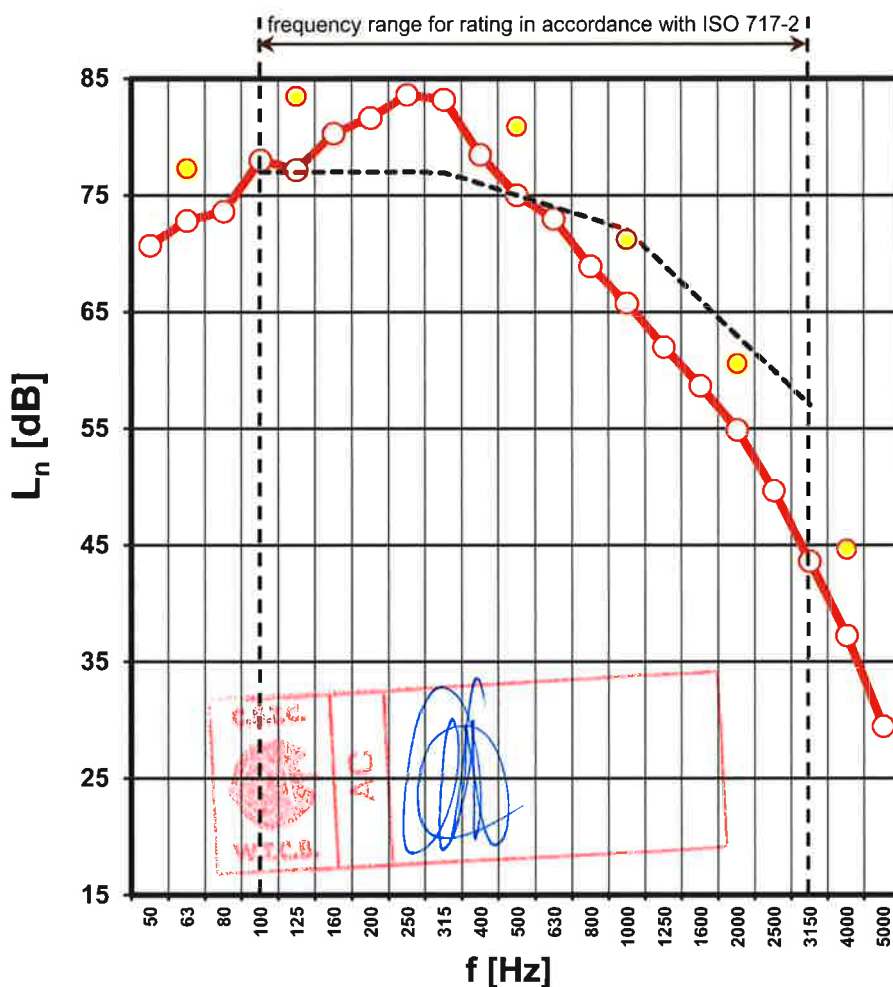
EN ISO 10140-3:2010 Acoustics – Measurement of sound insulation in buildings and of building elements – Part 3: Measurement of impact sound insulation

EN ISO 717-2:2013 Acoustics – Rating of sound insulation in buildings and of building elements – Part 2: Impact sound insulation

Date of Test / Testdatum / Date d'essais / Prüfdatum: 17/06/2015
Source room / Zendruimte / Salle d'émission / Senderaum: /
Receiving room / Ontvangstruimte / Salle de réception / Empfangsraum: D V = 62.99 m³ % H₂O = 45.9 % T = 22.1 °C
Test sample / Testelement / Elément de l'essai / Testelement: S_{testelement} = 10.7 m²
Load-bearing floor / Draagvloer / Plancher support / Lagerboden: S_{load-bearing floor} = 10.7 m²

f (Hz)	L _n (dB)
1/3 octaves	
50	70.7
63	72.8
80	73.6
100	78.0
125	77.2
160	80.3
200	81.6
250	83.6
315	83.2
400	78.5
500	75.0
630	73.0
800	68.9
1000	65.8
1250	62.0
1600	58.7
2000	54.9
2500	49.7
3150	43.6
4000	37.3
5000	29.5

octaves	L _n (dB)
63	77.3
125	83.5
250	87.7
500	80.9
1000	71.2
2000	60.6
4000	44.6



L _{n,w} = 75 dB	C ₁ = 0 dB	C _{1,50-2500} = 0 dB	cat = /
L _{n,t,r,w} = 59 dB	C _{1,t,r} = 1 dB		
ΔL _{t,w} = 16 dB	C _{1,t,Δ} = -4 dB		ΔL _{t,lin} = 12 dB

Single-value ΔL_{t,w} calculated according to EN ISO 10140-5:2010 - Annex C, from the one-third-octave band values L_{n,t,r,0} of the lightweight reference floor C3.

Description by the producer - Beschrijving door de fabrikant - Description par le fabricant

Acoustical underlayer INSULWOOD 6,5 mm for wooden floors, placed under 2 layers of 12.5 mm OSB. The underlayer is made up of a laminated high-density polyethylene film on a closed cells physically reticulated polyolefin acoustic foam and assembled on an acoustic resilient felt - total thickness ±6.5 mm - weight ±650 g/m² - colour : black/beige/anthracite.

Characteristics of the basic test floor - Beschrijving van basistestvloer - Description du plancher d'essai de base

Timber floor composed of wooden beams, sections 65 mm x 180 mm and 450 mm (400 mm on the extremities). One layer of OSB boards (tongued and grooved) with thickness 22 mm is screwed on the wooden joists.



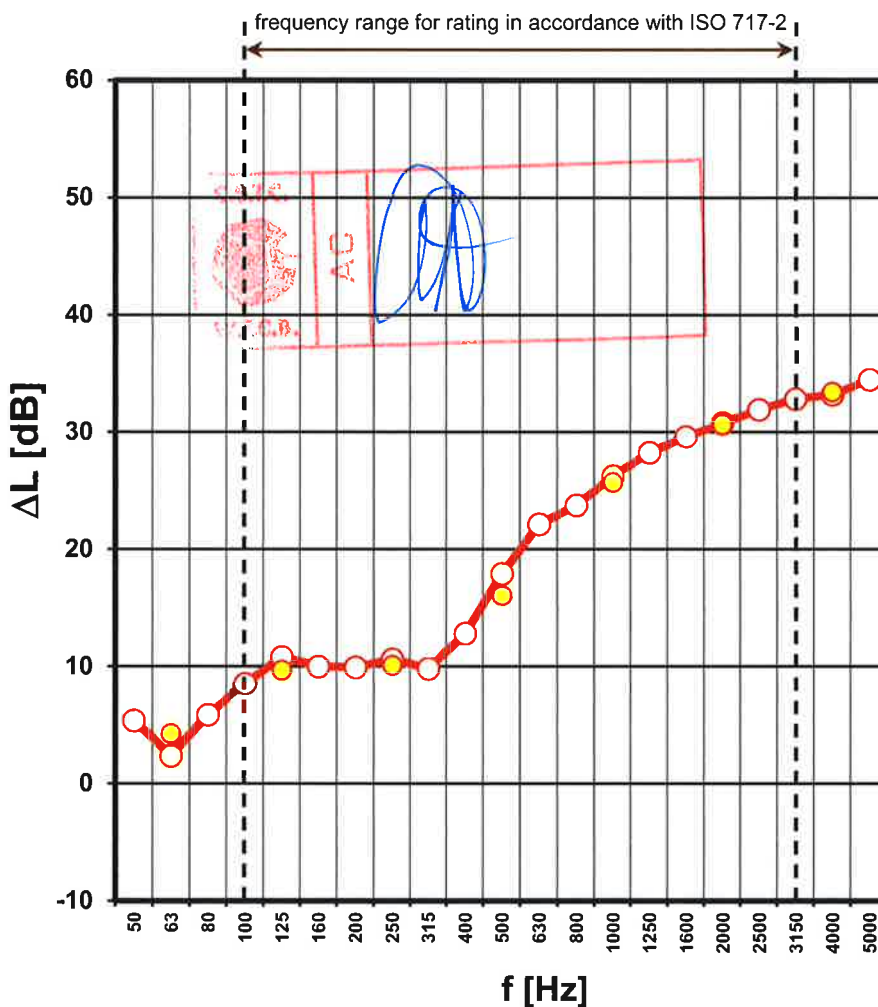
REDUCTION OF IMPACT SOUND PRESSURE LEVEL
AFFAIBLISSEMENT ACOUSTIQUE BRUT / CONTACTGELUIDNIVEAUREDUCTIE

EN ISO 10140-3:2010 Acoustics – Measurement of sound insulation in buildings and of building elements – Part 3: Measurement of impact sound insulation
 EN ISO 717-2:2013 Acoustics – Rating of sound insulation in buildings and of building elements – Part 2: Impact sound insulation

Date of Test / Testdatum / Date d'essais / Prüfdatum: 17/06/2015
 Source room / Zendruimte / Salle d'émission / Senderaum: /
 Receiving room / Ontvangstruimte / Salle de réception / Empfangsraum: D V = 62.99 m³ % H₂O = 45.9 % T = 22.1 °C
 Test sample / Testelement / Elément de l'essai / Testelement: S_{testelement} = 10.7 m²
 Load-bearing floor / Draagvloer / Plancher support / Lagerboden: S_{load-bearing floor} = 10.7 m²

f (Hz)	ΔL (dB)
1/3 octaves	
50	5.4
63	2.4
80	5.9
100	8.5
125	10.8
160	10.0
200	9.9
250	10.6
315	9.8
400	12.8
500	17.9
630	22.1
800	23.7
1000	26.2
1250	28.2
1600	29.6
2000	30.7
2500	31.9
3150	32.8
4000	33.2
5000	34.4

octaves	○
63	4.3
125	9.7
250	10.1
500	16.0
1000	25.6
2000	30.6
4000	33.4



L _{n,w} = 75 dB	C ₁ = 0 dB	C _{1,50-2500} = 0 dB	cat = /
L _{n,t,r,w} = 59 dB	C _{1,t,r} = 1 dB		
ΔL _{t,w} = 16 dB	C _{1,t,Δ} = -4 dB		ΔL _{t,lin} = 12 dB

Single-value ΔL_{t,w} calculated according to EN ISO 10140-5:2010 - Annex C, from the one-third-octave band values L_{n,t,r,0} of the lightweight reference floor C3.

Description by the producer - Beschrijving door de fabrikant - Description par le fabricant

Acoustical underlayer INSULWOOD 6,5 mm for wooden floors, placed under 2 layers of 12.5 mm OSB. The underlayer is made up of a laminated high-density polyethylene film on a closed cells physically reticulated polyolefin acoustic foam and assembled on an acoustic resilient felt - total thickness ±6.5 mm - weight ±650 g/m² - colour : black/beige/anthracite.

Characteristics of the basic test floor - Beschrijving van basistestvloer - Description du plancher d'essai de base

Timber floor composed of wooden beams, sections 65 mm x 180 mm and 450 mm (400 mm on the extremities). One layer of OSB boards (tongued and grooved) with thickness 22 mm is screwed on the wooden joists.

1. Measurement and calculation methods

A detailed description of the mounting and measuring procedures can be respectively found in EN 10140-1&5:2010 and EN ISO 10140-3:2010 (see page 1). In simple terms, the determination principle can be summarized as follows : The impact sound is generated by the standardized tapping machine (with steel-headed hammers) which is set successively at various positions on the test floor. For each position, sound pressure measurements are carried out with the help of 2 continuously rotating microphones in the measuring cell located beneath the floor. Measurements are done during at least one complete rotation and different planes of rotation. One thus obtains an integration over time and space of the sound pressure level spectrum, which results in an average sound pressure level. The reverberation time in the receiving room is measured, which permits one to calculate the correction term to be integrated into the formula for calculating the normalized impact sound pressure level:

$$L_n = L_{pm} + 10 \lg (A / A_0)$$

with: L_{pm} = the average sound pressure level in the receiving room, in dB (reference 20 Micro Pa);
 A_0 = the reference equivalent absorption area 10 m²;
 A = the equivalent absorption area of the receiving room in m².

Successively, the following normalised impact sound pressure level spectra are obtained for:

- $L_{n,0}$ ⇒ (a) measured 1/3d octave band values for the bare load-bearing floor described in EN ISO 10140-1:2010
- L_n ⇒ (b) measured 1/3d octave band values for the total test floor (load-bearing floor + eventually a topping and/or a suspended ceiling)
- ΔL ⇒ (a)-(b) calculated reduction of impact sound pressure level due to the topping and/or suspended ceiling
- $L_{n,t,r,0}$ ⇒ (c) given 1/3d octave band values for a fictitious reference load bearing floor (EN ISO 10140-5:2010)
- $L_{n,t,r}$ ⇒ (c)-(a)+(b) calculation of the normalized impact sound pressure level of a reference lightweight floor with the floating floor (covering) and/or suspended ceiling

The single-number values (given by the index "w") and spectrum adaptation terms are described in the standard EN ISO 717-2:2013 (see page 1). Calculation modules and more information about the single-number value (and about acoustical standardisation in general) can be found on the website of the Acoustics laboratory, i.e.:

http://www.bbri.be/antenne_norm/

Single-value $\Delta L_{r,w}$ calculated according to EN ISO 10140-5:2010 - Annex C, from the one-third octave band values $L_{n,t,r,0}$ of the lightweight reference floor C3.

	(a)	(b)	(a)-(b)	(c)	
f (Hz)	$L_{n,0}$ (dB)	L_n (dB)	ΔL (dB)	$L_{n,t3,r,0}$ (dB)	$L_{n,t,r}$ (dB)
50	76.1	70.7	5.4	/	/
63	75.2	72.8	2.4	/	/
80	79.5	73.6	5.9	/	/
100	86.5	78.0	8.5	69.0	60.5
125	88.0	77.2	10.8	72.0	61.2
160	90.3	80.3	10.0	75.0	65.0
200	91.5	81.6	9.9	78.0	68.1
250	94.2	83.6	10.6	78.0	67.4
315	93.0	83.2	9.8	78.0	68.2
400	91.3	78.5	12.8	78.0	65.2
500	92.9	75.0	17.9	78.0	60.1
630	95.1	73.0	22.1	78.0	55.9
800	92.6	68.9	23.7	76.0	52.3
1000	92.0	65.8	26.2	74.0	47.8
1250	90.2	62.0	28.2	72.0	43.8
1600	88.3	58.7	29.6	69.0	39.4
2000	85.6	54.9	30.7	66.0	35.3
2500	81.6	49.7	31.9	63.0	31.1
3150	76.4	43.6	32.8	60.0	27.2
4000	70.5	37.3	33.2	/	/
5000	63.9	29.5	34.4	/	/

Basic test floor:

[based on spectrum (a)]

$$L_{n,0,w} = 93 \text{ dB} \quad C_{1,0} = -5 \text{ dB}$$

Basic floor + linings:

[based on spectrum (b)]

$$L_{n,w} = 75 \text{ dB} \quad C_1 = 0 \text{ dB}$$

Reference load-bearing floor:

(c) given 1/3d octave band values for a fictitious reference load bearing floor (EN ISO 10140-5:2010)

$$L_{n,t3,r,0,w} = 75 \text{ dB} \quad C_{1,t3,r,0} = -3 \text{ dB}$$

Reference floor + linings:

[calculated (c)-(a)+(b)]

$$L_{n,t,r,w} = 59 \text{ dB} \quad C_{1,t,r} = 1 \text{ dB}$$

Reduction of impact sound pressure level

$$\Delta L_{t,w} = L_{n,t,r,0,w} - L_{n,t,r,w} = 16 \text{ dB}$$

$$C_{1\Delta,t} = C_{1,t,r,0} - C_{1,t,r} = -4 \text{ dB}$$

$$\Delta L_{t,lin} = \Delta L_{t,w} + C_{1\Delta,t} = 12 \text{ dB}$$

↑ **TABLE 1: calculation of the single ratings as to EN ISO 717-2:2013**
 ⇐ **TABLE 2: 1/3 octave band measured and calculated spectral values**

2. Test equipment

TEST EQUIPMENT	BRANDMARK
2 microphones 1/2"	Brüel & Kjær type 4190
2 pre-amplifiers for microphone	Brüel & Kjær type 2669-L
One power supply for microphones	Brüel & Kjær type 2829
One rotating microphone set-up	Norsonic Nor265
Acquisition system	Norsonic Nor850 Distributed Multichannel System
Measurement software	Norsonic Nor850 Building Acoustic Software
One calibration source pistonphone	Brüel & Kjær type 4228
One standardized tapping machine	Brüel & Kjær type 3207

3. The precision of the measurement results

Is subject of study within AHWG of ISO/TC 43/SC 2/WG 18 (preparing a revised ISO/PWI 140-2)

4. Description of the test element


This description is given by the producer of the test element and is not guaranteed by the laboratory. The equivalence between the tested product in this report and the commercialised product is the sole responsibility of the producer.

GENERAL DESCRIPTION

Acoustical underlayer INSULWOOD 6,5 mm for wooden floors, placed under 2 layers of 12.5 mm OSB. The underlayer is made up of a laminated high-density polyethylene film on a closed cells physically reticulated polyolefin acoustic foam and assembled on an acoustic resilient felt - total thickness ± 6.5 mm - weight ± 650 g/m² - colour : black/beige/anthracite.

COMPOSITION OF THE TESTELEMENT

Only parts of the table below can be made unreadable in copies of this report, e.g. if some data are confidential.

layer	thickness [mm]	density [kg/m ³]	surface mass [kg/m ²]	description	
+7					
+6					
+5					
+4					
+3	12.5 mm	650 kg/m ³	8.1 kg/m ²		OSB-layer-3 TG-4
+2	12.5 mm	650 kg/m ³	8.1 kg/m ²		OSB-layer-3 TG-4
+1	6.5 mm	-	0.65 kg/m ²		Acoustical underlayer INSULWOOD (± 650 g/m ²)
BASIC FLOOR	202.0 mm	-	-	Timber floor composed of wooden beams, sections 65 mm x 180 mm and 450 mm (400 mm on the extremities). One layer of OSB boards (tongued and grooved) with thickness 22 mm is screwed on the wooden joists.	
-1					
-2					
-3					
-4					

Total thickness of the layers on top of the basic floor = 31.5 mm

Total surface mass on top of the basic floor = 16.9 kg/m² (calculated value)

REMARKS

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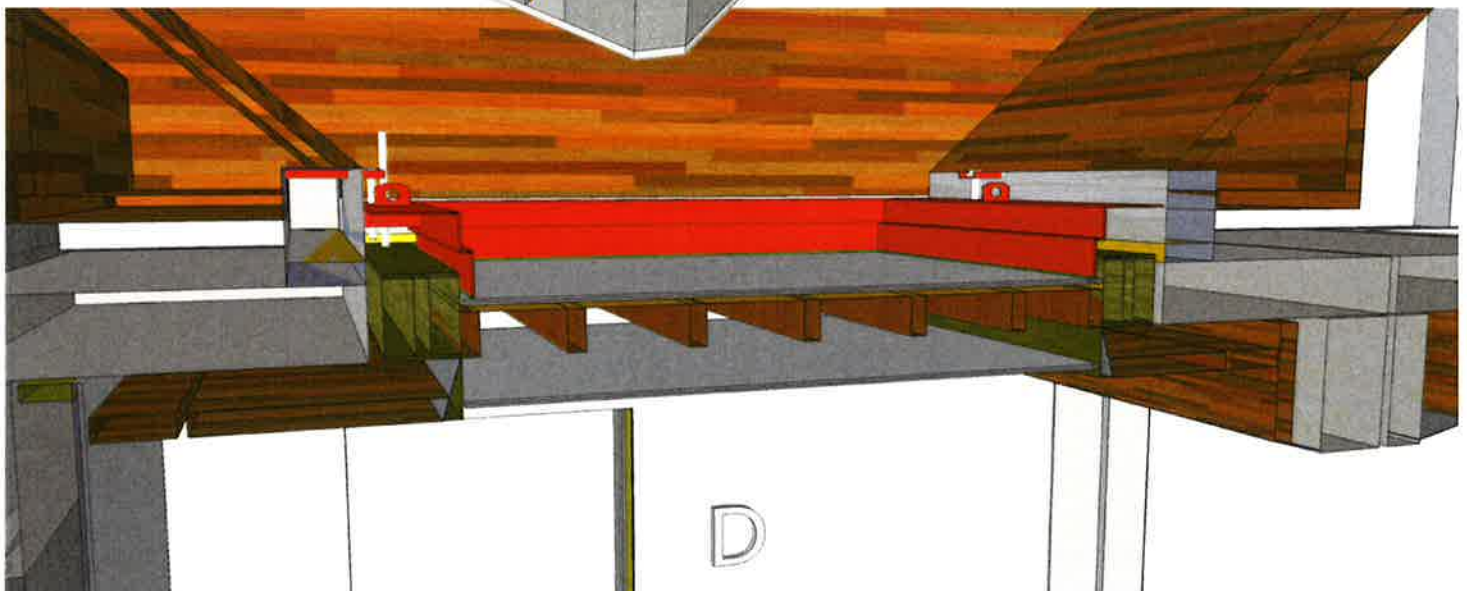
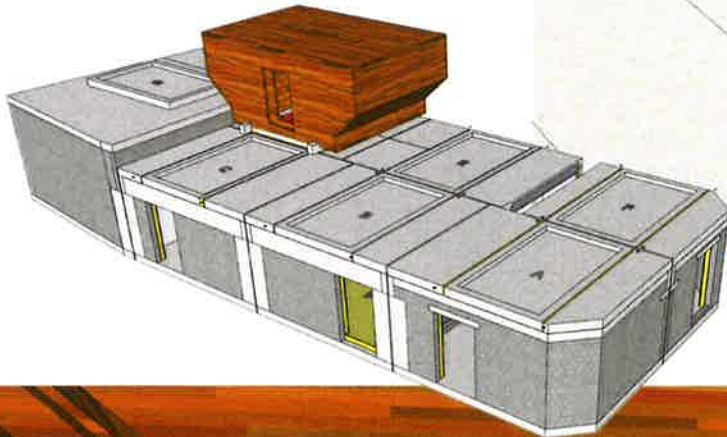
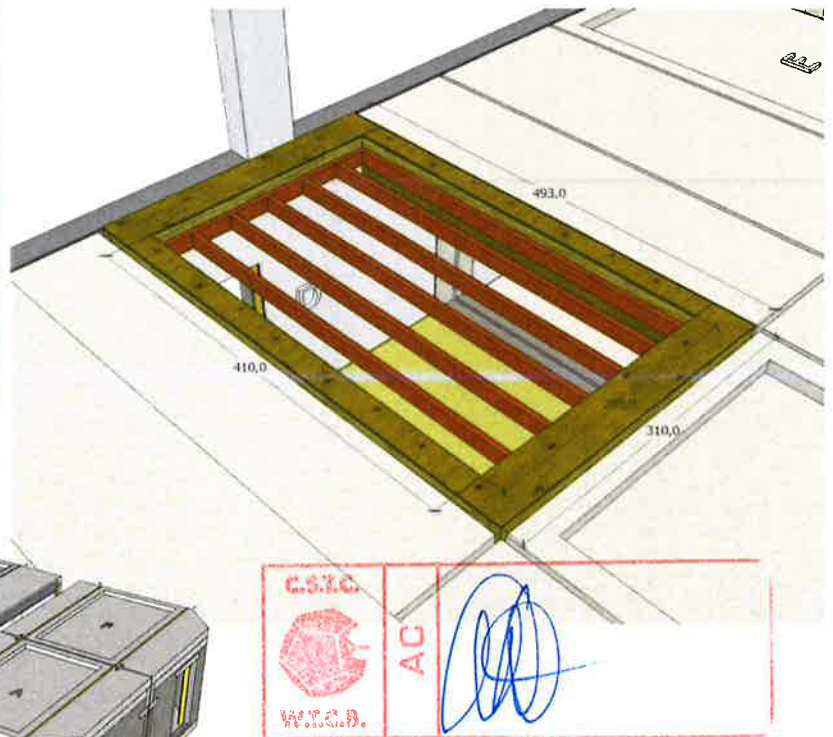
6. Description of the test set-up

The acoustic laboratory has six test cells A, B, C, D, E and F. There is a concrete floor slab with a thickness of 30 cm in each cell, which rely, by means of pads, on foundation beams.

These concrete slabs are separated from the outside environment and the adjacent cells by a 5 cm seal filled with mineral wool.

The lightweight floor (410 cm x 260 cm) is mounted in an acoustically insulated wooden frame (external frame dimensions: 493 cm x 310 cm x 33.6 cm). The tested lightweight floor construction is mounted in one of the horizontal test openings for floors, located on top of cells A, B, C, D, E and F, on a manner as close to practice as possible, and according to the standard NBN EN ISO 10140-3. A mobile cell, manipulated by means of a roller bridge, can be placed on top of each horizontal test opening, without making any direct contact with the underlying test chamber. The impact sound insulation measurement is performed between the mobile cell, the so-called "sending room" and the underlying "receiving room". On top of the floor a metal frame, adjustable in height, determines the test surface (10 m²). Underneath, the same surface is limited by acoustical suspended ceilings, see cross section below.

The structure of the laboratory meets the standard requirements and allows impact sound measurements according to the standard NBN EN ISO 10140-3.



(Illustration : example with floating floor and suspended ceiling)

7. Mounting of the test element

The test element is mounted according to the NBN EN ISO 10140-3, in a similar manner to the actual construction. (See also "4. Description of the test element"). The mounting details are illustrated below.



7. Mounting of the test element (2)



 W.T.C.B.	AC	
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