Cellule d'étude et de développement
en ingénierie acoustique
Laboratoire Acoustique de l'Université
de Liège

Sart Tilman, the 27th October 2014

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This is a translation of the test report N°2014/6557 dated 27th October 2014

Sound absorption coefficient for normal sound incidence measurements in laboratory

LD-C-50 / H²Foam Lite

Type : Water-blown polyurethane foam

Customer : DELHEZ SYSTEMES s.a
Distributeur Icynene Benelux
3, Chemin de Xhénorie
4890 THIMISTER
Belgique

Ir. A. MAILLARD Measures responsible	Ir. J. NEMERLIN CEDIA's Manager

1. General remarks

The measurements were undertaken on 24th October 2014 in the acoustics laboratories of the Institut Montefiore, at the Sart Tilman university campus, by:

- A. MAILLARD, Research engineer at CEDIA

2. Measuring equipment

- 1 circular impedance tube ; interior diameter 100 mm,
- 1 circular impedance tube; interior diameter 28 mm,
- 2 ¼" prepolarized free-field microphones ; brand : GRAS ; type 40BE,
- 1 sound source ; brand : Monacor ; type SPH-135/AD,
- 1 sound source ; brand : Visaton ; type FRS8,
- 1 noise generator ; brand : B&K ; type 1405,
- 1 power amplifier ; brand : B&K ; type 2706,
- 1 computer with analysis software and acquisition system Symphonie from 01dB.

3. Measuring conditions

- The measurements were carried out following the technical provisions of European standard ISO 10534-2
- The temperature in the laboratory was 20.5°C, relative humidity was 47%, atmospheric pressure was 990 hPa
- The samples were cut using templates allowing them to fit perfectly inside of impedance tubes
- The whole of the frequency range of 100 Hz to 5000 Hz is covered using two tubes with dimensions of 100 mm internal diameter and 50 cm long and in the frequency range between 100 Hz and 1600 Hz, and 28 mm internal diameter and 50 cm long and in the frequency range between 800 Hz and 5000 Hz
- α values between 800 Hz and 1600 Hz are obtained by averaging the measurements in the two tubes
- White noise is generated inside the impedance tubes
- Two samples were cut and tested for each thickness
- Prior to measurements, the microphones are calibrated amplitude and phase
- The description of the samples is given in paragraph 4

4. Test specimens description

4.1. General description

★ Product name

LD-C-50 / H²Foam Lite

★ Technical data

Thicknesses tested : 5 cm, 10 cm, 15 cm et 20 cm
Density : 6 à 8.3 kg/m³
Fire testing : classe F
Thermal performance Lambda (λ) : 0,038

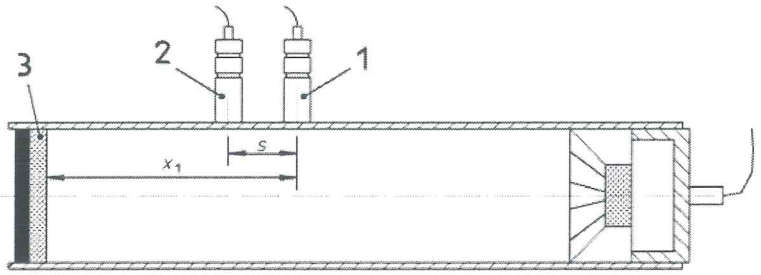
★ Manufacturer :

ICYNENE Europe sprl
Clos Chapelle aux Champs, boite 3030
B-1200 Bruxelles

Icynene Inc
6747 Campobello Road
Mississauga ON
L5N 2L7 Canada

4.2. Mounting of the test specimen

The measurements were performed using an impedance tube. The principle of this device is to place the sample for which it is desired to measure the sound absorption coefficient (α) at the end of a metal tube whose other end is occupied by a speaker. The speaker is used to acoustically exciting the tube, thereby causing standing waves (see figure below).



Key
1 Microphone A
2 Microphone B
3 Test specimen

Both fixed microphones measure the acoustic pressure inside the tube. By analysis of the measured signal, the sound absorption coefficient formal normal sound incidence and acoustic impedance of the sample are determined.

4.3. Sound absorption for normal sound incidence

The averaged values of the sound absorption coefficient α are given on pages 6, 7, 8 and 9 of this report and in the tables here under.

Thickness 5 CM											
Frequency in Hertz	50	63	80	100	125	160	200	250	315	400	500
α in %	5,8	6,7	4,7	4,6	6,7	6,6	7,2	9,0	11,5	16,7	17,8

Frequency in Hertz	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k
α in %	23,0	32,9	47,7	58,5	56,2	37,9	47,5	82,1	58,4	76,2

Thickness 10 CM											
Frequency in Hertz	50	63	80	100	125	160	200	250	315	400	500
α in %	6,9	8,1	6,2	6,9	9,8	10,2	11,1	12,9	14,9	19,3	20,7

Frequency in Hertz	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k
α in %	30,4	53,2	52,5	58,2	66,5	74,1	83,8	90,3	90,8	90,5

Thickness 15 CM											
Frequency in Hertz	50	63	80	100	125	160	200	250	315	400	500
α in %	6,1	9,6	6,7	7,9	10,7	11,0	11,8	13,0	14,3	18,5	19,8

Frequency in Hertz	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k
α in %	31,9	72,7	74,1	64,3	73,7	91,4	90,3	89,6	88,6	90,6

Thickness 20 CM											
Frequency in Hertz	50	63	80	100	125	160	200	250	315	400	500
α in %	7,7	9,8	7,3	7,7	10,3	10,3	11,1	12,8	14,8	20,5	23,3

Frequency in Hertz	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k
α in %	55,0	73,9	73,3	73,8	75,5	89,5	91,9	93,3	94,9	95,0

Sound absorption coefficient for normal sound incidence measurements
according to standard ISO 10534-2

Customer: Delhez Systemes SA

Product type: Polyurethane foam

Manufacturer: Icynene Europe / Icynene Inc.

Date de l'essai : 24/10/2014

Product description:

LD-C-50 / H²Foam Lite
Thickness: 50 mm

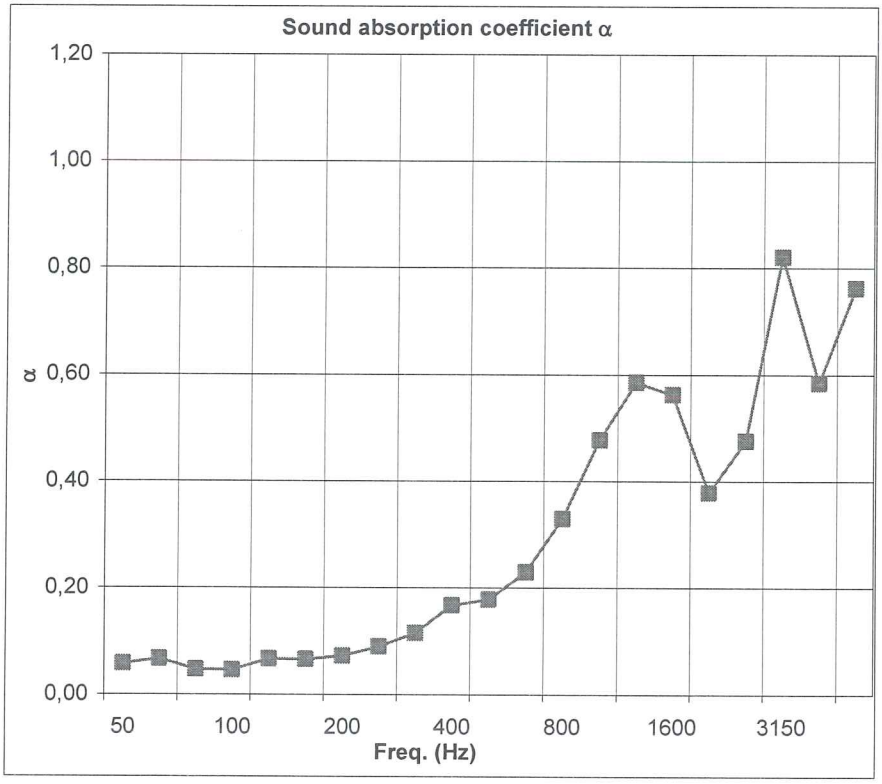
Water-blown polyurethane foam
Density: 6 to 8,3 kg/m³

ICYNENE®

Air temperature in °C: 20,5

Atmospheric pressure hPa: 990

Frequency in Hz	α
50	0,06
63	0,07
80	0,05
100	0,05
125	0,07
160	0,07
200	0,07
250	0,09
315	0,12
400	0,17
500	0,18
630	0,23
800	0,33
1000	0,48
1250	0,59
1600	0,56
2000	0,38
2500	0,47
3150	0,82
4000	0,58
5000	0,76



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Sound absorption coefficient for normal sound incidence measurements
according to standard ISO 10534-2

Customer: Delhez Systemes SA

Product type: Polyurethane foam

Manufacturer: Icynene Europe / Icynene Inc.

Date de l'essai : 24/10/2014

Product description:

LD-C-50 / H²Foam Lite
Thickness: 100 mm

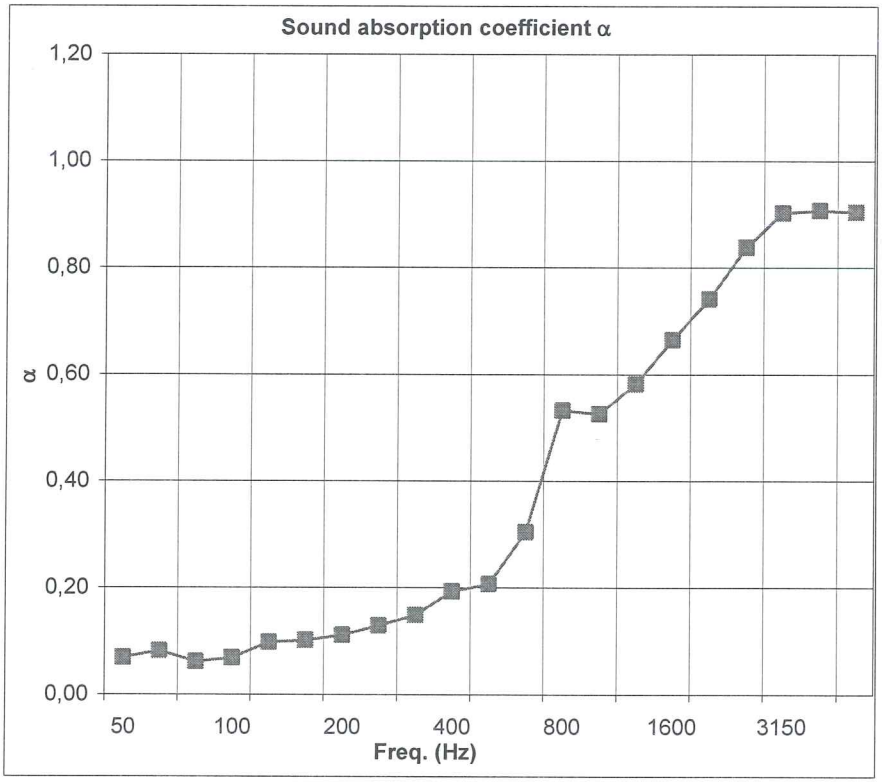
Water-blown polyurethane foam
Density: 6 to 8,3 kg/m³

ICYNENE®

Air temperature in °C: 20,5

Atmospheric pressure hPa: 990

Frequency in Hz	α
50	0,07
63	0,08
80	0,06
100	0,07
125	0,10
160	0,10
200	0,11
250	0,13
315	0,15
400	0,19
500	0,21
630	0,30
800	0,53
1000	0,52
1250	0,58
1600	0,66
2000	0,74
2500	0,84
3150	0,90
4000	0,91
5000	0,90



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Sound absorption coefficient for normal sound incidence measurements
according to standard ISO 10534-2

Customer: Delhez Systemes SA

Product type: Polyurethane foam

Manufacturer: Icynene Europe / Icynene Inc.

Date de l'essai : 24/10/2014

Product description:

LD-C-50 / H²Foam Lite
Thickness: 150 mm

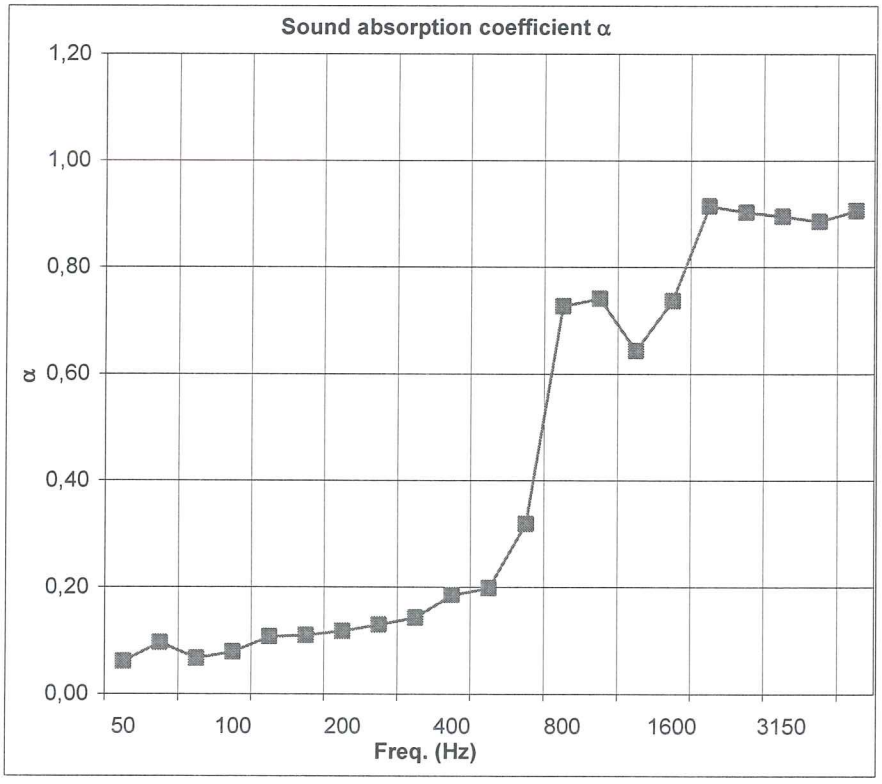
Water-blown polyurethane foam
Density: 6 to 8,3 kg/m³

ICYNENE®

Air temperature in °C: 20,5

Atmospheric pressure hPa: 990

Frequency in Hz	α
50	0,06
63	0,10
80	0,07
100	0,08
125	0,11
160	0,11
200	0,12
250	0,13
315	0,14
400	0,18
500	0,20
630	0,32
800	0,73
1000	0,74
1250	0,64
1600	0,74
2000	0,91
2500	0,90
3150	0,90
4000	0,89
5000	0,91



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Sound absorption coefficient for normal sound incidence measurements
according to standard ISO 10534-2

Customer: Delhez Systemes SA

Product type: Polyurethane foam

Manufacturer: Icynene Europe / Icynene Inc.

Date de l'essai : 24/10/2014

Product description:

LD-C-50 / H²Foam Lite
Thickness: 200 mm

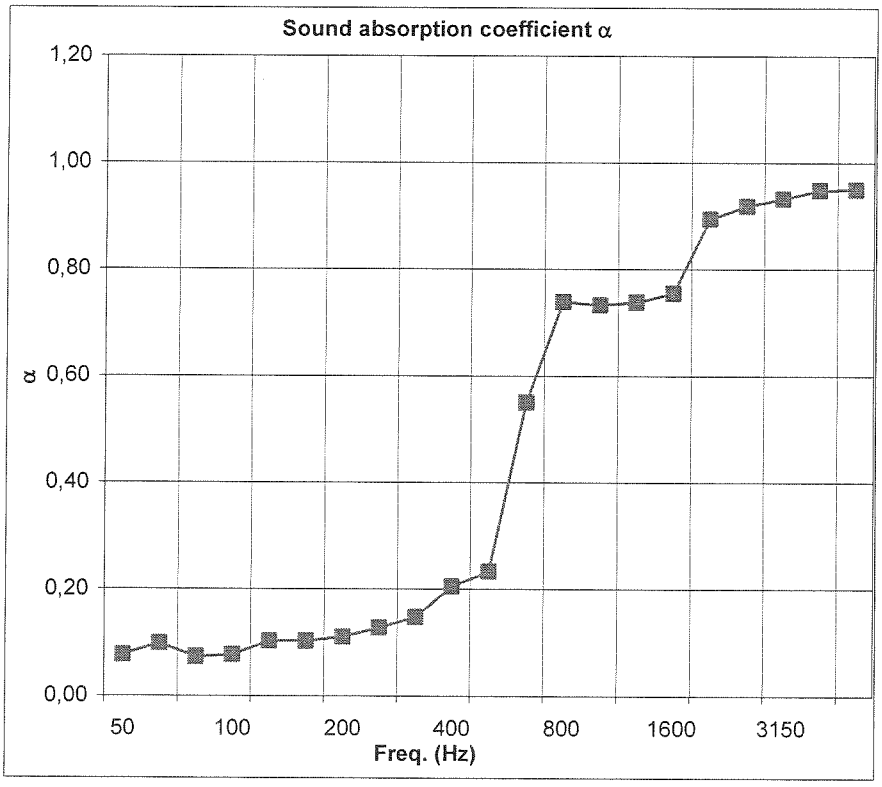
Water-blown polyurethane foam
Density: 6 to 8,3 kg/m³

ICYNENE®

Air temperature in °C: 20,5

Atmospheric pressure hPa: 990

Frequency in Hz	α
50	0,08
63	0,10
80	0,07
100	0,08
125	0,10
160	0,10
200	0,11
250	0,13
315	0,15
400	0,21
500	0,23
630	0,55
800	0,74
1000	0,73
1250	0,74
1600	0,75
2000	0,89
2500	0,92
3150	0,93
4000	0,95
5000	0,95



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