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LABORATORY OF ACOUSTICS
INSTITUTE OF CONSTRUCTION

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Test Report
8-113E/05

JOCAVI – Consultadoria e Design em Acústica, Lda.

Sintra, Portugal

DETERMINATION OF SOUND ABSORPTION

Basscorner

May 2005

Institute of Construction – Faculty of Engineering, Rua Dr. Roberto Frias, Ed. G, P-4200-465 Porto, PORTUGAL Tel./Fax: (+351) 22 508 15 25
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1 - DESCRIPTION

As requested by the company *JOCAVI – Consultadoria e Design em Acústica, Lda.* (Centro Empresarial LusoWorld edif. 22, Rua Pé de Mouro, Capa Rota, P-2710 Sintra, Portugal) this Laboratory of Acoustics has proceded to a series of measurements to determine the sound absorption per unit (A_U) of the system/material commercialy known as ***Basscorner***.

2 - METHOD

2.1 – Sample and date

The sample (eight panels each with the dimensions specified on Fig. 2 - according to the manufacter's online catalogue: *www.jocavi.net*), with a visible area for sound absorption of 8 x 0.760 x 1.200 = 7.296 m^2, was placed at the four corners (two on each corner, one on top of another) of the reverberation room and tested on May 5, 2005.

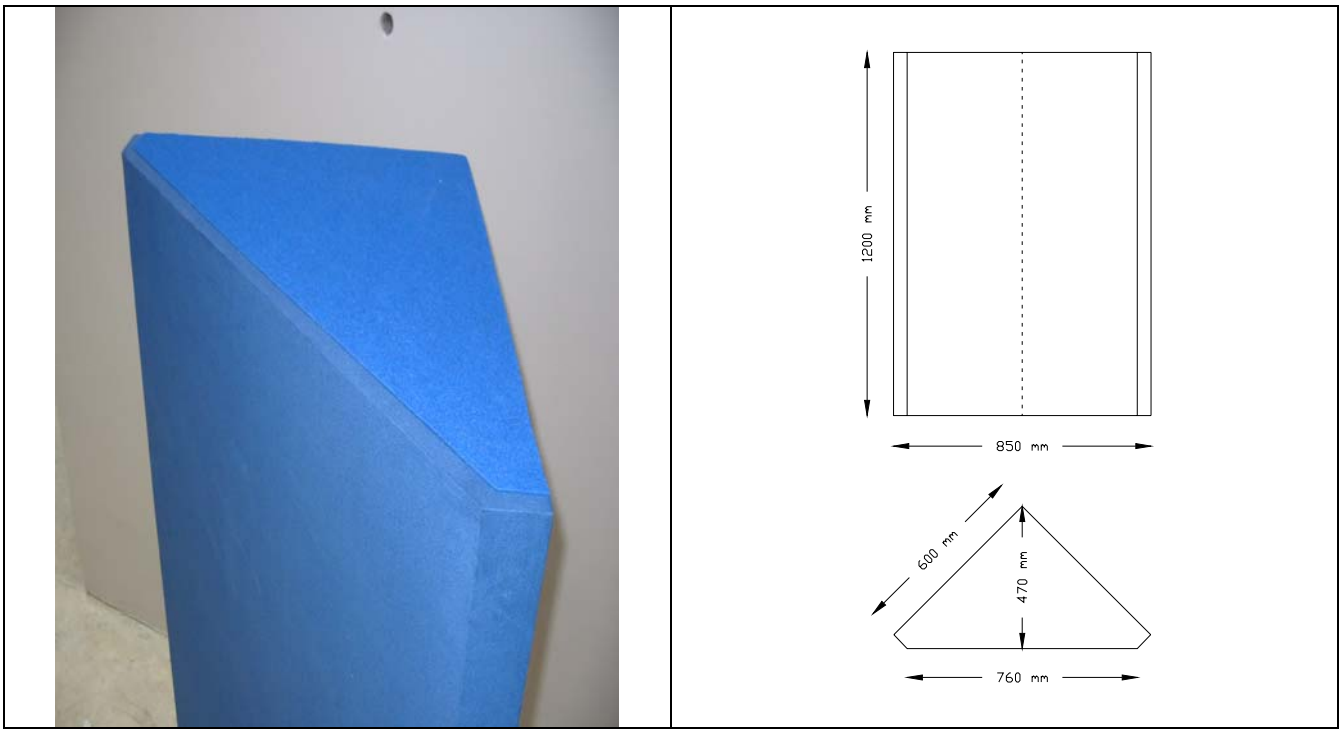

Fig. 1 (left) – Sample; Fig. 2 (right) – Panel's dimensions (according to the manufacter's online catalogue: *www.jocavi.net*).

2.2 - Parameters

The determination of the sound absorption per unit (A_U) was done by measuring the reverberation time of the reverberant room *R1* of the Laboratory of Acoustics of the Institute of Construction of the Faculty of Engineering of the University of Porto with and without the studying sample (in accordance with *EN 20354* / *ASTM C423*). The 95% confidence limits for the uncertainty of the sound absorption per unit limits were also determined.

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2.3 - Measurement positions

Twenty-seven (27) measurements were used as followed:

- Three positions of the sound source;
- Three positions for the microphone;
- Three measurements for each microphone position.

2.4 - Characteristics of the reverberant room

The receiving reverberant room (*R1*) has the following dimensions:

Average length = 7.25 m; Average width = 5.88 m; Height = 4.65 m; Volume = 216 m^3

The atmospheric conditions in the receiving room during the measurements were the following:

Air temperature = 19 ºC Relative air humidity = 68%

During the measurements the room was empty of persons or any extra objects.

2.5 - Equipment

The equipment and the measurement procedure used were in accordance with the applicable standards: Sound level meter *B&K 2260* nº 2168642 (verif. in ISQ - Certified nº 25310/04 of 03/09/2004); Calibrator *B&K 4231* nº 2176164 (verif. in ISQ - Cert. nº 25310/04 of 03/09/2004); ½ inch microphone, *Brüel & Kjaer*, model *4189*; Sound source, *Brüel & Kjaer Type 4224*; Termo-Higrometer *Wm HTA 4200.*

3 - RESULTS

Table 1 presents a global analysis of the obtained values for the sound absorption per unit ($A_{U,averag}$) and the average reverberation times (*RT*) of the room with and without the sample in study, for all the normative frequencies (one-third octave bands). The table also presents the values for the uncertainty of the sound absorption coefficients using 95% confidence limits, as in *ASTM C423*.

Table 1 – Summary of results (*RT*, $A_{U,average}$ and ΔA_U)
($A_U = A_{U,average} \pm \Delta A_U$)

Basscorner																		
Freq. (Hz)	**100**	**125**	**160**	**200**	**250**	**315**	**400**	**500**	**630**	**800**	**1k**	**1.25k**	**1.6k**	**2k**	**2.5k**	**3.15k**	**4k**	**5k**
$RTref^{average}$(s)	11.51	12.62	12.42	11.05	11.40	12.78	12.53	12.11	11.20	10.47	9.21	8.25	7.42	6.62	5.93	5.04	4.03	3.22
$RTsample^{average}$(s)	2.53	3.70	3.18	3.99	4.00	4.37	4.26	4.09	3.62	3.61	3.72	3.49	3.14	2.92	2.75	2.52	2.28	2.00
$A_{U,average}$ (m^2/unit)	1.34	0.83	1.02	0.70	0.71	0.66	0.68	0.70	0.81	0.79	0.70	0.72	0.80	0.83	0.85	0.86	0.83	0.82
ΔA_U (m^2/unit)	0.12	0.07	0.06	0.04	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.03	0.02	0.03	0.03	0.03

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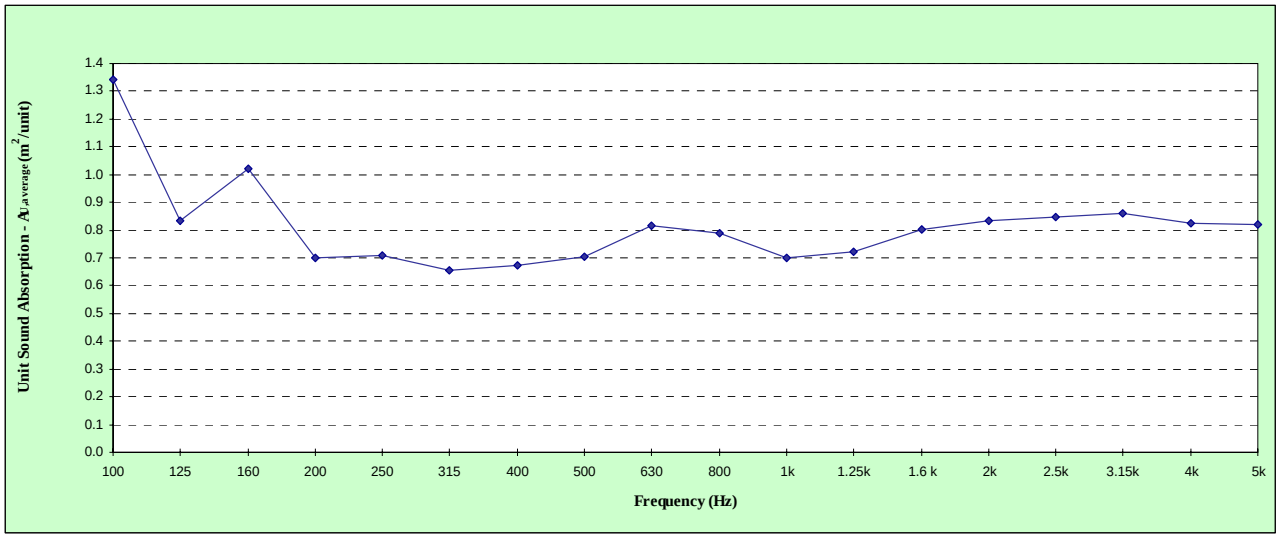
By special request of the client, Table 2 shows the obtained values for the sound absorption coefficients ($A_{U,average}$) and the uncertainty (ΔA_U) using 95% confidence limits, as in *ASTM C423*, for non-normative frequencies. The Fig. 3 shows the measured $A_{U,average}$ in graph form.

Table 2 – Summary of results ($A_{U,average}$ and ΔA_U) at frequencies other than the normative.
($A_U = A_{U,average} \pm \Delta A_U$)

Basscorner							
Freq. (Hz)	**50**	**63**	**80**		**6,3k**	**8k**	**10k**
$A_{U,average}$ **(m²/unit)**	0.52	0.56	1.16		0.85	0.86	0.99
ΔA_U **(m²/unit)**	0.07	0.12	0.31		0.03	0.05	0.05

Fig. 3 – Sound absorption coefficients ($A_{U,average}$) for *Basscorner* presented in the form of a graph at the normative 1/3 octave frequency bands.



Porto and F.E.U.P., May 24, 2005.

Made by: Paulo Marques
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