



AB 1241

CENTRUM TECHNIKI OKRĘTOWEJ S.A.

Ship Design and Research Centre S.A.

ZAKŁAD BADAWCZO-ROZWOJOWY



ZESPÓŁ LABORATORIÓW BADAŃ ŚRODOWISKOWYCH

LABORATORIUM BADAŃ WIBROAKUSTYCZNYCH



NOTIFIED BODY
NB 2434

MEASUREMENT REPORT

No RS-2016/B-533

The measurement of the sound absorption coefficient
of the flame retardant Fluffo Office wall panels,
produced by „Paweł Sumiński Fabryka Miękkich Ścian”

Address:

ul. Szczecińska 65
80-392 Gdańsk

tel.: 58 511 62 28
e-mail: rs@cto.gda.pl

Date of issue:
Copy no:

21.12.2016

.....0.....

Table of contents:

1. Basic data	3
2. Test methodology	4
3. Technical description of polyurethane foam	5
4. Measurement	8
5. Analysis and summary of the results	8

DUPLICATION OF THIS REPORT IS PERMITTED EXCLUSIVELY IN ITS ENTIRETY.
OTHERWISE A WRITTEN PERMISSION OF THE ISSUER IS REQUIRED.

1. Basic data

Table 1. Summary of data and sample test parameters as described at CTO S.A.

Principal: Paweł Sumiński Fabryka Miękkich Ścian Ul. Głubczycka 37/3 02-424 Warszawa	Order (via e-mail) of: 19.10.2016 Internal CTO S.A. order no.: 8:604:03:223	
Name and type of tested product: <i>Fluffo Office</i> flame retardant wall panels, of “ <i>Paweł Sumiński Fabryka Miękkich Ścian</i> ”	Date of acceptance of the object for testing: 20.10.2016 Date and place of measurement: 21.11.2016 Gdansk, Laboratory of Vibro-acoustic Testing, Environmental Laboratories Division	
Producer: Paweł Sumiński Fabryka Miękkich Ścian Ul. Głubczycka 37/3 02-424 Warszawa	Testing methodology and result analysis: In accordance with the documents: <ul style="list-style-type: none"> • PN-EN ISO 354:2005 standard • PN-EN ISO 11654:1997 standard 	
Sample labeling at CTO S.A.: LA679	Conditions for performing the test	(start / finish of the test)
	Relative humidity	Detailed results for the test shown in chapter 5.
	Air temperature	
Atmospheric pressure		
Measurement equipment:	Canal 1	Canal 2
Test leads	0SvankK3	1SvankK3
Measurement microphones	Norsonic type 1225 Serial no 69873	Norsonic type 1225 Serial no 112850
Preamplifier	Norsonic type 1201 Serial no 30454	Norsonic type 1201 Serial no 30610
Analyser	Norsonic type N-121 serial no 31378	
Calibrator	Norsonic type 1251 serial no 33204	
Sound source	Larson Davis BAS001 serial no 1225-DIC08	
Thermo-hygro-barometer	LB-706BP, no 846 LB-701, no 3605	
Wind-up measuring tape	RS/0003	
Sound absorption measurement results:		
Measurand	Measured value	
α_s - sound absorption coefficient	$\alpha_w = 0,55$	
Sound absorption chart in the frequency function and other important information have been presented in accordance with PN-EN ISO 354:2005 standard in chapter no 5.		
Attention: The presented test results are valid only for the tested product.		

DUPLICATION OF THIS REPORT IS PERMITTED EXCLUSIVELY IN ITS ENTIRETY.
OTHERWISE A WRITTEN PERMISSION OF THE ISSUER IS REQUIRED.

2. Testing Methodology

The measurement of sound absorption of the flame-retardant *Fluffo Office* wall panels, produced by “Paweł Sumiński Fabryka Miękkich Ścian” was conducted in the reverberation chamber of 200m³ volume at the Laboratory of Vibro-acoustic Testing, Environmental Laboratories Division in Gdansk. Specifications of the chamber are stated in appendix no 1. The reverberation chamber has been tuned to the reverberation time required by PN-EN-ISO 354:2005 standard by placing 3 elements of sound absorbing – dispersing properties and 8 dispersing elements where the sound absorption surface was in line with Table 2.

Table 2. Equivalent fields of sound absorbent surface for sound absorption coefficient testing chamber of 200m³ capacity.

Frequency, Hz	100	125	160	200	250	315	400	500	630	800
A ₁ ,m ² - laboratory means	4,2	4,0	4,6	4,8	5,5	5,6	5,6	5,6	5,8	5,9
A ₁ maximum standard value	6,5	6,5	6,5	6,5	6,5	6,5	6,5	6,5	6,5	6,5
Frequency, Hz			1000	1250	1600	2000	2500	3150	4000	5000
A ₁ ,m ² - laboratory means			6,1	6,3	6,7	7,1	8,0	9,4	11,1	13,6
A ₁ maximum standard value			7,0	7,5	8,0	9,5	10,5	12,0	13,0	14,0

The measurement was conducted with 12 settings of microphone – source. The measurement of each of the 12 settings of microphone – source was repeated 3 times in accordance with the PN-EN ISO 354:2005 standard requirement. The tested sample has been mounted directly on the floor of the measurement chamber, at a minimum 1000 mm distance from the wall, in accordance with type “A” assembly. Eight sound dispersing elements of 16m² total surface were hung in the chamber. The measurement was conducted with the use of Norsonic Nor 121 meter, and the sound absorption analysis conducted with the use of NorBuild program. The measurement was executed with the application of “Measurement of sound absorption in the reverberation chamber” research methodologies as per PN-EN ISO 354:2005 standard. Due to the intended use of the tested panels the side surface of the sample was included in the measurement.

3. Technical description of the *Fluffo Office* flame retardant wall panels

The test was conducted on *Fluffo Office* flame retardant wall panels, produced by *Paweł Sumiński Fabryka Miękkich Ścian*.

Table 3. Technical description of the tested sample – summary

Name of the object	Symbol of the object	No of tested sample	Date of sample acceptance
Fluffo Office flame retardant wall panels	LA679	B67901	20.10.2016

Description of the tested sample

The tested *Fluffo Office* flame retardant wall panels, marked as LA679, are produced from high density bio-soluble mineral wool, covered with decorative layer of flock. The panels consist of 3 layers: base, high density bio-soluble mineral wool 19mm thick, layer of adhesive + 1mm layer of flock. The sides of the panels are finished with PCW trim covered with flock. The panels are affixed to the walls with the use of a standard mounting adhesive.

Purpose of the panels: *Fluffo Office* flame retardant wall panels can be applied everywhere where there is a need for sound absorbent materials but the use of flammable materials is excluded.

Fluffo Office wall panels fulfill the fire proof requirement stated in the PN 13501 standard. In addition they are offered in several shapes and sizes as well as several dozen colours, which makes them an esthetic decorative material.

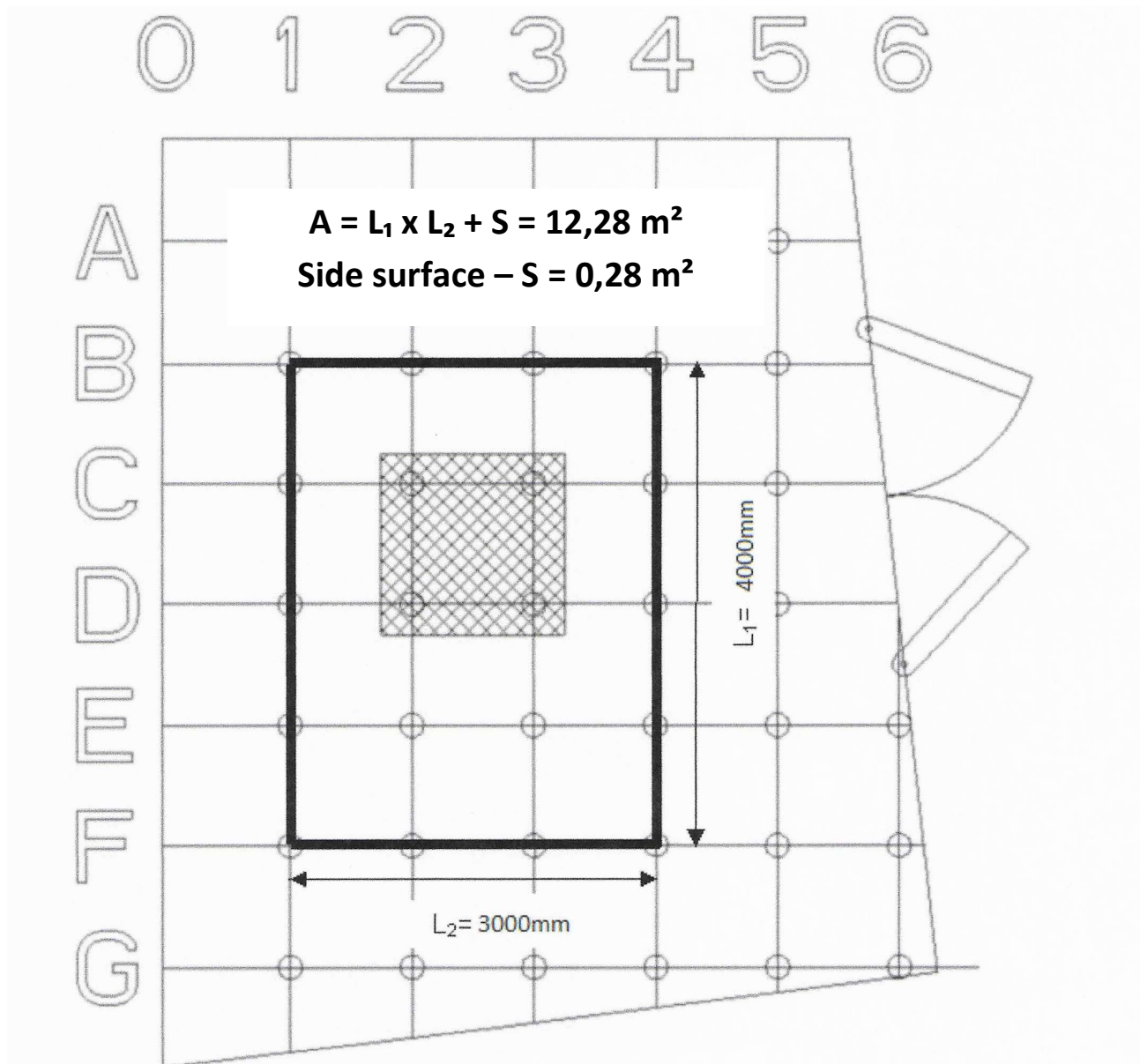
Photograph of the *Fluffo Office* flame retardant wall panel samples, produced by *Paweł Sumiński Fabryka Miękkich Ścian*, in the 200m² volume measuring chamber at the Laboratory of Vibro-acoustic Testing, Environmental Laboratories Division CTO S.A. presented in picture no 1.



Pic. 1. Photograph of sample LA679, *Fluffo Office* flame retardant wall panels, in the reverberation chamber at the Laboratory of Vibro-acoustic Testing, Environmental CTO S.A.

Scheme of the arrangement of all tested *Fluffo Offcie* flame retardant wall panel samples in the measurement chamber at CTO S.A. described in the Pic 3.

DUPLICATION OF THIS REPORT IS PERMITTED EXCLUSIVELY IN ITS ENTIRETY.
OTHERWISE A WRITTEN PERMISSION OF THE ISSUER IS REQUIRED.



Pic. 3. Scheme of the arrangement of all tested samples of Fluffo Office flame retardant wall panels in the measurement chamber at CTO S.A.

The tested sample, in the shape of a 4000mm x 3000mm rectangle, 20 mm thick, with side surface of 0,28m², of total sound absorption area of 12.28m², has been placed on the floor of the chamber without adhesion. The panels have been placed closely together, with minimum distance from the wall of 1000mm in accordance with type A assembly described in the standard. The side surface of the tested samples have also taken part in the test. The maximum surface of the sample recommended by the standard is from 10 to 12m², nevertheless the tested surface amounted to 12.28m² due to the standard linear dimensions of the samples delivered by the producer.

DUPLICATION OF THIS REPORT IS PERMITTED EXCLUSIVELY IN ITS ENTIRETY.
OTHERWISE A WRITTEN PERMISSION OF THE ISSUER IS REQUIRED.

Table 4 presents the time schedule of the work in regards to sample testing.

Table 4. Testing schedule

Object symbol	Operation	Date
LA679	Date of sample admission:	20.10.2016
	Sample seasoning time	20.10-21.11 - 2016
	Date of assembly of sample	21.11.2016
	Date of the measurement	21.11.2016
	Date of dismantling of sample	21.11.2016

The sample was seasoned in a hall, where the conditions are identical to those in the research chamber.

4. Execution of the measurement

The measurement has been conducted in accordance with the PN-EN ISO 354:2005 standard. Before the execution of the measurement a calibration of the measuring lines were conducted and a description of the conditions within the reverberation chamber was characterized. The measurement was conducted with the use of two microphones arranged in 6 positions for 2 locations of sound source. For each of the configurations the measurement was repeated 3 times giving a total of 36 measurements.

5. Analysis and summary of the test results

After the measurement, the data from the meter was loaded into the NorBuild program and analyzed. The effect of this analysis is the sound absorption chart in frequency band divided into thirds along with reverberation time, which has been detailed in table 5. The sound absorption coefficient and class have been defined in accordance with the PN-EN ISO 11654:1997 standard , as per table 5.

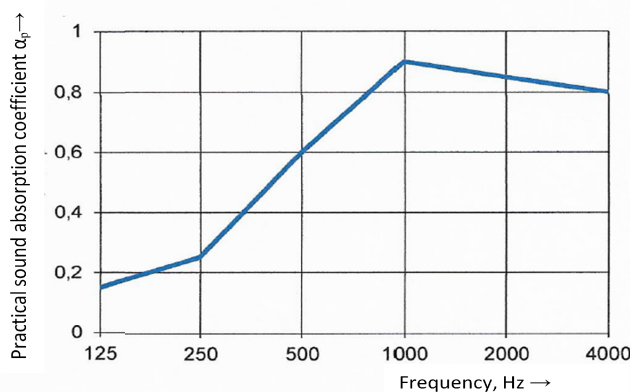
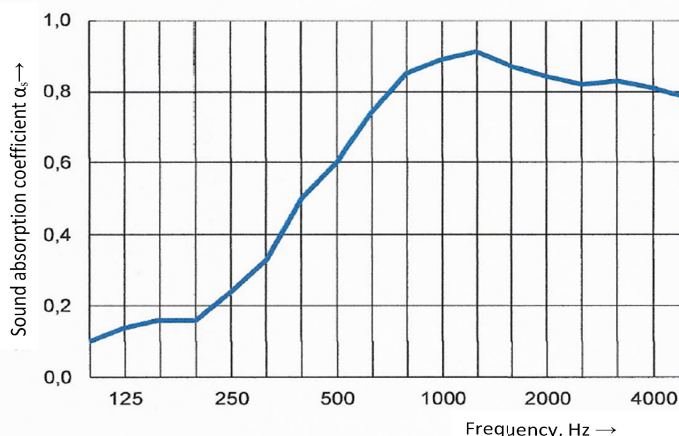
Table 5. The sample sound absorption measurement results at the Laboratory of Vibro-acoustic Testing, Environmental Laboratories Division CTO S.A., in accordance with the PN-EN ISO 354:2005 standard

Sound absorbency coefficient in accordance with PN-EN ISO 354:2005 standard
Measurement of sound absorption in reverberation chamber

Client: Paweł Sumiński Fabryka Miękkich Ścian, ul. Głębczycka 37/3 02-424 Warsaw **Date:** 21.11.2016
Research Laboratory: CTO S.A. Laboratory of Vibro-acoustic Testing, Environmental Laboratories Division
Sample No: LA679
Description: Fluffo Office flame retardant wall panels. The panels are produced from high density bio-soluble mineral wool (base material) covered with flock (top decorative layer). Tested directly on the floor of the chamber (48 units placed proportionally 6x8) without adhesion. Dimensions of the panels: 500x500x20mm. The side surface of the sample has been included in the measurement.

External surface of sample: Volume of measurement chamber:	12.28m ² 200.0m ²	Empty reverberation chamber:	Reverberation chamber with sample:
		Relative humidity: 62.5 %	Relative humidity: 42,1 %
		Air temperature: 21.9 °C	Air temperature: 20,9 °C
		Atmospheric pressure: 101,0 kPa	Atmospheric pressure: 101,1 kPa

Frequency f [Hz]	Empty T1 [s]	Sample T2 [s]	α_s	α_p
100	6,73	5,35	0,10	0,15
125	7,36	5,26	0,14	
160	6,20	4,46	0,16	
200	5,50	4,10	0,16	0,25
250	5,11	3,44	0,24	
315	5,08	3,09	0,33	
400	5,13	2,58	0,50	0,60
500	5,08	2,36	0,60	
630	4,90	2,06	0,74	
800	4,67	1,87	0,85	0,90
1000	4,34	1,77	0,89	
1250	4,24	1,72	0,91	
1600	4,00	1,71	0,87	0,85
2000	3,69	1,67	0,84	
2500	3,30	1,58	0,82	
3150	2,83	1,43	0,83	0,80
4000	2,38	1,28	0,81	
5000	1,98	1,12	0,78	



Sound absorption coefficient in accordance with PN-EN ISO 11654:1997

$\alpha_w = 0,55$

Sound absorption class: D

Measurement No: B67901

Date: 21.11.2016

Signature: Krzysztof Kopaczewski

There is 1 Attachment to this report

- **Attachment 1** – Shape of the measurement chamber

Prowadzący zlecenie
Specjalista ds. akustyki



mgr Krzysztof Kopaczewski
KK – inicjały autora raportu

Autoryzował
Kierownik Laboratorium Badań
Wibroakustycznych



dr inż. Piotr Jakubowski

Kierownik Zespołu
Kierownik Zespołu Laboratoriów
Badań Środowiskowych



dr inż. Mateusz Weryk

DUPLICATION OF THIS REPORT IS PERMITTED EXCLUSIVELY IN ITS ENTIRETY.
OTHERWISE A WRITTEN PERMISSION OF THE ISSUER IS REQUIRED.

