

THERMAL PHYSICS, ACOUSTICS AND ENVIRONMENT DEPARTMENT
 THERMAL PHYSICS, ACOUSTICS AND ENVIRONMENT LABORATORY

REPORT OF THE TESTS AND ASSESSMENT OF THE PERFORMANCE

№ LZF00 - 6016/16/R10NZF

Client:	<i>Sokółka Okna i Drzwi S.A. (producent)</i>
Client address:	<i>Lotników Lewoniewskich 1, 16 – 100 Sokółka</i>
INFORMATION ABOUT PRODUCT	
Manufacturer (name and address):	<i>Sokółka Okna i Drzwi S.A., Lotników Lewoniewskich 1, 16 – 100 Sokółka</i>
Name and address of factory:	<i>jw.</i>
Product:	<i>Wooden windows opening outwards of EURO system and wood-aluminium windows opening outwards of EURO_ALU system</i>
Harmonised standard:	<i>PN-EN 14351-1+A1:2010</i>
Information about product, intended use, and the number of the applicable system of assessment and verification of constancy of performance:	<i>Elements of the building envelope - system 3</i>
Unique identification code of the product-type:	<i>00990EX16</i>
INFORMATION ABOUT TEST ITEM	
Test item: name, description, condition, identification	<i>Wooden windows opening outwards of EURO system and wood-aluminium windows opening outwards of EURO_ALU system</i>
Date of receipt /sampling	<i>10.05.2016</i>
Receipt /sampling procedure	<i>Test object was delivered and assembled in the laboratory by the Customer and accepted for test in accordance with the Procedure PZ ZLB 18</i>
INFORMATION ABOUT TESTS:	
Test commencement date:	<i>16.05.2016</i>
Test completion date:	<i>16.05.2016</i>
Test method / procedure	<i>PN-EN 20140-3:1999 „Acoustics – Laboratory measurement of sound insulation of building elements – Part 2: Measurement of airborne sound insulation” (A_{not}).</i>

THERMAL PHYSICS, ACOUSTICS AND ENVIRONMENT LABORATORY

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PRODUCT DESCRIPTION:

At the request of the manufacturer, Sokółka Okna i Drzwi SA, ul. Lotników Lewoniewskich 1; 16-100 Sokółka, the acoustic test of wooden windows and wood-aluminum windows were conducted, as defined in the harmonized standard product PN - EN 14351-1 + A1: 2010, according to the conformity assessment system 3.

Samples were produced at the manufacturer seat, production line 1 on 13.04.2016r, from 00990EX16 batch, type EURO item 001 and EURO_ALU item 002. Samples were taken on 05.05.2016.

Subject of study were:

- Wooden window of system EURO, with glazing 4/16Ar/4LE. Producer of glazing was PRESS GLASS S.A.
- Wood – aluminium window of system EURO_ALU, with glazing 4LE/14Ar/4/14Ar/4LE. Producer of glazing was PRESS GLASS S.A.

View windows with dimensions, a cross-sections of the tested samples, together with the applied design elements are presented on pages 3 - 6. The drawings were provided by the Customer.

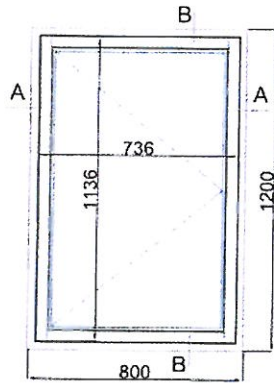
TEST RESULTS:

Measured feature – Sound reduction index	Test results	
	$R_w(C,C_{tr})$	R(f) no of meas.
Wooden window opening outwards of EURO system - wymiary: H x L = 800 mm x 1200 mm - glazing: 4/16Ar/4LE Sample no 1/LZF00 – 6016/16/R10NZF	34(-2;-4)	page 7 318.16
Wood-aluminium window opening outwards of EURO_ALU system - wymiary: H x L = 1500 mm x 1500 mm - glazing: 4LE/14Ar/4/14Ar/4LE Sample no 2/LZF00 – 6016/16/R10NZF	31(-1;-4)	page 8 319.16

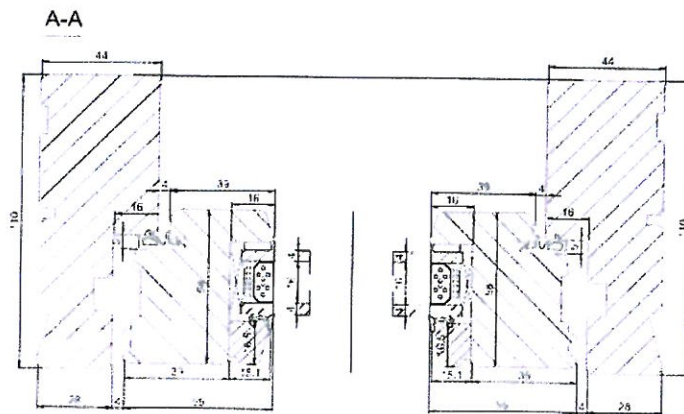
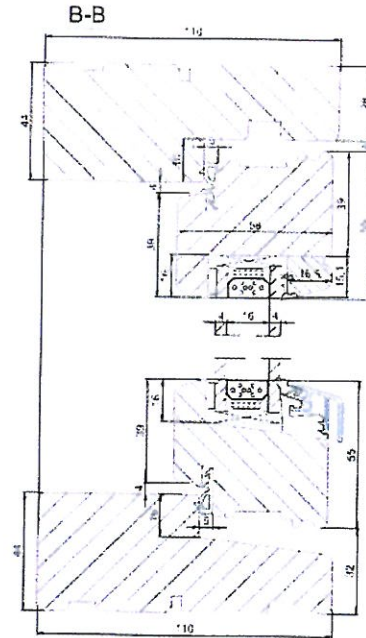
END OF PAGE 2

Sample no 1/LZF01- 6016/16/R10NZF

View and cross-section

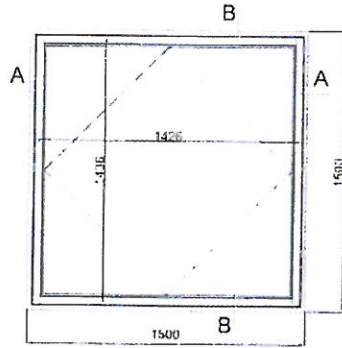


outside view

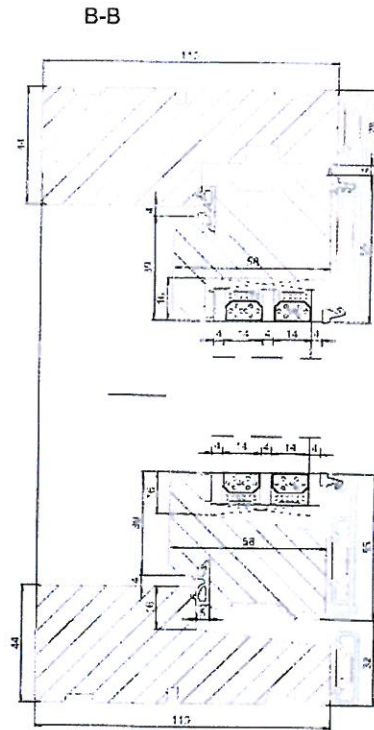


Sample no 2/LZF00 - 6016/16/R10NZF

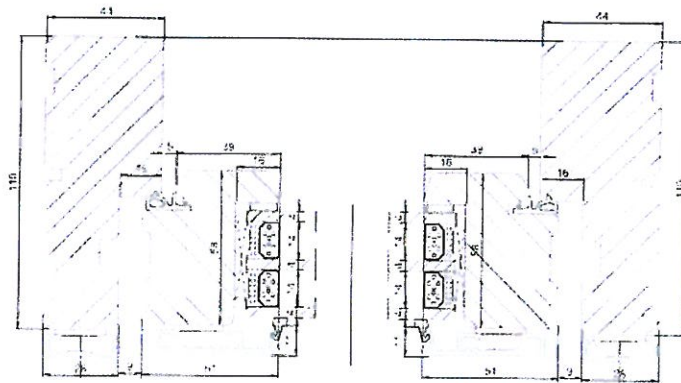
View and cross-section



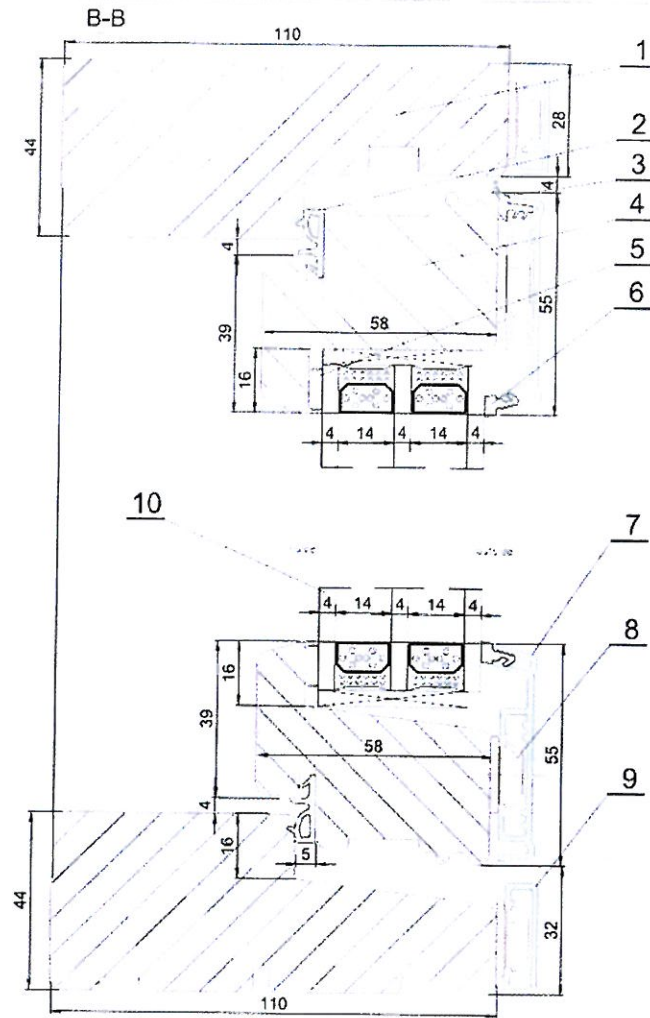
outside view



A-A



Sample no 2/LZF01- 6016/16/R10NZF

Elements descriptionDescription

- 1 - Window frame -laminated pine
- 2 - Gaskett rebate[1TLRGXRT Trelleborg]-EPDM
- 3- Gaskett [1TLXTAR Primo]-TPE
- 4- Window sash -laminated pine
- 5- Gaskett [1TAK 10x40 Trelleborg]-EPDM
- 6- Gaskett[1TARSVG2 Primo]-TPE
- 7 - Sash profile - alu
- 7- Gaskett[1TARSVG2 Primo]-TPE
- 8- Clip
- 9 - Frame profile -alu
- 10 - Glass 4LE/14Ar/4/14Ar/4LE

Sound reduction index according to PN-EN 20140-3:1999

Laboratory measurements of airborne sound insulation of building elements

Client: **Sokółka Okna i Drzwi Spółka Akcyjna**
ul. Lotników Lewoniewskich 1, 16-100 Sokółka

Test specimen mounted by: **Client**
 Description of the test facility, test specimen and test arrangement:

Wooden window opening outwards of EURO system

- wymiary: **H x L = 800 mm x 1200 mm**
 - glazing: **4/16Ar/4LE**

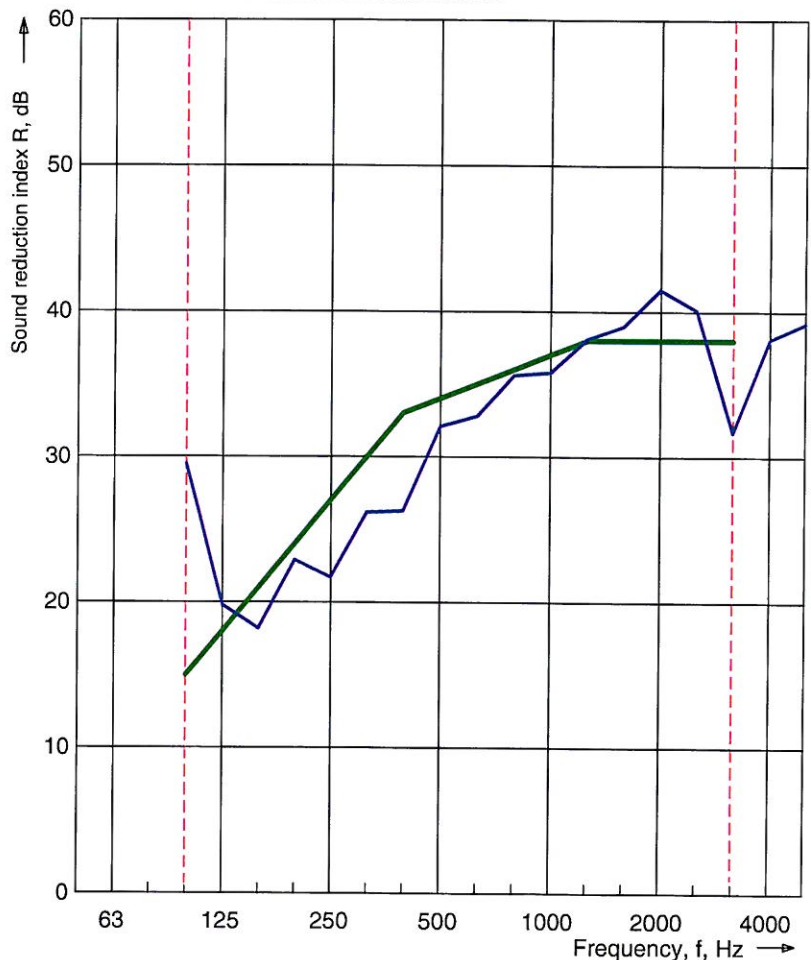
Sample no 1/LZF00 - 6016/16/R10NZF

Area of test specimen: **1,00 m²**
 Air permeability coefficient: **--- m³/(m²·h·daPa^{2/3})**
 Test room:

	source	receive
Volume, m ³ :	87,5	51,6
Air temperature, °C:	19,3	19,5
Air humidity, %:	62,9	61,8

--- Frequency range according to the curve reference values (PN-EN ISO 717-1:2013)
 — Characteristics measured

Frequency f [Hz]	R 1/3 octave [dB]
50	---
63	---
80	---
100	29,5
125	19,8
160	18,2
200	22,9
250	21,7
315	26,2
400	26,3
500	32,1
630	32,8
800	35,6
1000	35,8
1250	38,1
1600	39,0
2000	41,5
2500	40,1
3150	31,7
4000	38,1
5000	39,2



Rating according to PN-EN ISO 717-1:2013

R_w(C;C_{tr}) = 34 (-2; -4) dB

C₅₀₋₃₁₅₀ = --- dB C₅₀₋₅₀₀₀ = --- dB C₁₀₀₋₅₀₀₀ = -1 dB
 C_{tr,50-3150} = --- dB C_{tr,50-5000} = --- dB C_{tr,100-5000} = -5 dB

Single number index and its uncertainty U₉₅ determined in accordance with PN-EN ISO 12999-1:2014: R_w = 34,0dB ±0,8dB

Building Research Institute Group of the Testing Laboratories
 Thermal Physics, Acoustics and Environment Laboratory

Test No.: **318.16**

Date of analysis: **2016-05-16**

Signature: **N.Bombała**

Sound reduction index according to PN-EN 20140-3:1999

Laboratory measurements of airborne sound insulation of building elements

Client: **Sokołka Okna i Drzwi Spółka Akcyjna**
ul. Lotników Lewoniewskich 1, 16-100 Sokółka

Test specimen mounted by: **Client**

Description of the test facility, test specimen and test arrangement:

Wood-aluminium window opening outwards of EURO_ALU system

- wymiary: **H x L = 1500 mm x 1500 mm**

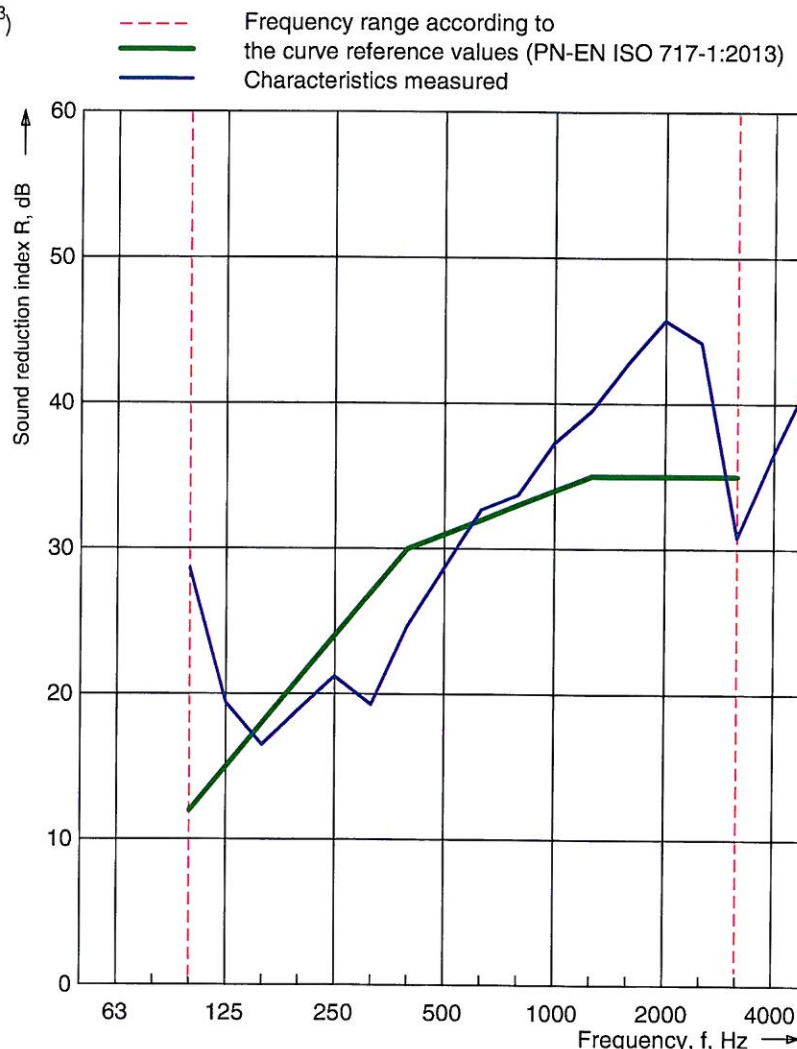
- glazing: **4LE/14Ar/4/14Ar/4LE**

Sample no 2/LZF00 - 6016/16/R10NZF

Area of test specimen: **2,30 m²**
 Air permeability coefficient: **--- m³/(m²·h·daPa^{2/3})**

	Test room:	
	source	receive
Volume, m ³ :	87,5	51,6
Air temperature, °C:	19,5	20,1
Air humidity, %:	64,1	62,2

Frequency f [Hz]	R 1/3 octave [dB]
50	---
63	---
80	---
100	28,6
125	19,4
160	16,5
200	18,9
250	21,2
315	19,3
400	24,7
500	28,7
630	32,7
800	33,7
1000	37,3
1250	39,5
1600	42,8
2000	45,7
2500	44,2
3150	30,8
4000	36,6
5000	41,8



Rating according to PN-EN ISO 717-1:2013

$R_w(C;C_{tr}) = 31 (-1; -4) \text{ dB}$

$C_{50-3150} = \text{--- dB}$

$C_{50-5000} = \text{--- dB}$

$C_{100-5000} = 0 \text{ dB}$

$C_{tr,50-3150} = \text{--- dB}$

$C_{tr,50-5000} = \text{--- dB}$

$C_{tr,100-5000} = -4 \text{ dB}$

Single number index and its uncertainty U_{95} determined in accordance with PN-EN ISO 12999-1:2014: $R_w = 31,8\text{dB} \pm 0,8\text{dB}$

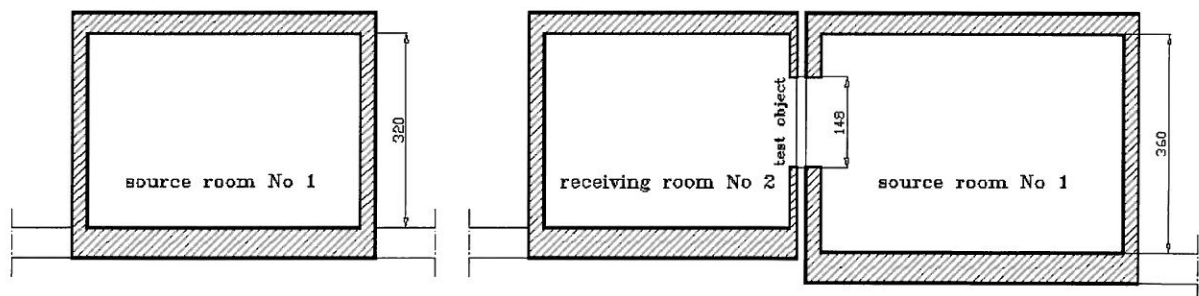
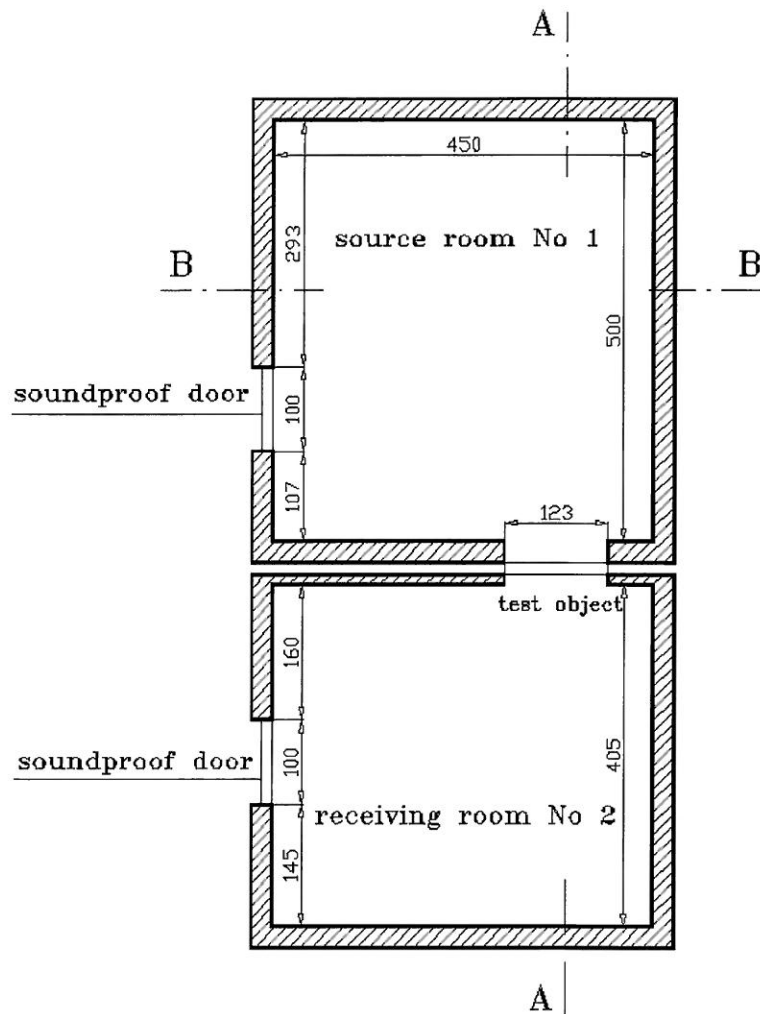
Building Research Institute Group of the Testing Laboratories
 Thermal Physics, Acoustics and Environment Laboratory

Test No.: **319.16**

Date of analysis: **2016-05-16**

Signature: **N.Bombała**

THE TEST ROOM TO AIRBORNE SOUND INSULATION MEASUREMENT IN LABORATORY



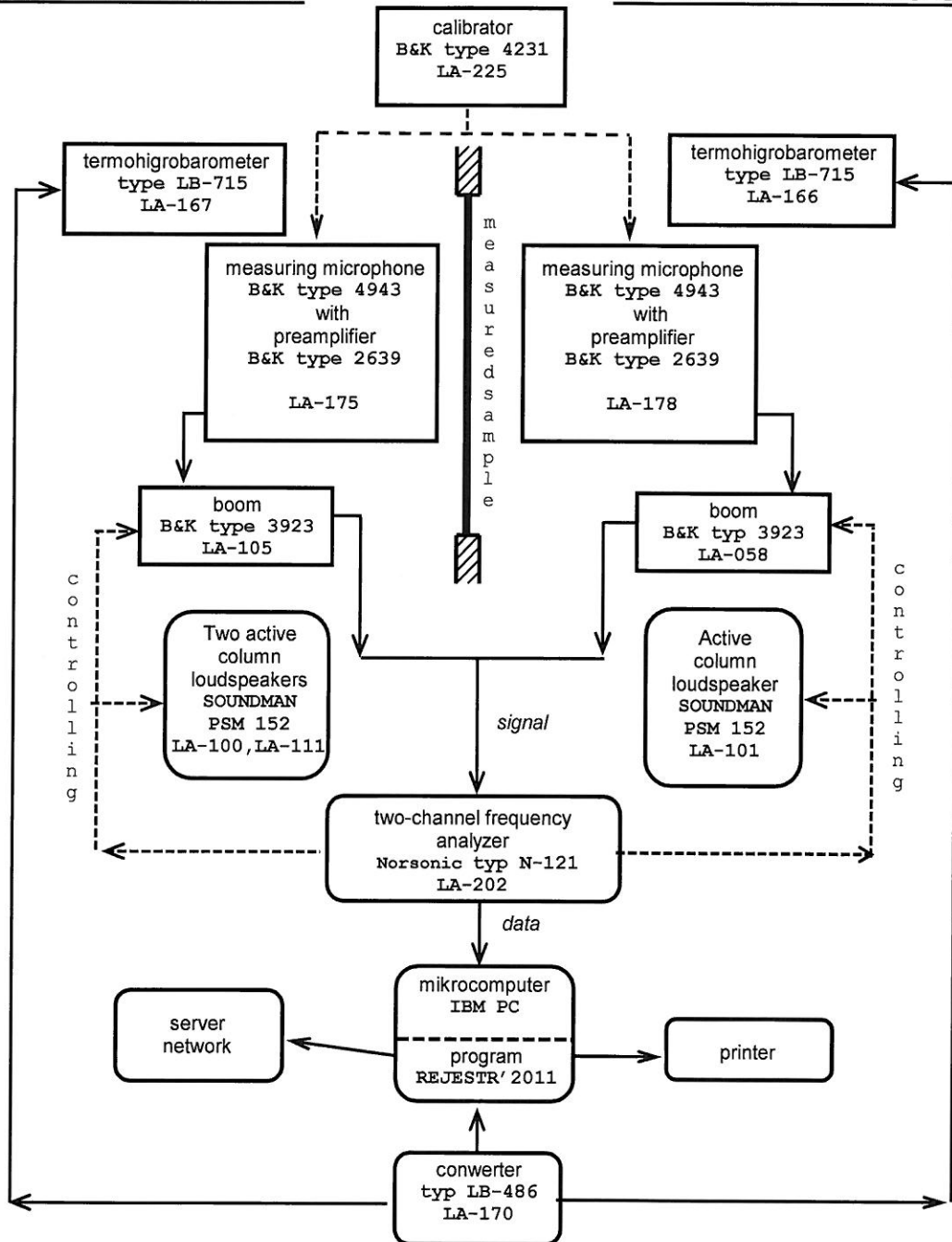
View and cross – section of the test room for sound insulation measurements

(dimensions given in cm)

INSULATING MEASUREMENT SYSTEM FROM AIRBORNE SOUNDS IN LABOLATORY

SOURSE ROOM

RECEIVING ROOM



OTHER INFORMATIONS CONCERNING THE TEST:**Sound insulation measurement method:**

The scheme of the test room are presented on the page 9. In the source room a steady pink noise is emitted and it is generated by sound sources so as to obtain an as good as possible diffuse sound field. The average sound pressure level spectrum is measured per 1/3 octave bands in the source and receiving room using a continuous rotating microphones. An integration in time and space of the sound pressure level is obtained, resulting in an average sound pressure level spectrum for the source and receiving room.

The reverberation time T is measured in the receiving room what allows to calculate the correction term in the formula for the sound reduction index R (via the equation of Sabine: $A=0.16V/T$, V – volume of the receiving room). The sound reduction index R is calculated with the formula:

$$R = L_1 - L_2 + 10 \log \frac{S}{A} \text{ [dB]}$$

L_1 – the average sound pressure level per 1/3 octave bands in the source room [dB] (ref. 20 μ Pa),

L_2 – the average sound pressure level per 1/3 octave bands in the receiving room [dB] (ref. 20 μ Pa),

S – surface of the test element in m^2 ,

A – the equivalent sound absorption area of the receiving room in m^2 (obtained by Sabine equation).

Calculations of the indexes $R_w(C, C_{tr})$ are carried out as to PN – EN ISO 717 – 1.

Test sample was mounted in the hole (adapted to the dimensions of the sample) in the double wall of silicate blocks thickness of 25 cm + mineral wool thickness of 5 cm (axis joints between the chambers of the test) + wall from silicate blocks thickness of 18 cm.

The measuring system from airborne sound insulation of the tested object is presented on the page 10.

Prior to the measurements, routine calibration/inspection of the measuring system was carried out in accordance with the Instruction No. 1 entitles "Routine Calibration/Inspection of the Acoustic Measuring System".

Responsible for test and product assessment:

dr inż. Elżbieta Nowicka



.....
Signature

Authorizing person:

dr Anna Iżewska



.....
Signature

Warsaw, June 9TH, 2016 r.

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