BUILDING RESEARCH INSTITUTE (N I S I) Ltd.
NOTIFIED TEST LABORATORY
Identification number NB 2032 of the Register of EC
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TEST REPORT
INITIAL TYPE TESTING
ITT-15.27 / 25.01.2016

The tests are carried out in compliance with the Chapter T wo of t he Bulgarian ***Regulation for the Essential Requirements to Constructions and Conformity Assessment of Construction Products*** *(RERCCACP)* that bring into force the ***Construction Products Directive (CPD) 89/106/EEC*** of the Council of European Communities.

Product:	**Facade System 50 mm (CW 50) of aluminium profiles system "VIVA ALUMINIUM SYSTEMS"**
Producer:	Factory of VIAS Ltd, Bulgaria, Shumen, 68A "Rishki prohod" Blvd.
Applicant:	VIAS Ltd, Bulgaria, Shumen, 68A "Rishki prohod" Blvd.
Document for assignment:	Contract No 40/2015
Test samples:	Fragment of facade system 50 mm (CW 50) with dimensions 2000/2000 mm. Details of the window are supplied in Annex 1.
Test period:	From 07.12.2015 to 22.01.2016
Assessment of the performance:	**The submitted Facade System 50 mm (CW 50) of aluminium profiles system „VIVA ALUMINIUM SYSTEMS meets watertightness class R6; air permeability class A2; impact resistance class I3, E3; resistance to wind load 800 Pa with deformities 0,18/0,58 mm; weighted sound reduction index R_w (C; C_{tr}) = 28 (-1; -3) dB; thermal transmittance U_w = 1,34 W/(m^2.K).**

Head of Test Laboratory
Res. Ass. Eng. Tsvetana Gyurova

General Manager of NISI
Prof. Dr. Eng. Rumen Gugliev

НАУЧНОИЗСЛЕДОВАТЕЛСКИ СТРОИТЕЛЕН ИНСТИТУТ - НИСИ - ОСНОВАН 1895 - СОФИЯ

Testing data:

No	Characteristic	Unit of measu-rement	Test method	Test result	Requirement according
1.	Watertightness in static test pressure P = 600 Pa *	class	EN 12155	R6	EN 12154 The requirements are given in Annex 2 of the test report.
* Detailed test results are given in Annex 2 of the test report.					
2.	Resistance to wind load *		EN 12179		EN 13116:
2.1	Deformations (f) the main load profiles of wind pressure P = ± 800 Pa: - horizontal axis (point 2); - vertical axis (point 5)	 mm mm		 +0,18 / -0,18 +0,58 / -0,55	P = ± 800 Pa and f < 1/200 L < ±4,68 < ±9,50
2.2	Safety test at triple pressure	-		P = ± 1200 Pa Functional qualities and links with hardware are reserved.	P = ± 1200 Pa Functional qualities of the window and links with hardware to be reserved.
* Detailed test results are given in Annex 3 of the test report.					
3.	Impact resistance **	class	EN 12600	I3; E3	EN 14019 No residual deformities and defects in the glass.
* Detailed test results are given in Annex 3 of the test report. ** Detailed test results are given in Annex 4 of the test report.					
4.	Airborne sound insulation – weighted sound reduction index, R_w (C; C_{tr}) *	dB	EN ISO 10140-2	28 (-1; -3)**	-
* Weighted sound reduction index, Rw (C; Ctr) dB, according to EN ISO 717-1. ** Detailed test results are given in Annex 5 of the test report.					
5.	Thermal transmittance coefficient: - the horizontal profile - the vertical profile - the glass - the fragment facade	W/(m^2.K)	EN ISO 12631	 1,85 ±0,004 1,99 ±0,004 1,24 ±0,011 1,34 ±0,010	 - - - -
6.	Air permeability *	class	EN 12153	A2	EN 12152 The requirements are given at Annex 6 of the test report.
* Detailed test results are given in Annex 6 of the test report.					

Technical documentation:

БДС EN 13830:2015	Curtain walling - Product standard
БДС EN 12179:2003	Curtain walling - Resistance to wind load - Test method
БДС EN 13116:2003	Curtain walling - Resistance to wind load - Performance requirements
БДС EN 12155:2003	Curtain walling - Watertightness - Laboratory test under static pressure
БДС EN 12154:2003	Curtain walling - Watertightness - Performance requirements and classification
БДС EN 12153:2003	Curtain walling - Air permeability - Test method
БДС EN 12152:2003	Curtain walling - Air permeability - Performance requirements and classification
БДС EN ISO 10140-2:2003	Acoustics. Laboratory measurements of sound insulation of building elements. Part 2: Measurement of airborne sound insulation
БДС EN ISO 717-1:2013	Acoustics. Rating of sound insulation in buildings and of building elements. Part 1: Airborne sound insulation;
БДС EN ISO 12567-1:2010	Thermal performance of windows and doors - Determination of thermal transmittance by the hot-box method - Part 1: Complete windows and doors
БДС EN 12600:2003	Glass in building - Pendulum test - Impact test method and classification for flat glass

Tests are carried out by

1. Eng. O. Savov
2. Res. Ass. Eng. K. Glushkova

Head of Test Laboratory

Res. Ass. Eng. Tsvetana Gyurova

ЛОС при НИСИ-ЕООД

Annex 1

Data of facade for testing

Name of product: Facade System 50 mm (CW 50) of aluminum profiles system „VIVA ALUMINIUM SYSTEMS“

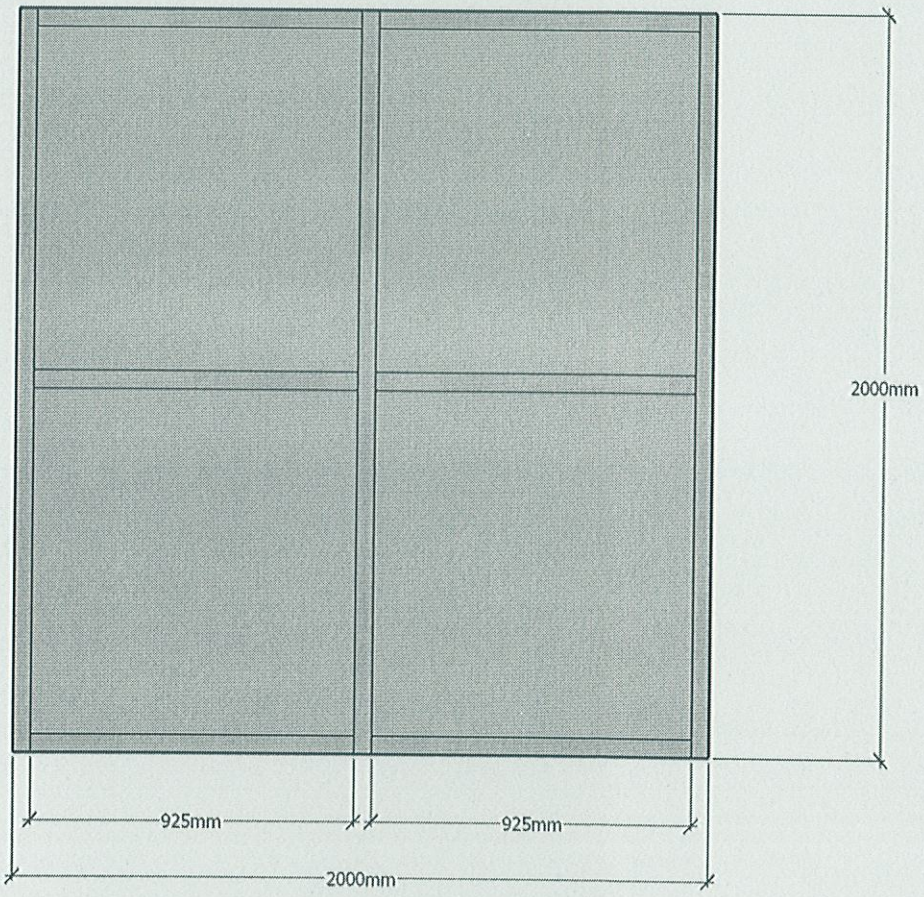
Description of test specimen: Facade System 50 mm (CW 50):

- Dimensions 1750/2550 mm;
- Glazing – glass with a total thickness of 20 mm (4 mm white glass, 12 mm air gap filled with Argon, 4 mm glass „сънерджи”);
- Used Al profiles:
  - mullion – 5015;
  - transom – 5005;
  - subcap – 5006;
  - cap – 5007;
  - clasp for contibever – 5012;
  - contibever – 5013;
  - pressure plate – 5011;
  - connecting profile – 5014;
- Gasket:
  - G06 – gasket for mullion;
  - G07 – gasket for transom and subcap.

Note: Detailed drawings of the test specimen are shown on p. 6 to p. 10.

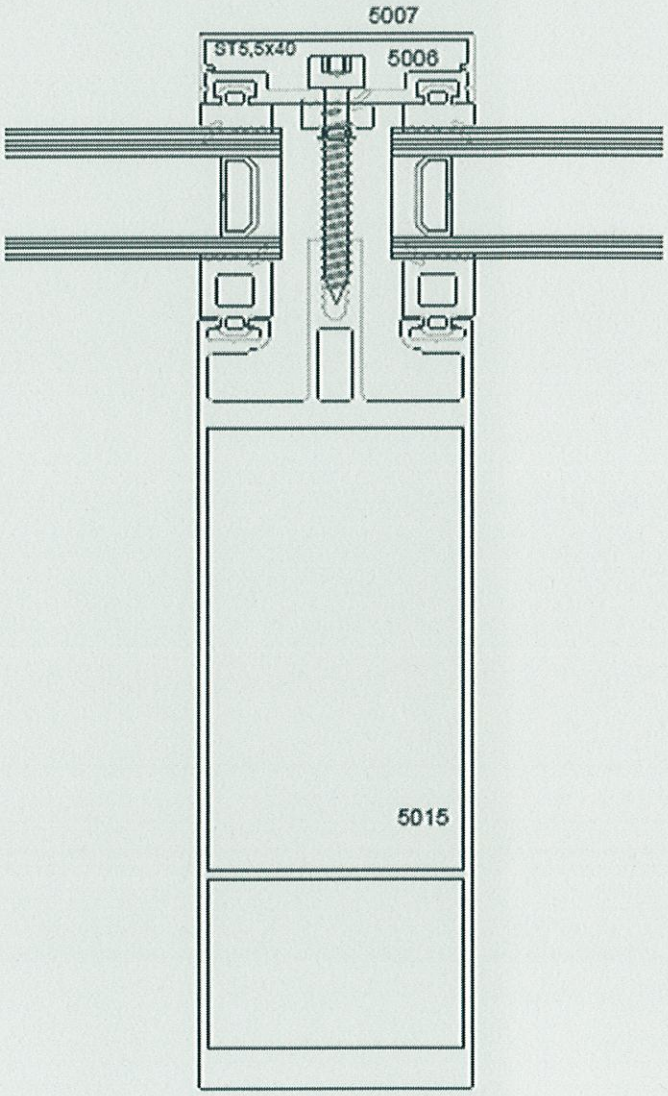
VIVA® ALUMINIUM SYSTEMS

FACADE SYSTEM CW 50



VIVA® ALUMINIUM SYSTEMS

Фасадна Система 5000



VIVA® ALUMINIUM SYSTEMS

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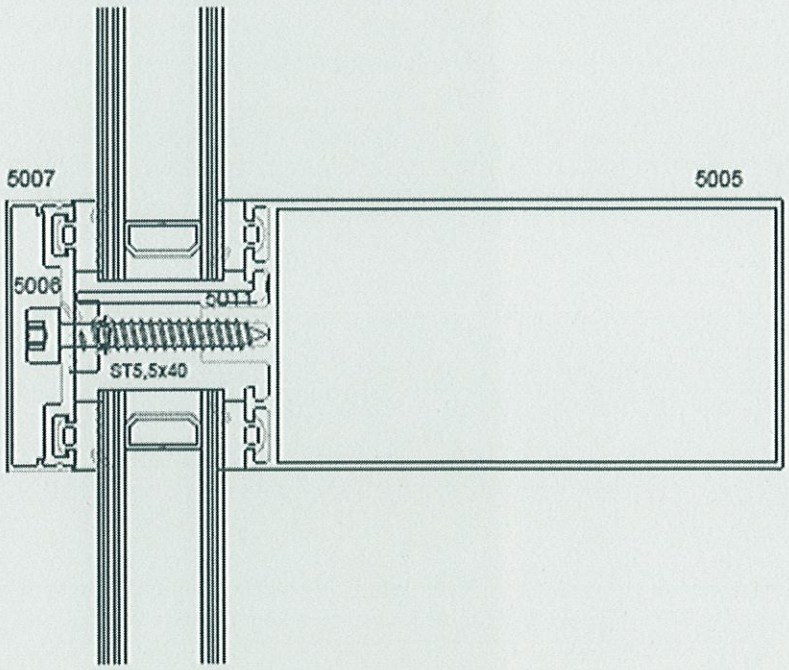

VIVA® ALUMINIUM SYSTEMS

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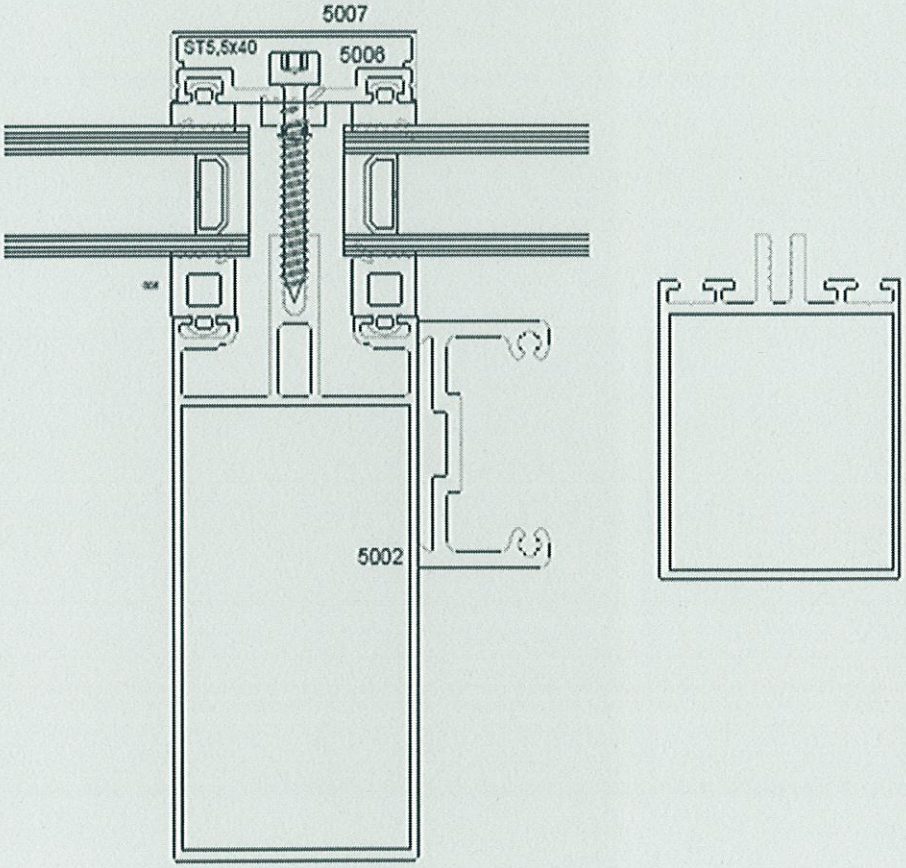

VIVA® ALUMINIUM SYSTEMS

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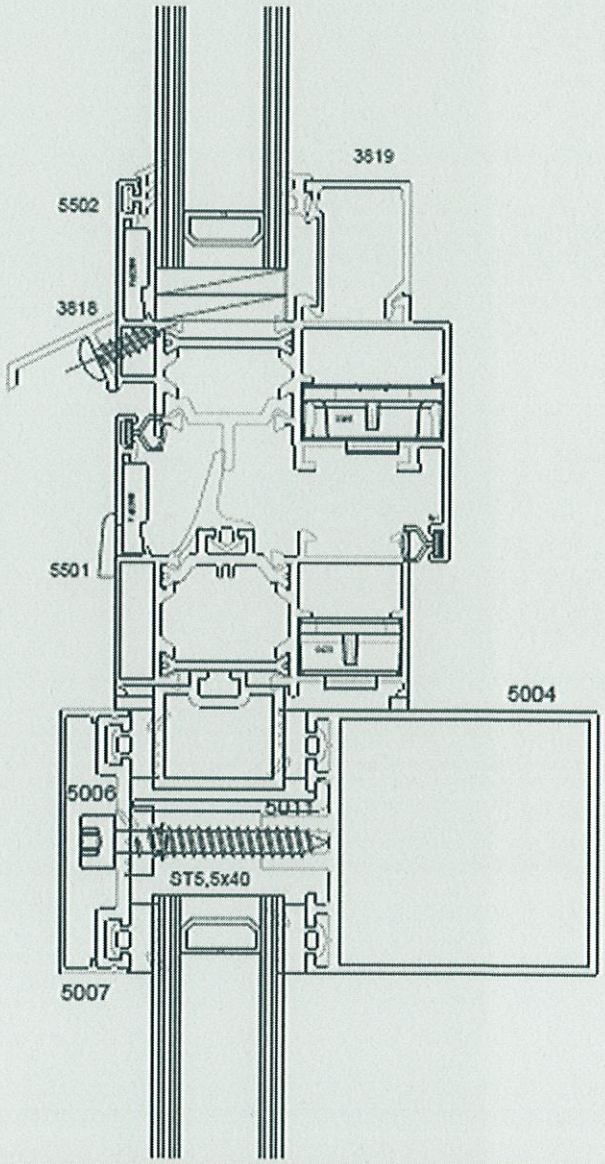


Annex 2

Watertightness – EN 12155

1. Test conditions and test equipment data

The test is carried out on a stand system "Rosenheim" type "VH AE" of HOLTEN located in the Laboratory "Building Physics" at NISI Ltd. The stand consists of a chamber and control and measurement desk. The chamber is airtight and only one of the sides is open. This side is closed by appropriate fixing of testing facade that is oriented to the outside of the chamber.

The testing window is fixed to the spacers (the chamber sides) by manual clamps. Microporous rubber seals are used between the facade frame and the chamber walls for good seal.

Water quantity – 2 dm^3 per 1 m^2/min.

Air temperature in the chamber and the laboratory is 20 °C.

Relative humidity in the chamber and the laboratory is 50 %.

2. Test results

Test pressure, Pa	Continuance, min	Results of the monitoring on the internal face of the test specimen	Classification	Requirements according to EN 12154
				Do not leaking, Pa/min
0	15	Water resistant	-	0/15; 50/5
50	5	Water resistant	-	0/15; 50/5; 100/5
100	5	Water resistant	-	0/15; 50/5; 100/5; 150/5
150	5	Water resistant	**R4**	0/15; 50/5; 100/5; 150/5; 200/5; 300/5
300	5	Water resistant	**R5**	
450	5	Do not leaking	**R6**	0/15; 50/5; 100/5; 150/5; 200/5; 300/5; 450/5
600	5	Leaking from the inner corners of the wings below (left and right)	**R7**	0/15; 50/5; 100/5; 150/5; 200/5; 300/5; 450/5; 600/5

Annex 3

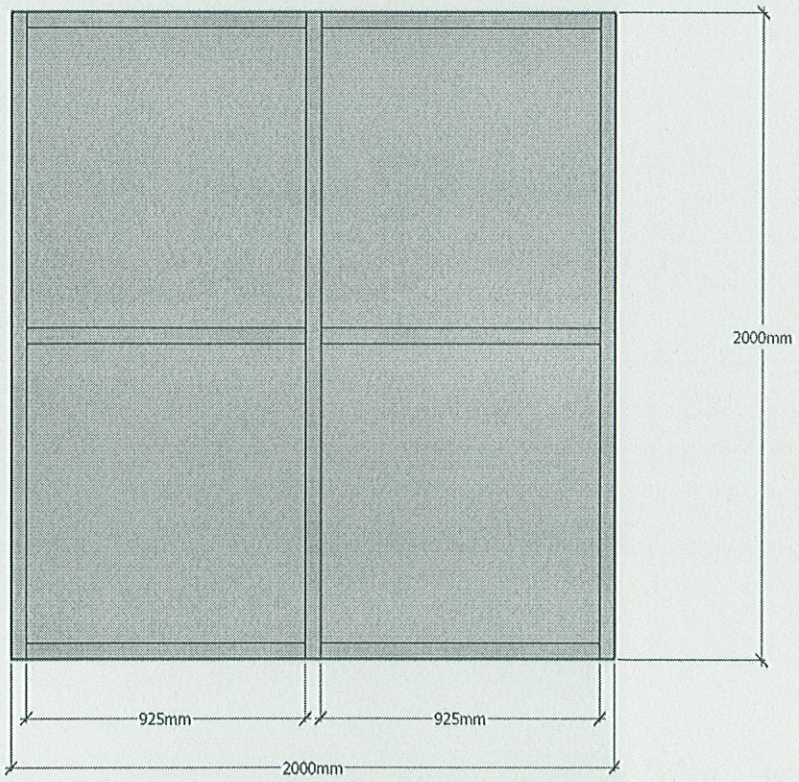
Resistance to wind load – БДС EN 12179

1. Test conditions and equipment data

The test equipment and the chamber are in accordance with Annex 2 of the test report.
Air temperature in the chamber and the laboratory is 15 °C.
Relative humidity in the chamber and the laboratory is 64 %.

2. Testing of deformation (deflections)

Measurement of deformations (deflections) of the linear elements in height of the facade wings is made using measuring devices type TGL 7682 accurate to 0,01 mm (produced of SUHL, Germany).



Disposition scheme of measuring points on the facade

Test pressure, Pa	**Deflection in mm**		
	f ($f_{p\,res}$) в т.1	**f ($f_{p\,res.}$) в т.2**	**f ($f_{p\,res}$) в т.3**
+800 / -800	+0,65 / -0,43 (+0,03/-0,03)	+0,52 / -0,53 (+0,06/-0,01)	+0,04 / -0,28 (0,00/-0,10)
	f ($f_{p\,res.}$) в т.4	**f ($f_{p\,res.}$) в т.5**	**f ($f_{p\,res.}$) в т.6**
+800 / -800	+0,22 / -0,24 (+0,01/-0,03)	+0,75 / -0,76 (+0,06/ 0,00)	+0,11 / -0,18 (0,16/-0,02)

* $f_{p\,res}$ is residual deflection.

3. Repeated pressure test

The test is implemented at a pressure of ± 400 Pa, repeated 50 times.

At the repeated 50 cycles test including negative and positive pressure of 400 Pa, that simulate the facade behavior at the wind blows (pressure and suction) defects and damages that deteriorate the facade performance are not detected.

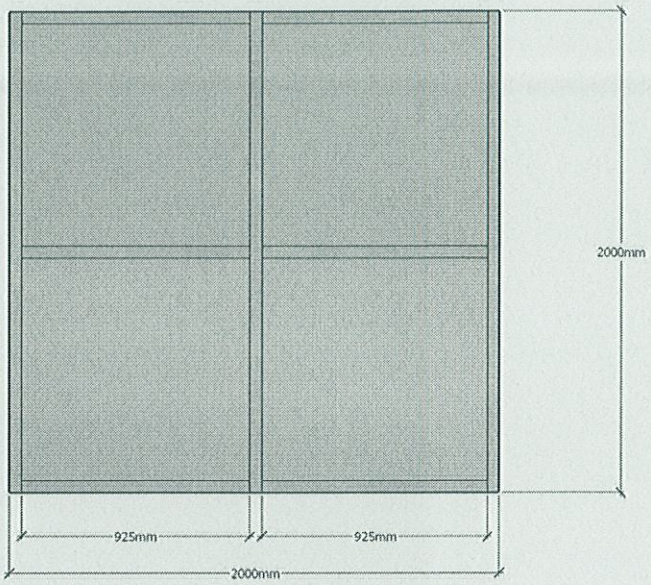
4. Safety test at triple pressure

The test is carried out at positive and negative pressure ± 1200 Pa only once.

Damages that deteriorate the facade performance are not detected during the safety test at triple pressure.

Annex 4

Iimpact resistance – EN 12600



Height release, mm	Test items			
	1	2	3	4
200	withstands	withstands	withstands	withstands
300	withstands	withstands	withstands	withstands
450	withstands	withstands	withstands	withstands
700	Breaking the glass	-	-3,7 mm deformation	-

Annex 5

Airborne sound insulation – EN ISO 10140-2, EN ISO 717-1

1. Test conditions, test facilities and equipment data

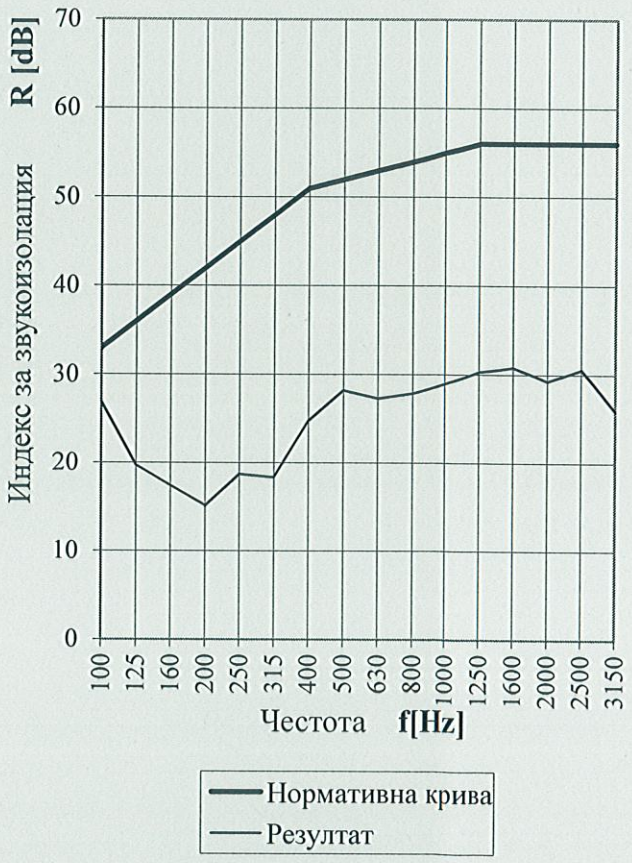
The test is carried out at "Building physics" laboratory:

- Air temperature 10 °C; relative humidity 60 %
- Source room V = 170 m³;
- Receiving room V = 119 m³;;
- Filling wall with Rw = 50 dB;
- Acoustic equipment "Brüel & Kjær" - Denmark:
  - Analyzer for building acoustics Type 4418;
  - Microphone Type 4166;
  - Preamplifier Type 2916;
  - Source noise Type 4292;
  - Sound calibration Type 4230.

The test specimen is installed by the specialists of Applicant.

2. Test results

f, Hz	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150
R, dB	26,9	19,7	17,4	15,1	18,7	18,4	24,8	28,2	27,3	27,9	29,0	30,3	30,8	29,3	30,6	25,9



ОЦЕНЕН ИНДЕКС НА ИЗОЛАЦИЯ ОТ ВЪЗДУШЕН ШУМ

Rw (C; C_{tr}) = 28 (-1; -3) dB

Annex 6

Air permeability – EN 12153

1. Test conditions and test equipment data

The test equipment is in accordance with Annex 2 of the test report.

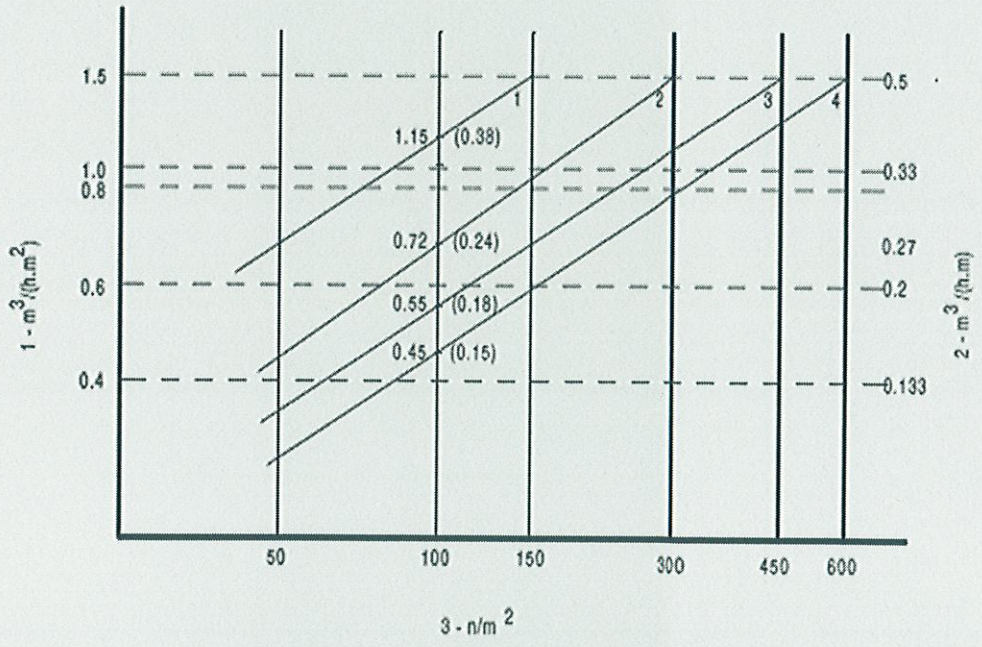
Air temperature in the receiving room is 20 °C.
Relative humidity in the receiving room is 50 %.

2. Test results

P, Pa	50	100	150	300	450	600
V, m³/h	1,80	2,50	3,00	4,90	6,70	10,90
V_1, m³/hm	0,18	0,25	0,31	0,50	0,67	1,10
V_w,m³/hm²	0,40	0,56	0,70	1,26	1,59	2,60

Air permeability – classification:

- overall area – class A2;
- length of opening joints – class A2.



Classification - maximum air permeability