Test center of Saint-Petersburg State University of Architecture and Civil Engineering (SPbGASU)
Center for Mechanical Testing of Building Structures (TsMISK)
190005, Saint Petersburg, 2-ya krasnoarmeyskaya, h. 4, tel./fax (812) 575 05 45
Accreditation certificate No RA RU 21 CT 39
is put in the register on May 20, 2015

TEST CERTIFICATE
No 48 (4-32-2/19/13) under date of July 15, 2019

1. Test object: Portland cement wood wool board (WWC boards).
2. Test objective: Measurement of physical and mechanical properties of WWC boards.
3. Customer: OOO “Fibrolit”.
4. Manufacture: OOO “Fibrolit”.
5. Reason for test performance: contract No 4-32-2/19/13 under date of June 05, 2019.
6. Date of test performance: 17.06-05.07.2019
7. Number of batch for test and sample date: batch No 30 under date of March 11, 2019.
8. Quantity of selected samples: 68 pieces.
9. Place of sample selection: Vologda region, city of Cherepovets, Proyezzhaya str., h.4.
10. Test environment

Air temperature	20,2-22,0^{0}C
Humidity	60-63%
Atmospheric pressure	754-763 mm Mercury

11. Test procedure: GOST 17177-94 Building thermal insulating materials and products. Test method: GOST 10634-88 Wood wool boards. Methods of measurement of physical properties. GOST 10636-2018 Wood wool and wood fiber boards. The method of measurement of the tensile strength perpendicular to the plate surface. GOST 11843-76 Wood wool boards. Method of hardness measurement. GOST 10637-78 Wood wool boards. Method of measurement of specific resistance to pulling screws and nails. GOST 10635-88 Wood wool boards. Methods of measurement of bending strength and elasticity modulus.
12. Measuring equipment and test facility

Items No	Name of measuring equipment, type, brand	Serial No	Information about verification (calibration test)
1	Universal testing machine 5969	No 5969L6060	Certificate of Verification No 0215719 from December 10, 2018 to December 09, 2019
2	Double-sided caliper with depth gauge	No 08012357	Certificate of Verification No 0007721 valid up to January 28, 2020
3	Test chamber of cold, heat, humidity “КТХВ-300”	No 02092017	Certificate No115614-2018 from July 05, 2018 to July 06, 2019
4	Electronic laboratory scales GF-200	No T0332054	Certificate of Verification No 0006270 from January 28, 2019 to January 27, 2020
5	Adhesion meter ПСО-МГ4АД	No1184	Certificate of Verification No 0264-2019 from June 03, 2019 to June 02, 2021

Results are shown in Appendixes No 1-3 on sheets No 2-4.
Graphical part is shown in Appendixes No 4-11 on sheets No 5-12.
Vice director of Test center SPbGASU
Director TsMISK SPbGASU Bezpalchuk S. N.

Appendix No 1
to the Test certificate
No 48 (No 4-32-2/19/13) under date of July 15, 2019

Test results:

Table No 1

Item No	Sample No	Parameters description	Product regulatory documentation name	Product regulatory documentation designation	Parameter value			
					Unit of physical quantity	According regulatory documentation	During tests	Average
1	2	3	4	5	6	7	8	9
1	F-1	Moisture	GOST 10634-88	–	%	–	5.1	5.4
2	F-2						5.9	
3	F-3						6.0	
4	F-4						4.9	
5	F-5						5.0	
6	F-6	Density	GOST 10634-88	–	kg/m^3	–	455.6	433.5
7	F-7						415.3	
8	F-8						437.5	
9	F-9						400.0	
10	F-10						459.0	
11	F-11	Water absorption	GOST 10634-88	–	%	–	50.9	51.6
12	F-12						50.5	
13	F-13						51.6	
13	F-14						52.3	
15	F-15						52.8	
16	F-16	Swelling	GOST 10634-88	–	%	–	2.2	2.2
17	F-17						2.2	
18	F-18						1.9	
19	F-19						1.9	
20	F-20						3.4	
21	F-21						2.0	

22	F-22						2.6	
23	F-23						0.9	

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Appendix No 2
to the Test certificate
No 48 (No 4-32-2/19/13) under date of July 15, 2019

Test results:

Table No 2

Item No	Sample No	Parameters description	Product regulatory documentation name	Product regulatory documentation designation	Parameter value			
					Unit of physical quantity	According regulatory documentation	During tests	Average
1	2	3	4	5	6	7	8	9
24	F-24.B	Bending strength (samples are cut along the sheet)	GOST 10635-88	–	MPa	–	1.60	1.72
25	F-25.B						2.31	
26	F-26.B						1.17	
27	F-27.B						1.33	
28	F-28.B						2.89	
29	F-29.B						1.45	
30	F-30.B						1.47	
31	F-31.B						1.54	
32	F-24.P	Bending strength (samples cut across the sheet)	GOST 10635-88	–	MPa	–	1.47	1.35
33	F-25.P						1.23	
34	F-26.P						1.46	
35	F-27.P						1.77	
36	F-28.P						1.46	
37	F-29.P						1.05	
38	F-30.P						1.01	
39	F-31.P						1.39	
40	F-24.1	Flex modulus (samples are cut along the sheet)	GOST 10635-88	–	MPa	–	220.03	271.89
41	F-24.2						364.45	
42	F-24.3						231.20	
43	F-25.1	Flex modulus (samples are cut across the sheet)	GOST 10635-88	–	MPa	–	182.30	239.78
44	F-25.2						271.02	
45	F-25.3						266.01	

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Appendix No 3
to the Test certificate
No 48 (No 4-32-2/19/13) under date of July 15, 2019

Test results:

Table No 3

Item No	Sample No	Parameters description	Product regulatory documentation name	Product regulatory documentation designation	Parameter value			
					Unit of physical quantity	According regulatory documentation	During tests	Average
1	2	3	4	5	6	7	8	9
46	F-32	Bending strength	GOST 26816-2016	–	MPa	–	0.35	0.34
47	F-33						0.39	
48	F-34						0.30	
49	F-35						0.30	
50	F-36						0.34	
51	F-37						0.31	
52	F-38						0.38	
53	F-39						0.36	
54	F-40	Hardness	GOST 11843-76	–	N/mm^2	–	1.44	1.50
55	F-41						1.54	
56	F-42						1.65	
57	F-43						1.37	
58	F-44	Compression resistance at 10% linear strain	GOST 17177-94	–	MPa	–	0.405	0.427
59	F-45						0.359	
60	F-46						0.516	
61	F-47.P	Specific resistance to pulling screws from the sheet surface	GOST 10637-2010	–	N/mm	–	6.0	6.4
62	F-48.P						7.1	
63	F-49.P						6.9	
64	F-50.P						5.7	
65	F-47.K	Specific resistance to pulling screws from the sheet edge	GOST 10637-2010	–	N/mm	–	7.5	6.5
66	F-48.K						8.5	
67	F-49.K						4.3	
68	F-50.K						5.9	

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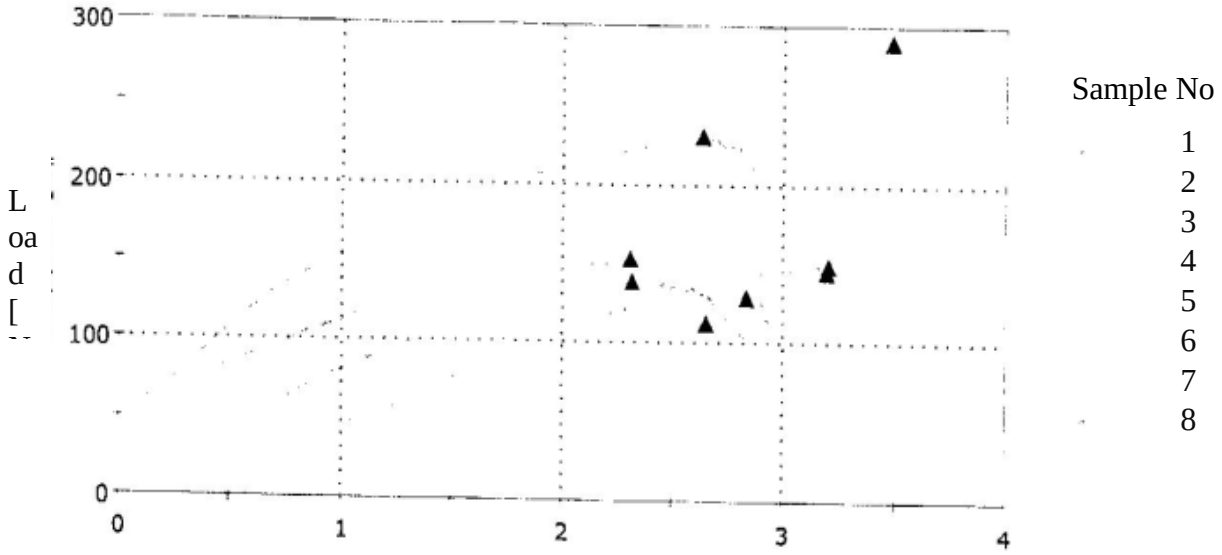
Appendix No 4
to the Test certificate
No 48 (No 4-32-2/19/13) under date of July 15, 2019

The graphical part

Three-point bending test of WWC boards samples



Sample No	Tensile strength [MPa]	Maximum load [N]
F-24.B	1.60	152.19
F-25.B	2.31	231.11
F-26.B	1.17	112.02
F-27.B	1.33	128.54
F-28.B	2.89	290.91
F-29.B	1.45	138.06
F-30.B	1.47	143.97
F-31.B	1.54	148.68
Average	1.72	168.18

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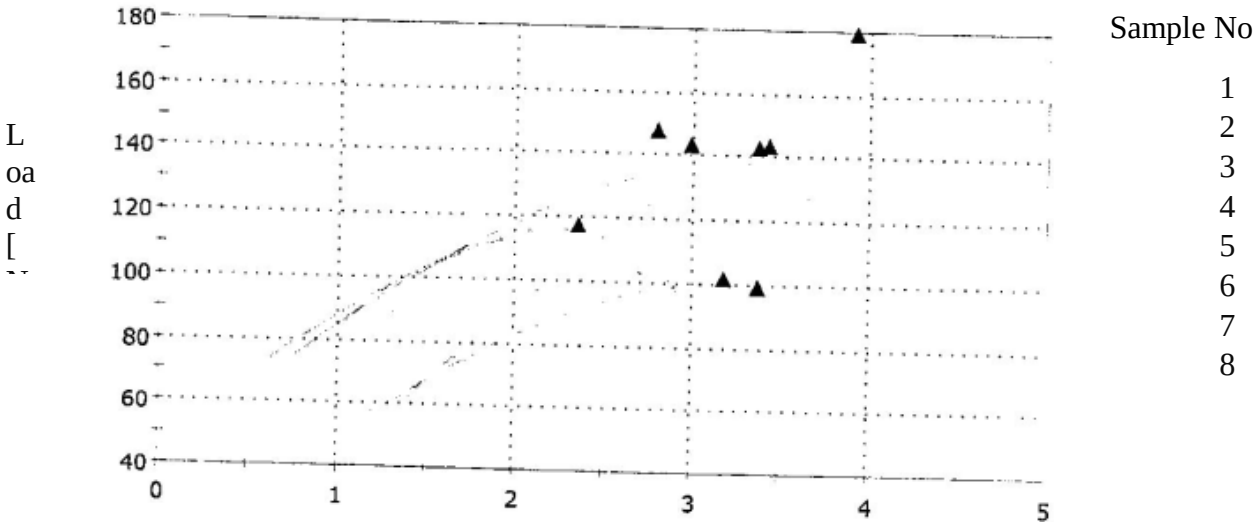
Appendix No 5
to the Test certificate
No 48 (No 4-32-2/19/13) under date of July 15, 2019

The graphical part

Three-point bending test of WWC boards samples



	Tensile strength [MPa]	Maximum load [N]
F-24.P	1.47	142.86
F-25.P	1.23	117.75
F-26.P	1.46	143.46
F-27.P	1.77	179.51
F-28.P	1.46	147.63
F-29.P	1.05	101.88
F-30.P	1.01	99.08
F-31.P	1.39	143.24
Average	1.35	134.43

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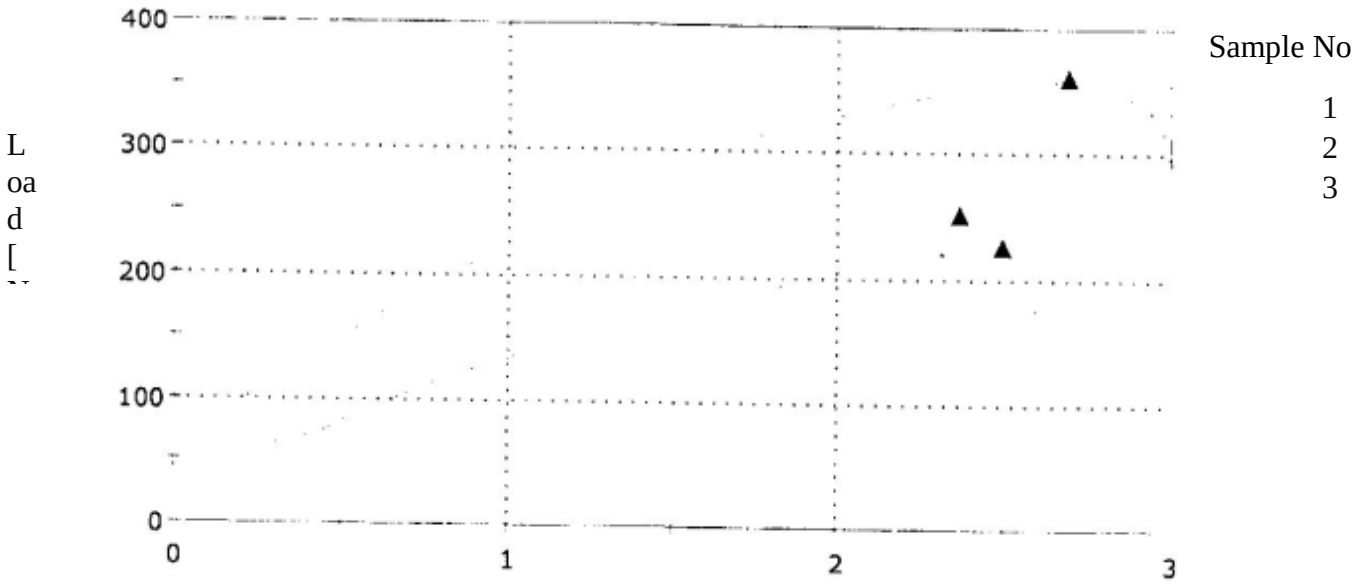
The graphical part

Three-point bending test of WWC boards samples



Sample No	Flex modulus [MPa]	Maximum load [N]
F-24.1	220.03	227.35
F-24.2	364.45	360.82
F-24.3	231.20	252.82
Average	271.89	280.33

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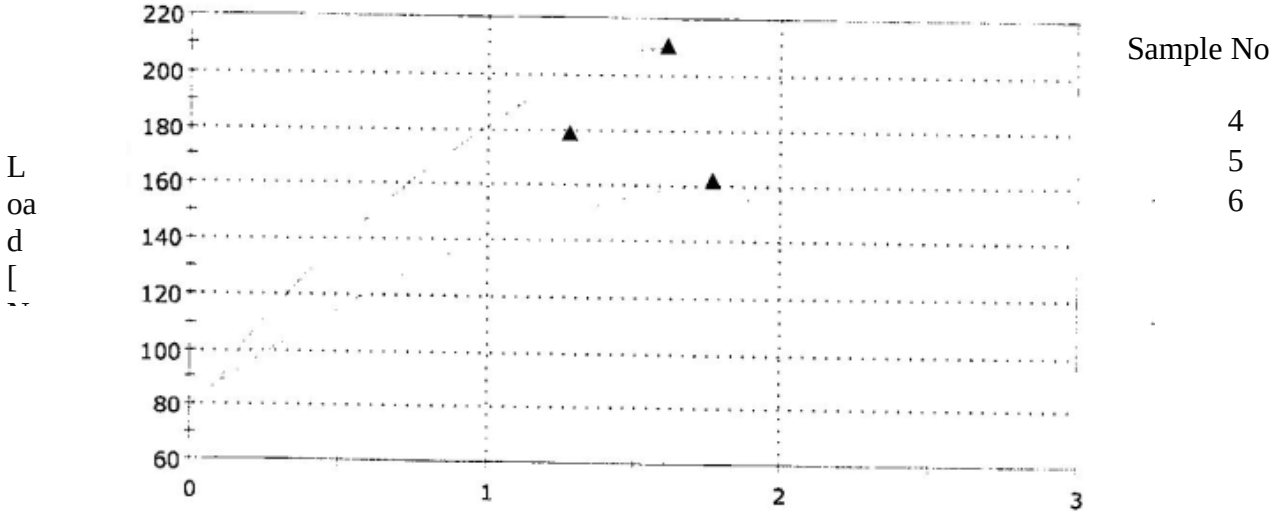
The graphical part

Three-point bending test of WWC boards samples



Sample No	Flex modulus [MPa]	Maximum load [N]
F-25.1	182.30	162.14
F-25.2	271.02	210.39
F-25.3	266.01	179.18
Average	239.78	183.90

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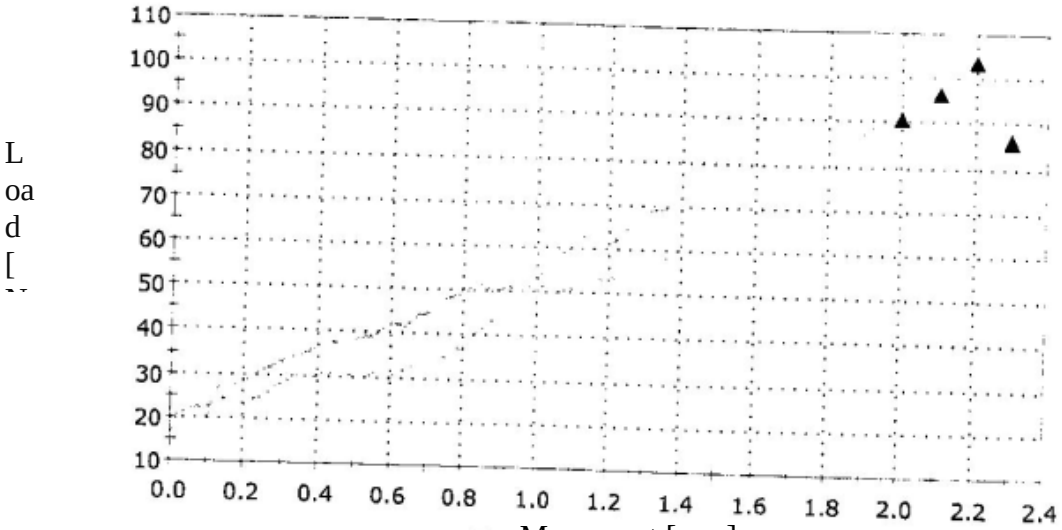
The graphical part

Hardness test of WWC boards samples



Sample No	Indentation load when pressing the ball into the sample to a depth of 2 mm P [N]	Hardness H [N/mm^2]
F-40	90.41	1.44
F-41	96.47	1.54
F-42	103.88	1.65
F-43	86.15	1.37
Average	94.23	1.50

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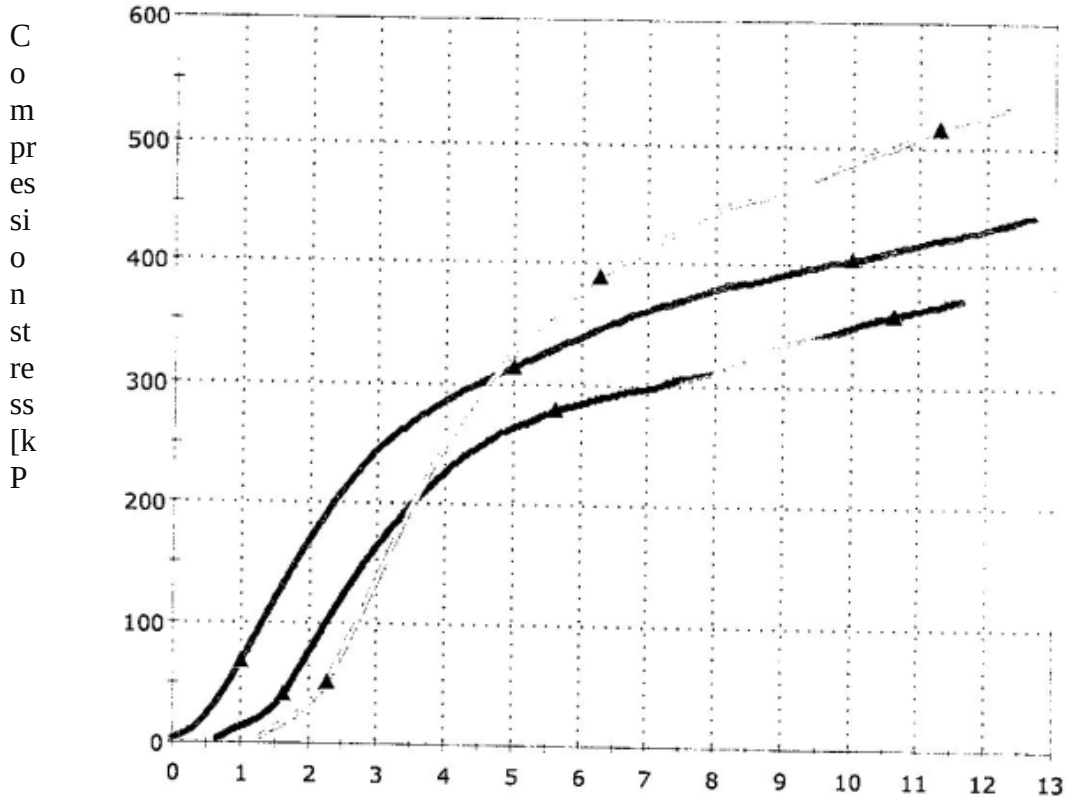
Appendix No 9
to the Test certificate
No 48 (No 4-32-2/19/13) under date of July 15, 2019

The graphical part

Compression test of WWC boards samples



Sample No	Compression resistance at 10% linear strain [MPa]
F-44	405.62
F-45	359.33
F-46	516.52
Average	427.16

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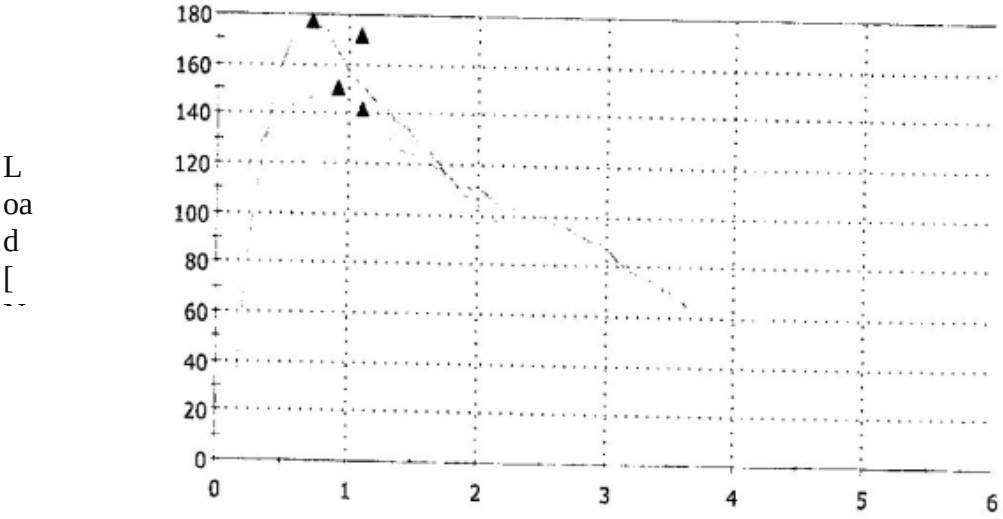
Appendix No10
to the Test certificate
No 48 (No 4-32-2/19/13) under date of July 15, 2019

The graphical part

Graph of test of WWC boards samples for specific resistance to pulling screws



Sample No	Maximum load [N]	Specific resistance to pulling screws [N/mm]
F-47.P	151.04	6.0
F-48.P	177.79	7.1
F-49.P	171.98	6.9
F-50.P	142.2	5.7
Average	160.8	6.4

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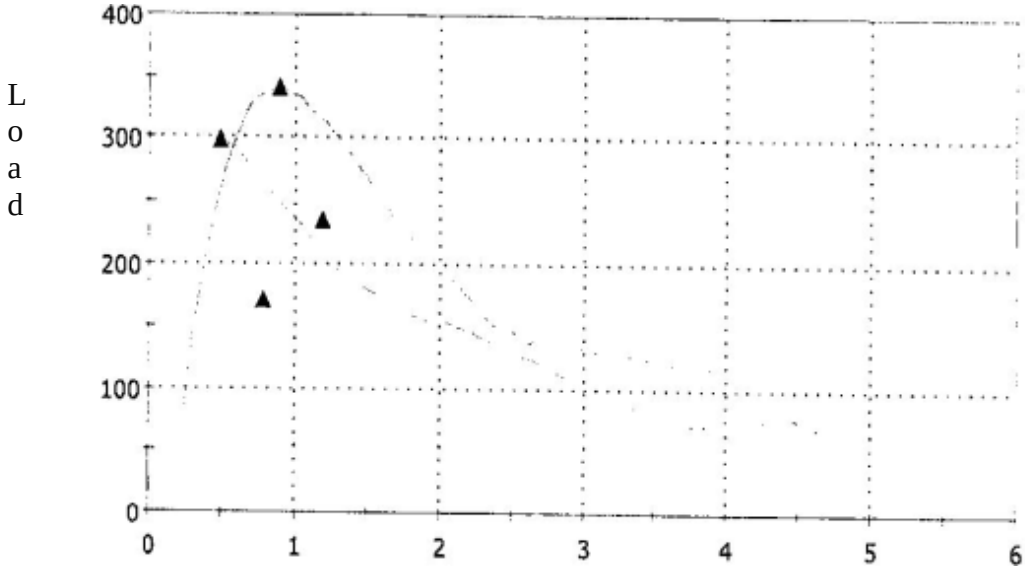
Appendix No 11
to the Test certificate
No 48 (No 4-32-2/19/13) under date of July 15, 2019

The graphical part

Graph of test of WWC boards samples for specific resistance to pulling screws



Sample No	Maximum load [N]	Specific resistance to pulling screws [N/mm]
F-47.K	299.83	7.5
F-48.K	340.77	8.5
F-49.K	170.85	4.3
F-50.K	235.35	5.9
Average	261.7	6.5

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