KAUNAS UNIVERSITY OF TECHNOLOGY
INSTITUTE OF ARCHITECTURE AND CONSTRUCTION

Wind suction and pressure load tests of multi-layer self-supporting facade insulation and veture panels and a set of materials used for their installation

TEST REPORT

No. 144 SF/24 OVA

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Product Definition

This national technical assessment is intended for multi-layer self-supporting facade insulation and veture panels and a set of materials used for their installation (hereinafter referred to as a veture set).

The veture set consists of:

- Multilayer self-supporting facade insulation and veture panels Koderus 2IN1.

- Screws for attaching panels to the base for panel fastening.

- Set of sealing joints between panels, consisting of:

    - Sealing foam Penosil Fire Rated Gunfoam B1 187 (manufacturer Wolf Group OU, Estonia).

    - Sealant Penosil Premium FireStop Silicone (manufacturer Wolf Group OU, Estonia).

    - Expanded polyethylene profile Bostik Bottningslist (manufacturer Bostik AB, Sweden).

Panels Koderus 2IN1 consist of a heat-insulating polystyrene foam layer and an external concrete veture layer which are fused to each other while manufacturing panels.

Panels are produced with steel perforated mounting strips for mechanical fastening to the base.

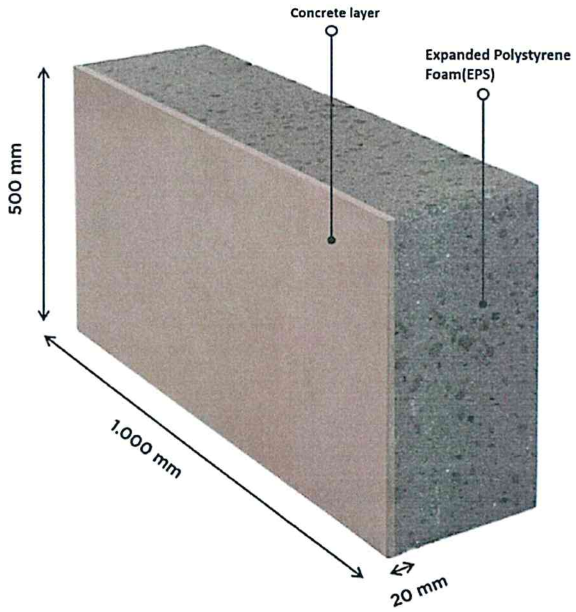

Fig. 1. System cross section

Intended use

The panels are designed for the insulation and renovation of the external walls of new, reconstructed, and renovated residential and non-residential buildings.

The specific use of the panels depends on the construction technical regulations, other legal acts, in individual cases on the customer's special requirements, specific climatic conditions and must be specified in the project documentation in each case.

In order to ensure that the finish is watertight and to protect the panels from soaking, the points of connection between the panels are hermetically sealed during their installation.

The construction of the veture sets is intended for installation on a base made of concrete, masonry and other bases that ensure sufficient mechanical durability of the veture to be fixed.

This technical assessment is based on the assumption that these panels have an economically feasible useful life of 50 years, provided that the product is properly installed, operated and maintained. The concept of economically feasible useful life should not be understood as a guarantee provided by the manufacturer. The economically feasible useful life of the product is the period during which there is a purposeful use of the product, maintaining its operational characteristics that meet the major requirements of the building, taking into account the costs required for its maintenance, renovation and repairs.

Wind suction and pressure load tests

The test was performed in accordance with the requirements of Section 2.2.9 and Appendix E of EAD090062-00-0404.

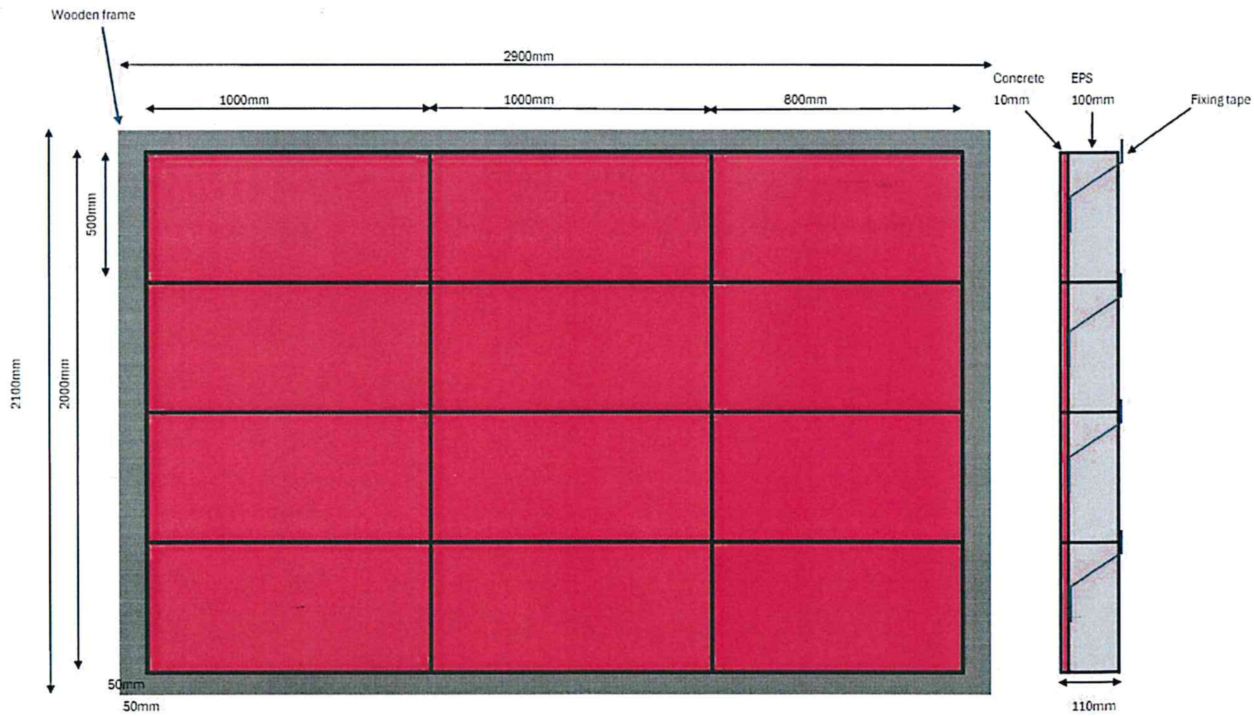

Fig. 2. Arrangement scheme of finishing elements, elements of attachment to the base for testing

Test results

The layout diagram of the indicators is shown in Fig. 3. The locations of the sensors were specified by the customer. The deformation of the system elements is estimated as the difference in displacements.

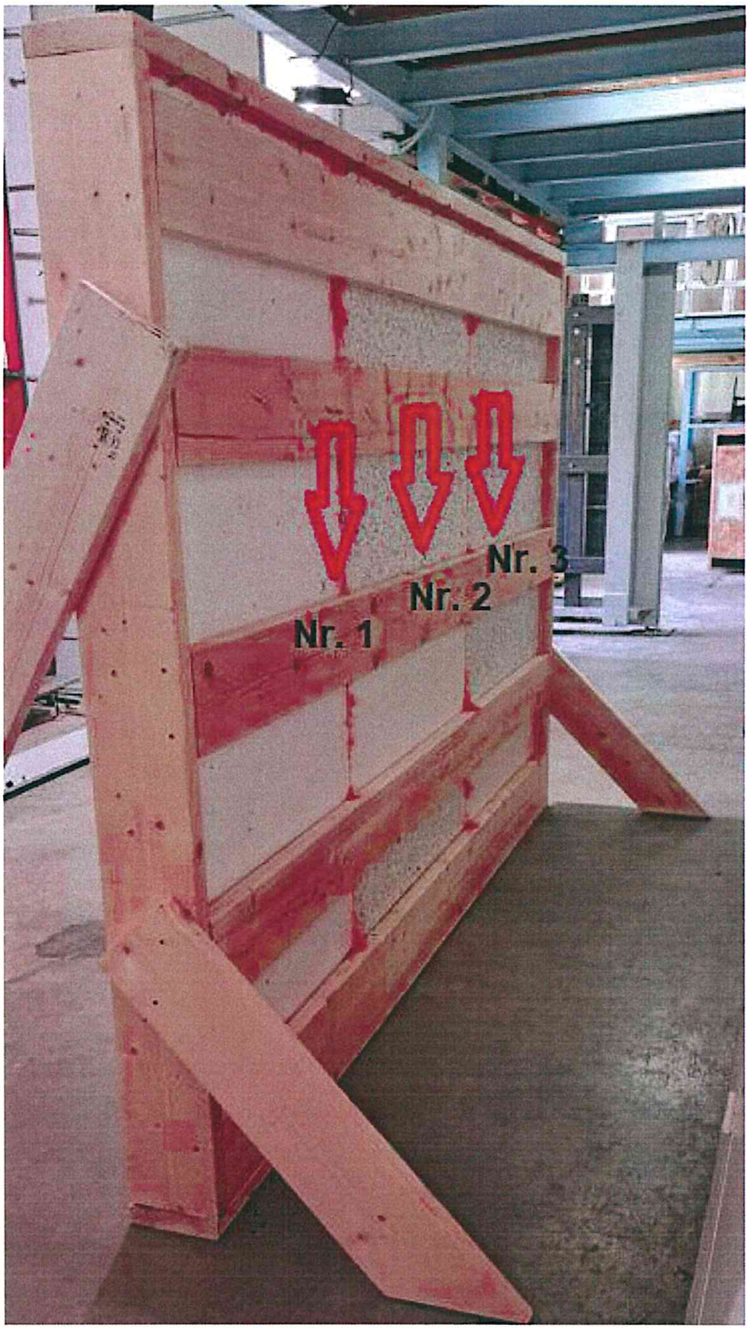

Fig. 3. Scheme of measurement indicators installation

Table 1. Dependence of deflektion of system elements under wind pressure load

Pressure, Pa	Point No. 1		Point No. 2		Point No. 3	
	Deflection, mm	Permanent deflection, mm	Deflection, mm	Permanent deflection, mm	Deflection, mm	Permanent deflection, mm
300	1,74	0,03	2,44	0,08	1,71	0,02
300	1,72	0,03	2,44	0,08	1,71	0,02
500	2,98	0,05	4,14	0,15	2,95	0,07
1000	6,29	0,13	8,54	0,38	6,25	0,22
1200	7,67	0,05	10,70	0,45	7,68	0,29
1400	9,30	0,03	13,02	0,78	9,40	0,49
1600	10,66	0,27	15,24	0,80	11,06	0,52
1800	12,46	0,05	17,88	1,38	12,91	0,87
2000	13,94	0,07	20,00	1,48	14,46	1,02
2200	15,75	0,20	22,56	1,65	16,36	1,04
2400	17,55	0,10	25,22	2,09	18,23	1,54
2600	19,38	0,23	27,91	2,76	20,25	1,98

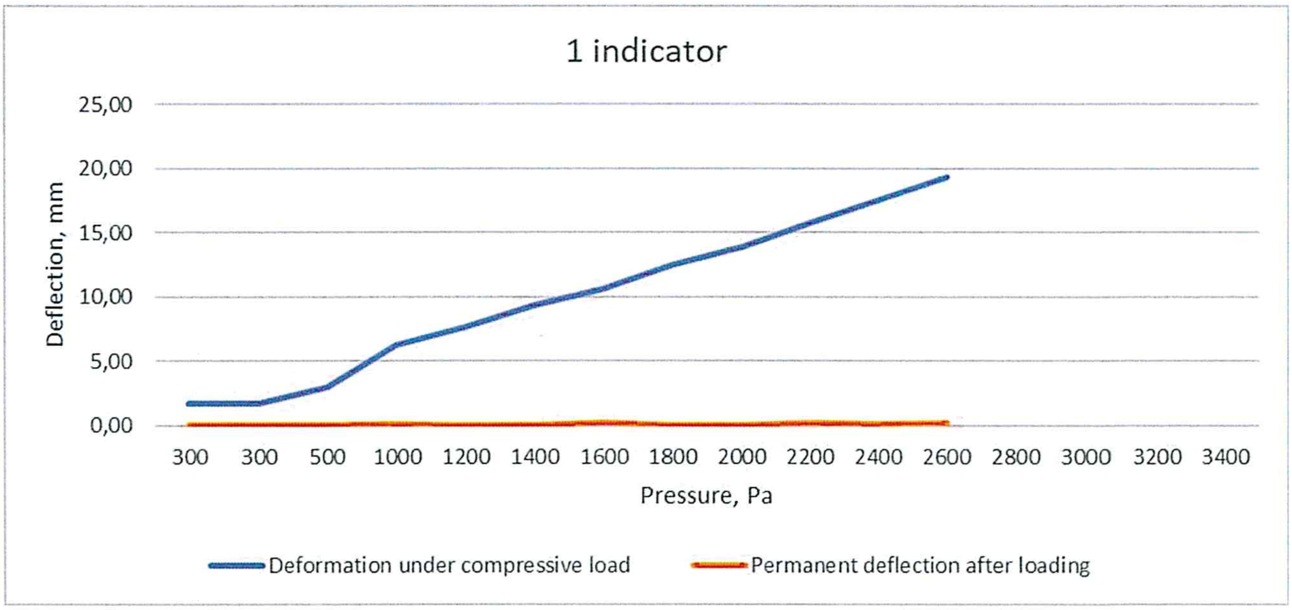

Fig 4. Dependence of deflection on pressure under wind pressure load at the first measurement point

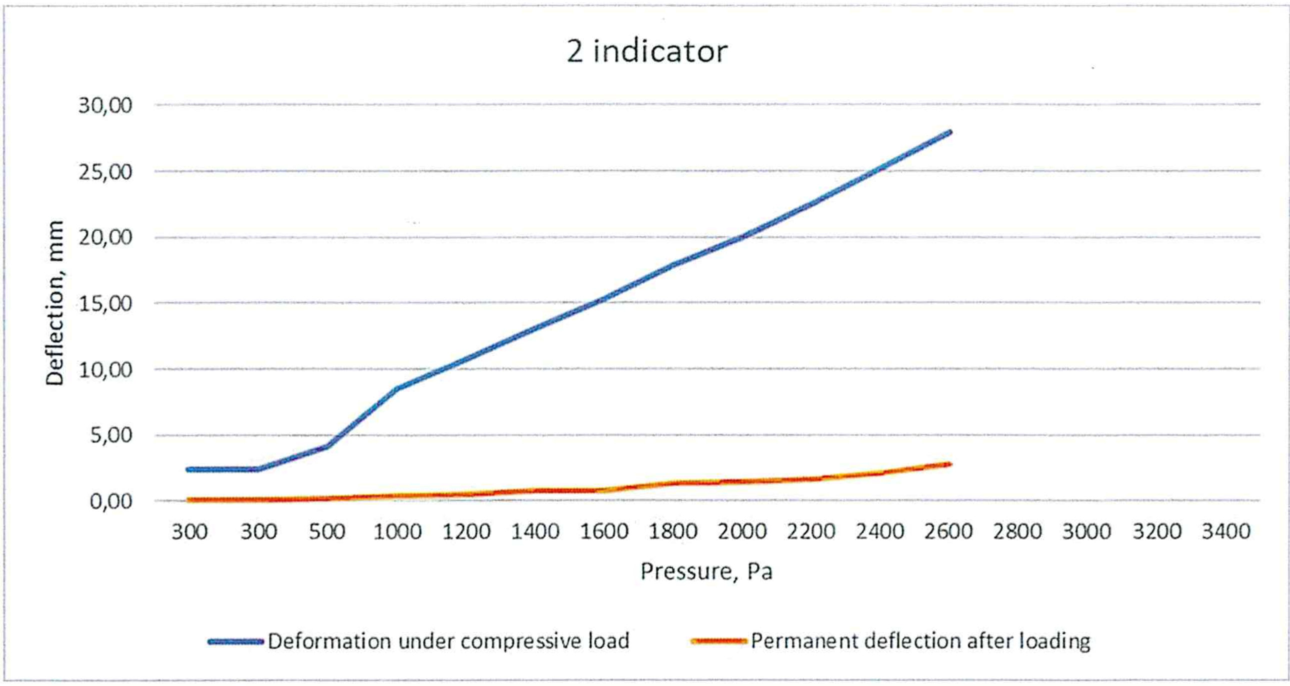

Fig. 5. Dependence of deflection on pressure under wind pressure load at the second measurement point

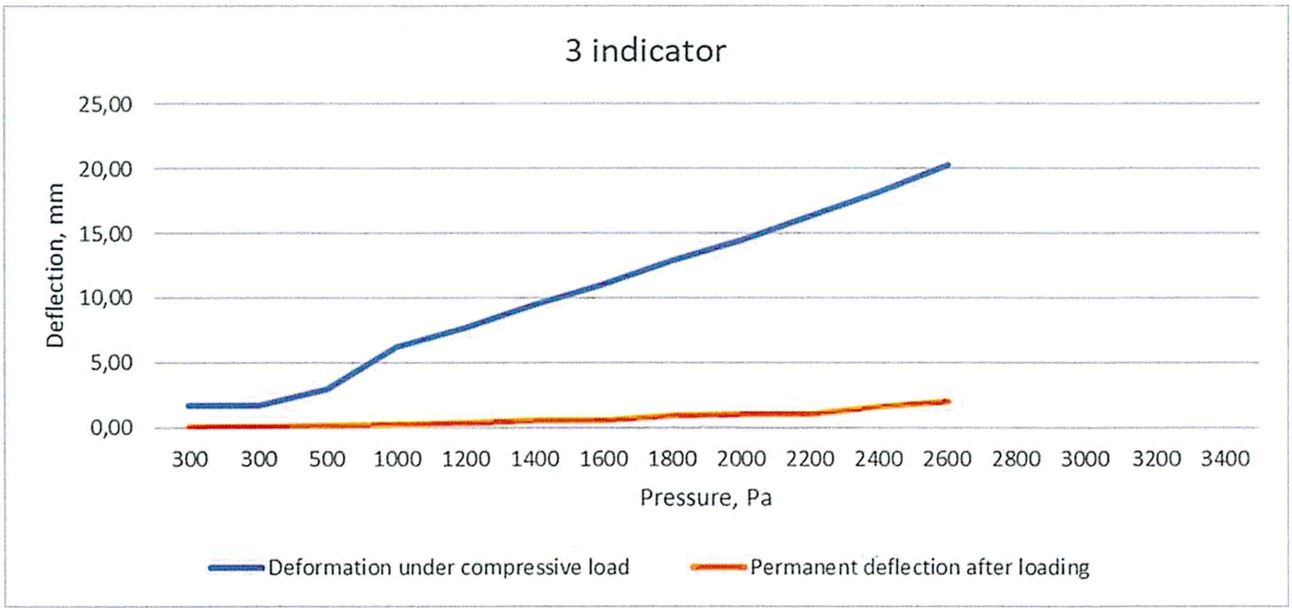

Fig 6. Dependence of deflection on pressure under wind pressure load at the third measurement point

At the customer's request, the system was tested under a pressure load of up to 2600 Pa. The product has not started to failure.

Table 2. Dependence of deflection of system elements under wind suction load

Pressure, Pa	Point No. 1		Point No. 2		Point No. 3	
	Deflection, mm	Permanent deflection, mm	Deflection, mm	Permanent deflection, mm	Deflection, mm	Permanent deflection, mm
-300	2,38	0,54	3,19	0,65	2,32	0,55
-300	2,61	0,77	3,46	0,90	2,52	0,70
-500	4,45	1,09	5,83	1,25	4,26	1,00
-1000	8,47	1,56	11,24	1,79	8,20	1,47
-1200	10,31	1,91	13,61	2,24	9,94	1,85
-1400	12,32	2,28	16,25	2,72	11,93	2,24
-1600	14,21	2,61	18,77	3,14	13,90	2,59
-1800	16,72	2,98	22,26	3,69	16,31	2,99
-2000	19,63	3,50	26,15	4,34	19,20	3,47
-2200	22,29	4,00	29,59	4,99	21,67	3,94
-2400	25,35	4,32	33,50	5,33	24,41	4,26
-2600	28,07	5,02	37,94	6,23	27,52	4,88
-2800	34,27	6,46	43,35	7,33	31,53	5,86

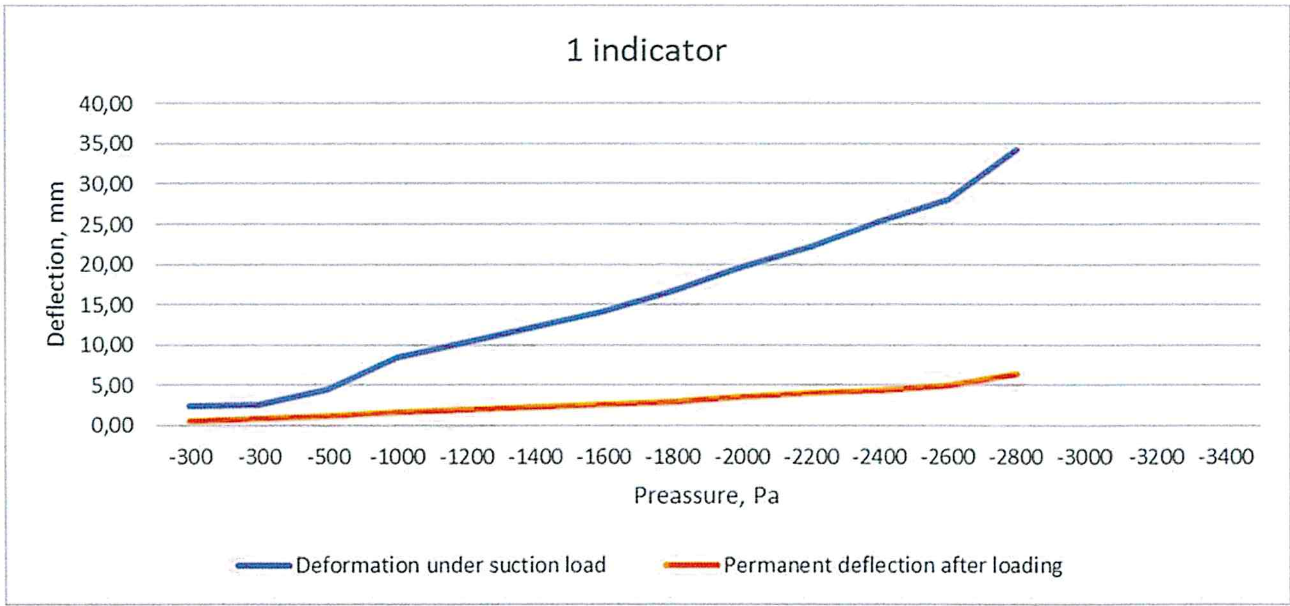

Fig. 7 Dependence of deflection on pressure under wind suction load at the first measurement point

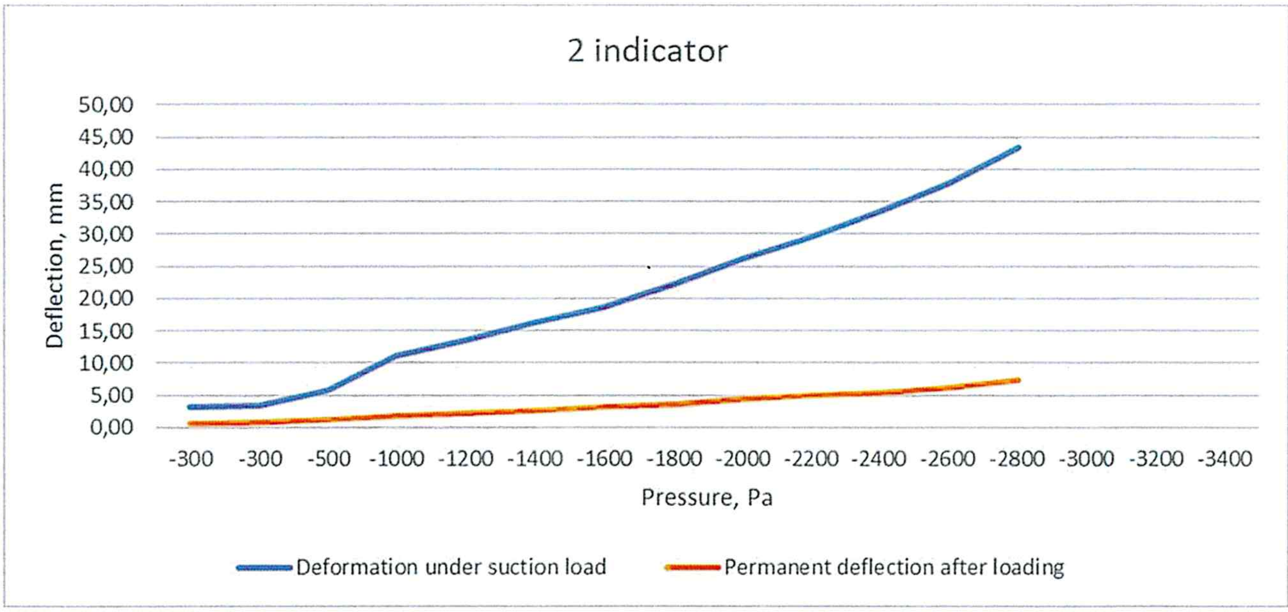

Fig. 8 Dependence of deflection on pressure under wind suction load at the second measurement point

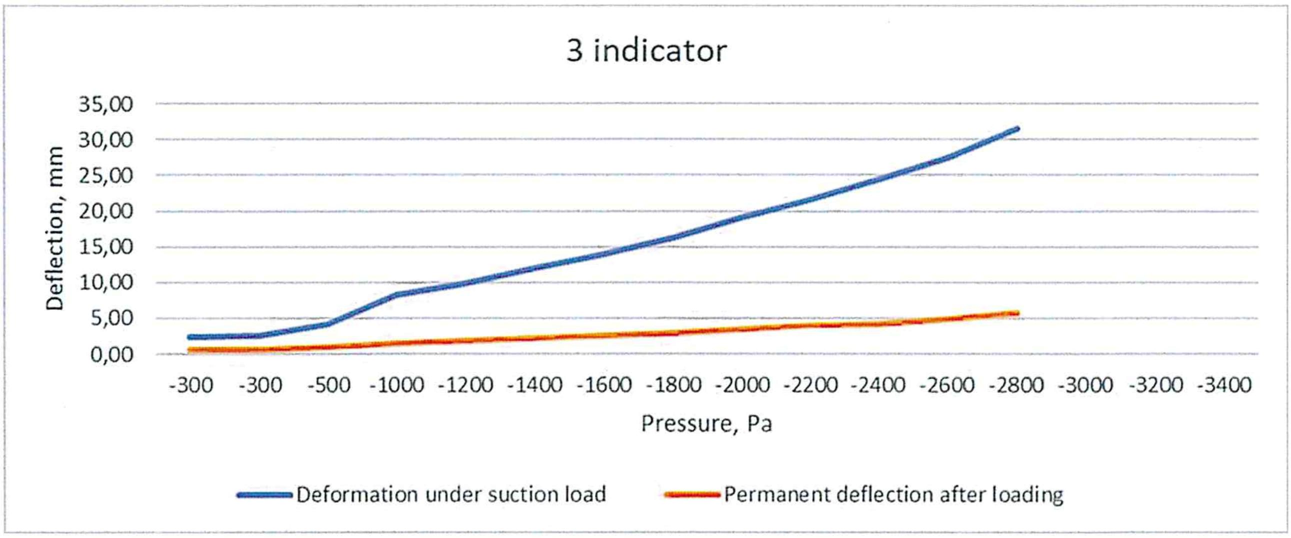

Fig. 9 Dependence of deflection on pressure under wind suction load at the third measurement point

When the specimen was subjected to a suction load of 3000 Pa, the product began to failure. Failure photos are presented in Fig. 10.

Fig. 10. System failures under 3000 Pa wind suction load

Annex No. 1
Test page

Užsakovas UAB „KODERUS"

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Slėgis, Pa	Deformacija, mm					
	Vėjo slėgio apkrova			Vėjo čiulpimo apkrova		
	1 taškas	2 taškas	3 taškas	1 taškas	2 taškas	3 taškas
0	1,42	1,65	1,54	2,14	-0,00	0,37
300	-0,32	-0,79	-0,17	4,52	3,19	2,64
0	1,39	1,57	1,52	2,68	0,65	0,87
300	-0,30	-0,78	-0,17	4,75	3,46	2,84
0	1,39	1,57	1,52	2,91	0,90	1,02
500	-1,56	-2,49	-1,41	6,58	5,83	4,58
0	1,37	1,50	1,47	3,23	1,25	1,32
1000	-4,87	-6,89	-4,71	10,61	11,24	8,52
0	1,29	1,27	1,32	3,70	1,78	1,79
1200	-6,25	-9,05	-6,14	12,45	13,61	10,26
0	1,37	1,20	1,25	4,05	2,24	2,17
1400	-7,88	-11,37	-7,86	14,46	16,25	12,25
0	1,59	0,87	1,05	4,42	2,72	2,56
1600	-9,24	-13,59	-9,52	16,35	18,77	14,22
0	1,69	0,85	1,02	4,75	3,14	2,91
1800	-11,04	-16,23	-11,37	18,86	22,26	16,63
0	1,37	0,27	0,67	5,12	3,69	3,31
2000	-12,52	-18,35	-12,92	21,77	26,15	19,52
0	1,49	0,17	0,52	5,64	4,34	3,78
2200	-14,33	-20,91	-14,82	24,43	29,58	21,99
0	1,62	0,00	0,50	6,14	4,99	4,26
2400	-16,13	-23,57	-16,69	27,49	33,50	24,73
0	1,52	-0,44	0,00	6,46	5,33	4,58
2600	-17,96	-26,26	-18,71	30,21	37,94	27,84
0	1,19	-1,11	-0,44	7,16	6,23	5,20
2800				36,41	43,35	31,85
0				8,60	7,33	6,18
3000				50,82	51,	
0						
3200						
0						

Annex No. 2
Photos of sample