Building Research Institute
Research Laboratory Group
accredited by the Polish Centre for Accreditation
Accreditation Certificate no. AB 023

TESTING REPORT
LZM02-01593/22/Z00NZM

Client:	EKOMER Sp. z o.o. ul. Lipnowska 21-23, 87-100 Toruń
Product name: **(as specified by Client)**	Terrace profiles, facade profiles, terrace systems, facade systems
Issue date:	27 December 2022

Laboratory of Building Materials (LZM)
materialy@itb.pl

Contents

1. Testing information

Product manufacturer: EKOMER Sp. z o.o.

Testing start date: 18-10-2022

Testing end date: 12-12-2022

Other testing information:
Testing Team: inż. Iwona Gałąska, mgr inż. Cezary Strąk, dr inż. Damian Wojnowski,

Testing location:
LZM laboratory, site: ul. Ksawerów 21, 02-656 Warszawa and Filtrowa 1, 00-611 Warszawa

2. Product

2.1. Information provided by Client

Product: Terrace profiles, facade profiles, terrace systems, facade systems

Declared application: Flooring and external facades

3. Test object, sample

3.1. Information obtained by visual inspection at the Laboratory

Acceptance of test object at Laboratory:

Date: 16-09-2022

Acceptance protocol: LZM00-01593/22/Z00NZM

Tested object condition:
Samples were provided in a condition and quantity suitable for testing.

Tested object description:
Client, for the tests covered by this report, provided the following:

- terrace profile measuring 21.5x125 mm and length 2500 mm - 40 pieces,
- facade profile measuring 12.1x177.1 mm and length 2500 mm - 40 pieces,
- mounting beam 70x37 mm with a length of 1 m - 3 pieces,
- floor model measuring approximately 2.5x1.5 m.

Tested object storage:
Test objects were stored in the Laboratory's heated storage room.

4. Testing results

The uncertainty has been determined on the basis of available data including the accuracy of the measurement system used. Uncertainty estimated in this way does not include a component related to the heterogeneity of the test sample.
The result, together with its uncertainty, applies only to the samples tested. Value of the uncertainty cannot be directly attributed to the level of properties of the product in question, as the laboratory has no knowledge of the variability of its population, only of the sample under test.

4.1. Resistance to hard body impact

4.1.1. Testing method

PN-EN 15534-1+A1:2017-12

Implementation of the test, environmental conditions and accuracy of the measuring equipment used comply with the requirements of the above-mentioned standard.

The test was carried out after the samples had been seasoned at +23°C (one series of tests) and after seasoning for 1 h at -20°C (second series of tests).

Testing conditions:

- terrace profile / terrace system: sample 300 mm, spacing 200 mm, drop height 700 mm, weight 1000 g
- facade profile / facade system: sample 200 mm, spacing 100 mm, drop height 500 mm, weight 1000 g

4.1.2. Results

Table 1a. Test results for impact resistance of terrace profile / terrace system (temp. +23°C)

Ref.	Impact resistance [mm]		Testing result
	Dent	Length of rupture	
1	*2*	*3*	*4*
Terrace profile			
1.	0.107	-	No damage
2.	0.086	-	No damage
3.	0.092	-	No damage
4.	0.116	-	No damage
5.	0.121	-	No damage
6.	0.106	-	No damage
7.	0.076	-	No damage
8.	0.089	-	No damage
9.	0.123	-	No damage
10.	0.098	-	No damage
Terrace system			
11.	0.115	-	No damage
12.	0.130	-	No damage
13.	0.114	-	No damage
14.	0.094	-	No damage
15.	0.085	-	No damage
16.	0.090	-	No damage
17.	0.107	-	No damage
18.	0.076	-	No damage
19.	0.093	-	No damage
20.	0.102	-	No damage
Delamination or crack ≥10mm in length and an indentation greater than 0.5mm is considered as damage.			
Extended uncertainty of measurement (related to the accuracy of the equipment used) U=0.004 mm (at a confidence level of approx. 95% and with a coverage factor of k=2)			

Table 1b. Test results for impact resistance of terrace profile / terrace system (temp. +23°C)

Ref.	Testing result
1	*2*
Facade profile	
1.	No damage
2.	No damage
3.	No damage
4.	No damage
5.	No damage
6.	No damage
7.	No damage
8.	No damage
9.	No damage
10.	No damage
Facade system	
11.	No damage
12.	No damage
13.	No damage
14.	No damage
15.	No damage
16.	No damage
17.	No damage
18.	No damage
19.	No damage
20.	No damage
In the case of qualitative testing, it is not possible, with the current level of knowledge, to provide uncertainty relating to the results presented.	

Table 1c. Test results for impact resistance of terrace profile / terrace system (temp. +23°C/ 1h)

Ref.	Impact resistance [mm]		Testing result
	Dent	Length of rupture	
1	*2*	*3*	*4*
Terrace profile			
1.	0.088	-	No damage
2.	0.091	-	No damage
3.	0.071	-	No damage
4.	0.066	-	No damage
5.	0.107	-	No damage
6.	0.122	-	No damage
7.	0.092	-	No damage
8.	0.084	-	No damage
9.	0.140	-	No damage
10.	0.081	-	No damage
Terrace system			
11.	0.069	-	No damage
12.	0.085	-	No damage
13.	0.087	-	No damage
14.	0.096	-	No damage
15.	0.071	-	No damage
16.	0.105	-	No damage
17.	0.094	-	No damage
18.	0.113	-	No damage
19.	0.057	-	No damage
20.	0.082	-	No damage
Delamination or crack ≥10mm in length and an indentation greater than 0.5mm is considered as damage.			
In the case of qualitative testing, it is not possible, with the current level of knowledge, to provide uncertainty relating to the results presented.			

Table 1d. Test results for the impact resistance of the facade profile / facade system (temp. -20°C/1h)

Ref.	Testing result
1	*2*
Facade profile	
1.	No damage
2.	No damage
3.	No damage
4.	No damage
5.	No damage
6.	No damage
7.	No damage
8.	No damage
9.	No damage
10.	No damage
Facade system	
11.	No damage
12.	No damage
13.	No damage
14.	No damage
15.	No damage
16.	No damage
17.	No damage
18.	No damage
19.	No damage
20.	No damage
In the case of qualitative testing, it is not possible, with the current level of knowledge, to provide uncertainty relating to the results presented.	

4.2. Bending strength and flexural modulus

4.2.1. Testing method

PN-EN 15534-1+A1:2017-12

Implementation of the test, environmental conditions and accuracy of the measuring equipment used comply with the requirements of the above-mentioned standard.

The test of the terrace profiles / terrace system was carried out under the following conditions:
- nominal length of specimens: 400 mm,
- support spacing: 300 mm,
- load speed: 16.3 mm/min.

A moment of inertia of 113,769 mm^4 was assumed for the calculations.

The test of the facade profiles / facade system was carried out under the following conditions:
- nominal length of specimens: 350 mm,
- support spacing: 250 mm,
- load speed: 9.0 mm/min.

A moment of inertia of 8,198 mm^4 was assumed for the calculations.

4.2.2. Results

Table 2a. Results of the determination of bending properties of terrace profile / terrace system

Ref.	Profile setting	Deflection at 500 N [mm]	Destructive force [N]	Bending strength [MPa]	Flexular modulus [MPa]
1	*2*	*3*	*4*	*5*	*6*
Terrace profile					
1.	**Usable side (ground)**	0.95	4429	32.1	2563
2.		0.84	4447	32.2	2815
3.		1.02	4466	32.3	2715
4.		1.00	4405	31.8	2772
5.		1.04	4461	32.2	2638
6.		1.03	4460	32.2	2743
7.		1.01	4389	31.7	2752
8.		1.04	4464	32.2	2714
Average value		**0.99**	**4440**	**32.1**	**2714**
Single value		maximum	minimum	-	-
		1.04	**4389**		
Terrace system					
9.	**Usable side (ground)**	0.75	4533	33.1	2869
10.		0.81	4443	32.4	2900
11.		0.83	4491	32.5	2850
12.		0.81	4485	32.5	2882
13.		0.81	4471	32.4	2683
14.		0.85	4490	32.5	2877
15.		1.00	4472	32.4	2754
16.		0.99	4500	32.7	2799
Average value		**0.86**	**4486**	**32.6**	**2849**
Single value		maximum	minimum	-	-
		1.00	**4443**		
Extended measurement uncertainty (related to the accuracy of the equipment used) for the destructive force: U=10 N, for a bending strength of U= 0.1 MPa (at a confidence level of approx. 95% and with an coverage factor of k=2)					

Table 2b. Results of the determination of bending properties of facade profile / facade system

Ref.	Profile setting	Deflection at 250 N [mm]	Destructive force [N]	Bending strength [MPa]	Flexular modulus [MPa]
1	*2*	*3*	*4*	*5*	*6*
Facade profile					
1.	**Usable side**	3.50	732	33.9	2791
2.		2.80	720	33.8	3676
3.		2.86	748	35.7	3842
4.		2.86	731	34.2	3598
Average value		**3.00**	**733**	**34.4**	**3477**
Single value		maximum	minimum	-	-
		3.50			

cont. Tab. 2b. Results of the determination of the bending properties of the facade profile boards / facade system

Ref.	Profile setting	Deflection at 250 N [mm]	Destructive force [N]	Bending strength [MPa]	Flexular modulus [MPa]
1	*2*	*3*	*4*	*5*	*6*
Facade system					
5.	**Usable side**	2.75	731	34.2	3733
6.		2.93	705	32.9	3526
7.		2.80	746	35.0	3810
8.		2.74	729	33.9	3833
Average value		**2.81**	**727**	**34.0**	**3726**
Single value		maximum	minimum	-	-
		2.93	**705**		
Extended measurement uncertainty (related to the accuracy of the equipment used) for the destructive force: U=10 N, for a bending strength of U= 0.1 MPa (at a confidence level of approx. 95% and with an coverage factor of k=2)					

4.3. Resistance to artificial ageing assessed by colour change

4.3.1. Testing method

PN-EN ISO 4892-2:2013-06, PN-ISO 7724-1:2003, PN-ISO 7724-2:2003, PN-ISO 7724-3:2003

Implementation of the test, environmental conditions and accuracy of the measuring equipment used comply with the requirements of the above-mentioned standards.

Xenon lamp ageing was performed under the following conditions:
- exposure: according to EN ISO 4892-2:2013, method A (sprinkling cycle with rain 18/102, BST 65°C, RH 50%, average Cht 38 °C, irradiance 60 W/m^2),
- exposure time: 300 h,
- device type: Xenotest model Beta LM (with an arc-discharge xenon lamp as light source and external filter).

Durability of the composite from which the tested boards are made was determined by the colour difference between the samples before and after ageing.
The colour difference of the composite of boards aged under artificial conditions (described above) compared to unaged ones was determined according to PN-ISO 7724-2:2003 and PN-ISO 7724-3:2003, using a spectrophotometer with the following measurement conditions:
- measurement surface and specular component: *M/SCI,*
- lighting: *D65,*
- observer: *10°.*

4.3.2. Results

Table 3a. Results of the colour difference determination

Product: **terrace profile**, **beige** colour										
Ref.	**Colour components of unaged surface**			**Colour components of aged surface**			**Psychometric brightness difference ΔL***	**Coordinate difference**		**Colour difference ΔE^*_{ab}**
	L*	**a***	**b***	**L***	**a***	**b***		**Δa***	**Δb***	
1	*2*			*3*			*4*	*5*	*6*	*7*
1	73.66	2.42	8.05	75.59	2.16	5.94	1.93	-0.29	-2.11	2.87
2	73.17	2.54	8.27	75.51	2.25	6.68	2.35	-0.30	-1.60	2.85
3	73.43	2.55	8.21	76.63	1.93	5.78	3.19	-0.62	-2.43	4.06
4	72.64	2.49	8.44	76.41	2.04	5.87	3.78	-0.45	-2.58	4.59
5	72.12	2.60	8.90	75.99	2.10	5.94	3.88	-0.50	-2.96	4.90
Average value										**3.85**
Extended measurement uncertainty (related to the accuracy of the equipment used) for the ΔE^*_{ab}: U=0.30 (at a confidence level of approx. 95%) and with a coverage factor of k=2)										

Table 3b. Results of the colour difference determination

Product: **terrace system**, **beige** colour										
Ref.	**Colour components of unaged surface**			**Colour components of aged surface**			**Psychometric brightness difference ΔL***	**Coordinate difference**		**Colour difference ΔE^*_{ab}**
	L*	**a***	**b***	**L***	**a***	**b***		**Δa***	**Δb***	
1	*2*			*3*			*4*	*5*	*6*	*7*
1	72.42	2.58	8.86	76.46	2.03	5.83	4.04	-0.55	-3.03	5.08
2	72.41	2.73	8.68	76.49	2.05	5.99	4.09	-0.68	-2.69	4.94
3	72.55	2.59	8.87	75.08	2.24	6.33	2.54	-0.36	-2.54	3.60
4	72.54	2.67	8.52	76.35	2.05	6.15	3.82	-0.62	-2.37	4.53
5	72.18	2.78	9.27	77.00	1.91	5.47	4.82	-0.87	-3.80	6.20
									Average value	**4.87**
Extended measurement uncertainty (related to the accuracy of the equipment used) for the ΔE^*_{ab}: U=0.30 (at a confidence level of approx. 95%) and with a coverage factor of k=2)										

Table 3c. Results of the colour difference determination

Product: **facade profile**, **beige** colour										
Ref.	**Colour components of unaged surface**			**Colour components of aged surface**			**Psychometric brightness difference ΔL***	**Coordinate difference**		**Colour difference ΔE^*_{ab}**
	L*	**a***	**b***	**L***	**a***	**b***		**Δa***	**Δb***	
1	*2*			*3*			*4*	*5*	*6*	*7*
1	71.91	2.71	8.68	78.17	1.74	4.85	6.27	-0.97	-3.83	7.41
2	72.00	2.57	8.52	77.54	1.86	5.22	5.54	-0.71	-3.31	6.49
3	71.75	2.68	8.68	76.85	2.00	5.80	5.10	-0.68	-2.88	5.89
4	72.58	2.68	8.73	76.48	2.06	5.83	3.90	-0.63	-2.91	4.91
5	73.23	2.52	8.07	76.33	2.05	5.79	3.10	-0.47	-2.28	3.87
									Average value	**5.71**
Extended measurement uncertainty (related to the accuracy of the equipment used) for the ΔE^*_{ab}: U=0.30 (at a confidence level of approx. 95%) and with a coverage factor of k=2)										

Table 3d. Results of the colour difference determination

Product: **facade profile**, **beige** colour										
Ref.	**Colour components of unaged surface**			**Colour components of aged surface**			**Psychometric brightness difference ΔL***	**Coordinate difference**		**Colour difference ΔE^*_{ab}**
	L*	**a***	**b***	**L***	**a***	**b***		**Δa***	**Δb***	
1	*2*			*3*			*4*	*5*	*6*	*7*
1	73.28	2.54	8.36	76.10	2.21	6.15	2.82	-0.33	-2.21	3.60
2	73.02	2.41	8.37	76.97	1.97	5.45	3.95	-0.44	-2.92	4.93
3	74.27	2.33	7.86	76.30	2.17	6.17	2.04	-0.16	-1.70	2.65
4	72.68	2.69	8.48	75.92	2.27	6.22	3.24	-0.42	-2.26	3.97
5	73.42	2.54	8.50	76.15	2.16	6.11	2.73	-0.38	-2.39	3.65
									Average value	**3.76**
Extended measurement uncertainty (related to the accuracy of the equipment used) for the ΔE^*_{ab}: U=0.30 (at a confidence level of approx. 95%) and with a coverage factor of k=2)										

4.4. Resistance to wet conditions

4.4.1. Testing method

PN-EN 15534-1+A1:2017-12

Implementation of the test, environmental conditions and accuracy of the measuring equipment used comply with the requirements of the above-mentioned standard.

Resistance to wet conditions was determined using cyclic interactions:
cycle 1: 28 days soaking in water, 24 h freezing at -20°C, 72 h drying at +70°C,
cycle 2 and 3: 72 h soaking in water, 24 h freezing at -20°C, 72 h drying at +70°C.
After completion of the cyclic interaction, the specimens were stored for 72 h under laboratory conditions, i.e. (23±2)°C and (50±5)% relative humidity, followed by a bending strength test according to the conditions given in section 4.2.1 of this Report.

4.4.2. Results

Table 4a. Bending strength results of terrace profile / terrace system after cyclic exposure to wet conditions

Ref.	Board set up	Bending strength [MPa]
1	*2*	*3*
Terrace profile		
1.	**Usable side (ground)**	33.1
2.		33.6
3.		33.5
4.		32.8
5.		32.8
6.		33.0
7.		33.0
8.		33.3
	Average value	**33.1 (increase of 3.1%)**
	Lowest single value	**32.8 (increase of 2.1%)**
Terrace system		
9.	**Usable side (ground)**	33.2
10.		33.7
11.		33.5
12.		32.8
13.		33.4
14.		32.9
15.		32.7
16.		33.2
	Average value	**33.2 (increase of 1.8%)**
	Lowest single value	**32.7 (increase of 0.3%)**
Extended uncertainty of measurement (related to the accuracy of the equipment used U= 0.1 (at a confidence level of approx. 95% and with a coverage factor of k=2)		

Table 4b. Bending strength results of facade profile / facade system after cyclic exposure to wet conditions

Ref.	Profile set up	Bending strength [MPa]
1	*2*	*3*
Facade profile		
1.	**Usable side**	29.4
2.		30.9
3.		31.4
4.		30.5
Average value		**30.6 (decrease 11%)**
Lowest single value		**29.4 (decrease 14%)**
Facade system		
5.	**Usable side**	32.3
6.		31.6
7.		30.3
8.		32.6
Average value		**31.7 (decrease 6.8%)**
Lowest single value		**30.3 (decrease 10.9%)**
Extended uncertainty of measurement (related to the accuracy of the equipment used U= 0.1 (at a confidence level of approx. 95% and with a coverage factor of k=2)		

4.5. Swelling and water absorption

4.5.1. Testing method

PN-EN 15534-1+A1:2017-12

Implementation of the test, environmental conditions and accuracy of the measuring equipment used comply with the requirements of the above-mentioned standard.

4.5.2. Results

Table 5a. Results of the determination of swelling of terrace profile / terrace system

Ref.	Direction of measurement	Swelling [%] after soaking in water for:					
		1 day	2 days	3 days	7 days	14 days	28 days
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Terrace profile							
1	length	0.010	0.020	0.030	0.050	0.060	0.060
	width	0.008	0.024	0.040	0.048	0.064	0.080
	thickness	0.046	0.046	0.091	0.137	0.183	0.183
2	Length	0.000	0.000	0.010	0.010	0.020	0.050
	width	0.016	0.016	0.024	0.024	0.040	0.080
	thickness	0.046	0.092	0.092	0.137	0.137	0.229
3	length	0.000	0.020	0.030	0.040	0.060	0.070
	width	0.016	0.024	0.032	0.040	0.064	0.080
	thickness	0.046	0.046	0.091	0.091	0.091	0.091
4	length	0.000	0.010	0.020	0.020	0.030	0.030
	width	0.016	0.032	0.040	0.056	0.072	0.088
	thickness	0.046	0.046	0.046	0.091	0.091	0.091
5	length	0.000	0.020	0.030	0.040	0.040	0.060
	width	0.008	0.008	0.016	0.024	0.048	0.080
	thickness	0.046	0.046	0.046	0.091	0.091	0.137
Average value							**0.05** (in length)
							0.08 (in width)
							0.15 (in thickness)
Maximum single value							**0.07** (in length)
							0.09 (in width)
							0.23 (in thickness)

cont. Tab. 5a. Results of the determination of swelling of terrace profile / terrace system

Ref.	Direction of measurement	Swelling [%] after soaking in water for:					
		1 day	2 days	3 days	7 days	14 days	28 days
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Terrace system							
6	length	0.010	0.010	0.020	0.020	0.030	0.040
	width	0.008	0.016	0.032	0.040	0.056	0.096
	thickness	0.091	0.091	0.091	0.137	0.137	0.137
7	length	0.010	0.020	0.030	0.050	0.050	0.050
	width	0.000	0.016	0.032	0.064	0.064	0.104
	thickness	0.046	0.046	0.091	0.091	0.091	0.137
8	length	0.000	0.010	0.010	0.010	0.030	0.030
	width	0.000	0.008	0.016	0.024	0.032	0.072
	thickness	0.045	0.045	0.091	0.091	0.091	0.136
9	length	0.010	0.030	0.040	0.050	0.060	0.060
	width	0.008	0.024	0.032	0.048	0.064	0.080
	thickness	0.046	0.091	0.137	0.182	0.182	0.182
10	length	0.000	0.010	0.020	0.030	0.030	0.030
	width	0.016	0.024	0.032	0.048	0.064	0.072
	thickness	0.092	0.137	0.137	0.183	0.183	0.183
						Average value	**0.04** (in length)
							0.09 (in width)
							0.16 (in thickness)
						Maximum single value	**0.06** (in length)
							0.10 (in width)
							0.18 (in thickness)
Extended uncertainty of measurement (related to the accuracy of the equipment used) U=0.04 % (at a confidence level of approx. 95% and with a coverage factor of k=2)							

Table 5b. Results of the determination of swelling of facade profile / facade system

Ref.	Direction of measurement	Swelling [%] after soaking in water for:					
		1 day	2 days	3 days	7 days	14 days	28 days
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Facade profile							
1	length	0.020	0.020	0.030	0.040	0.050	0.060
	width	0.017	0.029	0.034	0.046	0.069	0.080
	thickness	0.000	0.167	0.250	0.334	0.501	0.501
2	length	0.010	0.010	0.020	0.020	0.030	0.040
	width	0.006	0.017	0.029	0.040	0.063	0.069
	thickness	0.083	0.083	0.165	0.165	0.248	0.248
3	length	0.010	0.010	0.010	0.020	0.040	0.040
	width	0.006	0.011	0.017	0.029	0.057	0.075
	thickness	0.083	0.083	0.166	0.166	0.249	0.332
4	length	0.020	0.020	0.030	0.030	0.030	0.040
	width	0.006	0.012	0.017	0.023	0.052	0.069
	thickness	0.166	0.166	0.249	0.332	0.332	0.415
5	length	0.010	0.010	0.020	0.020	0.030	0.040
	width	0.011	0.011	0.017	0.017	0.057	0.086
	thickness	0.000	0.083	0.083	0.166	0.166	0.249
						Average value	**0.04** (in length)
							0.08 (in width)
							0.35 (in thickness)
						Maximum single value	**0.06** (in length)
							0.09 (in width)
							0.50 (in thickness)

cont. Tab. 5b. Results of the determination of swelling of facade profile / facade system

Ref.	Direction of measurement	Swelling [%] after soaking in water for:					
		1 day	2 days	3 days	7 days	14 days	28 days
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Facade system							
6	length	0.010	0.010	0.010	0.010	0.030	0.080
	width	0.000	0.006	0.011	0.017	0.057	0.069
	thickness	0.167	0.250	0.250	0.334	0.417	0.417
7	length	0.010	0.010	0.010	0.010	0.020	0.030
	width	0.011	0.011	0.017	0.023	0.057	0.075
	thickness	0.083	0.083	0.166	0.250	0.333	0.416
8	length	0.010	0.010	0.010	0.020	0.030	0.040
	width	0.006	0.011	0.023	0.034	0.075	0.080
	thickness	0.000	0.083	0.083	0.167	0.250	0.250
9	length	0.000	0.000	0.010	0.010	0.010	0.020
		0.006	0.017	0.023	0.029	0.069	0.075
	thickness	0.083	0.167	0.167	0.250	0.250	0.333
10	length	0.010	0.010	0.020	0.020	0.030	0.040
	width	0.000	0.006	0.011	0.023	0.057	0.074
	thickness	0.083	0.083	0.083	0.167	0.250	0.250
						Average value	**0.04** (in length)
							0.07 (in width)
							0.33 (in thickness)
						Maximum single value	**0.08** (in length)
							0.08 (in width)
							0.42 (in thickness)
Extended uncertainty of measurement (related to the accuracy of the equipment used) U=0.04 % (at a confidence level of approx. 95% and with a coverage factor of k=2)							

Table 6a. Results of the determination of water absorption of facade profile / facade system

Ref.	Absorption [%] after soaking in water for:					
	1 day	2 days	3 days	7 days	14 days	28 days
1	*2*	*3*	*4*	*5*	*6*	*7*
Terrace profile						
1.	0.11	0.41	0.48	0.52	0.57	0.61
2.	0.17	0.44	0.52	0.56	0.62	0.66
3.	0.21	0.42	0.51	0.57	0.67	0.70
4.	0.19	0.41	0.54	0.63	0.68	0.70
5.	0.21	0.41	0.53	0.61	0.67	0.70
					Average value	**0.68**
					Maximum single value	**0.70**
Terrace system						
6.	0.18	0.41	0.47	0.54	0.60	0.68
7.	0.16	0.40	0.43	0.51	0.58	0.64
8.	0.18	0.40	0.47	0.53	0.60	0.65
9.	0.19	0.40	0.45	0.54	0.61	0.67
10.	0.18	0.37	0.46	053	0.61	0.66
					Average value	**0.66**
					Maximum single value	**0.68**
Extended uncertainty of measurement (related to the accuracy of the equipment used) U=0.03 % (at a confidence level of approx. 95% and with a coverage factor of k=2)						

Table 6b. Results of the determination of water absorption of terrace profile / terrace system

Ref.	Absorption [%] after soaking in water for:					
	1 day	2 days	3 days	7 days	14 days	28 days
1	*2*	*3*	*4*	*5*	*6*	*7*
Facade profile						
1.	0.30	0.63	0.75	0.91	1.01	1.05
2.	0.45	0.60	0.70	0.76	0.86	1.04
3.	0.40	0.86	0.90	0.97	1.04	1.10
4.	0.44	0.76	0.98	1.12	1.25	1.32
5.	0.40	0.78	0.85	0.91	0.98	1.10
					Average value	**1.12**
					Maximum single value	**1.32**
Facade system						
6.	0.34	0.76	0.82	0.84	0.87	1.04
7.	0.37	0.75	0.83	0.98	1.11	1.23
8.	0.33	0.79	0.96	1.07	1.17	1.22
9.	0.47	0.78	0.91	0.97	1.00	1.17
10.	0.34	0.61	0.71	0.80	0.86	0.97
					Average value	**1.12**
					Maximum single value	**1.23**
Extended uncertainty of measurement (related to the accuracy of the equipment used) U=0.03 % (at a confidence level of approx. 95% and with a coverage factor of k=2)						

4.6. Slip resistance

4.6.1. Testing method

CEN/TS 15676:2007

Implementation of the test, environmental conditions and accuracy of the measuring equipment used comply with the requirements of the above-mentioned standard.

A pendulum instrument with a wide slide - Slider 57 (CEN) measuring 25x76mm - was used in the test. The configuration most prone to slipping, i.e. in the wet and along the profile, was selected for testing. Test was performed on the usable, ground side.

4.6.2. Results

Table 7. Results of the slip resistance determination

Ref.	Slip resistance PTV (wet, longitudinal) of profile
1	*2*
Terrace profile	
1.	36
2.	37
3.	36
4.	39
5.	38
6.	36
7.	35
8.	35
9.	37
10.	37
Average	**37**

cont. Tab. 7. Results of the slip resistance determination

Ref.	Slip resistance PTV (wet, longitudinal)
1	*2*
Terrace system	
1.	35
2.	36
3.	36
4.	35
5.	37
6.	36
7.	37
8.	38
9.	38
10.	36
Average	**36**
Extended uncertainty of measurement (related to the accuracy of the equipment used) U=3 PTV (at a confidence level of approx. 95% and with a coverage factor of k=2)	

4.7. Floor resistance to dynamic load

Testing outside the scope of accreditation

4.7.1. Testing method

PN-EN 1195:1999

Implementation of the test, environmental conditions and accuracy of the measuring equipment used comply with the requirements of the above-mentioned standard.

A model of the terrace system was assembled and supplied by the Client. The model was characterised by the following parameters:

- model elements: terrace profile 21.5x125 mm , ground beams 70x37 mm, plastic assembly clips, steel screws,
- beam spacing: 300 mm clear,
- method of boards mount on beams: ground side up,
- model dimensions: 2500x1500 mm.

The boards between the central beams were impacted. Trials started at 445 Nm, gradually increasing the energy.

4.7.2. Results

Table 8. Results of the large soft object impact strength test of the floor model with boards

Ref.	Impact energy, Nm	Surface condition at the point of impact
1	*2*	*3*
1	445	No damage
2	594	No damage
3	742	No damage
4	742	No damage
5	742	No damage
Test result (*maximum energy at which the floor is not damaged in any of the 3 impacted locations*)		**742 Nm**
Extended uncertainty of measurement (related to the accuracy of the equipment used) U=1 Nm (at a confidence level of approx. 95% and with a coverage factor of k=2)		

4.8. Pull-through capacity of connectors

Testing outside the scope of accreditation

4.8.1. Testing method

PN-EN 1383:2000; PN-EN 15534-1+A1:2017-12

Implementation of the test, environmental conditions and accuracy of the measuring equipment used comply with the requirements of the above-mentioned standard.

The tests used a 70x37 composite beam, 3.87 mm diameter screws and plastic mounting clips. Pulling speed was 0.5 mm/min. Clip spacing on the beam was 100 mm.

4.8.2. Results

Table 9. Results of the plastic clip capacity to screw pulling

Ref.	Destructive force [N]	Pull-through strength [MPa]
1	*2*	*3*
Terrace system		
1.	562	47.8
2.	478	40.7
3.	433	36.8
4.	428	36.4
5.	447	38.0
6.	478	40.6
7.	888	75.5
8.	474	40.3
9.	457	38.9
10.	498	42.4
Average	**514**	**43.7**
Facade system		
11.	439	37.4
12.	508	43.2
13.	838	71.3
14.	461	39.2
15.	461	39.3
16.	415	35.3
17.	442	37.6
18.	487	41.4
19.	439	37.3
20.	466	39.6
Average	**496**	**42.1**
Extended uncertainty of measurement (related to the accuracy of the equipment used U= 3 N for pull-through strength U=0.5 MPa (at a confidence level of approx. 95% and with a coverage factor of k=2)		

4.9. Testing the coefficient of linear thermal expansion

4.9.1. Testing method

PN-EN 1770:2000

Implementation of the test, environmental conditions and accuracy of the measuring equipment used comply with the requirements of the above-mentioned standard
Samples were cut from the supplied terrace profiles. The rate of temperature rise was 5 °C/min. The test was carried out with a device that complies with clause 3.2. of the standard. SIL 180 silicone oil was used as a coolant. Temperature range: -20 ÷ 80°C. Length of samples approx. 50mm.

4.9.2. Results

Table 10a. Test results for the coefficient of linear thermal expansion of the terrace profile / terrace system

Ref.	Coefficient of linear thermal expansion in the temperature range -20÷80°C [1/°C]
1	*2*
Terrace profile	
1.	$5.10 \cdot 10^{-5}$
2.	$5.06 \cdot 10^{-5}$
3.	$5.04 \cdot 10^{-5}$
Average	**$5.07 \cdot 10^{-5}$**
Terrace system	
4.	$4.96 \cdot 10^{-5}$
5.	$4.97 \cdot 10^{-5}$
6.	$4.91 \cdot 10^{-5}$
Average	**$4.95 \cdot 10^{-5}$**
Extended uncertainty of measurement (related to the accuracy of the equipment used) U= $0.26 \cdot 10^{-5}$ 1/°C (at a confidence level of approx. 95% and with a coverage factor of k=2)	

a) b) c)

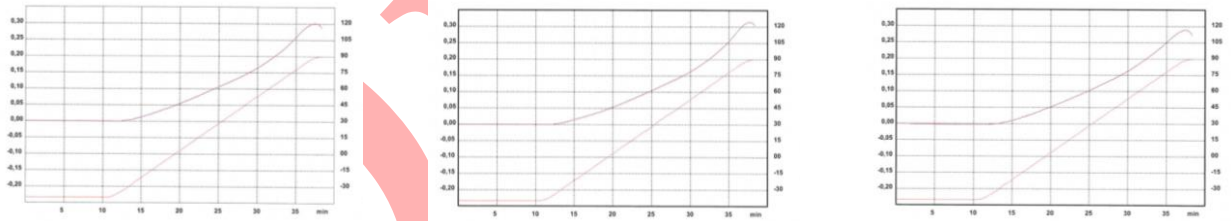

Fig. 1. **Elongation curve for terrace profile: a - sample no. 1, b - sample no. 2, c - sample no. 3**

a) b) c)

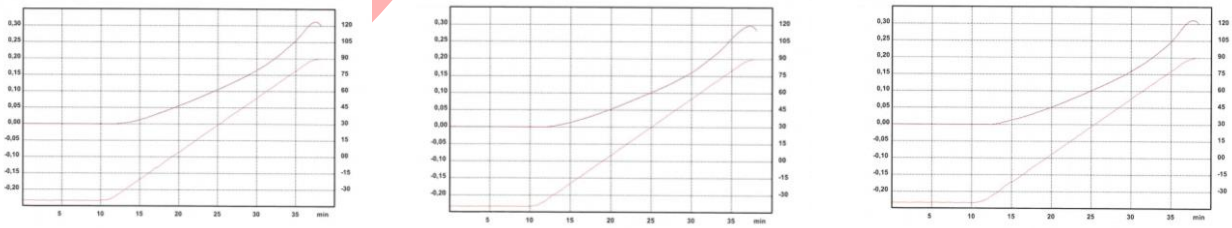

Fig. 2. **Elongation curve for terrace system: a - sample no. 1, b - sample no. 2, c - sample no. 3**

Table 10b. Test results for the coefficient of linear thermal expansion of the terrace profile/terrace system

Ref.	Coefficient of linear thermal expansion in the temperature range -20÷80°C [1/°C]
1	*2*
Facade profile	
1.	$4.68 \cdot 10^{-5}$
2.	$4.66 \cdot 10^{-5}$
3.	$4.70 \cdot 10^{-5}$
Average	**$4.68 \cdot 10^{-5}$**
Facade system	
4.	$4.81 \cdot 10^{-5}$
5.	$4.84 \cdot 10^{-5}$
6.	$4.88 \cdot 10^{-5}$
Average	**$4.85 \cdot 10^{-5}$**
Extended uncertainty of measurement (related to the accuracy of the equipment used) U= 0,25 ·10-5 1/°C (at a confidence level of approx. 95% and with a coverage factor of k=2)	

a) b) c)

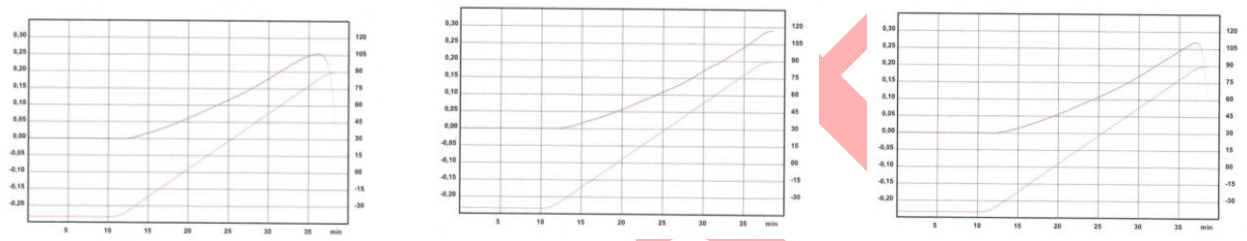

Fig. 1. **Elongation curve for facade profile: a - sample no. 1, b - sample no. 2, c - sample no. 3**

a) b) c)

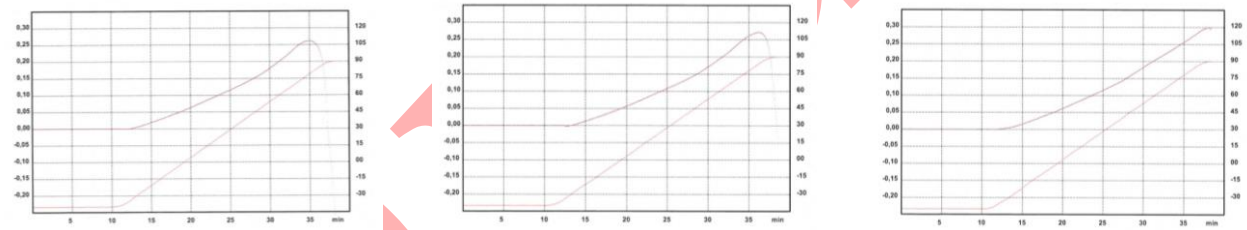

Fig. 2. **Elongation curve for terrace system: a - sample no. 1, b - sample no. 2, c - sample no. 3**

4.10. Vicat softening temperature

4.10.1. Testing method

PN-EN ISO 306:2014-02

Implementation of the test, environmental conditions and accuracy of the measuring equipment used comply with the requirements of the above-mentioned standard

Vicat softening temperature determination (VST/B50) was performed on specimens 3.71÷3.78mm thick. Silicone oil was used as the heating medium.

4.10.2. Results

Table 11. Test results for the coefficient of linear thermal expansion of the facade system

Ref.	Vicat softening temperature [°C]
1	*2*
1.	80.1
2.	80.1
3.	79.8
Average	**80.0**
Extended uncertainty of measurement (related to the accuracy of the equipment used), at a confidence level of 95% and with a coverage factor of k=2, U=0.2°C.	

5. Information

Laboratorium Badawcze oświadcza, że wyniki badania odnoszą się wyłącznie do otrzymanej próbki.

Bez pisemnej zgody Laboratorium Badawczego Raport nie może być powielany inaczej, jak tylko w całości.

Raport z badań nie zastępuje dokumentów wymaganych przy wprowadzaniu do obrotu i udostępnianiu wyrobów budowlanych.

This report was issued in 3 copies, with 2 received by the Client and one remaining at ITB.

Responsible for testing
mgr inż. Magdalena Wasiak

.....

date, signature

Authorised by
mgr inż. Marcin Czarnecki

.....

date, signature

LZM Laboratory Manager
dr inż. Ewa Sudoł

.....

date, signature

END OF REPORT