

Test report no. 072136.1 - Mk

ENGLISH VERSION

Principal Argeton GmbH
Oldenburger Allee 26
30659 Hannover

Date of commission 11.10.2007 - Herr Siegfried Gummels

Commission Determining the dimensions and superficial quality according to EN ISO 10545-2, the flexural strength according to DIN EN 538, and testing water absorption, open porosity, evident relative density and dry density according to DIN EN ISO 10545-3 for the ArGeTon-Terracotta Rainscreen

The test report covers seven pages.

The testing material has been consumed.

In case of dispute, the original German version is decisive.

1. Test samples

Delivered on 11th October 2007 by the Principal:

- 10 ArGeTon-rainscreen plates, 592 mm x 290 mm, brick red

2. Commission

Determining the dimensions and superficial quality according to EN ISO 10545-2, the flexural strength according to DIN EN 538, and testing water absorption, open porosity, evident relative density and dry density according to DIN EN ISO 10545-3.

3. Test results

3.1 Determining the dimensions and superficial quality

The test was carried out according to EN ISO 10545-2 on 10 rainscreen plates. The results are given in tables 1 to 3.

Table 1: Dimensions

sample no.	length			width			height				
	1 mm	2 mm	mean mm	1 mm	2 mm	mean mm	1 mm	2 mm	3 mm	4 mm	mean mm
1	592.1	592.1	592.1	314.0	314.0	314.0	29.9	29.5	29.5	29.5	29.6
2	592.0	592.0	592.0	314.0	314.4	314.2	29.4	29.5	29.4	29.4	29.4
3	592.1	592.1	592.1	313.8	313.9	313.9	29.5	29.4	29.4	29.4	29.4
4	592.0	592.3	592.2	313.6	314.0	313.8	29.4	29.3	29.4	29.4	29.4
5	592.0	592.1	592.1	313.6	313.4	313.5	29.4	29.4	29.4	29.5	29.4
6	592.2	592.0	592.1	314.6	313.5	314.1	29.5	29.5	29.4	29.5	29.5
7	592.1	592.0	592.1	313.9	313.8	313.8	29.5	29.5	29.4	29.5	29.5
8	592.0	592.0	592.0	314.3	314.0	314.1	29.4	29.5	29.5	29.5	29.5
9	592.1	592.0	592.1	313.7	313.8	313.7	29.4	29.4	29.5	29.4	29.4
10.	592.3	592.3	592.3	313.8	313.7	313.8	29.4	29.5	29.4	29.4	29.4
mittel	---	---	592.1	---	---	313.9	---	---	---	---	29.5

length in third dimension

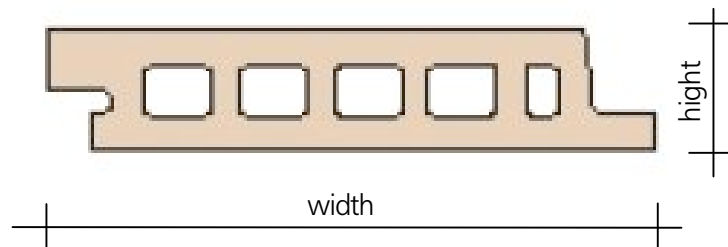


Table 1: dimensions (continued)

specimen no. ---	surface width				Groove width			
	1 mm	2 mm	3 mm	mean mm	1 mm	2 mm	3 mm	mean mm
1	296.0	295.3	295.5	295.6	290.2	289.7	289.7	289.9
2	296.0	295.6	295.6	295.7	290.0	290.0	290.4	290.1
3	295.7	295.5	295.7	295.6	289.9	289.6	289.8	289.7
4	296.0	295.2	295.7	295.6	289.8	289.5	289.9	289.7
5	294.8	294.8	295.6	295.1	289.0	289.3	289.8	289.3
6	295.7	295.1	295.8	295.5	289.8	290.0	290.0	289.9
7	295.4	296.0	295.4	295.6	289.6	289.5	289.7	289.6
8	296.2	295.7	296.0	295.5	290.1	289.9	290.3	290.1
9	295.9	295.2	295.5	295.6	284.8	289.6	289.5	288.0
10	295.9	295.4	295.5	295.6	289.7	289.5	289.7	289.6
mean	---	---	---	295.5	---	---	---	289.6

The diagram shows a cross-section of a specimen with five rectangular grooves. A horizontal dimension line above the specimen is labeled 'surface width', and a horizontal dimension line below is labeled 'groove width'.

Table 1: dimensions (continued)

spec. Nr. ---	upper side			lower side			thickness of stays		
	1 mm	2 mm	mean mm	1 mm	2 mm	mean mm	min. mm	max. mm	mittel mm
1	7.55	7.21	7.38	7.44	7.20	7.32	7.29	9.00	8.15
2	8.36	7.88	8.12	6.84	7.41	7.13	7.36	9.06	8.21
3	8.24	7.99	8.12	7.00	7.44	7.22	7.31	9.02	8.17
4	8.10	8.35	8.23	7.38	6.68	7.03	7.26	8.92	8.09
5	8.04	8.50	8.27	6.97	6.92	6.95	7.25	9.00	8.13
6	8.17	8.11	8.14	6.78	7.43	7.11	7.34	8.96	8.15
7	8.18	7.99	8.09	6.77	7.52	7.15	7.30	9.00	8.15
8	8.03	8.19	8.11	7.42	6.97	7.20	7.42	8.92	8.17
9	7.98	8.41	8.20	6.98	7.53	7.26	7.38	9.05	8.22
10	7.95	8.15	8.05	7.75	6.80	7.28	7.27	8.94	8.11
mittel	---	---	8.07	---	---	7.16	---	---	8.15

The diagram shows a cross-section of a specimen with five rectangular grooves. Arrows point to the thickness of the stays between the grooves, labeled 'thickness (stays)'. Vertical dimension lines on the left and right indicate the 'lower side' and 'upper side' respectively.

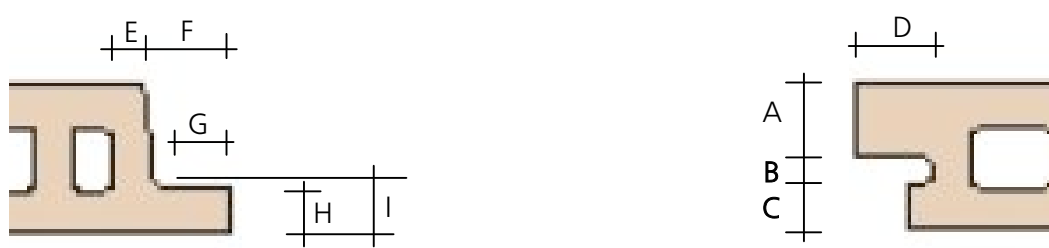
Table 2: superficial quality

sample no. ---	curvature ¹⁾			state of surface (description)
	1 mm	2 mm	mean mm	
1	0.5	0.4	0.5	uniform, very small open pores & pieces broken off (above & below)
2	0.0	0.1	0.0	uniform, very small open pores & pieces broken off (above & below)
3	0.5	0.4	0.5	uniform, very small open pores & pieces broken off (above & below), some extended scrape marks underneath
4	-0.1	0.0	-0.1	uniform, very small open pores & pieces broken off (above & below), some extended scrape marks underneath
5	0.6	0.6	0.6	uniform, very small open pores & pieces broken off (above & below), large open pores on top side
6	0.0	0.0	0.0	uniform, very small open pores & pieces broken off (above & below)
7	0.1	0.2	0.2	uniform, very small open pores & pieces broken off (above & below)
8	0.1	0.0	0.1	uniform, very small open pores & pieces broken off (above & below)
9	0.2	0.3	0.2	uniform, very small open pores & pieces broken off (below)
10	0.3	0.4	0.3	Uniform, no further peculiarities

¹⁾ positive value = curvature downwards, negative value = curvature upwards

Table 3: gauging points at supports

spec. no.	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	I mm
1	14.65	6.85	7.98	25.74	8.80	24.99	11.62	8.15	11.51
2	14.63	6.57	7.99	25.51	8.85	25.17	11.96	8.12	11.98
3	14.48	6.81	7.96	25.44	8.99	24.97	11.64	8.21	11.40
4	14.44	6.83	7.92	25.51	8.74	24.78	11.64	7.96	11.50
5	14.60	6.92	7.94	25.45	8.66	25.23	11.43	8.16	11.62
6	14.59	6.83	7.94	25.35	8.74	25.12	11.64	8.10	11.66
7	14.42	6.76	7.98	25.43	8.87	24.69	11.21	8.15	11.56
8	14.48	6.79	8.00	25.39	8.73	24.45	11.89	8.23	11.46
9	14.63	6.81	7.93	25.38	8.95	24.79	11.46	8.15	11.94
10	14.60	6.76	8.01	25.48	8.83	24.51	11.37	8.03	11.72
mean	14.55	6.79	7.97	25.47	8.82	24.87	11.59	8.13	11.64



3.2 Determining the flexural strength according to DIN EN 538

The flexural strength was tested according to DIN EN 538 on 10 rainscreen-plates. The test results are shown in Table 4.

Table 4: flexural strength according to DIN EN 538

specimen no.	span mm	breaking load kN
1	394	5.80
2	394	5.18
3	394	4.94
4	394	5.53
5	394	4.91
6	394	5.37
7	394	5.77
8	394	5.49
9	394	5.79
10	394	5.43
Mittlere Bruchlast	—	5.42
Kleinste Bruchlast	—	4.91

3.3 testing water absorption, open porosity, evident relative density and dry density

The tests were carried out according to DIN EN ISO 10545-3. Otherwise than in the standard method and because of the large size of the samples, two specimens, 200 mm x 200 mm, were cut out of the 5 samples tested, and, where the density was determined, the volume was calculated from the measured lengths, widths and thicknesses. The results are given in tables 5 and 6.

Table 5: density

specimen no. --- unit	dried weight m_1 kg	dimensions			volume --- V cm^3	density --- B g/cm^3
		length l mm	width b mm	thickness d mm		
1	1.752	201.4	199.9	29.4	1184	1.48
2	1.749	201.2	200.8	29.3	1182	1.48
3	1.737	202.4	197.8	29.5	1180	1.47
4	1.758	201.1	200.6	29.4	1187	1.48
5	1.755	202.4	200.4	29.4	1192	1.47
6	1.730	201.8	199.8	29.6	1195	1.45
7	1.742	202.6	200.4	29.7	1204	1.45
8	1.766	201.7	201.0	29.5	1196	1.48
9	1.764	200.9	202.5	29.7	1209	1.46
10	1.796	202.6	202.4	29.6	1213	1.48
mean	---	---	---	---	1194	1.47

Table 6: water absorption, open porosity and evident relative density

specimen no. --- ---	dried m_1 kg	weight soaked m_{2b} kg	under water m_3 kg	water absorption E_b %	volume V cm^3	open porosity P %	evident rel. density T g/cm^3
2	1.749	1.871	1.063	7.0	808	0.151	2.55
3	1.737	1.859	1.054	7.0	805	0.152	2.54
4	1.758	1.880	1.065	7.0	815	0.150	2.54
5	1.755	1.883	1.066	7.3	817	0.157	2.55
6	1.730	1.861	1.058	7.6	803	0.163	2.57
7	1.742	1.870	1.064	7.3	806	0.159	2.57
8	1.766	1.891	1.075	7.1	816	0.153	2.56
9	1.764	1.892	1.074	7.2	818	0.156	2.56
10	1.796	1.925	1.095	7.2	830	0.156	2.56
mean	---	---	---	7.2	813	0.155	2.55

4. Summary

The ArGeTon-Terracotta Rainscreen plates underwent various tests. The individual results can be found in the corresponding sections.

Hannover, 19th December 2007
Head of the Testing Institute
By Order

Case Worker

(Dr.-Ing. Höveling)

(Techn. Ang. Meek)