

Test certificate no. 220006360-08-02-e

Customer	Date of order	06.12.2007
MULIA EUROPA Vertriebs GmbH Bahnhofstraße 40 56422 Wirges	Date of sampling	22.01.2008

Order

First test of glass blocks for the year 2007
190 mm x 190 mm x 80 mm in accordance with DIN EN 1051-1

Sample type	Number of samples	40 pieces
Glass blocks 190 mm x 90 mm x 80 mm Design: Wave and Clear		

Description of the tests/underlying regulations

The test was carried out in accordance with DIN EN 1051- Glass blocks and glass pavers

- Part 1 : Definitions and description (04.2003)
- Part 2 : Evaluation of conformity/Product standard (12.2007)

The results of the tests refer exclusively to the samples/test object described above.
Test certificates may not be published or copied with changes to the form or contents without the permission of the MPA NRW. Publication of extracts from a test certificate is only permissible with the approval of the MPA NRW.

This test certificate has 4 pages.

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1 Sampling

The glass blocks were delivered to the MPA NRW for testing by the customer and come from the production of the Mulia Industrie Estate, Cikarang-Bekasi, Indonesia.

2 Test results

2.1 Design and quality

Design: Wave and Clear
 Quality: The appearance of the glass blocks was perfect.
 No irregularities due to production were detected.
 The requirements of Section 7.1 of DIN EN 1051-1 were fulfilled.

2.2 Dimensions, weight, shape and position tolerances

The dimensions, weight, shape and position tolerances are listed in Table 1.

Table 1

Sample No.	Length mm	Width mm	Height mm	Hollow- ing	Bulging-	Dev. of parallelism	Hollow- edges	Pos. deviation	Weight kg
				max. mm	max. mm	max. mm/100 mm	max. mm	max. mm	
1	189	89.0	80.0	0.8	2.0	0.3	0.2	0.4	1.50
2	189	89.5	79.0	0.7	1.1	0.6	0.3	0.3	1.51
3	190	89.8	80.5	0.8	1.2	0.5	0.4	0.4	1.51
4	189	89.8	80.0	0.8	1.4	0.4	0.5	0.3	1.50
5	190	90.0	80.0	0.9	1.6	0.7	0.4	0.5	1.51
6	189	89.0	79.0	1.0	1.4	0.4	0.1	0.5	1.42
7	190	89.8	80.0	0.9	1.6	0.2	0.0	0.4	1.42
8	189	90.0	80.0	1.0	1.5	0.5	0.0	0.3	1.42
9	190	90.0	80.0	0.9	1.1	0.3	0.2	0.4	1.42
10	190	90.0	80.0	0.8	1.7	0.4	0.0	0.5	1.42
Mean value:	189.5	90.0	79.9	-	-	-	-	-	1.46
Setpoint:	190	90.0	80.0	0	0	0	0	0	1.40
Perm. deviation:	± 1	± 1	± 1	≤ 1	≤ 2	≤ 1	≤ 1.0	≤ 1.0	± 10%

The tested glass blocks conformed to the requirements of the permissible limit deviations in accordance with No. 5.3.1 in class 1 in Table 1 DIN EN 1051-1.

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2.3 Permissible internal stress

A quench test was carried out in accordance with Annex b of DIN EN 1051-2 to determine the internal stress.

The quench test conformed to DIN EN ISO 7459 Glass containers - Thermal shock resistance and thermal shock endurance - Test methods.

In accordance with the defaults of DIN EN 1051 Part 2 the temperature difference was 30 K.

In the quench test all 20 examined glass blocks withstood the load with the prescribed temperature difference.

2.4 Pressure resistance

The pressure resistance test was carried out in accordance with Section 6 and Annex A of DIN EN 1051 Part 1.

The test was carried out 28 days after application of the levelling layer.

Samples from the design high.size and oblong were tested.

The test results are shown in Table 2 and 3.

Table 2 oblong

Sample No.	Width mm	Height mm	Breaking load kN	Pressure resistance N/mm ²
11 Clear	190	80	95	6.3
12 Clear	190	80	116	7.6
13 Clear	190	80	114	7.5
14 Clear	190	80	131	8.6
15 Clear	190	80	137	9.0
16 Clear	190	80	151	9.9
17 Clear	190	80	117	7.7
18 Clear	190	80	140	9.2
19 Wave	190	80	139	9.1
20 Wave	190	80	147	9.7
21 Wave	190	80	91	6.0
22 Wave	190	80	92	6.1
23 Wave	190	80	122	8.0
24 Wave	190	80	114	9.3
25 Wave	190	80	259	8.2
26 Wave	190	80	107	7.0
Mean value:	-	--	-	8.1
Setpoints:				
Mean value:	-	--	-	≥ 7.0
Individual value:	-	--	-	≥ 6.0

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Table 3 high-size

Sample No.	Width mm	Height mm	Breaking load kN	Pressure resistance N/mm ²
27 Clear	90	80	73	10.1
28 Clear	90	80	67	9.3
29 Clear	90	80	65	9.0
30 Clear	90	80	54	7.5
31 Clear	90	80	64	8.9
32 Clear	90	80	72	10.0
33 Clear	90	80	66	9.2
34 Clear	90	80	57	7.9
35 Wave	90	80	76	10.5
36 Wave	90	80	92	12.8
37 Wave	90	80	88	12.2
38 Wave	90	80	79	11.0
39 Wave	90	80	123	17.0
40 Wave	90	80	64	8.9
41 Wave	90	80	93	12.9
42 Wave	90	80	80	11.1
Mean value:	-	--	-	10.5
Setpoints:				
Mean value:	-	--	-	≥ 7.0
Individual value:	-	--	-	≥ 6.0

3 Results of the tests

The first test of the above-mentioned glass blocks 190 mm x 190 mm x 80 mm in the designs Wave and Clear conforms to the requirements of DIN EN 1051 Parts 1 and 2.

Dortmund, 17.09.2008

p.p.




Dipl.-Ing. Hans Förster
 Oberregierungsrat

Test certificate no. 220006360-08-01-e

Customer	Date of order	06.12.2007
MULIA EUROPA Vertriebs GmbH Bahnhofstraße 40 56422 Wirges	Date of sampling	22.01.2008

Order

First test of glass blocks for the year 2007
190 mm x 190 mm x 80 mm in accordance with DIN EN 1051-1

Sample type	Number of samples	60 pieces
Glass blocks 190 mm x 190 mm x 80 mm Design: Wave, Clear, Bubble, Mist, Tangerine, Quadra and Toba		

Description of the tests/underlying regulations

The test was carried out in accordance with DIN EN 1051- Glass blocks and glass pavers

- Part 1 : Definitions and description (04.2003)
- Part 2 : Evaluation of conformity/Product standard (12.2007)

The results of the tests refer exclusively to the samples/test object described above.
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Test Certificate No. 220006360-08-01-e- of 17.09.2008

1 Sampling

The glass blocks were delivered to the MPA NRW for testing by the customer and come from the production of the Mulia Industrie Estate, Cikarang-Bekasi, Indonesia.

2 Test results

2.1 Design and quality

Design: Wave, Clear, Bubble, Mist, Tangerine, Quadra and Toba
 Quality: The appearance of the glass blocks was perfect.
 No irregularities due to production were detected.
 The requirements of Section 7.1 of DIN EN 1051-1 were fulfilled.

2.2 Dimensions, weight, shape and position tolerances

The dimensions, weight, shape and position tolerances are listed in Table 1.

Table 1

Sample No.	Length mm	Width mm	Height mm	Hollow-	Bulging-	Dev. of	Hollow-	Pos.	Weight kg
				ing max. mm	ing max. mm	parallelism max. mm/100 mm	edges max. mm	deviation max. mm	
1	190	190	80.5	0.8	1.9	0.1	0.1	0.3	2.42
2	190	190	81.0	0.6	1.8	0.5	0.0	0.2	2.41
3	190	191	80.0	0.7	1.6	0.5	0.4	0.4	2.46
4	190	190	81.0	0.6	0.4	0.3	0.0	0.3	2.45
5	190	191	81.0	0.8	1.8	0.5	0.1	0.5	2.40
6	190	190	81.0	0.9	1.8	0.5	0.6	0.5	2.40
7	190	190	79.0	1.0	2.0	0.3	0.2	0.6	2.40
8	190	189	81.0	0.4	1.8	0.5	0.1	0.4	2.39
9	190	190	81.0	0.5	1.8	0.0	0.4	0.4	2.41
10	190	190	80.0	0.6	1.6	0.0	0.1	0.3	2.40
Mean value:	190	190	80.6	-	-	-	-	-	2.25
Setpoint:	190	190	80.0	0	0	0	0	0	2.25
Perm. deviation:	± 1	± 1	± 1	≤ 1	≤ 2	≤ 1	≤ 1.0	≤ 1.0	± 10%

The tested glass blocks conformed to the requirements of the permissible limit deviations in accordance with No. 5.3.1 in class 1 in Table 1 DIN EN 1051-1.

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2.3 Permissible internal stress

A quench test was carried out in accordance with Annex b of DIN EN 1051-2 to determine the internal stress.

The quench test conformed to DIN EN ISO 7459 Glass containers - Thermal shock resistance and thermal shock endurance - Test methods.

In accordance with the defaults of DIN EN 1051 Part 2 the temperature difference was 30 K. In the quench test all 20 examined glass blocks withstood the load with the prescribed temperature difference.

2.4 Pressure resistance

The pressure resistance test was carried out in accordance with Section 6 and Annex A of DIN EN 1051 Part 1.

The test was carried out 28 days after application of the levelling layer.

Samples from all design variants were tested for the pressure resistance test.

The test results are shown in Table 2.

Table 2

Sample No.	Width mm	Height mm	Breaking load kN	Pressure resistance N/mm ²
11	190	80	106	7.0
12	190	80	132	8.7
13	190	80	108	7.1
14	190	80	106	7.0
15	190	80	125	8.2
16	190	80	122	8.0
17	190	80	118	7.8
18	190	80	117	7.7
19	190	80	109	7.2
20	190	80	107	7.0
21	190	80	110	7.2
22	190	80	117	7.7
23	190	80	143	9.3
24	190	80	94	6.2
25	190	80	99	6.4
Mean value:	-	--	-	7.5
Setpoints:				
Mean value:	-	--	-	≥ 7.0
Individual value:	-	--	-	≥ 6.0

Test Certificate No. 220006360-08-01-e- of 17.09.2008

3 Results of the tests

The first test of the above-mentioned glass blocks 190 mm x 190 mm x 80 mm in the designs Wave, Clear, Bubble, Mist, Tangerine, Quadra and Toba conforms to the requirements of DIN EN 1051 Parts 1 and 2.

Dortmund 17.09.2008

p.p.




Dipl.-Ing. Hans Förster
Oberregierungsrat