



British Ceramic Tile Limited
Heathfield.
Newton Abbot
Devon
TQ12 6RF

FAO: Tim Chadwick

PHYSICAL TESTING REPORT

CERAM Reference:	(053035)	
Order Number:	PO016609	
Date Logged	31-May-2005	Test Start Date: 31-May-2005
Date Reported	14-Jun-2006	Test Finish Date: 14-Jun-2005

Please find attached the results for the samples recently submitted for analysis.

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.

S Hall
Authorised Signatory



CERAM TEST RESULTS

Your Reference: White Glazed Wall Tiles.
CERAM Reference: (053035) - 12101

Test Specimens

148 x 148 x 6mm B111 glazed wall tiles, White.

Accredited Tests

1. BS EN ISO 10545-2: 1997 Determination of dimensions and surface quality.
2. BS EN ISO 10545-3: 1997 Determination of water absorption.
3. BS EN ISO 10545-4: 1997 Determination of modulus of rupture and breaking strength.
4. BS EN ISO 10545-11 1997 Determination of crazing resistance for glazed tiles.
5. BS EN ISO 10545-13: 1997 Determination of chemical resistance.
6. BS EN ISO 10545-14: 1997 Determination of resistance to stains.

Results

1. Dimensions and Deviations

Actual measurements contained in Appendix 1.

Length

Work size 148 mm.

Maximum deviation from work size, + 0.32%. The permissible deviation is $\pm 0.5\%$ and so the tiles comply with the requirements.

Average size of 10 tiles, 148.27 mm.

Maximum deviation from average size, - 0.22%. The permissible deviation is $\pm 0.3\%$ and so the tiles comply with the requirements.

Thickness

Work size, 6.0 mm.

Maximum deviation from work size, - 6.8% mm. The permissible deviation is $\pm 10\%$ and so the tiles comply with the requirements.

Straightness of Sides

Maximum deviation from straightness, + 0.09%. The permissible deviation is $\pm 0.3\%$ and so the tiles comply with the requirements.



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Rectangularity

Maximum deviation from rectangularity, - 0.30%. The permissible deviation is $\pm 0.3\%$ and so the tiles comply with the requirements.

Centre Curvature

Maximum deviation from flatness, + no positive values and - 0.10% related to the diagonal. The permissible deviation is + 0.5 to - 0.3% and so the tiles comply with the requirements.

Edge Curvature

Maximum deviation from flatness, + 0.02 to - 0.07%. The permissible deviation is + 0.5 to - 0.3% and so the tiles comply with the requirements.

Warpage

Maximum warpage, -0.05%, related to the diagonal. The permissible deviation is $\pm 0.5\%$ and so the tiles comply with the requirements.

Surface Quality

When examined under the standard conditions of the test, more than 95% of the tiles tested were acceptable and so they comply with the requirements.

2. Water Absorption

Sample No	Water Absorption (%)
1	16.4
2	18.9
3	19.1
4	16.7
5	16.8
6	17.4
7	19.2
8	18.4
9	16.7
10	18.2
Average	17.8%

The stipulation for B111 tiles is that the average value should be $>10\%$. The tiles therefore comply with the requirements.



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3. Modulus of Rupture

Sample No	Thickness (mm)	Breaking Strength (N)	Load (KN)	Modulus of Rupture (N/mm ²)
1	5.04	353	0.409	20.8
2	5.08	362	0.419	21.0
3	5.11	396	0.458	22.7
4	5.13	448	0.518	22.5
5	5.07	409	0.473	23.9
6	5.02	371	0.429	22.1
7	5.04	378	0.438	22.3

Thickness of Rubber = 5mm
 Diameter of Rod = 20mm
 Overlap = 10mm
 Span = 128mm

The average modulus of rupture was 22.2 N/mm². The stipulation is that the average value should be ≥ 15 N/mm². The tiles therefore comply with the requirements.

The average breaking strength was 388 N. The stipulation is that the value should not be less than 200 N. The tiles therefore comply with the requirements.

4. Craze Resistance

When tested according to the standard, none of the five tiles tested showed signs of crazing.

5. Chemical Resistance (Glazed Tiles)

Test Solutions	Sample Number				
	1	2	3	4	5
1. Ammonium Chloride solution 100g/l	GA	GA	GA	GA	GA
2. Sodium Hypochlorite solution 20mg/l	GA	GA	GA	GA	GA
3. Hydrochloric Acid solution 3% v/v	GLA	GLA	GLA	GLA	GLA
4. Citric Acid solution 100g/l	GLA	GLA	GLA	GLA	GLA
5. Potassium Hydroxide solution 30g/l	GLA	GLA	GLA	GLA	GLA
6. Hydrochloric Acid solution 18% v/v	GHA	GHA	GHA	GHA	GHA
7. Lactic Acid solution 5% v/v	GHA	GHA	GHA	GHA	GHA
8. Potassium Hydroxide solution 100g/l	GHA	GHA	GHA	GHA	GHA

For household chemicals and swimming pool salts (1 and 2) the Class is GA.
 The stipulation is for a minimum of Class GB and so the tiles comply with the requirements.

For low concentration acids and alkalis (3, 4 and 5) the Class is GLA.

For high concentration acids and alkalis (6, 7 and 8) the Class is GHA.



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6. Stain Resistance

Staining Agent	Sample Number				
	1	2	3	4	5
1.Green paste in light oil (paste)	5	5	5	5	5
2. Iodine in alcohol, 13g/l (chemical/oxidising)	5	5	5	5	5
3. Olive Oil (film)	5	5	5	5	5

The tiles exceed the minimum requirement of class 3.

APPENDIX

Work Size:

THICKNESS					
No.	AB	BC	CD	DA	Average
1	5.89	5.92	5.99	5.99	5.95
2	5.86	5.80	5.77	5.85	5.82
3	5.78	5.77	5.66	5.70	5.73
4	5.81	5.76	5.73	5.75	5.76
5	5.77	5.74	5.73	5.75	5.75
6	5.83	5.76	5.75	5.77	5.78
7	5.81	5.76	5.84	5.88	5.82
8	5.79	5.72	5.76	5.81	5.77
9	5.80	5.76	5.71	5.71	5.75
10	5.72	5.69	5.63	5.73	5.69

LENGTH & BREADTH					
No.	AB	BC	CD	DA	Average
1	148.45	148.24	148.01	148.34	148.26
2	147.93	147.83	147.83	148.17	147.94
3	148.39	148.16	147.97	148.38	148.48
4	148.46	148.36	148.14	148.43	148.35
5	148.52	148.35	148.14	148.46	148.40
6	148.44	148.07	147.81	148.04	148.09
7	148.60	148.26	148.07	148.27	148.30
8	148.53	148.31	148.09	148.31	148.31
9	148.35	148.25	148.15	148.36	148.28
10	148.42	148.27	148.15	148.33	148.29
				Average	148.27



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RECTANGULARITY				
No.	A	B	C	D
1	-0.34	-0.16	0.23	0.18
2	-0.04	0.27	0.27	0.32
3	-0.28	-0.16	0.36	0
4	-0.24	-0.11	0.16	0.15
5	-0.29	-0.12	0.20	0.15
6	-0.21	-0.44	0.39	0.21
7	-0.24	-0.36	0.33	0.18
8	-0.17	-0.28	0.25	0.14
9	-0.09	-0.13	0.21	-0.05
10	-0.10	-0.19	0.23	0.01

STRAIGHTNESS OF SIDES				
No.	AD	BA	CB	DC
1	0.05	0.06	0	-0.09
2	0.10	-0.12	-0.12	-0.10
3	0.13	0.03	0.03	-0.10
4	0.10	0.04	0.01	-0.05
5	0.10	0.05	0	-0.05
6	-0.05	0.10	-0.07	-0.08
7	0.04	0.11	-0.02	-0.05
8	0.05	0.07	0	-0.05
9	0.10	0.04	0.03	-0.01
10	0.08	0.06	0.03	-0.01

EDGE CURVATURE				
No.	AD	BA	CB	DC
1	-0.07	0.01	-0.05	-0.05
2	-0.07	-0.11	-0.11	0.01
3	-0.04	-0.05	-0.04	0
4	-0.03	0.01	-0.04	-0.01
5	-0.02	0	0	0
6	-0.05	0.01	-0.07	0.01
7	-0.05	0	-0.04	0
8	-0.06	0	-0.06	0
9	-0.03	-0.02	-0.01	0.02
10	-0.07	0	-0.07	0.03



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CENTRE CURVATURE				
No.	ABD	BCA	CBD	DAC
1	-0.15	-0.15	-0.16	-0.15
2	-0.16	-0.18	-0.20	-0.17
3	-0.10	-0.10	-0.11	-0.10
4	-0.13	-0.13	-0.15	-0.12
5	-0.09	-0.10	-0.08	-0.08
6	-0.13	-0.13	-0.16	-0.12
7	-0.08	-0.18	-0.10	-0.09
8	-0.07	-0.06	-0.14	-0.13
9	-0.15	-0.10	-0.12	-0.11
10	-0.18	-0.16	-0.20	-0.18

WARPAGE				
No.	AC	BD	CA	DB
1	-0.02	-0.03	-0.04	-0.02
2	-0.04	-0.02	-0.03	0
3	-0.04	-0.06	0	-0.05
4	-0.01	-0.03	-0.03	0
5	0	-0.06	-0.01	-0.07
6	-0.05	-0.05	-0.03	0
7	0	-0.10	0.01	-0.07
8	-0.02	-0.06	-0.05	-0.09
9	-0.04	-0.03	-0.04	0.03
10	-0.04	-0.02	-0.05	0.05

End of Test Report



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