

TEST REPORT

No. : GZIN2211007198CM

Date : Jan 04, 2023

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CUSTOMER NAME: H. L. TECHNOLOGY & DEVELOPMENT CO., LTD.
ADDRESS: NORTH SIDE OF JIANCAI AVENUE, SHIMEN TOWN, LULONG COUNTY, QINHUANGDAO CITY, HEBEI PROVINCE, CHINA

Sample Name : MINERALI SINTERED SURFACE

Above information and sample(s) was/were submitted and confirmed by the client. SGS, however, assumes no responsibility to verify the accuracy, adequacy and completeness of the sample information provided by client.

SGS Ref. No. : IN-GZ-CP-5627-22046
Date of Receipt : Nov 21, 2022
Testing Start Date : Nov 21, 2022
Testing End Date : Jan 04, 2023
Test result(s) : For further details, please refer to the following page(s)
(Unless otherwise stated the results shown in this test report refer only to the sample(s) tested)

Signed for
SGS-CSTC Standards Technical
Services Co., Ltd. GZ Branch Testing
Center

Tobyy Yang
Authorized signatory



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Summary of Results:

No.	Test Item	Test Method	Result	Conclusion
1	Determination Dimensions and Surface Quality	With reference to EN 14411:2012 Annex G & EN ISO 10545-2:2018 and client's requirement	See results	Pass
2	Water Absorption	EN 14411:2012 Annex G & EN ISO 10545-3:2018	Mean value: 0.04% Individual maximum: 0.06%	Pass
3	Breaking Strength	EN 14411:2012 Annex G & EN ISO 10545-4:2019	1331N	Pass
	Modulus of Rupture		Ave.: 50.3N/mm ² Individual minimum: 44.29N/mm ²	
4	Resistance to Surface Abrasion for Glazed Tiles	EN 14411:2012 Annex G & EN ISO 10545-7:1999	Class 0	/
5	Coefficient of Linear Thermal Expansion	EN 14411:2012 & EN ISO 10545- 8:2014	See result	/
6	Thermal Shock Resistance	EN 14411:2012 & EN ISO 10545- 9:2013	No visible defects	Pass
7	Moisture expansion	EN 14411:2012 & EN ISO 10545- 10:2021	<0.06 mm/m	/
8	Crazing resistance for glazed tiles	EN 14411:2012 Annex G & EN ISO 10545-11:1996	No crazing	Pass
9	Frost Resistance	EN 14411:2012 Annex G & EN ISO 10545-12:1997	No defect	Pass
10	Resistance to Chemicals	EN 14411:2012 Annex G & EN ISO 10545-13:2016	See results	Pass



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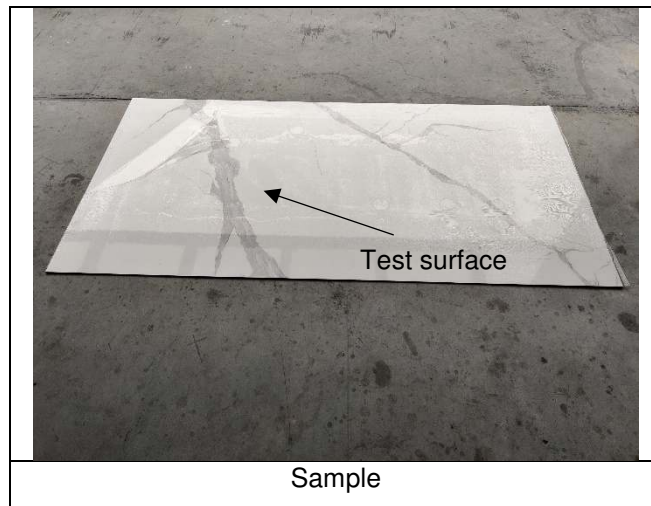
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No.	Test Item	Test Method	Result	Conclusion
11	Resistance to Staining	EN 14411:2012 Annex G & EN ISO 10545-14:2015	See results	Pass
12	Slipperiness	EN 14411:2012 Annex G & CEN/TS 16165:2012 Annex C	See results	Pass
13	Leachable Lead and Cadmium	With reference to EN 14411:2012 Annex G & EN ISO10545-15:2021, analysis was performed by ICP-OES.	See result	/

Note: Pass : Meet the requirements;
 Fail : Does not meet the requirements;
 / : Not Apply to the judgment.

Original Sample Photo:



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Test Item 1: Determination Dimensions and Surface Quality

Sample Description: See photo

Test Method: With reference to EN 14411:2012 Annex G & EN ISO 10545-2:2018 and client's requirement

Test Condition:

Specimen (Work size): 2400mm×1200mm×6mm

Test Result:

Test items	Test results	Requirements in EN 14411:2012 Annex G (Dry-pressed ceramic tiles Eb≤0.5 % Group BIa)	Conclusion
Length	0.00%~0.00% 0.00mm~0.01mm	Related to work size: ± 0.6% to a maximum of ± 2.0mm	Pass
Width	0.00%~0.00% 0.01mm~0.01mm	Related to work size: ± 0.6% to a maximum of ± 2.0mm	Pass
Thickness	-0.33%~0.83% -0.02mm~0.05mm	Related to work size: ± 5.0% and ± 0.5mm	Pass
Straightness of sides (Length)	0.00%~0.01% 0.10mm~0.20mm	/	/
Straightness of sides (Width)	0.00%~0.01% 0.05mm~0.10mm	/	/
Rectangularity (Length)	0.00%~0.01% 0.10mm~0.20mm	/	/
Rectangularity (Width)	0.00%~0.01% 0.05mm~0.10mm	/	/
Surface flatness	Centre curvature 0.02%~0.04% 0.50mm~1.10mm	/	/
	Edge curvature (Length) 0.02%~0.04% 0.40mm~0.90mm	/	/



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Test items		Test results	Requirements in EN 14411:2012 Annex G (Dry-pressed ceramic tiles Eb≤0.5 % Group Bla)	Conclusion
Surface flatness	Edge curvature (Width)	0.01%~0.03% 0.10mm~0.30mm	/	/
	Warpage	0.04%~0.06% 1.00mm~1.50mm	/	/
Surface quality		100%	A minimum of 95% of the tiles shall be free from visible defects that would impair the appearance of a major area of tiles	Pass



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Test Item 2: Water Absorption

Sample Description: See photo

Test Method: EN 14411:2012 Annex G & EN ISO 10545-3:2018

Test Condition:

Dry condition: Dry at 110°C until constant mass → Cool to room temperature

Impregnation condition: 10kPa, 30min → immersed in water, 15min

Test Result:

Specimen No.	1	2	3	4	5
Water absorption (%)	0.03	0.04	0.04	0.05	0.06
Mean value (%)	0.04				
Individual maximum (%)	0.06				
Requirement in EN 14411:2016 Annex G (Dry-pressed ceramic tiles Eb ≤ 0.5 % Group Bla):	Mean value: Eb ≤ 0.5% Individual maximum: 0.6%				
Conclusion	Pass				

Note: All test specimens were cut from the samples.



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Test Item 3: Breaking Strength and Modulus of Rupture

Sample Description: See photo

Test Method: EN 14411:2012 Annex G & EN ISO 10545-4:2019

Test Condition:

Specimen: 200mm×200mm×6.30mm, 9pcs

Conditioning: 110°C, 24h

Loading rate: 1N/mm²/s

Test Result:

Specimens No.	1	2	3	4	5	6	7	8	9
Modulus of rupture (N/mm ²)	49.32	52.01	44.29	48.41	46.94	54.72	52.14	55.43	49.77
Mean value (N/mm ²)	50.3								
Individual minimum (N/mm ²)	44.29								
Requirement in EN 14411: 2012 Annex G (Dry-pressed ceramic tiles E _b ≤0.5% Group Bl _a , nominal size N≥15cm)	Minimum 35N/mm ² Individual minimum 32N/mm ²								
Conclusion	Pass								
Specimens No.	1	2	3	4	5	6	7	8	9
Breaking strength (N)	1305	1372	1176	1289	1258	1457	1371	1453	1300
Mean value (N)	1331								
Requirement in EN 14411: 2012 Annex G (Dry-pressed ceramic tiles E _b ≤0.5% Group Bl _a , nominal size N≥15cm)	Thickness < 7,5 mm: Not less than 700N								
Conclusion	Pass								

Note: All test specimens were cut from the samples.



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Test Item 4: Resistance to Surface Abrasion for Glazed Tiles

Sample Description: See photo

Test Method: EN 14411:2012 Annex G & EN ISO 10545-7:1999

Test Condition:

Specimen: 100mm×100mm×6.30mm

Condition: 110°C to constant mass

Test Result:

Specimens No.	1	2	3	4	5	6	7	8
Cycles	100	150	600	750	1500	2100	6000	12000
Visual failure	Yes	Yes	/	/	/	/	/	/
Abrasion class	Class 0							

Note: All test specimens were cut from the original samples.



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Test Item 5: Coefficient of linear thermal expansion

Test method:

EN 14411:2012 & EN ISO 10545-8:2014 Ceramic tiles — Part 8: Determination of linear thermal expansion

Specimens: 50mm×10mm×6.5mm, 2pcs, vertical cut from 1pc original sample

Test result(s):

Heating rate: 5°C /min

Specimens identification No.	1	2
Coefficient of linear thermal expansion ($\times 10^{-6}/^{\circ}\text{C}$)	4.5	4.7

Note: Test Item 5 was carried out by other laboratory in SGS group.

Test Item 6: Thermal shock resistance

Test method:

EN 14411:2012 & EN ISO 10545-9:2013 Ceramic tiles — Part 9: Determination of resistance to thermal shock

Specimens: 150mm×100mm, 5pcs

Test result(s):

Specimens identification No.	1	2	3	4	5
Description of damage	No visible defects	No visible defects	No visible defects	No visible defects	No visible defects

Requirement according to EN ISO 10545-1:2014 table 1: At most 1 specimen shows defects

Conclusion: Pass

Note: Test Item 6 was carried out by other laboratory in SGS group.



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Test item 7: Moisture expansion

Sample description: See photo

Test Method: EN 14411:2012 & EN ISO 10545-10:2021

Test Result: <0.06 mm/m

Note: Test Item 7 was carried out by COMPREHENSIVE TECHNOLOGY CENTRE OF FOSHAN CUSTOMS.

Test Item 8: Craze resistance for glazed tiles

Sample Description: See photo

Test Method: EN 14411:2012 Annex G & EN ISO 10545-11:1996

Test Condition:

Condition: 500kPa for 2 h → cool in the autoclave for 0.5h → laboratory atmosphere for 0.5h

Test Result:

Specimens No.	1	2	3	4	5
Description of damage	No crazing	No crazing	No crazing	No crazing	No crazing

Requirement according to EN ISO 10545-1:2014 table 1: At most 1 specimen shows defects

Conclusion: Pass

Note: All test specimens were cut from the original samples.



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Test Item 9: Frost Resistance

Sample Description: See photo

Test Method: EN 14411:2012 Annex G & EN ISO 10545-12:1997

Test Condition:

Specimen: 300mm×300mm×6.30mm, 10pcs.

Test condition: 100 times of freeze-thaw cycles in temperature of 5°C~-5°C

Test Result:

Specimens No.	1	2	3	4	5	6	7	8	9	10
Surface of specimens	No defect	No defect	No defect	No defect	No defect	No defect	No defect	No defect	No defect	No defect

Requirement according to EN ISO 10545-1:2014 table 1: At most 1 specimen show defect.

Conclusion: Pass

Note: All test specimens were cut from the original samples.



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TEST REPORT

No. : GZIN2211007198CM

Date : Jan 04, 2023

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Test Item 10: Resistance to Chemicals

Sample Description: See photo

Test Method: EN 14411:2012 Annex G & EN ISO 10545-13:2016

Test Condition:

Testing surface: See photo

Test Result:

Test Item	Test Result	Requirement in EN 14411:2016 Annex G (Dry-pressed ceramic tiles Eb≤0.5 % Group BI _a):	Conclusion
Ammonium chloride solution (100g/L)	Class A	Minimum Class B	Pass
Sodium hypochlorite solution (20mg/L)	Class A	Minimum Class B	Pass
Hydrochloric acid solution 3 % (V/V)	Class LA	Declared value	/
Citric acid solution (100g/L)	Class LA	Declared value	/
Potassium hydroxide solution (30g/L)	Class LA	Declared value	/

Note:

1. All test specimens were cut from the sample.
2. Class A and Class LA: No visible effect.
3. Class is evaluated according to EN ISO 10545-13:2016, with Class A and Class LA as the best and Class C and Class LC as the worst.



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Test Item 11: Resistance to Staining

Sample Description: See photo

Test Method: EN 14411:2012 Annex G & EN ISO 10545-14:2015

Test Condition:

Testing surface: See photo

Test Result:

Test Item	Test Result	Requirement in EN 14411:2016 Annex G (Dry-pressed ceramic tiles Eb ≤ 0.5 % Group Bl _a):	Conclusion
Iodine: 13 g/L solution in alcohol	Class 5	Minimum Class 3	Pass
Green staining agent	Class 5		Pass
Olive oil	Class 5		Pass

Note:

- All test specimens were cut from the sample.
- Class 5 corresponds to the greatest ease of removing the particular stain; class 1 corresponds to the impossibility of removing the particular stain with any of the test procedures and / or to irreversible damage of the proper surface.



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Test item 12: Slipperiness

Sample description: See photo

Test Method: EN 14411:2012 Annex G & CEN/TS 16165:2012 Annex C

Test Condition:

Specimens: 200mm×150mm×6.01mm

Scale: C (126mm)

Slider type: 96

Test Result:

Test Direction	PTV	
	Dry condition	Wet condition
0°	80	9
180°	80	9

Note: All test specimens were cut from the samples.



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Test Item 13: Leachable Lead and Cadmium

Sample Description: Offwhite board

Test method: With reference to EN 14411:2012 Annex G & EN ISO10545-15:2021, analysis was performed by ICP-OES.

Test result:

Sample 001

	<u>Vol. of 4%HAc used(mL)</u>	<u>Surface Area (dm²)</u>
1	893	5.35
2	893	5.35
3	893	5.35

	<u>Leachable Lead (mg/dm²)</u>	<u>Leachable Cad- mium(mg/dm²)</u>
1	<0.1	<0.01
2	<0.1	<0.01
3	<0.1	<0.01

Remarks :

- (1) mg/kg = miligram per kilogram
- (2) % = percentage of weight by weight
- (3) °C = degree Celsius
- (4) RL = Report Limit
- (5) ND = Not Detected (< RL)
- (6) < = less than

Unless otherwise stated, the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule (w =0) stated in ILAC-G8:09/2019.

Appendix information: The test report shall only be used for clients' scientific research, teaching, internal quality control, product research and development, etc., and just for internal reference.

***** End of report*****



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