SGS

测 试 报 告
TEST REPORT

TEST REPORT

No. : XMCCM130600529
Date : Aug.06, 2013

DOUBLEL
CONCRETE & GRANITE PRODUCTS

The following sample(s) was/ were submitted and identified on behalf of the client as:

Commercial Name	:	G603
Petrographic Name	:	MONZONITIC GRANITE
Typical colour	:	GREY WHITE
Manufacturer	:	
Manufacturer address	:	DOUBLEL CONCRETE & GRANITE PRODUCTS Calliaghstown, Rathcoole, Co. Dublin
Place of origin	:	FUJIAN, CHINA
Name of quarry	:	G603 QUARRY
Address of quarry	:	FUJIAN, CHINA
Trade mark	:	
Intend use	:	Internal & external wall, flooring and stair External uses and road finishes to cover external pedestrian and vehicular circulation areas
Test required	:	EN 12057:2004 Natural stone products - Modular tiles - Requirements EN 12058:2004 Natural stone products - Slabs for floors and stairs - Requirements EN 1469:2004 Natural stone products - Slabs for cladding - Requirements EN 1341:2012 Slabs of natural stone for external paving - Requirements and test methods EN 1342:2012 Setts of natural stone for external paving - Requirements and test methods EN 1343:2012 Kerbs of natural stone for external paving - Requirements and test methods
Date of Receipt	:	Jun.18, 2013
Test Period	:	Jun.18, 2013 to Jul.26, 2013
Test result(s)	:	For further details, please refer to the following page(s)

******** To be continued********

Signed for and on behalf of
SGS-CSTC Ltd.

Civi Huang
Xiamen Materials Lab Technical Supervisor

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Summary of test results:

(Average value)

Test items	Test methods	Test results	Page
Apparent density	EN 1936:2006	2660kg/m^3	3
Open porosity	EN 1936:2006	0.96%	3
Water absorption	EN 13755:2008	0.28%	3
Flexural strength in natural condition	EN 12372:2006	15.5MPa	4
Flexural strength after 12 cycles freeze/thaw	EN 12371:2010 EN 12372:2006	15.3MPa	4
Flexural strength after 56 cycles freeze/thaw	EN 12371:2010 EN 12372:2006	15.6MPa	5
Abrasion resistance (sawn)	EN 14157:2004 method A	18.7mm	6
Slip resistance (sawn)	EN 14231:2003	SRV "dry": 68 SRV "wet": 49	6
Compressive strength in natural condition	EN 1926:2006	200MPa	7
Compressive strength after 56 cycles freeze/thaw	EN 12371:2010 EN 1926:2006	201MPa	7
Breaking load at dowel hole	EN 13364:2002	2150N	8
Petrographic description	EN 12407:2007	MONZONITIC GRANITE	9

******** To be continued********

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1. Apparent density and open porosity

Test Method:

EN 1936:2006 Natural stone test methods - determination of real density and apparent density and of total and open porosity

Specimens: 6 cubes having 50mm edge, all specimens are in natural condition with sawn faces

Test Result:

Specimens identification No.	1	2	3	4	5	6
Apparent density (kg/m^3)	2660	2660	2660	2660	2660	2660
Arithmetic mean of the apparent density (kg/m^3)	2660					
Open porosity (%)	0.96	0.96	0.95	0.96	0.96	0.96
Arithmetic mean of the open porosity (%)	0.96					

2. Water absorption

Test Method:

EN 13755:2008 Natural stone test methods - Determination of water absorption at atmospheric pressure

Specimens: 6 cubes having 50mm edge, all specimens are in natural condition with sawn faces

Test Result:

Specimens identification No.	1	2	3	4	5	6
Water absorption (%)	0.27	0.29	0.29	0.29	0.28	0.28
Arithmetic mean of the water absorption (%)	0.28					

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3. Flexural Strength in natural condition and subjected to frost test

Test Method:

EN 12372:2006 Natural stone test methods - Determination of flexural strength under concentrated load

EN 12371:2010 Natural stone test methods - Determination of frost resistance

Specimens: 300mm×50mm×50mm, 30pcs, all specimens are in natural condition with sawn faces

Loading rate: (0.25±0.05)MPa/s

Test Result:

Flexural strength in natural condition

No.	1	2	3	4	5	6	7	8	9	10
Flexural strength (MPa)	14.0	15.4	16.0	16.4	14.6	15.5	15.2	16.0	14.9	17.0
Mean value (MPa)	15.5									
Standard deviation (MPa)	0.9									
Lower expected value (MPa)	13.7									

Visual inspection after 12 freezing and thawing cycles: Scale 0, sample intact.

Flexural strength after 12 freezing and thawing cycles

No.	1	2	3	4	5	6	7	8	9	10
Flexural strength (MPa)	16.2	15.2	15.3	17.0	16.7	13.7	14.3	14.3	14.4	16.3
Mean value (MPa)	15.3									
Standard deviation (MPa)	1.2									
Lower expected value (MPa)	13.1									

Change in flexural strength after 12 cycles of freeze/thaw: 1.3%

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Visual inspection after 56 freezing and thawing cycles: Scale 0, sample intact.

Flexural strength after 56 freezing and thawing cycles

No.	1	2	3	4	5	6	7	8	9	10
Flexural strength (MPa)	16.8	15.2	16.2	15.4	13.7	15.9	15.3	15.1	14.8	17.1
Mean value (MPa)	15.6									
Standard deviation (MPa)	1.0									
Lower expected value (MPa)	13.6									

Change in flexural strength after 56 cycles of freeze/thaw: -0.6%

******** To be continued********

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4. Abrasion resistance

Test Method:

EN 14157:2004 Natural stone - Determination of abrasion resistance Method A - Wide wheel Abrasion Test

Specimens: 150mm×100mm×20mm, 6pcs, all specimens are in natural condition with sawn faces

Testing surface: sawn

Test Result:

Specimens identification No.	1	2	3	4	5	6
The length of the groove (mm)	18.0	19.5	19.5	18.0	19.0	18.0
Mean value (mm)	18.7					

5. Slip resistance

Test Method:

EN 14231:2003 Natural stone test methods - Determination of the slip resistance by means of the pendulum tester

Specimens: 200mm×150mm×20mm, 6pcs, all specimens are in natural condition with sawn faces

Testing surface: sawn

Test Result:

Specimens identification No.	1	2	3	4	5	6
Mean pendulum value (Dry condition)	68	68	68	67	68	68
Slip resistance value (SRV "dry")	68					
Mean pendulum value (Wet condition)	48	50	50	48	48	48
Slip resistance value (SRV "wet")	49					

******** To be continued********

6. Compressive strength

Test Method:

EN 1926:2006 Natural stone test methods -Determination of uniaxial compressive strength

EN 12371:2010 Natural stone test methods - Determination of frost resistance

Specimens: 50mm×50mm×50mm, 21pcs, all specimens are in natural condition with sawn faces

Loading rate: (1±0.5) MPa/s

Test Result:

Compressive strength in natural condition

No.	1	2	3	4	5	6	7	8	9	10
Compressive strength (MPa)	206	190	178	201	206	199	204	206	206	200
Mean value (MPa)	200									
Standard deviation (MPa)	10									
Lower expected value (MPa)	181									

Visual inspection after 56 freezing and thawing cycles: Scale 0, sample intact.

Compressive strength after 56 freezing and thawing cycles

No.	1	2	3	4	5	6	7	8	9	10
Compressive strength (MPa)	195	206	196	193	202	209	196	204	202	202
Mean value (MPa)	200									
Standard deviation (MPa)	6									
Lower expected value (MPa)	190									

Change in mean strength after 56 cycles of freeze/thaw: 0.0%

******** To be continued********

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7. Breaking load at dowel hole

Test Method:

EN 13364:2002 Natural stone test methods – Determination of the breaking load at dowel hole

Specimens: 200mm×200mm×30mm, 3pcs, 4 holes were drilled on each specimen. All specimens are in natural condition with sawn faces

Diameter of the hole: 10mm, Diameter of the dowel: 8mm

Loading rate: (50±5) N/s

Test results:

Specimens identification No.		d_1 (mm)	b_A (mm)	Breaking load F (N)
1	Hole 1	10	48	2350
	Hole 2	10	31	1850
	Hole 3	10	38	2250
	Hole 4	10	38	2200
2	Hole 1	11	39	2150
	Hole 2	11	43	2250
3	Hole 1	10	37	1650
	Hole 2	10	44	2350
	Hole 3	10	43	2250
	Hole 4	10	51	2200
Mean value		10.2	41.2	2150
Lower expected value		/	/	1686
Standard deviation		/	/	225

d_1: Distance from the hole to the face

b_A: Maximum distance from the centre of the hole to the edge of the fracture

********To be continued********

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8. Petrographical description

Test Method:

EN 12407:2007 Natural stone test methods – Petrographic examination

Test Result:

CLASSIFICATION: Monzonitic granite

HAND SAMPLE DESCRIPTION

Very strong, fresh, light grey, several dark minerals and opaque particles spreader over the rock fabric in disorder, It is not easily scored with a penknife.

MICROSCOPIC DESCRIPTION

Texture	Granitic texture , Medium-fine grained texture
Structure	Massive structure
Major Minerals	Plagioclase (40%), Potash feldspar (30%), Quartz (20-25%), Biotite(5-10%)
Accessory mineral	Metallic (opaque) particles, Sphene, Apatite, Allanite
Secondary mineral	Kaolinite, Sericite, Chlorite, Epidote

MATERIAL COMPONENT	PETROGRAPHIC DETAILS
Plagioclase	Hypautomorphic platy, which grain sizes are usually 0.2-2mm, partially 2-3.9mm, replaced by kaolinite and sericite inordinately, zonal structure can be seen frequently, the area where contact to potash feldspar shows myrmekitic texture usually, messy distribution.
Potash feldspar	Hypautomorphicr platy, which grain sizes are usually 2-5mm, partially 0.4-2mm, kaolinization slightly, contain few plagioclase inclusions and biotite inclusions, replace some parts of plagioclase, messy distribution.
Quartz	Xenomorphic granular, which grain sizes are usually 0.2-3.2mm, with clean surfurce and obvious undulatory extinction, messy distribution.
Biotite	Flaky, which grain sizes are usually 0.1-1.75mm, replaced by chlorite inordinately and epidote rarely, scattered distribution.

********To be continued********

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Alterations:

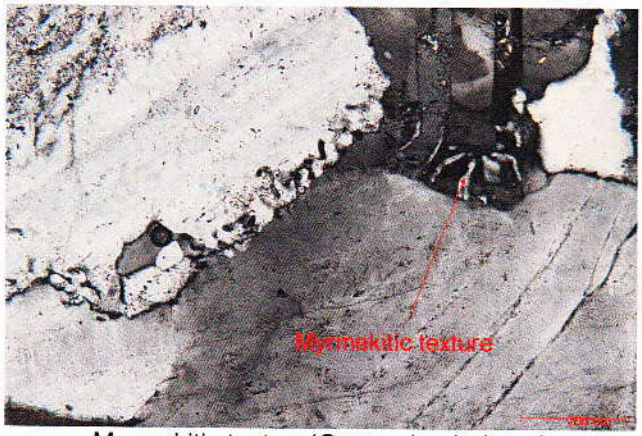
Slightly, kolinization, sericitization, chloritization and epidotization can be seen occasionally in the rock fabric.

Remaks:

The rock fabric is composed of plagioclase, potash feldspar, quartz and biotite. According to content, mineral component and texture of the rock, we named it **Medium-fine grained biotite-bearing monzonitic granite.**

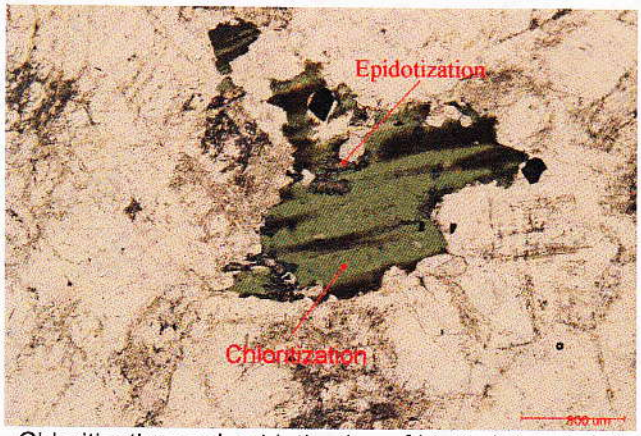
Photomicrographs

Granitic texture(Crossed polarizers)



Myrmekitic texture(Crossed polarizers)

Zonal texture of plagioclase(Crossed polarizers)



Chloritization and epidotization of biotite(Plain light)

******** To be continued********

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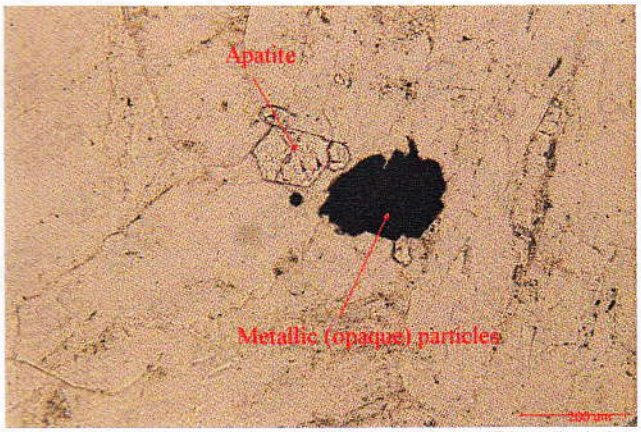
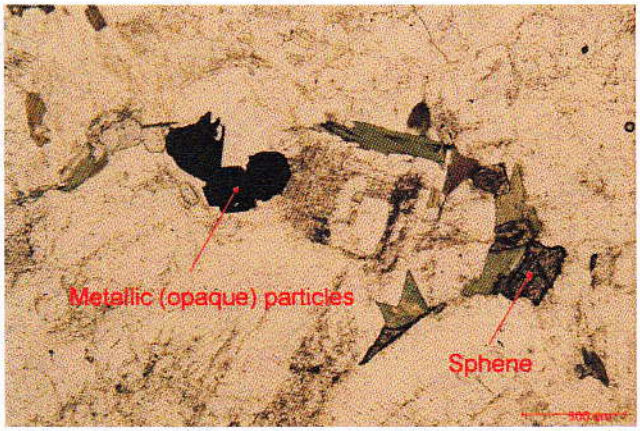


Metallic (opaque) particles and apatite(Plain light)



Metallic (opaque) particles and sphene(Plain light)

Allanite(Plain light)

NO PHOTO

Note: The test was carried out by external laboratory assessed as competent.

******** To be continued********

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Specimen photograph:

SGS authenticate the photo on original report only
********End of report********

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