



TEST REPORT

No. : XMCCM161201717

Date : Jun.19, 2017

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CUSTOMER NAME: GONMAR (XIAMEN) TRADING CO., LTD
ADDRESS: ROOM 706, NO.668 XIAHE ROAD, XIAMEN, FUJIAN, CHINA CODE:361004

Commercial Name : G654
Petrographic Name : FINE GRAINED BIOTITE PYROXENE QUARTZ MONZODIORITE
Typical colour : GREY
Manufacturer : GONMAR (XIAMEN) TRADING CO., LTD
Manufacturer address : ROOM 706, NO.668 XIAHE ROAD, XIAMEN, FUJIAN, CHINA CODE:361004
Place of origin : CHINA
Name of quarry : G654
Address of quarry : GUANYUAN INDUSTRIAL ZONE CHENXIANG TOWN, CHANGTAI, ZHANGZHOU, CHINA
Intended use : Internal & external wall, flooring and stairs
External uses and road finishes to cover external pedestrian and vehicular circulation areas

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.

Test required : EN 12057:2015 Natural stone products - Modular tiles - Requirements
EN 12058:2015 Natural stone products - Slabs for floors and stairs - Requirements
EN 1469:2015 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 : Mar.01, 2017
Testing Start Date : Mar.01, 2017
Testing End Date : Jun.19, 2017
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)

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

Signed for
SGS-CSTC Standards Technical
Services Co., Ltd. XM Branch

Civi Huang Authorized Signatory



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Summary of test results:

(Average value)

Test items	Test methods	Test results	Page
Apparent density	EN 1936:2006	2800 kg/m ³	3
Open porosity	EN 1936:2006	0.43 %	3
Water absorption	EN 13755:2008	0.13 %	3
Flexural strength in natural condition	EN 12372:2006	21.3 MPa	4
Flexural strength after 56 cycles freeze/thaw	EN 12371:2010 EN 12372:2006	18.2 MPa	4
Abrasion resistance (sawn)	EN 14157:2004 method A	21.6 mm	5
Slip resistance (sawn)	CEN/TS 16165:2012 Annex C EN 14231:2003	SRV "dry": 67 SRV "wet": 41	5
Compressive strength in natural condition	EN 1926:2006	239 MPa	6
Compressive strength after 56 cycles freeze/thaw	EN 12371:2010 EN 1926:2006	215 MPa	6
Breaking load at dowel hole	EN 13364:2001	2595 N	7
Petrographic description	EN 12407:2007	FINE GRAINED BIOTITE PYROXENE QUARTZ MONZODIORITE	8

***** 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)	2800	2790	2800	2790	2800	2800
Arithmetic mean of the apparent density (kg/m ³)	2800					
Open porosity (%)	0.42	0.44	0.44	0.43	0.43	0.44
Arithmetic mean of the open porosity (%)	0.43					

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 (%)	0.13	0.13	0.13	0.13	0.14	0.13
Arithmetic mean of the water absorption (%)	0.13					

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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, 21pcs, all specimens are in natural condition with sawn faces

Loading rate: (0.25±0.05)MPa/s

Test Result:

Flexural strength in natural condition

Specimens identification No.	1	2	3	4	5	6	7	8	9	10
Flexural strength (MPa)	21.7	22.2	20.6	21.0	22.2	21.7	21.4	19.9	21.3	21.0
Mean value (MPa)	21.3									
Standard deviation (MPa)	0.8									
Lower expected value (MPa)	19.8									

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

Flexural strength after 56 freezing and thawing cycles

Specimens identification No.	1	2	3	4	5	6	7	8	9	10
Flexural strength (MPa)	19.0	18.7	18.2	17.4	18.1	18.4	18.4	18.2	18.0	18.0
Mean value (MPa)	18.2									
Standard deviation (MPa)	0.5									
Lower expected value (MPa)	17.3									

Change in flexural strength after 56 cycles of freeze/thaw: 14.6 %

***** 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)	21.5	21.0	22.0	22.0	21.5	21.5
Mean value (mm)	21.6					

5. Slip resistance

Test Method:

CEN/TS 16165:2012 Determination of slip resistance of pedestrian surfaces - Methods of evaluation -

Annex C - Pendulum friction test

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

Slider material: Slider 55 rubber

Testing surface: sawn

Test Result:

Specimens identification No.	1	2	3	4	5	6
Mean pendulum value (Dry condition)	66	67	67	67	66	67
Slip resistance value (SRV "dry")	67					
Mean pendulum value (Wet condition)	40	42	41	41	42	41
Slip resistance value (SRV "wet")	41					

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6. Compressive strength in natural condition and subjected to frost test

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

Specimens identification No.	1	2	3	4	5	6	7	8	9	10
Compressive strength (MPa)	246	242	259	220	239	238	233	235	243	239
Mean value (MPa)	239									
Standard deviation (MPa)	10									
Lower expected value (MPa)	219									

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

Compressive strength after 56 freezing and thawing cycles

Specimens identification No.	1	2	3	4	5	6	7	8	9	10
Compressive strength (MPa)	217	209	218	217	208	212	220	219	218	216
Mean value (MPa)	215									
Standard deviation (MPa)	5									
Lower expected value (MPa)	207									

Change in compressive strength after 56 cycles of freeze/thaw: 10.0 %

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7. Breaking load at dowel hole

Test Method:

EN 13364:2001 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 Result:

Specimens identification No.		d ₁ (mm)	b _A (mm)	Breaking load F (N)
1	Hole 1	10	31	2600
	Hole 2	11	36	2650
	Hole 3	11	33	2750
	Hole 4	9	43	2600
2	Hole 1	11	39	2700
	Hole 2	10	47	2800
3	Hole 1	10	43	2250
	Hole 2	11	40	2400
	Hole 3	9	36	2250
	Hole 4	12	48	2950
Mean value		10	40	2595
Lower expected value		/	/	2136
Standard deviation		/	/	232

d₁: 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: Fine grained biotite pyroxene quartz monzodiorite

HAND SAMPLE DESCRIPTION

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

MICROSCOPIC DESCRIPTION

Texture	Fine grained hypidiomorphic granular texture
Structure	Massive structure
Major mineral	Plagioclase(55%±), Potash feldspar(10-15%), Quartz(5%±), Pyroxene(15%±), Amphibole(2-3%), Biotite (10%±)
Accessory mineral	Metallic (opaque) particles, Apatite, Zircon
Secondary mineral	Kaolinite

MATERIAL COMPONENT	PETROGRAPHIC DETAILS
Plagioclase	Hypautomorphic platy, which grain sizes are usually 0.1-2mm, with clean surface. zonal texture can be seen frequently. Some contain few pyroxene inclusions. the area where contact to potash feldspar shows myrmekitic texture occasionally. Messy distribution.
Potash feldspar	Hypautomorphic platy-xenomorphic granular, which grain sizes are usually 0.2-1.8mm, Interstitial distribution, kolinization slightly. contain few plagioclase inclusions, pyroxene inclusions, amphibole inclusions and biotite inclusions. replace some parts of plagioclase.
Quartz	Xenomorphic granular, which grain sizes are usually 0.2-2mm, with clean surface and slight undulatory extinction. Interstitial distribution.
Pyroxene	Hypautomorphic column-granular, give first place to diopside, take second place to hypersthene, which grain sizes are usually 0.1-1.3mm. Amphibole and biotite reaction rim can be seen usually at the edge of pyroxene. Messy distribution.
Amphibole	Xenomorphic column-granular, which grain sizes are usually 0.1-0.5mm, always as reaction rim of pyroxene, biotite reaction rim can be seen at the edge of amphibole partially.
Biotite	Flaky, which grain sizes are usually 0.1-2mm, Messy distribution. some as reaction rim of pyroxene and amphibole.

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



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Alterations:

Slightly. kolinization can be seen occasionally in the rock fabric.

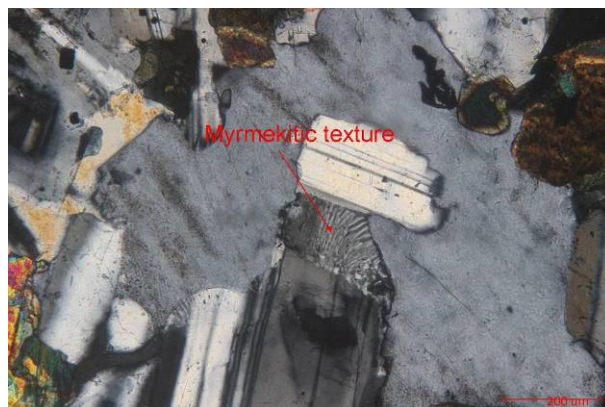
Remaks:

The rock fabric is composed of plagioclase, potash feldspar, quartz, pyroxene, amphibole and biotite. According to content, mineral component and texture of the rock, we named it **Fine grained biotite pyroxene quartz monzodiorite**. And it belongs to neutral intrusive rock.

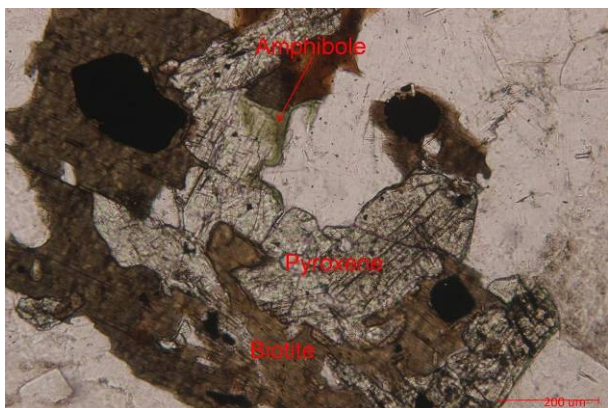
Photomicrographs



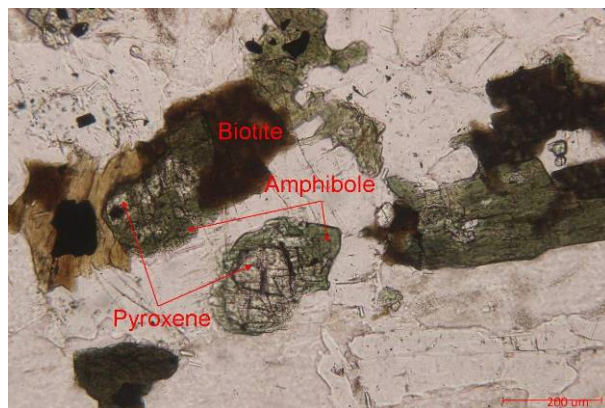
Fine grained hypidiomorphic granular texture
(Crossed polarizers)



Myrmekitic texture
(Crossed polarizers)



Amphibole and biotite reaction rim of pyroxene
(Plain light)



Amphibole reaction rim of pyroxene, biotite reaction
rim of amphibole (Plain light)

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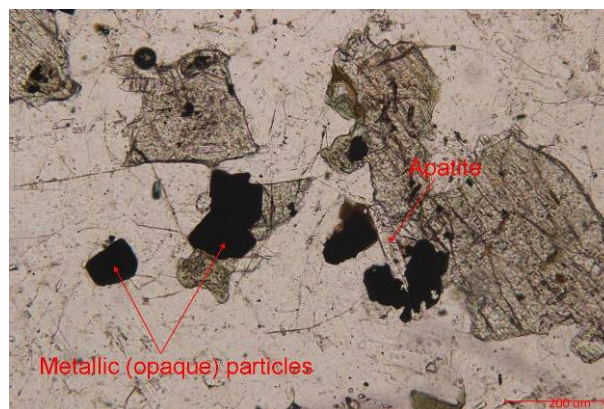
Zonal texture of plagioclase
(Crossed polarizers)



Plagioclase inclusions, pyroxene inclusions and
amphibole inclusions in potash feldspar
(Crossed polarizers)



Pyroxene inclusions in plagioclase
(Crossed polarizers)



Metallic (opaque) particles and apatite
(Plain light)

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

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



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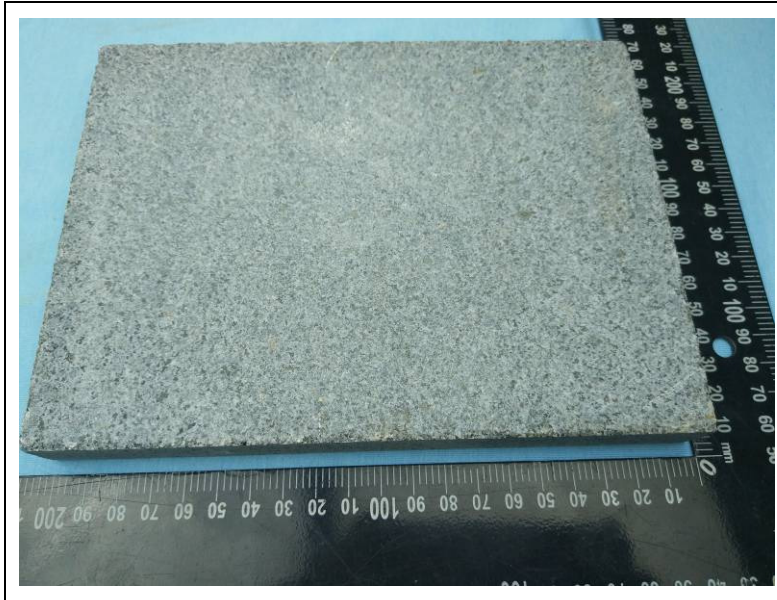
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Specimen photograph:



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