مركز تكنولوجيا الصناعات التعدينية والرخام
Mining Industries & Marble Technology Center

وزارة التجارة والصناعة
جمهورية مصر العربية

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ISO-IEC 17025/2005
Accredited Laboratory

Date : 2 / March / 2019

Total No. of Pages: 11

Test Report # (012 -7/1)

Client ID
012

This document presents the result of the lab testing performed by our center according to the EUROPEAN AND AMERICAN STANDARDS on the samples of SINIA PEARL delivered by:

Company Name:ELMORSY FOR MARBLE AND GRANITE &Quarries

Telephon No:002-0229700700 *Fax No:002-0229700184*

Address:INDUSTRIAL AREA-SHAQ ELTHUBAN,TURA,EGYPT

WITH THE FOLLOWING CRITEREA:

1- GENERAL :-

Commercial name	SINIA PEARL
Petrographic name of the stone	LIMESTONE
Name and location of the quarry	EGYPT
Superficial finishing of the samples	Sawn by diamond disc
Date of delivery	2 JENUARY 2019
Date of performance	2MARCH2019

2- Test methods & Discription of test item :-

No.	Standard	Test method	Description of test item dimension (mm)	Nr
1	EN 1936	Determination of real density and apparent density	50*50*50	
2	EN 1936	Determination of total and open porosity	50*50*50	
3	EN 12372	Determination of flexural strength under concertrated load	150*75*25	6
4	EN 14157	Determination of Abrasion resistance	150*100*50	6
5	EN 1926	Determination of compressive strength	50*50*50	
6	EN 12371	Determination of Frost Resistance- Compressive Strenght	50*50*50	6
7	EN 12371	Determination of Frost Resistance- Flexural Strenght	25*75*150	6
8	EN 14231	Measurements of Flamed slip resistance value (SRV)	86*42*40	
9	EN 14579	Determination of Sound speed propagation	300*100*20	6

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All results only to the items tested

Testing team leader
Moshira Roushdy

Quality manager
Mohammad Abdelaleem

Executive Director
Ahmed Anwer Mahfouz
Eng. Ahmed Anwer

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Date of Test Report
2March 2019

Material commercial name **SINAI PEARL**	*Test Report* **(012-7/1)**
Client Name **ELMORSY FOR MARBLE AND GRANITE**	*Material Origin* **EGYPT**
	Client ID **012**

Test procedure **EN 1936**	*Determination of* **Density& Porosity**

- APPARENT DENSITY AND OPEN POROSITY – EN 1936

Sample code	Apparent density (kg/m³)	Open Porosity (%)
B4-1	2570.3	1.09
B4-2	2571.2	1.08
B4-3	2575.3	1.09
B4-4	2575.2	1.08
B4-5	2572.5	1.09
B4-6	2570.1	1.08
Mean value	**2572.433**	**1.08**

- REAL DENSITY AND POROSITY -EN 1936

Sample code	Real density (kg/m³)	Open Porosity (%)
B4-1	2600.3	1.37
B4-2	2590.2	1.39
B4-3	26200.3	1.39
B4-4	2605.2	1.37
B4-5	2595.5	1.38
B4-6	2592.1	1.38
Mean value	**2590**	**1.38**

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Testing team leader
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Quality manager
Mohammad Abdelaleem

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Client Name **ELMORSY FOR MARBLE AND GRANITE**	*Material Origin* **EGYPT**
	Client ID **012**

Test procedure EN **14157**	*Determination of* **ABRASION RESISTANCE**

Sample code	Groove length (mm)
E4-1	23.1
E4-2	22
E4-3	21.4
E4-4	22.2
E4-5	23.5
E4-6	22.9
Mean value	22.51

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Quality manager
Mohammad Abdelaleem

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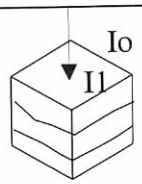
2March 2019

Material commercial name: SINAI PEARL	*Test Report*: (012-7/1)
Client Name: ELMORSY FOR MARBLE AND GRANITE	*Material Origin*: EGYPT *Client ID*: 012

Test procedure: EN 1926	*Determination of*: Compressive strength



NATURAL CONDITION SAMPLES

Normal to planes of anisotropy

Test nr.	Code	Dimension [mm]			Breaking load [N]	Compressive strength [MPa]
		l_1	l_0	A (l_1* l_0)		
1	H4-1	50.5	50.4	2545.2	269774	96.2
2	H4-2	50.2	50.4	2540.2	272622	97.3
3	H4-3	50.4	50.5	2552.8	273398	97.6
4	H4-4	50.3	50.5	2545.2	273916	97.8
5	H4-5	50.5	50.7	2547.7	272881	97.4
6	H4-6	50.1	50.5	2555.3	273657	97.7
Mean value						**97.3**
Standard deviation						**0.33**
Coefficient of variation						**00.0**
Minimum expected value						**103.5**

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l_1: height of specimen ,
l_0: mean value of lateral dimension ,
A: cross sectional area

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Material commercial name
SINAI PEARL

Client Name
ELMORSY FOR MARBLE AND GRANITE

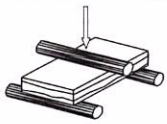
Test Report
(012-7/1)

Material Origin
EGYPT

Client ID
012

Test procedure
EN 12372

Determination of
FLEXURAL STRENGTH UNDER CONCENTRATED LOAD



NATURAL CONDITION SAMPLES

Test nr.	Code	Breaking section dimension		Distance between the	Breaking force [N]	Presence of veins in the fracture	Flexural strength [MPa]
		width	thickness				
1	I1-1	75.4	31.5	125	5650	*	9.9
2	I1-2	76.4	31.5	125	5956	-	10.6
3	I1-3	76.3	31.1	125	5913	*	10.5
4	I1-4	76.8	31.6	125	5606	-	9.8
5	I1-5	76.8	31.8	125	5913	*	10.5
6	I1-6	76.4	32.4	125	6175	*	11.1
7	I1-7	76.8	31.4	125	6000	*	10.7
8	I1-8	76.2	31.8	125	5781	-	10.2
9	I1-9	76.1	31.4	125	5518	-	9.6
10	I1-10	76.2	31.7	125	5913	-	10.5
Mean value							**10.9**
Standard deviation							**0.96**
Coefficient of variation							**0.11**
Minimum expected value							**8.2**

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Testing team leader
Moshira Roushdy

Quality manager
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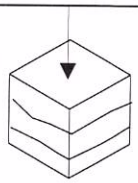
Material commercial name SINAI PEARL	*Test Report* **(012-7/1)**
Client Name **ELMORSY FOR MARBLE AND GRANITE**	*Material Origin* **EGYPT**
	Client ID **012**

Test procedure EN **12371**	*Determination of* **FROST RESISTANCE**

The effect of freeze/thaw cycles was evaluated on the relevant performance characteristics (flexural and compressive strength) after 144 cycles of freeze/thaw between 20°C and -12°C.

FROST RESISTANCE – EN 12371, COMPRESSIVE STRENGTH – EN 1926



SAMPLES SUBJECTED TO 144 FREEZE/THAW CYCLES

Test nr.	Code	Dimension [mm]			Breaking load [N]	Compressive strength [MPa]
		l_1	l_2	A		
1	K3-1	50.6	50.5	2547.7	181256.0	93.1
2	K3-2	50.5	50.5	2547.7	180663.0	93.9
3	K3-3	50.7	50.7	2560.4	179886.0	93.3
4	K3-4	50.4	50.6	2547.7	179864.0	93.6
5	K3-5	50.6	50.8	2550.2	178779.0	93.1
6	K3-6	50.3	50.6	2560.4	178693.0	93.8
Mean value						**93.46**
Standard deviation						**0.72**
Coefficient of variation						**0.01**
Minimum expected value						**100.10**

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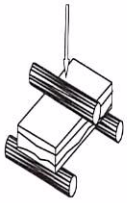
Material commercial name SINAI PEARL	*Test Report* **(012-7/1)**
Client Name **ELMORSY FOR MARBLE AND GRANITE**	*Material Origin* **EGYPT**
	Client ID **012**
Test procedure EN **12371**	*Determination of* **FROST RESISTANCE**

FROST RESISTANCE – EN 12371, FLEXURAL STRENGTH UNDER CONCENTRATED LOAD – EN 12372



SAMPLES SUBJECTED TO 144 FREEZE/THAW CYCLES

Test nr.	Code	Breaking section dimension [mm]		Distance between the supporting rollers [mm]	Breaking force [N]	Presence of veins in the fracture	Flexural strength [MPa]
		width	thickness				
1	K3-7	76.5	31.5	125	5605	*	11.85
2	K3-8	76.4	31.4	125	5609	*	11.86
3	K3-9	76.3	31.6	125	5552	*	11.72
4	K3-10	76.2	31.5	125	5216	*	10.89
5	K3-11	76.4	31.7	125	5657	*	11.98
6	K3-12	76.1	31.5	125	5673	*	12.02
7	K3-13	76.5	31.6	125	524	*	10.95
8	K3-14	76.3	31.2	125	5779	*	12.28
9	K3-15	76.5	31.5	125	5686	*	12.05
10	K3-16	76.8	31.6	125	5653	*	11.97
Mean value							**11.875**
Standard deviation							**0.21**
Coefficient of variation							**0.01**
Minimum expected value							**13.4**

(*) The distance is more than 15% of the distance between the supporting rollers from the centre of the sample.

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Test procedure EN **14231**	*Determination of* **Skid resistance (Flamed slip resistance value)**

Sample code	Mean value of pendulum friction test (F scale) (wet)	Mean value of pendulum friction test (F scale) (DRY)
F1	34	30
F2	39	34
F3	39	34
F4	39	34
F5	39	34
F6	39	34
Mean value	38.1	33.3

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Client Name **ELMORSY FOR MARBLE AND GRANITE**	*Material Origin* **EGYPT**
	Client ID **012**

Test procedure EN **14579**	*Determination of* **DETERMINATION OF SOUND SPEED PROPAGATION**

Nr	Sample code	L(mm)	T(µs)	V(km/s)
1	T1	300	249000000	$1.208*10^{-6}$
2	T2	301	249000000	$1.202*10^{-6}$
3	T3	299	249000000	$1.201*10^{-6}$
4	T4	301	249000000	$1.202*10^{-6}$
5	T5	300	249000000	$1.196*10^{-6}$
6	T6	301	249000000	$1.202*10^{-6}$
Mean value				$1.201*10^{-6}$

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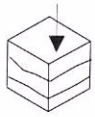
SINAI PEARL	**(012-7/1)**
Client Name	*Material Origin*
ELMORSY FOR MARBLE AND GRANITE	**EGYPT**
	Client ID
	012

Technical characteristics				**Technical characteristics variation [%]**
		Natural condition	**After 144 freeze/thaw cycles**	
Compressive strength 	Number of specimens	6	6	
	Mean value	**105.3**	**100.46**	
	Standard deviation	**0.33**	**0.72**	
	Coefficient of variation	**00.0**	**0.01**	
	Minimum expected value	**103.5**	**100.10**	**-3.40**
Flexural strength 	Number of specimens	10	10	
	Mean value	**13.4**	**13.875**	
	Standard deviation	**0.96**	**0.21**	
	Coefficient of variation	**0.11**	**0.01**	
	Minimum expected value	**8.2**	**13.4**	**21.6**

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SINAI PEARL	**(012-7/1)**
Client Name	*Material Origin*
ELMORSY FOR MARBLE AND GRANITE	**EGYPT**
	Client ID
	012

Summary of the Test report:

No.	*Standard*	*Test method*	Result
1	EN 1936: 2006	Determination of real density	2590 (kg/m3)
2	EN 1936 :2006	Determination of total porosity	1.3 (%)
3	EN 12372:2006	Determination of flexural strength under concertrated load.	10.9 [MPa]
4	EN14157:2017	Determination of Abrasion Resistance	22 (mm)
5	EN 1926 :2006	Determination of compressive strength	97.8 [MPa]
6	EN 12371 :2010	Determination of Frost Resistance - compressive strength	93.5 MPa
7	EN 12371:2010	Determination of Frost Resistance – flexural strength	11.1 MPa
8	EN 14231:2003	Measurements of Flamed slip resistance value (SRV) (wet)	38 Scale
8*	EN 14231:2003	Measurements of Flamed slip resistance value (SRV) (dry)	33 F Scale
9	EN 14579:2004	Determination of Sound speed propagation	$1.201*10^{-6}$

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