

TEST REPORT No. 56

MATERIAL NAME: Moca Beige (Grey)

CLIENT : A&G 23 S.r.l.


STONELAB BY IMM TECHNOLOGICAL LABORATORY FOR TESTING ON STONES



PERFORMED TESTS:

- 1. Modulus of Rupture (ASTM C99-09)** **Table 1**
(Dry+Wet after 300 ASTM C666 Freeze/Thaw cycles; Perpendicular to rift edges)

The Test Report No. 56 consists of 5 pages including this one.

Technological Laboratory Dr. Geol. Marco Mazzoni		DATE: July 21 st , 2015
---	---	------------------------------------

STONELAB by IMM Technological Laboratory Viale G.Galilei, 133 - 54033 M. di Carrara - Italy Tel. +39 0585 787963 - Fax. +39 0585 787602 E-mail: m.mazzoni@immcarrara.it A.S.T.M. MEMBER No. 1741518	TEST REPORT No. 56 RESULTS SUMMARY TABLES
--	--

By request of **A&G 23 S.R.L.**, the under listed Tests have been performed on specimens of the material named by **A&G 23 S.R.L.**, “**Moca Beige (Grey)**”, quarried in Turkey.

The relevant results have been reported in the tables enclosed to this document. The specimens under testing have been consigned to this laboratory by **A&G 23 S.R.L.** in date May 14th, 2015. No further information about the geological setting of this rock was given.

NOTE:

- 1) the standard deviation and the coefficient of variation of mechanical tests have been indicated inside the tables enclosed to this test report.
- 2) The percentage reported together with the average values of the specimens subjected to the freeze/thaw cycles shows the % modulus of rupture loss if compared to the untreated material.

Type of Test	Ref. Std.	Units	Conditioning (Load applying dir.)	Average values	Std. Dev.
Modulus of Rupture (See Test Report No.50)	ASTM C99-09	MPa	DRY (Perp. to rift edges)	12.97	0.43
		Psi		1880.8	61.7
Modulus of Rupture (See Test Report No.50)	ASTM C99-09	MPa	WET (Perp. to rift edges)	10.26	0.70
		Psi		1488.4	101.9
Modulus of Rupture (Table 1)	ASTM C99-09	MPa	DRY after No.300 ASTM C666 cycles (Perp. to rift edges)	11.69 (-9.87%)	0.69
		Psi		1695.5 (-9.87%)	101.1
Modulus of Rupture (Table 1)	ASTM C99-09	MPa	WET after No.300 ASTM C666 cycles (Perp. to rift edges)	9.60 (-6.43%)	0.87
		Psi		1392.4 (-6.43%)	125.4

The density data indicate that the medium density limestones reference values (ASTM C568) should be taken into account.



Technological Laboratory Dr. Geol. Marco Mazzoni		DATE: July 21 st , 2015
--	--	---

Table 1

Natural Stone Test  BY IMM CARRARA ASTM MEMBER No. 1741518	Modulus of Rupture (ASTM C99-09 aft. No.300 ASTM C666 Freeze/Thaw cycles) - R -	Client: A&G 23 S.r.l.
---	--	---------------------------------

Material: Moca Beige (Grey) **Test Report No.:** 56
Test Standard: ASTM C 99-09; ASTM C666 (No.300 cycles) **Block No.:** unknown

Specimen No.	Dimensions [mm] a x b x h	Conditioning	Actual Values						Notes
			Fmax [kN]	R [MPa]	R [Psi]	R _{avdg⊥} [MPa]	R _{avdg⊥} [Psi]	Strain F _{max} [mm]	
01 DF⊥	200x99.4x60.7	Dry	16.22	11.96	1734.7			0.18	
02 DF⊥	200x99.6x60.7	Dry	17.23	12.68	1839.1			0.18	
03 DF⊥	200x99.7x61.3	Dry	14.96	10.78	1563.5	11.69	1695.5	0.17	
04 DF⊥	200x100.2x60.8	Dry	15.79	11.51	1669.4			0.15	
05 DF⊥	200x99.8x61.7	Dry	16.21	11.52	1670.9			0.18	

Note: Load applied perpendicular to rift

Avg. M.O.R. (Dry aft. ASTM C666 cycles - ⊥ to rift), **R_{avdg⊥} = 11.69 MPa ⇒ (R_{avdg⊥} = 1695.5 Psi)**

Standard deviation (Dry aft. ASTM C666 cycles - ⊥ to rift), **S_{dg⊥} = 0.69 MPa ⇒ (S_{dg⊥} = 101.1 Psi)**

Coefficient of Variation (Dry aft. ASTM C666 cycles - ⊥ to rift) = **5.94 %**

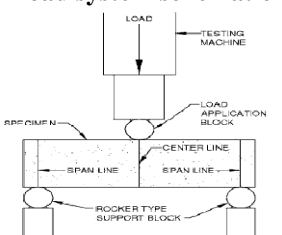

Specimen No.	Dimensions [mm] a x b x h	Conditioning	Actual Values						Notes
			Fmax [kN]	R [MPa]	R [Psi]	R _{avwg⊥} [MPa]	R _{avwg⊥} [Psi]	Strain F _{max} [mm]	
01 WF⊥	200x99.6x60.9	Dry	11.87	8.68	1258.9			0.15	
02 WF⊥	200x99.8x61.7	Dry	13.11	9.58	1389.5			0.16	
03 WF⊥	200x100.1x60.8	Dry	12.43	9.07	1315.5	9.60	1392.4	0.15	
04 WF⊥	200x100.1x61.8	Dry	15.52	10.96	1589.6			0.26	
05 WF⊥	200x100.0x61.0	Dry	13.39	9.71	1408.3			0.16	

Note: Load applied perpendicular to rift

Avg. M.O.R. (Wet aft. ASTM C666 cycles - ⊥ to rift), **R_{avwg⊥} = 9.60 MPa ⇒ (R_{avwg⊥} = 1392.4 Psi)**

Standard deviation (Wet aft. ASTM C666 cycles - ⊥ to rift), **S_{wg⊥} = 0.87 MPa ⇒ (S_{wg⊥} = 125.4 Psi)**

Coefficient of Variation (wet aft. ASTM C666 cycles - ⊥ to rift) = **9.01 %**

Load system schematic 	Technological Laboratory Dr. Geol. Marco Mazzoni 	DATE: July 21 st , 2015
---	--	---

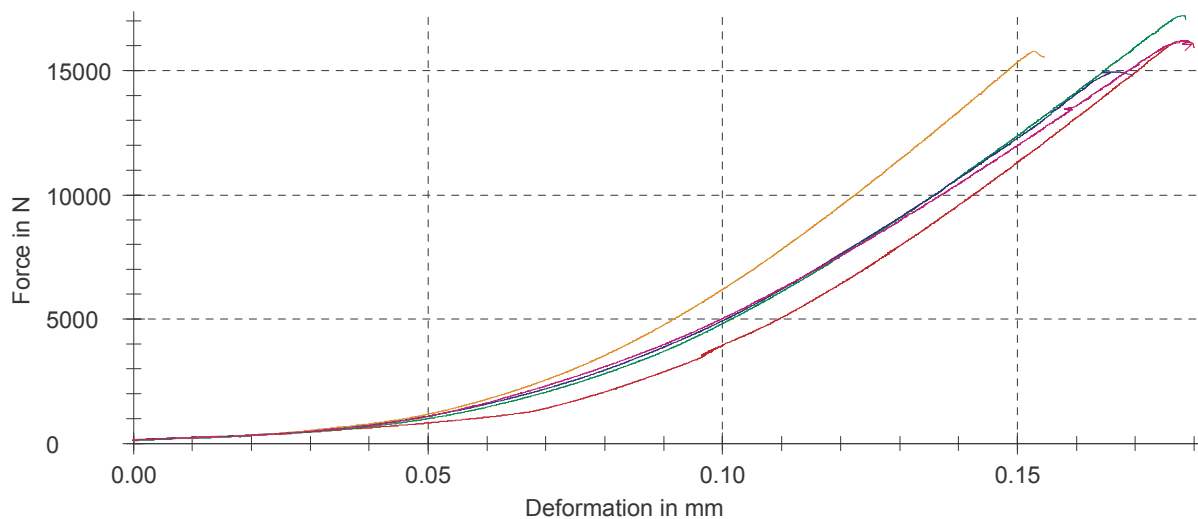
Test Report No.56

Client : A&G 23 S.r.l.
 Ref. Norm : ASTM C99-09 after No.300 ASTM C666 Freeze/Thaw cycles
 Material name : Moca Beige (Grey) - Honed - Dry - Perpendicular to rift edges
 Pre-load : 50 N
 Test speed : 80 N/s

Test results:

Legenda	No.	Specim.No.	Date	M.O.R. MPa	F.max N	Def. at Fmax mm	Span mm	Spec.Thk mm	Specim.Width mm
■	1	01DF	20/07/2015	11,96	16216,69	0,18	180	60,7	99,4
■	2	02DF	20/07/2015	12,68	17227,60	0,18	180	60,7	99,6
■	3	03DF	20/07/2015	10,78	14962,96	0,17	180	61,3	99,7
■	4	04DF	20/07/2015	11,51	15788,54	0,15	180	60,8	100,2
■	5	05DF	20/07/2015	11,52	16205,46	0,18	180	61,7	99,8

Load/Strain Graphs:



Statistics:

A&G 23 S.r.l. n = 5	M.O.R. MPa	F.max N	Def. at Fmax mm	Span mm	Spec.Thk mm	Specim.Width mm
\bar{x}	11,69	16080,25	0,17	180	61,0	99,74
s	0,69	819,17	0,01	0,00	0,44	0,30
v	5,94	5,09	6,51	0,00	0,73	0,30

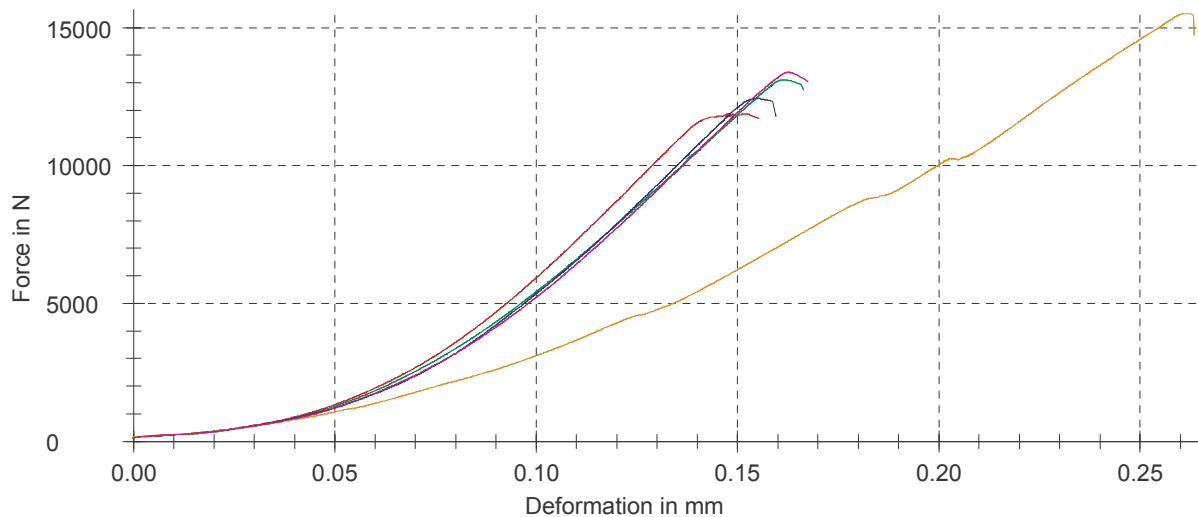
Test Report No.56

Client : A&G 23 S.r.l.
 Ref. Norm : ASTM C99-09 after No.300 ASTM C666 Freeze/Thaw cycles
 Material name : Moca Beige (Grey) - Honed - Wet - Perpendicular to rift edges
 Pre-load : 50 N
 Test speed : 80 N/s

Test results:

Legenda	No.	Specim.No.	Date	M.O.R. MPa	F.max N	Def. at Fmax mm	Span mm	Spec.Thk mm	Specim.Width mm
■	1	02WF	20/07/2015	8,68	11870,39	0,15	180	61,7	99,8
■	2	01WF	20/07/2015	9,58	13105,95	0,16	180	60,9	99,6
■	3	03WF	20/07/2015	9,07	12429,42	0,15	180	60,8	100,1
■	4	04WF	20/07/2015	10,96	15516,47	0,26	180	61,8	100,1
■	5	05WF	20/07/2015	9,71	13386,14	0,16	180	61,0	100

Load/Strain Graphs:



Statistics:

A&G 23 S.r.l. n = 5	M.O.R. MPa	F.max N	Def. at Fmax mm	Span mm	Spec.Thk mm	Specim.Width mm
\bar{x}	9,60	13261,67	0,18	180	61,2	99,92
s	0,87	1392,14	0,05	0,00	0,47	0,22
v	9,01	10,50	26,55	0,00	0,77	0,22