

TEST REPORT No. 49

MATERIAL NAME: Moca Beige (Grey)

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

STONELAB BY IMM **TECHNOLOGICAL LABORATORY FOR TESTING ON STONES**




PERFORMED TESTS:

1. Apparent density and open Porosity (EN 1936:2007) **Table 1**
2. Compressive Strength (EN 1926-2007) **Table 2**
3. Flexural Strength (EN 12372: 2007) **Table 3**

- Attachments: Load curves for EN 1926, EN 12372.

The Test Report No. 49 consists of 8 pages including this one.

Technological Laboratory Dr. Geol. Marco Mazzoni		DATE: May 25 th , 2015
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<p style="text-align: center;">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</p>	<p>TEST REPORT No. 49 RESULTS SUMMARY TABLES</p>
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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: the standard deviation and the coefficient of variation of mechanical tests have been indicated inside the tables enclosed to this test report.

Type of Test	Ref. Std.	Units	Conditioning	Average values	Std. Dev.
Apparent Density (Table 1)	UNI EN 1936:2007	Kg/m ³	-	2460.31	-
Open Porosity (Table 1)	UNI EN 1936:2007	%	-	8.17	-
Compressive Strength (Table 2)	UNI EN 1926:2007	MPa	Dry	104.22	11.74
Flexural Strength (⊥ to rift edges) (Table 3)	UNI EN 12372-2007	MPa	Dry	14.21	0.90



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Table 1

 <p>Natural Stone Test STONE LAB BY IMM CARRARA ASTM MEMBER No. 1741518</p>		Apparent Density and Open Porosity (UNI EN 1936:2007)			Client: A&G 23 S.r.l.				
Test Report No.: 49 Rock's Petrographic nature : Limestone Block No.: unknown Quarry location: Turkey					Material's commercial Name: Moca Beige (Grey) Specimens' delivery date: 14/05/2015				
Specim No.	Specimens' weight					Apparent Density [kg/m ³]	Open Porosity (%)	Specimen Dimension (mm)	
	After Dry conditioning (>48 hrs. / 70°C)		After Wet conditioning (>48 hrs. / 20°C)						
	Date	gr (m _d)	Date	gr (m _s)	gr (m _h)				
01	19/05/15	309.22	21/05/15	319.64	193.79	2457.05	8.28	51.4x50.0x50.0	
02	19/05/15	313.60	21/05/15	323.96	196.57	2461.73	8.13	51.4x50.0x49.9	
03	19/05/15	312.79	21/05/15	323.17	195.98	2459.23	8.16	51.5x49.8x49.9	
04	19/05/15	311.08	21/05/15	321.46	195.02	2460.30	8.21	50.7x50.0x50.3	
05	19/05/15	314.32	21/05/15	324.72	196.96	2460.24	8.14	51.1x50.0x50.4	
06	19/05/15	313.43	21/05/15	323.75	196.51	2463.30	8.11	51.3x49.8x50.1	
					Min.	Avg.	Max.		
Apparent Density ρ_b [kg/m³]					2457.05	2460.31	2463.30		
Open Porosity (%)					8.11	8.17	8.28		


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Table 2




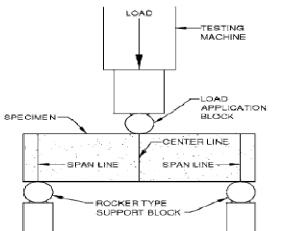

		Compressive Strength (UNI EN 1926:2007)		Client: A&G 23 S.r.l.			
Test Report No.: 49				Material's commercial Name: Moca Beige (Grey)			
Rock's Petrographic nature : Limestone				Specimens' delivery date: 14/05/2015			
Block No.: unknown				Quarry location: Turkey			
Specimen No.	Dimension [mm] a x b x h	Conditioning	Actual Values				Note
			Dry >48 hrs./70°C	Fmax [kN]	C [MPa]	Average C _{md} [MPa]	
01 D	51.5x50.1x49.8	Dry	234.02	90.70	104.22	388	
02 D	51.4x50.0x49.8	Dry	278.43	108.34		447	
03 D	50.7x50.0x50.7	Dry	260.14	102.62		431	
04 D	50.7x50.1x50.7	Dry	203.43	80.09		362	
05 D	51.5x50.4x49.8	Dry	311.86	120.15		452	
06 D	51.5x50.1x50.0	Dry	291.40	112.94		404	
07 D	51.6x50.0x49.8	Dry	285.27	110.57		434	
08 D	51.6x50.4x49.9	Dry	286.41	110.13		475	
09 D	51.5x50.1x49.9	Dry	253.76	98.35		467	
10 D	51.5x50.3x49.8	Dry	280.44	108.26		383	
NOTE: * = load applied // to the flamed+brushed surface <p style="text-align: center;"> Avg. Compressive Strength (Dry) C_{md} = 104.22 MPa Standard Deviation (Dry), s_d = 11.74 MPa Coefficient of variation (Dry), v_d = 0.11 Lower expected Value R_d = 80.62 MPa </p>							
Technological Laboratory Dr.Geol. Marco Mazzoni					Date: May 25 th , 2015		

Table 3

		Flexural Strength (EN 12372-2007) - σ -		Client: A&G 23 S.r.l.			
Material: Moca Beige (Grey)			Block No.: unknown				
Test Report No.: 49			Quarry location: Turkey				
Surface finish: Honed			Specimens' thickness: 30 mm				
Specimens' delivery date: 14/05/2015			Span: 150 mm				
Specimen No.	Dimensions [mm] a x b x h	Conditioning	Actual Values				Notes
			Dry >48hrs/70°C	Fmax [kN]	σ [MPa]	σ_{avd} [MPa]	
01D	180x90.2x30.1	Dry	5.30	14.60	14.21	0.14	
02D	180x89.8x30.8	Dry	5.41	14.90		0.16	
03D	180x90.5x30.8	Dry	5.58	14.63		0.16	
04D	180x90.1x30.7	Dry	5.40	14.31		0.15	
05D	180x90.0x30.9	Dry	5.91	15.47		0.13	
06D	180x90.0x31.3	Dry	5.34	13.63		0.14	
07D	180x90.0x31.0	Dry	5.12	12.59		0.16	
08D	180x89.8x30.7	Dry	5.20	13.82		0.14	
09D	180x90.1x31.0	Dry	5.06	13.14		0.28	
10D	180x89.8x30.6	Dry	5.60	14.99		0.15	
NOTES: Load applied perpendicular to rift edges <p style="text-align: center;">Average Flexural Strength (Dry), $\sigma_{avd} = 14.21$ MPa</p> <p style="text-align: center;">Standard deviation (Dry), $s_d = 0.90$ MPa</p> <p style="text-align: center;">Coefficient of Variation (Dry) = 0.06</p> <p style="text-align: center;">Lower Expected Value – Flexural Strength (Dry), $\sigma = 12.39$ MPa</p>							
Load system schematic 		Technological Laboratory Dr.Geol. Marco Mazzoni 		DATE: May 25 th , 2015			

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Date: 22/05/15

Ref. Norm.: EN 1926:2005

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

Material: Moca Beige (Grey)

Test Device: Controls Mod.C56Z00

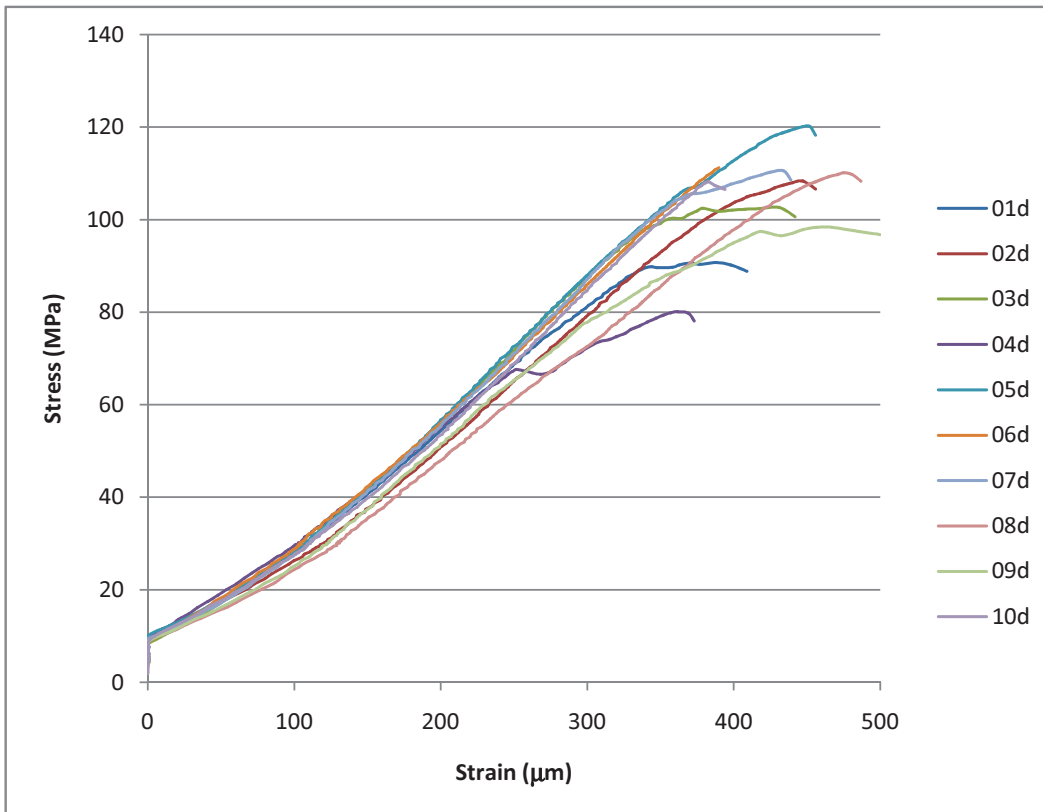
Test Speed: 0,5 MPa/sec

Load applying dir: perpendicular to rift direction

Condition: Dry

Specim.No	a (mm)	b (mm)	c (mm)	Area (mm ²)	Force (kN)	Compr. Strength (MPa)	Strain at Fmax (μm)
01	51,50	50,10	49,80	2580,15	234,02	90,70	388
02	51,40	50,00	49,80	2570,00	278,43	108,34	447
03	50,70	50,00	50,70	2535,00	260,14	102,62	431
04	50,70	50,10	50,70	2540,07	203,43	80,09	362
05	51,50	50,40	49,80	2595,60	311,86	120,15	452
06	51,50	50,10	50,00	2580,15	291,40	112,94	404
07	51,60	50,00	49,80	2580,00	285,27	110,57	434
08	51,60	50,40	49,90	2600,64	286,41	110,13	475
09	51,50	50,10	49,90	2580,15	253,76	98,35	467
10	51,50	50,30	49,80	2590,45	280,44	108,26	383

Average Compr. Strength : 104,22 MPa
 Standard deviation : 11,74 MPa



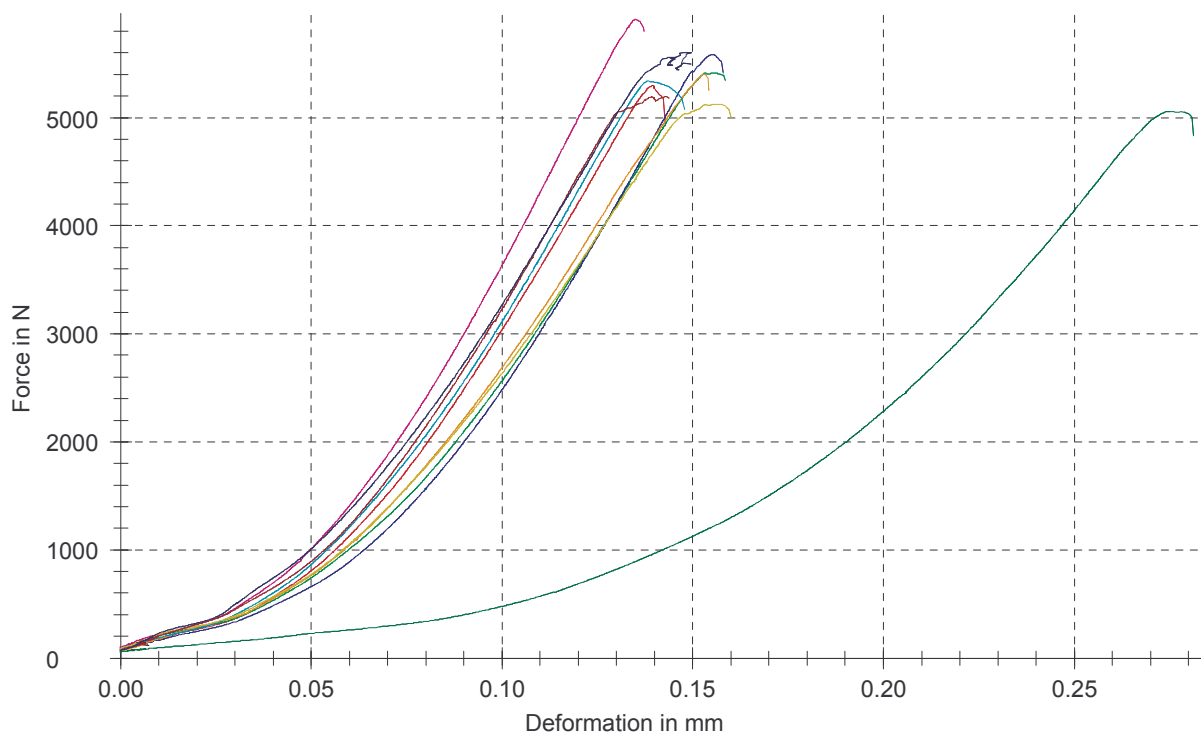
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Client : A&G 23 S.r.l.
 Ref. Norm : EN 12372 - 2007
 Material name : Moca Beige (Grey) - Dry - Perpendicular to rift edges - Honed finish
 Pre-load : 44 N
 Test speed : 0,25 MPa/s

Test results:

Legenda	No.	Specim.No.	Flex.Strength MPa	F.max N	Def. at Fmax mm	Span mm	Spec.Thk mm	Specim.Width mm
■	1	01D	14,60	5301,48	0,14	150	30,8	89,8
■	2	02D	14,90	5412,92	0,16	150	30,1	90,2
■	3	03D	14,63	5583,21	0,16	150	30,8	90,5
■	4	04D	14,31	5402,04	0,15	150	30,7	90,1
■	5	05D	15,47	5909,42	0,13	150	30,9	90,0
■	6	06D	13,63	5339,78	0,14	150	31,3	90,0
■	7	07D	12,59	5124,43	0,16	150	31,9	90,0
■	8	08D	13,82	5197,40	0,14	150	30,7	89,8
■	9	09D	13,14	5057,89	0,28	150	31,0	90,1
■	10	10D	14,99	5602,27	0,15	150	30,6	89,8

Load/Strain Graphs:



Statistics:

A&G 23 S.r.l. n = 10	Flex.Strength MPa	F.max N	Def. at Fmax mm	Span mm	Spec.Thk mm	Specim.Width mm
\bar{x}	14,21	5393,08	0,16	150	30,9	90,0
s	0,90	254,09	0,04	0,00	0,47	0,22
v	6,33	4,71	25,83	0,00	1,53	0,24