MEMBER A.S.T.M. No. 000122808
MEMBER UNI No. 30737

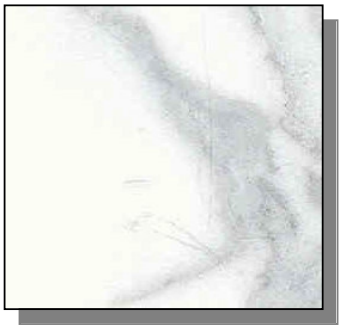
TEST REPORT No. 868

Commercial name of the material: **Calacata Arabescato**

Extraction location: **cava Calacata – Comune di Carrara (MS) Cava No. 10**

Client: **Guido M. Fabbricotti Fu B. Successori SRL**

E.R.I.C.A. SOC. CONS. A R.L.
TECHNOLOGICAL LABORATORY FOR TESTING ON STONE AND COMPOSITE MATERIALS



PERFORMED TESTS:

The Test Report No. 868 is composed by No. 36 pages including this one.

Technological Laboratory Dr. Marco Mazzoni Dr. Simone Salvetti	Eng. Mariano Fusco	**DATE:** September 05th, 2007

E.R.I.C.A. Soc. Cons. a r.l.
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TEST REPORT No. 868

(RESULTS SUMMARY TABLE)

Table 1 of 1

By request of *Guido M. Fabbricotti Fu B. Successori SRL* the under listed tests have been performed on specimens of a stone material named by *Guido M. Fabbricotti Fu B. Successori SRL* "Calacata Arabescato" quarried in "Cava Calacata - Comune di Carrara (MS) Cava No. 10", and the related results have been included within this Test Report. The information concerning the quarry location has been given to this laboratory by *Guido M. Fabbricotti Fu B. Successori SRL.*
The specimens submitted to the tests have been consigned to this laboratory by Ing. Stefano Hoffmann on July 12th , 2007.
The No. 48 Freeze/Thaw cycles have been conducted in accordance with the cycle expressed by EN 12371 (Determination of Frost Resistance).

NOTE: the standard deviation and the coefficient of variation of the mechanical tests have been indicated in the tables enclosed to this Test Report.

Type of Test	European Normative	Unit	Conditioning	Average values
Petrographic examination (Sheet 1-2)	**EN 12407**	**Marble**		
Bulk specific gravity (Table 1)	**EN 1936**	**Kg/m^3**	-	**2714.04**
Water absorption at atmospheric pressure (Table 2)	**EN 13755**	**%**	-	**0.14**
Flexural strength under concentrated load (Table 3)	**EN 12372**	**MPa**	Dry	**13.96**
Flexural strength under concentrated load (Table 4)	**EN 12372**	**MPa**	After No. 48 Freeze/Thaw cycles, Dry	**10.24**
Compressive strength (Table 5)	**EN 1926**	**MPa**	Dry	**100.13**
Determination of rupture energy (Table 6)	**EN 14158**	**Joule**	-	**10.7**

Technological Laboratory Dr. Marco Mazzoni Dr. Simone Salvetti	Eng. Mariano Fusco	**DATE**: September 05th, 2007

E.R.I.C.A. Soc. Cons. a r.l. TECHNOLOGICAL LABORATORY FOR TESTS ON STONES AND COMPOSITE MATERIALS A.S.T.M. MEMBER No. 000122808 U.N.I. MEMBER NO. 30737	PETROGRAPHIC EXAMINATION (EN 12407)	**Client:** Guido M. Fabbricotti Fu B. Successori SRL

COMMERCIAL NAME OF THE ROCK: **CALACATA ARABESCATO**

Three sections respectively called 1, 2 and 3 dimensioned 4cm x 3cm of a rock called by Guido M. Fabbricotti Fu B. Successori SRL "*Calacata Arabescato"* quarried in "Cava Calacata – Comune di Carrara (MS) Cava No. 10" have been analysed.
The three sections come from a specimen dimensioned 300 mm x 300 mm x 30 mm consigned to this laboratory by Guido M. Fabbricotti Fu B. Successori SRL in date July 12th , 2007.

Macroscopic observation

The stone material named "Calacata Arabescato" is a metamorphic, carbonatic rock presenting a breccia-like structure and a wide-spread colouration *White* (N 9 – Color table Chart of Munsell) with presence of vein (crossing one to each other according to different angles) characterised by shapes and dimension extremely variable (thickness from millimetric to centimetric in the analysed specimen); the colouration of the veins varies from *Medium dark gray* (N 4) to *Medium Light gray* (N 6) with some streaks coloured *Light brownish gray* (5 YR 6/1) and *Light Olive Gray* (5 Y 4/1).

Microscopic observation

Texture

Metamorphic rock with carbonatic composition showing an eteroblatic texture and shapes of the blasts from xenoblastic to polygonal with prevalence of the first one. The dimension of the blasts, we can observe microscopically, varies from 0.02 mm to 1.1 mm. The rock has a texture mainly iso – oriented with the major axis of the blasts of calcite directed parallel to the shorter side of the thin section No. 2. The rock shows also a breccia-like texture with: areas characterised by limpid calcite blasts, with average dimension 0.3 mm and borders from uneven to rectilinear with presence of triple junctions, areas/veins characterised by blasts of calcite with a dusty-like appearance and average dimension 0.02 mm; some blasts show crypto-crystalline dimension. Inside these last areas/veins it can be observed: a) sub-elliptical islands characterised by blasts of calcite showing average dimension 0.16 mm, b) a modal growth of the pyrite (2%) with sub-rounded blasts with average dimension 0.04 mm (some blasts can reach 0.3 mm); pyrite is concentrated above all along the borders. Finally it cam be noted the presence of a few number of lamellas of white mica with average dimension 0.08 mm. The veins show a development varying from rectilinear to "zig-zag" type. It can be underlined, above all inside the areas coloured "*White*", the presence of Fe-oxides/hydroxides (probably limonite with brownish colouration) amongst some calcite blasts.

Technological Laboratory Dr. Marco Mazzoni Dr. Simone Salvetti	Eng. Mariano Fusco	**DATE**: September 04th, 2007

E.R.I.C.A. Soc. Cons. a r.l. TECHNOLOGICAL LABORATORY FOR TESTS ON STONES AND COMPOSITE MATERIALS A.S.T.M. MEMBER No. 000122808 U.N.I. MEMBER NO. 30737	PETROGRAPHIC EXAMINATION (EN 12407)	**Client:** Guido M. Fabbricotti Fu B. Successori SRL

Mineralogical composition

Calcite (Dolomite) 99% ; accessory minerals (1%) : pyrite, quartz (few blasts), white mica (few blasts).

The distinction between calcite and dolomite can be made with a chemical (rays - X diffraction) of the stone material.

Mineral description

Name: **calcite**
Dimension: from crypto-crystalline to 1.1 mm (average dimension 0.3 mm)
*Main features***:** both in limpid blasts with shapes ranging from xenoblastic to polygonal with prevalence of the first one (in these blasts it can be noted cleavage traces and polysynthetic twinning; the degree of indentation of the blasts is medium-high) and in blasts showing a dusty-like appearance with average dimension 0.02 mm and blasts showing crypto-crystalline dimension. Amongst the blasts we can observe microscopically it can be underlined an iso – orientation with the major axis of the blasts directed parallel to the shorter side of the thin section No. 2.

Name: **pyrite**
Dimension: average dimension in the rock with "*White*" colouration: 0.04 mm – In the darker area/veins ⇒ average dimension 0.08 mm with blasts up to 0.3 mm
Main features: xenoblastic, both with isolated blasts and in clusters of several elements (with elements characterised by sub-rounded shapes). Inside the veins it can be noted an higher modal abundance (2%); the sulphur is concentrated above all along the borders and it appears 'fresh" without a significant alteration. In the other parts of the rock the pyrite is less abundance(1%) and it can be noted also amongst the blasts of calcite with a weak alteration (limonite).

Name: **white mica**
Dimension: average dimension 0.04 mm
Main features: limpid lamellas, with high birefringence colours. Lamellas with dimensions up to 0.16 mm.

Name: **quartz and feldspar**
Dimension: average dimension 0.1 mm
Main features: few isolated blasts, limpid, with low birefringence.

Petrographic classification (Metamorphic Rocks Classification Chart) : MARBLE

Technological Laboratory Dr. Marco Mazzoni Dr. Simone Salvetti	Eng. Mariano Fusco	**DATE**: September 04th, 2007

Table 1

E.R.I.C.A. Soc. Cons. a r.l. TECHNOLOGICAL LABORATORY FOR TESTS ON STONES AND COMPOSITE MATERIALS A.S.T.M. MEMBER NO. 000122808 U.N.I. MEMBER NO. 30737	**Bulk Specific Gravity (EN 1936)**	**Client**: Guido M. Fabbricotti Fu B. Successori SRL

Test Report No.: 868

Commercial name of the material: Calacata Arabescato

Extraction location: Cava Calacata – Comune di Carrara (MS) Cava No. 10

Date of delivery of the specimens: July 12th, 2007

Specimen No.	Specimens weight					Bulk Specific Gravity [kg/m^3]	Specimen dimension (mm)
	After conditioning Dry (>48 hrs. / 70°C)		After conditioning Wet (>48 hrs. / 20°C)				
	Date	gr. (m_d)	Date	gr (m_s)	gr (m_h)		
01	19/07/07	357.42	23/07/07	357.91	226.17	2713.07	50.7x51.0x51.0
02	19/07/07	354.33	23/07/07	354.85	224.27	2713.51	51.0x51.1x50.2
03	19/07/07	353.50	23/07/07	353.98	223.73	2714.01	50.7x50.9x50.8
04	19/07/07	356.53	23/07/07	357.06	225.69	2713.94	50.8x51.0x50.9
05	19/07/07	353.31	23/07/07	353.78	223.57	2713.39	50.5x50.8x50.9
06	19/07/07	356.16	23/07/07	356.66	225.54	2716.29	50.6x51.1x50.8

	Min.	Average	Max.
Bulk Specific Gravity ρ_b [kg/m^3]	**2713.07**	**2714.04**	**2716.29**

Technological Laboratory Dr. Marco Mazzoni Dr. Simone Salvetti	Eng. Mariano Fusco	**DATE**: July 23rd , 2007

Table 2

E.R.I.C.A. Soc. Cons. a r.l. TECHNOLOGICAL LABORATORY FOR TESTS ON STONES AND COMPOSITE MATERIALS A.S.T.M. MEMBER NO. 000122808 U.N.I. MEMBER NO. 30737	**Water absorption at atmospheric pressure (EN 13755)**	**Client**: Guido M. Fabbricotti Fu B. Successori SRL

Test Report No.: 868

Commercial name of the material: Calacata Arabescato

Extraction location: Cava Calacata – Comune di Carrara (MS) Cava No. 10

Date of delivery of the specimens: July 12th, 2007

Specimen No.	Specimens weight						Specimen dimension
	After conditioning Dry (>48 hrs. / 70°C)		After conditioning Wet (>48 hrs./ 20°C)		(m_s-m_d)	100x $(m_s-m_d)/m_d$	
	Date	gr. (m_d)	Date	gr. (m_s)	[gr.]	[%]	(mm)
01	19/07/07	357.42	23/07/07	357.91	0.49	0.14	50.7x51.0x51.0
02	19/07/07	354.33	23/07/07	354.85	0.52	0.15	51.0x51.1x50.2
03	19/07/07	353.50	23/07/07	353.98	0.48	0.14	50.7x50.9x50.8
04	19/07/07	356.53	23/07/07	357.06	0.53	0.15	50.8x51.0x50.9
05	19/07/07	353.31	23/07/07	353.78	0.47	0.13	50.5x50.8x50.9
06	19/07/07	356.16	23/07/07	356.66	0.50	0.14	50.6x51.1x50.8

Water absorption A_b. weight (%)	**Min.**	**Average**	**Max.**
	0.13	**0.14**	**0.15**

Maximum expected value A_b. weight (%): 0.16

Technological Laboratory Dr. Marco Mazzoni Dr. Simone Salvetti	Eng. Mariano Fusco	**DATE**: July 23rd , 2007

Table 3

E.R.I.C.A. Soc. Cons. a r.l. TECHNOLOGICAL LABORATORY FOR TESTS ON STONES AND COMPOSITE MATERIALS A.S.T.M. MEMBER NO. 000122808 U.N.I. MEMBER NO. 30737	**Flexural strength under concentrated load (EN 12372)**	**Client**: Guido M. Fabbricotti Fu B. Successori SRL

Test Report No.: 868

Commercial name of the material: Calacata Arabescato

Extraction location: Cava Calacata – Comune di Carrara (MS) Cava No. 10

Date of delivery of the specimens: July 12th, 2007

Specimen No.	Dimension [mm] a x b x h	Conditioning	Actual values				Note
		Dry >48 hrs. /70°C	Fmax [kN]	R [MPa]	R_{md} [MPa]	Strain F_{max} [mm]	
01 D	180x90.9x29.0	Dry	5.24	15.43		0.146	*
02 D	180x91.3x29.0	Dry	6.09	17.85		0.141	*
03 D	180x91.3x28.9	Dry	4.25	12.53		0.174	*
04 D	180x90.6x29.0	Dry	3.98	11.74		0.155	*
05 D	180x90.7x29.1	Dry	5.42	15.89	**13.96**	0.139	*
06 D	180x90.8x28.8	Dry	4.38	13.08		0.166	*
07 D	180x90.6x29.4	Dry	4.13	11.87		0.139	*
08 D	180x90.7x29.6	Dry	5.33	15.10		0.169	*
09 D	180x90.9x29.0	Dry	4.41	12.97		0.100	*
10 D	180x90.9x28.9	Dry	4.44	13.17		0.167	*

NOTE:
1) Load-application speed = 0.25 MPa/s
*= load applied perpendicular to rift

Average Flexural strength (Dry), R_{md} = 13.96 MPa

Standard deviation (Dry), s_d = 2.00 MPa

Coefficient of variation (Dry), v_d = 0.14

Minimum expected value R_d = 10.34 MPa

Technological Laboratory Dr. Marco Mazzoni Dr. Simone Salvetti	Eng. Mariano Fusco	**DATE**: July 21st, 2007

Table 4

E.R.I.C.A. Soc. Cons. a r.l. TECHNOLOGICAL LABORATORY FOR TESTS ON STONES AND COMPOSITE MATERIALS A.S.T.M. MEMBER NO. 000122808 U.N.I. MEMBER NO. 30737	**Flexural strength under concentrated load (EN 12372)**	**Client**: Guido M. Fabbricotti Fu B. Successori SRL

Test Report No.: 868

Commercial name of the material: Calacata Arabescato

Extraction location: Cava Calacata – Comune di Carrara (MS) Cava No. 10

Date of delivery of the specimens: July 12th, 2007

Specimen No.	Dimension [mm] a x b x h	Conditioning	Actual values				Note
			Fmax [kN]	R [MPa]	R_{mgd} [MPa]	Strain F_{max} [mm]	
01 GD	180x91.0x29.1	After No. 48 Freeze/ Thaw cycles (according to EN 12371); Dry	3.93	11.49		0.166	*
02 GD	180x91.0x29.8		3.94	10.97		0.162	*
03 GD	180x90.8x29.0		5.04	14.85		0.140	*
04 GD	180x90.8x29.2		3.14	9.13		0.183	*
05 GD	180x90.5x29.0		3.89	11.51	**10.24**	0.161	*
06 GD	180x90.6x29.0		2.41	7.13		0.197	*
07 GD	180x90.8x28.8		2.72	8.11		0.213	*
08 GD	180x90.8x29.0		3.69	10.86		0.186	*
09 GD	180x91.2x29.2		3.24	9.36		0.189	*
10 GD	180x90.5x29.9		3.24	9.02		0.164	*

NOTE:
1) Load-application speed = 0.25 MPa/s
*= load applied perpendicular to rift

Average Flexural strength (after Freeze/Thaw cycles), R_{mgd} = 10.24 MPa

Standard deviation (after Freeze/Thaw cycles), s_{gd} = 2.19 MPa

Coefficient of variation (after Freeze/Thaw cycles), v_{gd} = 0.21

Minimum expected value R_{gd} = 6.48 MPa

Technological Laboratory Dr. Marco Mazzoni Dr. Simone Salvetti	Eng. Mariano Fusco	**DATE**: September 03rd , 2007

Table 5

E.R.I.C.A. Soc. Cons. a r.l. TECHNOLOGICAL LABORATORY FOR TESTS ON STONES AND COMPOSITE MATERIALS A.S.T.M. MEMBER NO. 000122808 U.N.I. MEMBER NO. 30737	**Compressive strength** **(EN 1926)**	**Client**: Guido M. Fabbricotti Fu B. Successori SRL

Test Report No.: 868

Commercial name of the material: Calacata Arabescato

Extraction location: Cava Calacata – Comune di Carrara (MS) Cava No. 10

Date of delivery of the specimens: July 12th, 2007

Specimen No.	Dimension [mm] a x b x h	Conditioning	Actual values				Note
		Dry >48hrs/70°C	Fmax [kN]	R [MPa]	R_{md} Avg. [MPa]	S_{max} [mm]	
01 D	51.1x50.7x50.7	Dry	256.2	98.89		0.620	*
02 D	50.3x51.1x50.8	Dry	244.1	94.97		0.626	*
03 D	50.9x51.0x50.2	Dry	238.5	91.88	**100.13**	0.584	*
04 D	50.7x51.0x50.9	Dry	260.2	100.6		0.593	*
05 D	50.8x51.1x50.7	Dry	251.4	96.85		0.669	*
06 D	51.0x50.6x50.9	Dry	303.5	117.6		0.673	*

NOTE:
* = load-applying direction perpendicular to rift

Average Compressive strength (Dry) R_{md} = 100.13 MPa

Standard deviation (Dry), s_d = 9.08 MPa

Coefficient of variation (Dry), v_d = 0.09

Minimum expected value R_d = 81.55 MPa

Technological Laboratory Dr. Marco Mazzoni Dr. Simone Salvetti	Eng. Mariano Fusco	**DATE**: August 07th, 2007

Table 6

E.R.I.C.A. Soc. Cons. a r.l. TECHNOLOGICAL LABORATORY FOR TESTS ON STONES AND COMPOSITE MATERIALS A.S.T.M. MEMBER No. 000122808 U.N.I. MEMBER No. 30737	**Determination of Rupture energy (EN 14158)**	**Client**: Guido M. Fabbricotti Fu B. Successori SRL

Test Report No.: 868

Commercial name of the material: Calacata Arabescato

Extraction location: Cava Calacata – Comune di Carrara (MS) Cava No. 10

Date of delivery of the specimens: July 12th, 2007

Specimen No.	Dimension (mm) a x b x h	Rupture height "h" (m)	Rupture energy "W" (joule)	COMMENTS
01	300x300x30	0.90	8.8	Specimen broken in two parts
02	300x300x30	1.10	10.8	Specimen broken in three parts
03	300x300x30	1.05	10.3	Specimen broken in two parts
04	300x300x30	1.20	11.8	Specimen broken in two parts
05	300x300x30	1.20	11.8	Specimen broken in two parts

Average Rupture energy (W) = 10.7 joule

NOTE: the mass (m) of the iron spherical ball impacting the specimen surface is of 1000 g.

Technological Laboratory Dr. Marco Mazzoni Dr. Simone Salvetti	Eng. Mariano Fusco	**DATE**: September 03rd , 2007