

JA Cesare & Associates
 106 Cassia Way
 Henderson, NV 89014

Subject: Laboratory Testing of Sandstone
 Project No. 08.1213

As requested, this letter provide results of our laboratory testing for Stone Samples provided to our laboratory. The following is a list of testing that was required:

- 1) ASTM C97: Absorption and Bulk Specific Gravity
- 2) Modulus of Rupture of Dimension Stone
- 3) Compressive Strength of Dimension Stone
- 4) ASTM C616: Specification for Quartz Based Stone
- 5) Flexural Strength of Dimension Stone

The table below summarizes the requested laboratory test results with the individual test results attached to this letter.

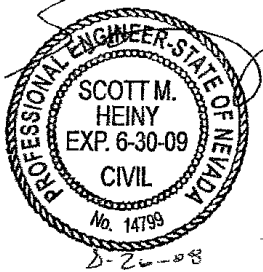
Test	Results
Absorption	3.1 to 3.87
Bulk Specify Gravity	2.235 to 2.323
Compressive Strength	Dry Parallel to Bedding: 7,150 to 8,940 Dry Perpendicular to Bedding: 7,100 to 12,440 Wet Parallel to Bedding: 5,390 to 7,770 Wet Perpendicular to Bedding: 6,380 to 9,700
Flexural Strength (PSI)	Dry Parallel to Bedding: 648 to 750 Dry Perpendicular to Bedding: 1,060 to 1,605 Wet Parallel to Bedding: 544 to 713 Wet Perpendicular to Bedding: 1,173 to 1,339
Modulus of Rupture (PSI)	Dry Parallel to Bedding: 1,793 to 2,054 Dry Perpendicular to Bedding: 1,624 to 1,803 Wet Parallel to Bedding: 1,359 to 1,693 Wet Perpendicular to Bedding: 1,239 to 1,359



Based on the above results and our observations of the stone provided classifies as an *I Sandstone* based on ASTM C616 for every test except the modulus of rupture. The samples classify as an *II Quartzitic Sandstone* based on the Modulus of rupture testing performed.

We hope this information is helpful, should you have further questions regarding this matter please contact our office at 564-3331.

Sincerely,
JOSEPH A. CESARE AND ASSOCIATES, INC.



Scott M. Heiny, P.E.
Regional Manager

Attachments: Individual Laboratory Test Results



DRAFT

**ROCK MECHANICS
DIMENSION STONE TESTING
RESULTS**

Prepared for

**JA CESARE
PROJECT #07.1213
LAS VEGAS ROCK QUARRY**

July 23, 2008

Agapito Associates, Inc.
715 Horizon Drive, Suite 340
Grand Junction, CO 81506

Draft: July 25, 2008

ROCK MECHANICS CORE TESTING RESULTS

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1.0 INTRODUCTION

JA Cesare commissioned Agapito Associates, Inc. (AAI) to complete a rock mechanics laboratory study to determine the mechanical properties of dimension sandstone from the Las Vegas Quarry. The rock was delivered by shipping carrier to AAI's Grand Junction, Colorado, laboratory facility July 9, 2008.

This laboratory report provides a summary of the rock mechanics testing performed by AAI on behalf of JA Cesare. JA Cesare provided AAI with multiple precut samples for sample selection and laboratory testing. All samples were precut such that orientation and rift were determined by JA Cesare. The samples delivered were then sized and prepared by AAI to conform to ASTM standard size descriptions and surface finish.

Table 1 shows the number of tests for samples supplied.

**Table 1. Number of Tests Completed
By Rock Type and Test**

Number of Tests		
Test	Sandstone	Total
C99	20	20

The samples were taken from JA Cesare's quarry (Las Vegas) and to comply with ASTM standards must represent a uniform or average sample for the rock type being tested. To comply with ASTM reporting standards a sample location, name or position of the ledge where sampled, and date sample was taken must accompany these results. As AAI was only supplied the samples for testing, AAI assumes no responsibility for misrepresented samples and has no record of sample locations or procedures used in obtaining test specimens.

All samples tested conformed to size and surface finish ASTM standards per test type, with successful tests and results.

2.0 LABORATORY PROCEDURES

The following test types were performed by AAI according to the American Society for Testing Materials (ASTM) specifications:

- Modulus of Rupture of Dimension Stone: C 99-87¹

¹American Society for Testing and Materials (ASTM), "Standard Test Method for Modulus of Rupture of Dimension Stone," Designation C99-87.

3.0 TEST RESULTS

The laboratory test results were derived from the mechanical properties tests on the dimension stone. Test results are summarized in Tables 2 and 3. Photographs of the samples post-test were taken and are presented on the accompanying compact disk (CD) which contains an electronic version of the Microsoft Excel test sheets and a PDF of the report.

Table 2. Summary Modulus of Rupture of Dimension Stone

	(psi)
Average Modulus of Rupture Parallel to Rift	1745.84
Average Modulus of Rupture Perpendicular to Rift	1526.11

Table 3. Modulus of Rupture of Dimension Stone

CLIENT: JA Cesare
 JOB NO: 680-01
 DATE TESTED: 7/24/2008

CLIENT: Las Vegas Rock Quarry # 07.1213
 JOB NO: to be determined
 DATE TESTED: to be determined

Rift	Wet / Dry	Dimension (Inches)				Span (Inches)	Breaking Load (lbf)	Modulus of Rupture (psi)	NOTES
		Width	Thickness	Length					
Perpendicular	Dry	4.21	2.32	8.00	7.00	3505.00	1624.1	Rift orientated as received	
Perpendicular	Dry	4.15	2.32	8.00	7.00	3490.00	1640.6	Rift orientated as received	
Perpendicular	Dry	4.16	2.32	8.00	7.00	3650.00	1711.6	Rift orientated as received	
Perpendicular	Dry	4.15	2.30	8.00	7.00	3650.00	1745.7	Rift orientated as received	
Perpendicular	Dry	4.13	2.31	8.00	7.00	3785.00	1803.4	Rift orientated as received	
Perpendicular	Wet	4.16	2.33	8.00	7.00	2810.00	1306.4	Rift orientated as received	
Perpendicular	Wet	4.18	2.32	8.00	7.00	2655.00	1239.1	Rift orientated as received	
Perpendicular	Wet	4.08	2.26	8.00	7.00	2505.00	1262.2	Rift orientated as received	
Perpendicular	Wet	4.13	2.32	8.00	7.00	2715.00	1282.4	Rift orientated as received	
Perpendicular	Wet	4.10	2.28	8.00	7.00	2760.00	1359.7	Rift orientated as received	
Parallel	Dry	4.12	2.33	8.00	7.00	3845.00	1805.0	Rift orientated as received	
Parallel	Dry	4.20	2.33	8.00	7.00	3895.00	1793.6	Rift orientated as received	
Parallel	Dry	4.22	2.32	8.00	7.00	4445.00	2054.8	Rift orientated as received	
Parallel	Dry	4.21	2.32	8.00	7.00	4200.00	1946.2	Rift orientated as received	
Parallel	Dry	4.17	2.31	8.00	7.00	4150.00	1958.3	Rift orientated as received	
Parallel	Wet	4.11	2.33	8.00	7.00	3425.00	1611.7	Rift orientated as received	
Parallel	Wet	4.19	2.32	8.00	7.00	2920.00	1359.5	Rift orientated as received	
Parallel	Wet	4.10	2.34	8.00	7.00	3620.00	1693.1	Rift orientated as received	
Parallel	Wet	4.14	2.33	8.00	7.00	3190.00	1490.3	Rift orientated as received	
Perpendicular	Wet	4.00	2.31	8.00	7.00	3345.00	1645.5	Rift orientated as received	

* 08-0511-R-17 Sample outside of (+/-) 20% tolerance of average, examining sample shows no signs of irregularities
 Tested in accordance with ASTM C 99-87 "Standard Test Method for Modulus of Rupture of Dimension Stone"
 All samples prepared with diamond saw and ground smooth on loading surfaces

DISCLAIMER

This work was prepared based on the samples received and by carefully following the standards and procedures listed in this report. Neither Agapito Associates, Inc. (AAI) nor any of its employees make any warranty, expressed or implied, or assumes any liability or responsibility for its application or usage. The user hereby acknowledges that the provisions of this disclaimer shall apply to all contents of this report.