TEC Services
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April 21, 2015

Mr. Sergio Hernandez
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Subject: **Compressive Strength, Absorption and Freeze-Thaw Testing of Cast Stone**
Sample ID: Masonry Sand Samples
TEC Services Project No: TEC 15-1166
TEC Services Laboratory ID: 15-008-M

Dear Mr. Hernandez:

Testing, Engineering and Consulting Services, Inc. (TEC Services) is an AASHTO R18, ANS/ISO/IEC 17025:2005, and Army Corps of Engineers accredited laboratory. TEC Services is pleased to present this report of our testing on the cast stone specimens. Six cubes (2 inch) and three freeze-thaw specimens labeled as Masonry Sand Samples were delivered to TEC Services on January 5, 2015. The specimens were tested in accordance with ASTM C1364-10 *Standard Specification for Architectural Cast Stone.* Our services were provided in accordance with the terms and conditions of our Service Agreement (TEC-PRO-15-1166) dated January 14, 2015. These test results pertain only to the samples tested.

ASTM C1194 – Compressive Strength

Three cubes were tested for compressive strength in accordance with ASTM C 1194-03(2011) *Standard Test Method for Compressive Strength of Architectural Cast Stone*. The specimens were oven dried at 110^{o}C until constant mass was reached and allowed to cool to room temperature prior to capping. The specimens were capped with a high strength gypsum cement plaster and allowed to harden for 16 hours prior to testing. The specimens were tested at 28 days and the results are reported in Table 1. ASTM C1364 requires a minimum compressive strength of 6,500 psi at 28-days. The results are reported in Table 1.

Table 1 – Compressive Strength Results

Cube I.D.	Date Tested	Width 1 (inches)	Width 2 (inches)	Height (inches)	Area, (inches^2)	Maximum Loads, lbs	Compressive Strength, psi
15-008-M1	1/27/2015	2.06	2.06	2.00	4.24	39,600	9,330
15-008-M2	1/27/2015	2.06	2.04	2.00	4.14	38,490	9,290
15-008-M3	1/27/2015	2.06	2.03	2.00	4.10	27,700	6,760
Average							**8,460**

ASTM C1195 – Absorption (Method A, Cold Water) & (Method B, Boiling Water)

Three cubes were tested for absorption in accordance with ASTM C 1195-03(2011) *Standard Test Method for Absorption of Architectural Cast Stone*. When the samples reached an age of 28-days after manufacture, the specimens were oven dried at 110°C until constant mass was reached and allowed to cool to room temperature prior to testing. The specimens were immersed in distilled water for 48 hours and the mass was determined in the SSD condition. ASTM C1364 requires a maximum absorption of 6% when tested in accordance with the cold water (Method A) in ASTM C1195 and maximum absorption of 10% when tested in accordance with the boiling water (Method B) in ASTM C1195. The cold water and boiling water absorption results are reported in Table 2.

Table 2 – Absorption Results

Sample ID	Mass of the dried specimen (grams)	Mass of the specimen After 48-hr Immersion (grams)	Mass of the specimen after 5-hr Boil (grams)	Method A, Cold Water Absorption (%)	Method B, Boiling Water Absorption (%)
15-008-M1	292.8	300.5	311.1	2.6%	6.3%
15-008-M2	289.4	298.5	310.2	3.1%	7.2%
15-008-M3	298.4	305.4	309.8	2.3%	3.8%
			Average	**2.7%**	**5.8%**

ASTM C666 – Modified Per C1364

Three freeze-thaw specimens (3 x 4 x 16 in.) were tested in accordance with ASTM C 666-03 *Resistance of Concrete to Rapid Freezing and Thawing – Procedure A (freezing and thawing in water)* with the modifications listed in ASTM C1364. The cumulative average percent mass loss at the end of 300 cycles was 2.2%. The maximum allowable cumulative percent mass loss according to ASTM C1364 *Standard Specification for Architectural Cast Stone* is 5.0%.

We appreciate the opportunity of providing our services to you. If you have any questions pertaining to this report or need any additional information, please do not hesitate to call us.
Sincerely,

Testing, Engineering, & Consulting Services, Inc.

Steven Maloof
Project Manager

Shawn McCormick
Laboratory Principal