



March 31, 2008

Mr. Michael Ennis  
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Subject:       **Final Report of Resistance ASTM 67-03**  
                  **Project: Stone Testing**  
                  **TEC Services Project Number: TEC 07-0621**  
                  **TEC Services Laboratory Number: 07-389**

Mr. Ennis:

Testing, Engineering & Consulting Services Inc. (TEC Services) is pleased to present this final report of our Freeze/Thaw testing of the five stone samples that you submitted to our laboratory. TEC Services performed the testing in accordance with ASTM C 67-03a *Standard Test Method for Sampling and Testing Brick and Structural Clay Tile*.

After examining each specimen for cracks the specimens were submerged in a water bath at 75° +/- 10° F for 4.5 hours prior to being placed in the freezing chamber at < -16° F. The head faces of the specimens were placed in 0.5 inches of water and then exposed to a temperature of < -16° F for the duration of 19-21 hours. Following the freezing cycle the specimens were placed in the thawing tank for 4.5 hours. After completing five of these cycles the specimens were placed in a 72° F, 50% humidity room for 43-45 hours. This process was repeated in its entirety until 50 freeze thaw cycles were completed with drying every 5 cycles. Specimens were examined through visual inspection during each of the drying periods. Based on our observations the specimens submitted by Norstone exhibited no sign of cracking after the completion of the 50 cycles. A crack is defined by ASTM C67 as a fissure or separation visible to a person with normal vision from a distance of one foot under an illumination of not less than 50 fc. The weights from the specimens can be found below in Table 1.

**Table 1: Specimens weights:**

	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Initial Weight after prep.:	1728.4	1802.8	1783.7	1374.4	1736.9
Weight of (wet) at 50 cycles:	1734.5	1806.1	1786.0	1383.9	1742.0
Finished Dry Weight of Sample:	1727.9	1802.5	1783.7	1373.4	1735.9

We appreciate the opportunity to provide our services to you on this project. Should you have any questions or comments regarding this report, please feel free to contact us at your convenience.

Sincerely,

**Testing, Engineering & Consulting Services, Inc.**



Chip P. Sherwood Jr. WITH PERMISSION  
Lab Technician



James G. McCants III  
Staff Chemist