



TESTING ENGINEERS, INC.

Quality Assurance Services
Materials Consulting
Since 1954

July 18, 2016

Ms. Jackie Yamnitz
EARTHWORKS
19797 Eisenbeis Bottom Road
STE Genevieve, MO 63670

Lab. No.: H356B
Page 1 of 2

SUBJECT: Freeze/Thaw Testing of "Gabouri" Limestone Stone Samples.

Dear Ms. Yamnitz;

At your request, we have completed the testing of the above referenced stone samples submitted to our laboratory. The test description and corresponding ASTM test method were as follows:

Test 1 – Freeze/Thaw – ASTM C67.

Test 2 – Freeze/Thaw & De-icing Salt Durability – ASTM C1645.

PROCEDURES & RESULTS

The specimens for each test were prepared and tested in accordance with the above ASTM designations.

Five specimens with 2"x2"x4" were subjected to 50 cycles of freezing and thawing in accordance with ASTM C67. There were no indications of, cracking, or breakage on any of the five specimens tested, and the average weight loss on completion of testing was 0.14%. The results are presented in Table I. The specimens meet the requirements of AC51/ ASTM C67 for freeze/thaw.

Five specimens with dimensions 3"x3"x6" were subjected to 28 cycles of freeze/thaw with specimens submerged in salt water. The tests were performed in accordance with ASTM C1645. The results for 7 day and 28 day cycles are presented in Table II. Based on the data, the weight loss on all specimens was below the maximum of 225 grams/m² specified in ASTM C936.

If you have any questions regarding this report, please contact the undersigned at 510 835 3142 X199.

Respectfully Submitted,
TESTING ENGINEERS, INC.

Hossein Arbabi, Ph.D., P.E.
Senior Engineer

TABLE I
Freeze/Thaw – ASTM C67
“Gabouri” Limestone

| Specimen No. | Original weight, g | Weight after 50 freeze/thaw cycles, g | Weight loss, g | Percent weight loss |
|---------------------|---------------------------|--|-----------------------|----------------------------|
| 1 | 716.0 | 715.1 | 0.9 | 0.13 |
| 2 | 698.3 | 697.4 | 0.9 | 0.13 |
| 3 | 746.8 | 745.7 | 1.1 | 0.15 |
| 4 | 729.7 | 728.5 | 1.2 | 0.16 |
| 5 | 687.6 | 686.8 | 0.8 | 0.12 |
| Average | 715.7 | 714.7 | 01.0 | 0.14 |

TABLE II
Salt Water Exposure-freeze/thaw – ASTM C1645
“Gabouri” Limestone

| Specimen No. | 7 Day Weight Loss, g | 7 Day Weight Loss per Unit Area, g/m² | 28 Day Weight Loss per Unit Area, g | 28 day Weight Loss per Unit Area, g/m² |
|---------------------|-----------------------------|---|--|--|
| 1 | 0.480 | 5.22 | 0.679 | 7.39 |
| 2 | 0.226 | 2.46 | 0.567 | 6.16 |
| 3 | 0.096 | 1.04 | 0.158 | 1.72 |
| Average | 0.267 | 2.91 | 0.468 | 5.09 |

The results presented in this report relate only to the item(s) tested. This report can only be reproduced in its entirety unless written permission from TEI is obtained