

November 19, 2019

Mr. David Boyle
The Quikrete Companies
500 Marathon Parkway
Lawrenceville, Georgia 30046

Phone: 404-926-3130
Fax: 770-237-2548
Email: dboyle@quikrete.com

Subject: **Aggregate ASR Testing – ASTM C1260**
TEC Services Project No: 04-0505
TEC Services Laboratory No: 19-1178-2

Dear Mr. Boyle:

SGS TEC Services (TEC Services) is an AASTHO R18, ANS/ISO/IEC 17025:2005 and Army Corp of Engineers accredited laboratory. TEC Services is pleased to present this report of our testing on the lightweight aggregate submitted to our laboratory August of 2019. It was communicated to TEC Services that the material source is Glass Mountain Pumice, Siskiyou County, CA. The aggregate was tested in accordance to ASTM C1260-14 *Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)*. Our services were performed in accordance with the terms and conditions of our Service Agreement TEC-PRO-04-0505. The test results presented only pertain to the samples tested.

The test samples were made on September 18, 2019 and were tested for 14 days (16 days after casting) in accordance with ASTM C1260-14 *Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)*.

Mix materials and proportions are presented in Table 1. The gradation of the aggregate used in preparing the length change specimens was in accordance with Table 1 in ASTM C1260. The coarse aggregate was crushed in a jaw type crusher at TEC Services. The crushed coarse aggregate grading is presented in Table 2. Test results are reported in Table 3. A graphical representation of the results is provided in Figure 1. No significant features of the specimens were observed during or after the test.

The Buzzi cement used in the testing had an Autoclave Expansion of 0.01%. The equivalent alkalis were 0.54%.

Table 1 – Mix Proportions

Material	Type	Amount (g)
Cement (Portland Type I/II)	Buzzi Cement	440.0
Crushed Coarse Aggregate	Glass Mountain Pumice	390.0
Water	Distilled	206.8

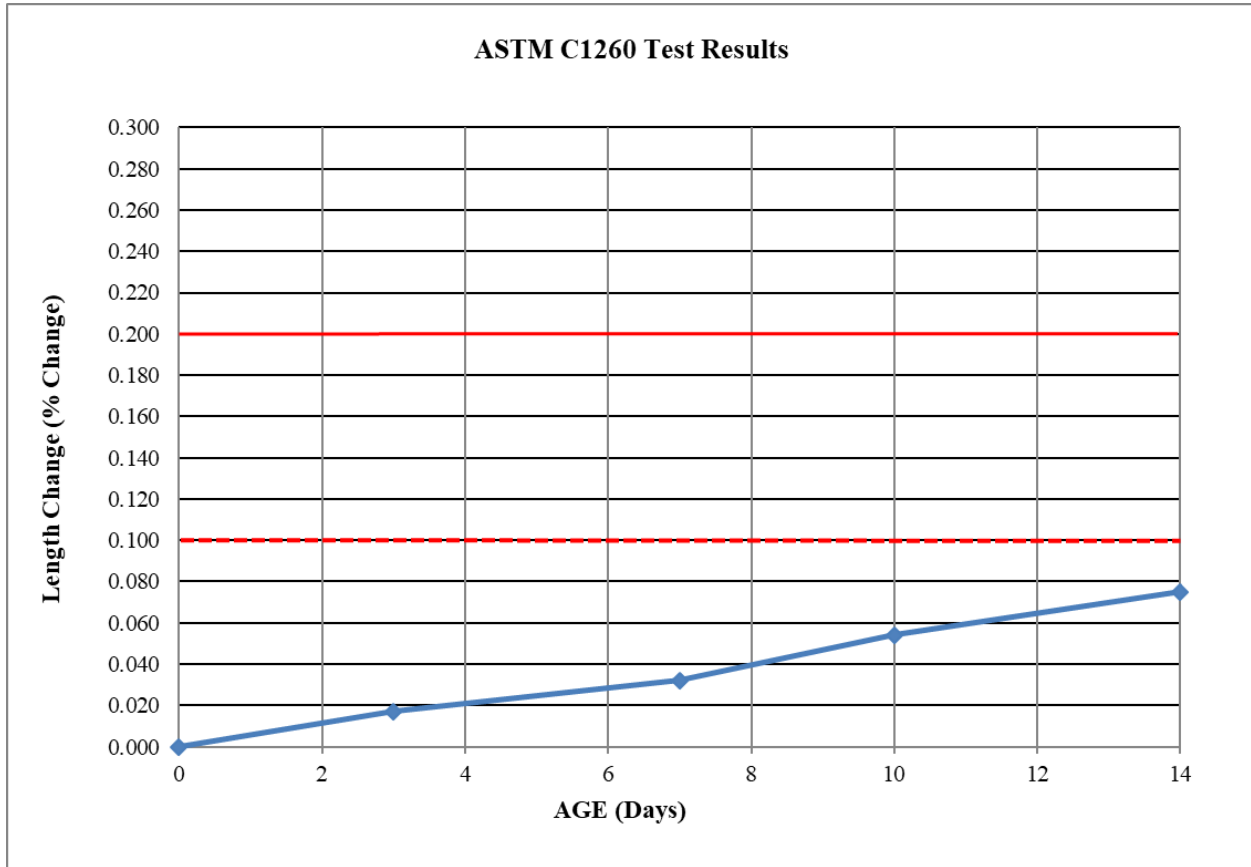
Table 2 – Crushed Coarse Aggregate Grading

AGGREGATE GRADING, grams			
Sieve No.	Amount Required	Mass, Percentage	Actual Amount
No. 8	39.0	10	39.0
No. 16	97.5	25	97.5
No. 30	97.5	25	97.5
No. 50	97.5	25	97.5
No. 100	58.5	15	58.5
Sum	390.0	100	390.0

Table 3 – Average Length Change

Age (days)	% Change			Average % Change
	No. 1	No. 2	No. 3	
0	0.000	0.000	0.000	0.000
3	0.018	0.015	0.017	0.017
7	0.032	0.032	0.031	0.032
11	0.056	0.054	0.053	0.054
14	0.079	0.073	0.073	0.075

Figure 1 – Length change during the 14-day exposure period



According to the appendix in C1260, Expansions of less than 0.10% at 16 days after casting are indicative of innocuous behavior in most cases, expansion between 0.10 and 0.20% at 16 days after casting include both aggregates that are known to be innocuous and deleterious in field performance and expansions of more than 0.20% at 16 days after casting are indicative of potentially deleterious expansion.

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,

SGS TEC Services

Steven Maloof
Laboratory Principal/Sr. Project Manager

Brian Smith
Project Manager