



# EVANS ENGINEERING, INC. CONSULTING ENGINEERS

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August 7, 2013

Re-issued April 24, 2020

Brundy Pursley  
Piazza Stone, LLC  
3817 Martinez Blvd  
Augusta, Georgia 30802

Re: Piazza Stone – Precast Architectural Stone Cornice / Entablature Elements  
ASTM testing to determine Coefficient of Lineal Expansion (CLT)

## **References:**

Chemical Test Report C200410; June 24, 2013,  
ASTM E831-06  
Standard for Lineal Thermal Expansion of Solid Material by Thermomechanical analysis

## **Prepared by:**

Applied Technical Services, Incorporated  
1049 Triad Court, Marietta GA. 30062

## **Structural Review:**

Upon your request, Evans Engineering, Inc. (EEI) reviewed the subject test report prepared by Applied Technical Services Incorporated. Our review of the analysis results have concluded that the test results are closely related to the structural assessment and EEI letter report dated October 18, 2012. In that letter we stated the following:

*“Based on this information (Concrete Ingredients) and Portland Cement Association (PCA) literature, we have concluded the average Coefficient of Thermal Expansion (CTE) is in the range of  $3.8 \times 10^{-6}$  in/in  $^{-\circ}F$ . This (CTE) is primarily based upon the limestone characteristics present in the concrete. Temperature changes of  $100^{\circ}F$  will result in length change of approximately 1/16 inch in 10'-0” of length”.*

The C(L)TE that was determined by this test achieved results well within and did not exceed our anticipated theoretical range as noted above. The specific precast concrete test specimen attained a CLTE of  $3.165 \times 10^{-6}$  in/in  $^{-\circ}F$ .

The test results are evidence that the ingredients and mix designs of your precast cement stone product have almost negative expansive characteristics during the in-service performance life. Furthermore since the curing occurs in a controlled shop environment under ambient temperatures, normal shrinkage will occur. Therefore the thin shell shrinkage should be less than .0063 inch of unit length in its service life.

Further recommendations and suggestions made in the previous October 8, 2012 report should still be considered to maintain standards for fabrication and erection of the precast elements.

This letter only serves as verification of results between the theoretical analysis documented in the August 8, 2012 letter and the results of the testing performed by Applied Technical Services. EEI is not certifying procedures related to the testing as we are aware the Applied Technical Services is a certified ASTM testing facility and are solely responsible for the validity of the testing process and the subsequent results.



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Evans Engineering, Inc. appreciates the opportunity of working with Piazza Stoneworks, LLC in this matter.

If you should have any questions or require further assistance, please contact us.

Respectfully,

**EVANS ENGINEERING, INC.**

A handwritten signature in blue ink that reads "Daniel S. Swartz". The signature is fluid and cursive.

Daniel S. Swartz  
Structural Project Engineer

Holly R. Evans, P.E.



April 24, 2020