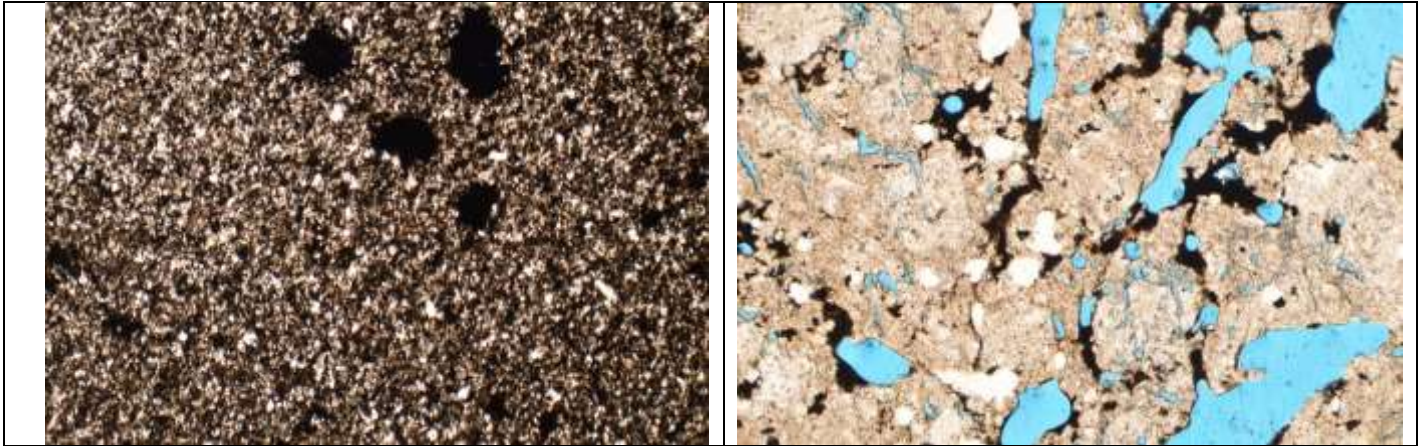


PETROGRAPHIC EVALUATION OF LIGHTWEIGHT AGGREGATES
CAROLINA STALITE COMPANY



Prepared for:

Carolina Stalite Company
Gold Hill, NC

Prepared by:

C3S, Inc.
Houston, Texas



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**November 3, 2020
C3S Project No.: 20-5026**

Jody Wall, PE
Carolina Stalite Company
Old Beatty Ford Road
Gold Hill, NC 28071

Re: Petrographic Evaluation of Lightweight Aggregate
Carolina Stalite Company

Dear Mr. Wall:

C3S, Inc. has completed an evaluation of the referenced lightweight aggregate sample as per ASTM C 295 "Petrographic Analysis of Aggregates for Concrete."

Please find attached the results of our findings and we do appreciate the continued use of our services.

Sincerely,
C3S, Inc.

A handwritten signature in blue ink that reads "Toby Ofordeme".

Toby Ofordeme, EIT. PMP, MS

A handwritten signature in blue ink that reads "S. Ebow Coleman".

S. Ebow Coleman, Ph.D., P.E.
Principal Consultant

I. PROJECT INFORMATION

A bucket of lightweight aggregate, weighing about 11 Pounds, was submitted for petrographic examination as per ASTM C295. "Petrographic Examination of Aggregates for Concrete" The sample was received, on October 19, 2020, from Gold Hill, North Carolina.

II. OBJECTIVE

To determine whether aggregate will have any adverse effect when used as an ingredient in concrete.

III. PETROGRAPHIC ANALYSIS

Petrographic analysis involves the optical examination of concrete specimens under low and high power magnification. Detailed instructions on conducting a petrographic examination of hardened concrete can be found in ASTM C295 for our examination, a sample of the aggregate was impregnated with blue dye under vacuum. The impregnation under vacuum causes the dye to permeate every crack, micro crack, and all pores, including micro pores in the aggregate sample. The impregnated aggregate is cut and placed on a glass plate, ground and polished to a thickness of about 30 microns.

The thin section of aggregate was examined for the following features:

- Forms of silica in aggregate
- The void system in aggregate
- Presence of cracks and micro cracks

The sample was examined using a magnification of 40X.

Findings from Petrographic Analysis

Two predominant aggregates of different coloration were randomly picked and evaluated. One of the aggregates was dark in color and did not have any voids in it; the other was yellowish-tan and had varying sizes of pores in it. See Figure 1(a to d). The blue areas in the photomicrographs represent voids in the aggregates.

The form of silica in the aggregates does not appear to be that which will pose a danger for its use in concrete; namely, be susceptible to alkali-silica reaction when used with high alkali cement.

No cracks or micro-cracks were found in any of the randomly picked samples that was examined.

LIMITATION

Reasonable variations from kiln batches of lightweight aggregates are assumed. If the source of raw materials changes and/or significant change occurs in firing conditions, observations made, and conclusions reached in this report may not reflect the change. C3S, Inc. should be notified if conditions different from those in the preparation of this lightweight aggregate are encountered.

NOTE:

Unless other disposition arrangements are made, samples will be discarded after one (1) month of presenting this final report.

Petrographic Evaluation of Lightweight Aggregate

Carolina Stalite Company

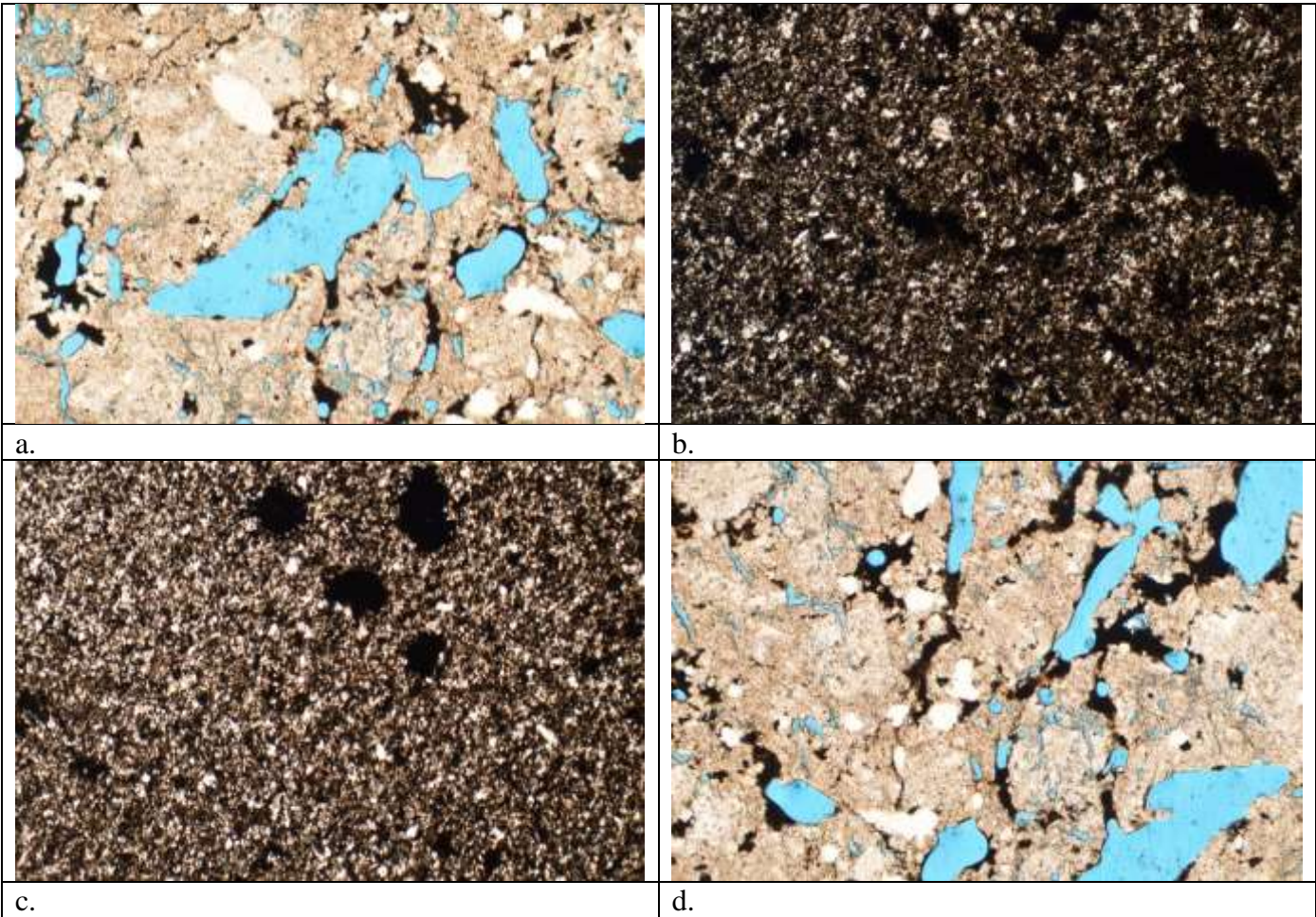


Figure 1 shows representative sections of the two predominant aggregate particles in sample.