



January 29, 2018
Revised March 1, 2018
Revised March 23, 2018

Utelite Corporation
72 East 1975 North
Centerville, Utah 84014

Attention: Mr. Darren Medeiros
P: (801) 243-7473
E: ucorp4@live.com

Re: Testing of Utelite Structural Medium Lightweight Aggregate
Terracon Project No. CB171603

Dear Mr. Medeiros:

At your request, Terracon Consultants, Inc. performed tests on the Utelite Medium Lightweight Aggregate to verify conformance with ASTM Designation C330-17 "Standard Specification for Lightweight Aggregates for Structural Concrete". The Utelite Medium Lightweight Aggregate is a maximum 3/8-inch, nominal 1/4-inch expanded shale aggregate produced at the Utelite plant in Coalville, Utah. The results show this aggregate meets ASTM C330 quality requirements.

A. DELETERIOUS SUBSTANCES:

<u>Test</u>	<u>Test Method</u>	<u>Test Result</u>	<u>C330 Requirement</u>
Organic Impurities	C 40	Lighter than Standard	Lighter than Standard
Staining	C 641	Stain Index of 20	Stain Index of Less than 60
Loss on Ignition	C 114	1.15 Percent	Less than 5 Percent

B. PHYSICAL TESTS:

<u>Test</u>	<u>Test Method</u>	<u>Test Result</u>	<u>C330 Requirement</u>
Clay Lumps and Friable Particles	C142	0.34 Percent	Less than 2 Percent
Bulk Density Dry Loose Condition	C29	51.8 PCF	55 PCF Maximum
Bulk Density Saturated Loose Condition	C29	58.9 PCF	No Requirement
Absorption of Lightweight Medium Aggregate	C1761	17.8 Percent	No Requirement
Relative Density (Specific Gravity) Medium Aggregate (SSD)	ACI 211.2-98	1.776 at 5 Minutes 1.778 at 10 Minutes 1.781 at 30 Minutes	No Requirement
Soundness of Aggregates (Sodium Sulfate)	C88	8.4 Percent	No Requirement

ACI 211.2-98 appendices A and B guidelines used.

Grading - Sieve Analysis (Test Method C136)		
<u>Sieve Size</u>	<u>Percent Passing</u>	<u>C330 Requirement</u>
1/2" (12.5 mm)	100	100
3/8" (9.5 mm)	97	80-100
No. 4 (4.75 mm)	33	5-40
No. 8 (2.36 mm)	2	0-20
No. 16 (1.18 mm)	1	0-10
No. 200 (75 µm)	0.1	0-10

C. TESTS ON CONCRETE MADE WITH LIGHTWEIGHT AGGREGATE (ASTM C192):

Concrete Mixture - Sand/Lightweight Aggregate

<u>Material</u>	<u>Weight (lbs.)</u>	<u>Specific Gravity</u>	<u>Abs. Volume</u>
Cement - Type II	564	3.15	2.87
Water	308	1.00	4.94
Air Content (%)	7.0		1.89
Natural Sand	1,345	2.62	8.23
Utelite Medium	974	1.72	9.07
Admixtures:			
Water Reducing (fl. oz.)	22.6		
Air Entraining (fl. oz.)	1.4		
			27.00 cu.ft
Slump (in.)	4.25		
Plastic Unit Weight (PCF)	119.3		

<u>Test</u>	<u>Test Method</u>	<u>28-Day Test Result (PSI)</u>	<u>C330 Requirement</u>
Compressive Strength	C 39	5,450 5,140 <u>5,460</u>	4,000 PSI Minimum
Average		5,350	
Splitting Tensile	C 496	535 510 505 520 530 520 525 <u>520</u>	330 PSI Minimum
Average		520	

C. TESTS ON CONCRETE MADE WITH LIGHTWEIGHT AGGREGATE (cont'd):
 Concrete Mixture - Sand/Lightweight Aggregate

<u>Test</u>	<u>Test Method</u>	<u>Test Result</u>	<u>C330 Requirement</u>
Oven Dry Density	C 567 (Measured)	109.5 PCF 109.6 PCF <u>109.3 PCF</u> 109.5 PCF	No Requirement
Average			
Calculated Approximate Equilibrium Density	C 567, Section 9.2	114.7	115.0 PCF Maximum
Drying Shrinkage	C 330, Section 6.2.3	0.032 %	0.070 % (Max)
Pop-out Test	C 151	No Pop-outs	No Pop-outs

D. CONFORMANCE:

The Utelite Medium Lightweight Aggregate manufactured by Utelite Corporation at Coalville, Utah, conforms to the quality requirements of ASTM Designation: C330-17 "Standard Specification for Lightweight Aggregates for Structural Concrete" for the tests indicated.

Thank you for the opportunity to provide materials testing services. If you should have any questions regarding this information, please do not hesitate to contact this firm at your convenience.

Respectfully submitted,

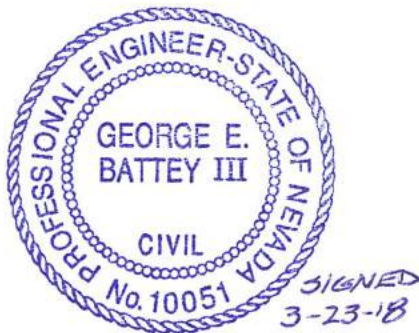
Terracon Consultants, Inc.



George Battey III
Senior Consulting Engineer



California Registered Civil Engineer No. 34323
Registration Expires 09-30-2019



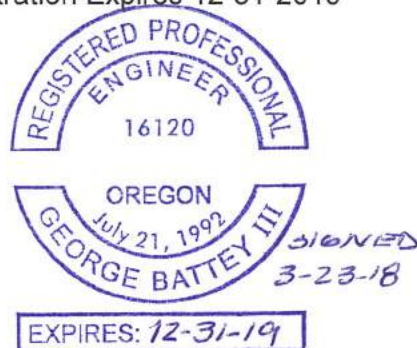
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