

February 12, 2021

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. CB201395

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>ASTM Test Method</u>	<u>Test Result</u>	<u>ASTM C330 Requirement</u>
Organic Impurities	C40	Lighter than Standard	Lighter than Standard
Staining Index	C641	20	Less than 60
Loss on Ignition	C114	0.006 Percent	Less than 5 Percent

B. PHYSICAL TESTS:

<u>Test</u>	<u>ASTM Test Method</u>	<u>Test Result</u>	<u>ASTM C330 Requirement</u>
Clay Lumps and Friable Particles (Coarse)	ASTM C142	0.20 Percent	Less than 2 Percent
Clay Lumps and Friable Particles (Fine)	ASTM C142	1.22 Percent	Less than 2 Percent
Bulk Density Dry Loose Condition	ASTM C29	50.5 PCF	55 PCF Maximum
Bulk Density Saturated Loose Condition	ASTM C29	57.9 PCF	No Requirement
Absorption of Lightweight Medium Aggregate (24-hour soak)	ASTM C127	12.7 Percent	No Requirement
Absorption of Lightweight Medium Aggregate (72-hour soak)	ASTM C127	14.7 Percent	No Requirement
Relative Density (Specific Gravity) Medium Aggregate (SSD) (24-hour soak)	ASTM C127	1.64 Oven Dry 1.85 SSD 2.07 Apparent	No Requirement
Relative Density (Specific Gravity) Medium Aggregate (SSD) (72-hour soak)	ASTM C127	1.63 Oven Dry 1.87 SSD 2.14 Apparent	No Requirement
Soundness of Aggregates (Sodium Sulfate)	ASTM C88	6.97	No Requirement
Soundness Aggregates (Magnesium Sulfate)	ASTM C88	5.40	No Requirement

Grading - Sieve Analysis (Test Method ASTM C136)		
<u>Sieve Size</u>	<u>Percent Passing</u>	<u>ASTM C330 Requirement</u>
1/2" (12.5 mm)	100	100
3/8" (9.5 mm)	94	80-100
No. 4 (4.75 mm)	28	5-40
No. 8 (2.36 mm)	6	0-20
No. 16 (1.18 mm)	3	0-10
No. 200 (75 µm)	0.8	0-10

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

Concrete Mixture - Sand/Lightweight Aggregate
 Ad Mixtures – Euclid Chemical Co. (Eucon NW, Eucon Air 40)

<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	1,046	2.64	6.35
Utelite Medium	1,278	1.87	10.95
Admixtures:			
Water Reducing (fl. oz.)	19.7		
Air Entraining (fl. oz.)	1.4		
Slump (in.)	4.00		
Plastic Unit Weight (PCF)	118.4		
			27.00 Cu. Ft.

<u>Test</u>	<u>ASTM Test Method</u>	<u>28-Day Test Result (PSI)</u>	<u>ASTM C330 Requirement</u>
Compressive Strength	C39	4,210 4,080 <u>4,130</u>	3,000 PSI Minimum
Average		4,140	
Splitting Tensile	C496	480 470 470 495 450 460 470 <u>485</u>	310 PSI Minimum
Average		475	

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

<u>Test</u>	<u>ASTM Test Method</u>	<u>Test Result</u>	<u>ASTM C330 Requirement</u>
Oven Dry Density	C567 (Measured)	105.5 PCF 106.2 PCF <u>105.8 PCF</u>	No Requirement
Average		105.7 PCF	
Calculated Approximate Equilibrium Density	C567, Section 9.2	108.7 PCF	110.0 PCF Maximum
Drying Shrinkage	C330, Section 6.2.3	0.044%	0.070 % (Max)
Pop-out Test	C151	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.



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TR/AP

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