



# C.H.J. Incorporated

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January 2, 2015

Utelite Corporation  
72 East 1975 North  
Centerville, Utah 84014  
Attention: Mr. Darren Medeiros

Job No. G14-056-5

Subject: Testing of Utelite Structural Coarse Lightweight Aggregate

Dear Mr. Medeiros:

At your request, C.H.J., Incorporated performed tests on the Utelite Coarse Lightweight Aggregate to verify conformance with ASTM Designation C330-14 "Standard Specification for Lightweight Aggregates for Structural Concrete". The Utelite Coarse Lightweight Aggregate is a maximum 1/2-inch, nominal 3/8-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	0.09 Percent	Less than 5 Percent



Client: Utelite Corporation  
 Material: Structural Coarse Lightweight Aggregate

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B. PHYSICAL TESTS:

<u>Test</u>	<u>Test Method</u>	<u>Test Result</u>	<u>C330 Requirement</u>
Clay Lumps and Friable Particles	C 142	0.0 Percent	Less than 2 Percent
Bulk Density Dry Loose Condition	C 29	51.1 PCF	55 PCF Maximum
Bulk Density Saturated Loose Condition	C 29	58.4PCF	No Requirement
Absorption of Lightweight Coarse Aggregate	*	14.7 Percent	No Requirement
Specific Gravity of Lightweight Coarse Aggregate (SSD)	*	1.61 Percent	No Requirement
Soundness of Aggregates (Sodium Sulfate)	C 88	2.53 Percent	No Requirement
LA Abrasion	C 131	24.5% Loss	No Requirement
Flat and Elongated Particles (5:1 Ratio)	D 4791	0%	No Requirement

\*No ASTM Method for lightweight aggregate.  
 ACI 211.2-98 appendices A and B guidelines used.

<b>Fractured Faces (Test Method AASTO T335) - Method 2</b>		
<u>Sieve Size</u>	<u>Percent with at Least Two Fractured Faces</u>	<u>C330 Requirement</u>
1/2"	75	No Requirement



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B. PHYSICAL TESTS (cont'd):

<b>Grading - Sieve Analysis (Test Method C 136)</b>		
<u>Sieve Size</u>	<u>Percent Passing</u>	<u>C330 Requirement</u>
3/4" (19 mm)	100	100
1/2" (12.5 mm)	96	90-100
3/8" (9.5 mm)	67	40-80
No. 4 (4.75 mm)	10	0-20
No. 8 (2.36 mm)	2	0-10
No. 200 (75 $\mu$ m)	0	0-10

C. TESTS ON CONCRETE MADE WITH LIGHTWEIGHT AGGREGATE:  
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
Natural Sand	1,314	2.64	7.98
Utelite Coarse	963	1.61	9.59
Admixtures:			
Water Reducing (fl. oz.)	19.7		
Air Entraining (fl. oz.)	2.8		
Slump (inches)	2.5		
Air Content (%)	5.75		1.62
Plastic Unit Weight (pcf)	117.2		



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

<u>Test</u>	<u>Test Method</u>	<u>28-Day Test Result (PSI)</u>	<u>C 330 Requirement</u>
Compressive Strength	C 39	4,360 4,430 4,440	3,000 PSI Minimum
Average		4,410	
Splitting Tensile	C 496	530 485 545 485 505 520 520 510	310 PSI Minimum
Average		515	

<u>Test</u>	<u>Test Method</u>	<u>Test Result</u>	<u>C330 Requirement</u>
Oven Dry Density	C 567 (Measured)	105.8 PCF 105.9 PCF 106.5 PCF	No Requirement
Average		106.1 PCF	
Calculated Approximate Equilibrium Density	C 567, Section 9.2	109.1 PCF	110.0 PCF Maximum
Tested Equilibrium Density	C 567	108.2 PCF	110.0 PCF Maximum
Drying Shrinkage	C 330, Section 8.4	0.036 %	0.070 % (Max)
Pop-out Test	C 151	No Pop-outs	No Pop-outs

D. RESISTANCE TO FREEZING AND THAWING TEST: TBD



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E. CONFORMANCE:

The Utelite Coarse Lightweight Aggregate manufactured by Utelite Corporation at Coalville, Utah, conforms to the quality requirements of ASTM Designation: C330-14 "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,  
C.H.J., INCORPORATED

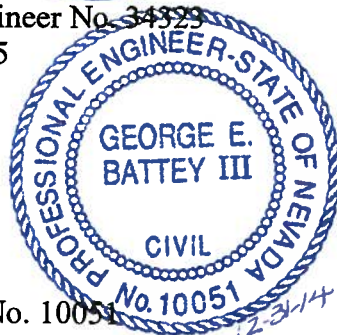
George Battey III  
President



California Registered Civil Engineer No. 34323  
Registration Expires 09-30-2015

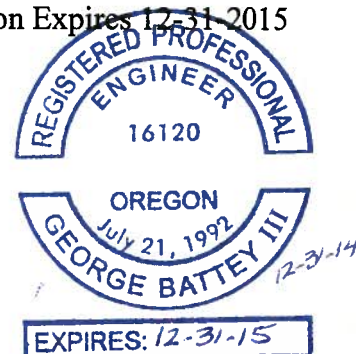


Arizona Registered Professional  
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Registration Expires 12-31-2016



Nevada Professional Engineer No. 10051  
Registration Expires 12-31-2016

Oregon Professional Engineer No. 16120  
Registration Expires 12-31-2015



GB:lb

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