

March 13, 2025
(Revised April 9, 2025)

Holcim-Utelite
P.O. Box 387
Coalville, Utah 84017

Attention: Mr. Kenneth Nunley

Subject: Physical Properties Testing
Holcim-Utelite 3/8" Structural Lightweight Coarse (9.5 mm – 2.36 mm)
Project No. CT17,698.000-400-L2

Dear Mr. Nunley:

This report presents results of laboratory testing performed to determine chemical and physical properties of lightweight aggregate delivered to our laboratory on January 22, 2024. Testing was performed in general conformance with ASTM C330, *Standard Specification for Lightweight Aggregates for Structural Concrete*. The following tests were performed:

CHEMICAL COMPOSITION

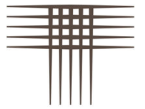
Staining Test (ASTM C641)
Loss on Ignition (ASTM C114)

PHYSICAL PROPERTIES OF AGGREGATES

Gradation Analysis (ASTM C136)
Passing No. 200 Sieve (ASTM C117)
Clay Lumps and Friable Particles (ASTM C142)
Loose Bulk Density (ASTM C29)
Relative Density (ASTM C127)
Sodium Soundness (ASTM C88)
Magnesium Soundness (ASTM C88)

CONCRETE PROPERTIES

Compressive Strength (ASTM C39)
Splitting Tensile Strength (ASTM C496)
Measured Equilibrium Density (ASTM C567) – In Progress
Measured Oven-Dry Density (ASTM C567)
Calculated Equilibrium Density (ASTM C567)
Drying Shrinkage (ASTM C157)
Popouts (ASTM C151)



A summary of test results is presented in Table 1. Detailed results are presented in Appendix A for the lightweight aggregate properties and Appendix B for the concrete properties and results. Test results indicate the lightweight aggregate meets the ASTM C330 requirements for the properties reported.

If we may be of further assistance, please call or email.

Respectfully submitted,

CTL | THOMPSON, INC.

Daniel L. Barrett
Junior Associate

Dbarrett@ctlthompson.com

Reviewed by:

Zachariah J. Ballard, MCE, P.E.
Materials Department Manager

Zballard@ctlthompson.com

Attachments:

Via email: Kenneth.nunley@holcim.com
Darren.medeiros@holcim.com



Aggregate Qualification Summary - ASTM Specifications (ASTM C330)

Holcim Utelite Lightweight - 9.5 mm to 2.36 mm

Project No. CT17,698.000

Report Date: April 09, 2025

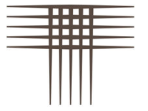
Sieve Analysis (ASTM C136 & C117)		
Sieve Size	Passing (%)	Specification (%)
1/2 inch (12.5 mm)	100	100
3/8 inch (9.5 mm)	98	80-100
No. 4 (4.75 mm)	32	5-40
No. 8 (2.36 mm)	3	0-20
No. 16 (1.18 mm)	2	0-10
No. 200 (75 µm)	0.3	0-10

Test	Results	Specification	
Specific Gravity (ASTM C128)	1.74	-	
Absorption (ASTM C128)	19.6%	-	
Clay Lumps and Friable Particles (ASTM C142)	0.3% Weighted Particles	2.0% Max	
Sodium Sulfate Soundness (ASTM C 88)	15% Weighted Loss	-	
Magnesium Sulfate Soundness (ASTM C 88)	2% Weighted Loss	-	
Loose Unit	Unit Weight	49 pcf	55 pcf Max
Weight & Voids (ASTM C29)	Percent Voids	46%	-
	Tons per cubic yard	0.66 tons/cu. yd.	-
Loss of Ignition (ASTM C114)	0.14%	5% Wt. Max	
Fe in Solution (ASTM C641)	0.1	1.5 mg Fe ₂ O ₃ /200G Max	

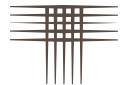
Concrete Properties		
	Results	Specifications
Plastic Unit Weight (lb/ft ³)	115	-
Air Content	6.5%	6±1%
Slump (in)	2.5	2in. to 4in.
Concrete Temperature (°F)	70	-
Average 7-Day Compressive Strength (ASTM C39)	3800 psi	
Average 28-Day Compressive Strength (ASTM C39)	4250 psi	3000 psi
Oven-Dry Density (ASTM C567)	98.0 pcf	-
Calculated Equilibrium Density (ASTM C567)	101.0 pcf	105 pcf Max
Splitting Tensile (ASTM C496)	310 psi	300 psi
Dry Shrinkage Average 28-Day (ASTM C157)	-0.029%	-0.07% Max
Popouts (ASTM C151)	No Popouts	No Popouts

CTL | THOMPSON, INC.

Zachariah J. Ballard, MCE, P.E.



APPENDIX A
LIGHTWEIGHT AGGREGATE TEST RESULTS



Company Name: Holcim - Utelite
Material Source: Utelite 3/8" Medium Aggregate
Material Type: 9.5 mm" to 2.36 mm

Received Date: January 22, 2025
Project No. CT17698.000
Report Date: April 9, 2025

PHYSICAL PROPERTIES OF AGGREGATES

Sieve Analysis of Coarse Aggregate

(ASTM C136)

Sieve Size	Percent Passing No. 4	Percent Passing (ASTM C330)
1/2 inch (12.5 mm)	100	100
3/8 inch (9.5 mm)	98	80-100
No. 4 (4.75 mm)	32	5-40
No. 8 (2.36 mm)	3	0-20
No. 16 (1.18 mm)	2	0-10

Material Finer Than No. 200 Sieve by Washing

ASTM C117) Procedure A

Initial Dry Weight (g)	Final Dry Weight (g)	Material Finer Than No. 200 Sieve (%)	Percent Passing (ASTM C330)
1939.4	1933.3	0.3	0-10

Specific Gravity and Absorption of Coarse Aggregate

(ASTM C127)

Oven Dry Weight (g)	SSD in Air Weight (g)	Submerged Weight (g)	Bulk Volume	Bulk (SSD) Specific Gravity	Absorption (%)
1839.9	2200.1	935.4	1264.7	1.74	19.6

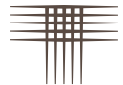
Clay Lumps and Friable Particles in Aggregate

(ASTM C142)

Sieve Size		Percent Grading of Sample	Weight Before (g)	Weight After (g)	Percent Loss	Weighted Percent Loss
Passing	Retained					
3/4 inch	3/8 inch	2	-	-	0.3	0.0
3/8 inch	No. 4	66	1001.7	999.0	0.3	0.2
Less Than No. 4		32	-	-	0.3	0.1

Total Percent Grading 100

Total Weighted Loss 0.3



Company Name: Holcim - Utelite
Material Source: Utelite 3/8" Medium Aggregate
Material Type: 9.5 mm" to 2.36 mm

Received Date: January 22, 2025
Project No. CT17698.000
Report Date: April 9, 2025

Soundness of Coarse Aggregates by Use of Sodium Sulfate
 (ASTM C 88)

Sieve Size		Percent Grading of Sample	Weight Before(g)	Weight After (g)	Weighted % Loss
Passing	Retained				
1/2 inch	3/8 inch	2	-	-	0.4
3/8 inch	No. 4	66	300.2	235.4	14.2
Less Than No. 4		32	-	-	-
Total Percent Grading:		100			15

Soundness of Coarse Aggregates by Use of Magnesium Sulfate
 (ASTM C 88)

Sieve Size		Percent Grading of Sample	Weight Before(g)	Weight After (g)	Weighted % Loss
Passing	Retained				
1/2 inch	3/8 inch	2	-	-	0.0
3/8 inch	No. 4	66	301.0	293.7	1.6
Less Than No. 4		32	-	-	-
Total Percent Grading:		100			2

Bulk Density (Unit Weight) and Voids in Aggregates (Loose Method)
 (ASTM C29)

Sample Weight (lbs)	Bucket Volume (ft ³)	Unit Weight (pcf)
24.71	0.4981	49.6
24.59	0.4981	49.4
24.58	0.4981	49.3
Average Unit Weight:		49 pcf

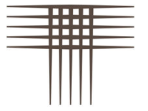
Bulk Specific Gravity (OD) = 1.45
 Voids in Aggregate Compacted by Rodding = 46%

Iron Staining Materials
 (ASTM C641)

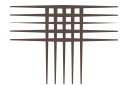
Parameters	Results	Units
Fe in Solution	0.1	mg Fe ₂ O ₃ /200G
Visual Determination	0	Photographic Stain Index

Loss on Ignition
 (ASTM C114)

Results	Units
0.14%	wt%



APPENDIX B
LIGHTWEIGHT CONCRETE TEST RESULTS



Company Name: Holcim - Utelite
Material Source: Utelite 3/8" Medium Aggregate
Material Type: 9.5 mm" to 2.36 mm

Received Date: January 22, 2025
Project No. CT17698.000
Report Date: April 9, 2025

CONCRETE PROPERTIES

Compressive Strength
(ASTM C39)

7 Day (psi)	28 Day (psi)
3740	4400
4020	4050
3650	4290
Average (psi)	
3800	4250

Popouts
(ASTM C151)

Results
No Popouts



TABLE 1
Splitting Tensile Strength of Cylindrical Concrete Specimens
ASTM C496

Client: Holcim Utah
Project No.: CT17698.000

Date Cast: February 6, 2025
Break Date: March 6, 2025

Mix ID	Sample ID	Age of Sample	Sample Cured	Diameter inches 0.00	Length inches 0.00	Total Load (lbs)	Tensile Splitting Strength (psi)	Percent Coarse Aggregate Fractured	Type of Fracture
Mix 2	1	28	50% RH	6.00	12.00	42,587	380	98	Split/Wedge
	2	28	50% RH	6.01	12.00	33,769	300	98	Split/Wedge
	3	28	50% RH	5.99	12.00	32,480	290	98	Split/Wedge
3/8"	4	28	50% RH	6.00	11.99	29,076	260	98	Split
	5	28	50% RH	6.02	11.98	52,600	460	98	Split
	6	28	50% RH	6.00	11.99	31,657	280	98	Split
	7	28	50% RH	6.00	12.00	29,579	260	98	Split/Wedge
	8	28	50% RH	6.00	12.00	27,444	240	98	Split/Wedge



Length Change of Hardened Hydraulic Cement Mortar and Concrete (ASTM C157)

Client Name: Holcim Utah

Project Name: Holcim Utelite Lightweight C330

Project No. CT17698.000

Report Date: April 9, 2025

Mix ID: 3/8" Medium Aggregate

Cast Date: February 6, 2025

Type of Specimen: Concrete

Fine Aggregate: Fountain Pit, WCS

Coarse Aggregate: 3/8" Utelite

Admixtures: None

Cement Source/Type: Holcim Type II

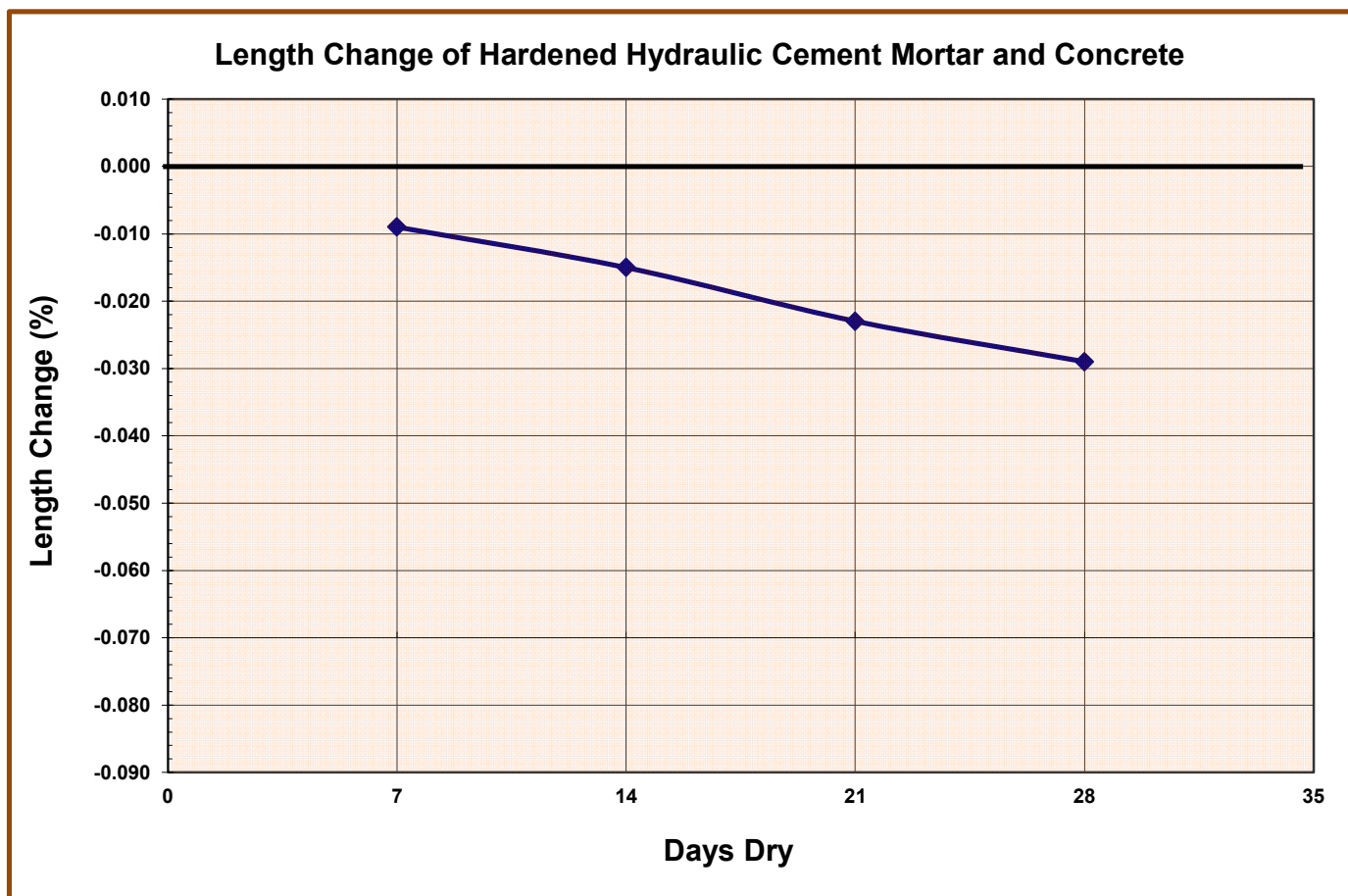
Fly Ash Source/Class: None

Consolidation Method: Rodding

Initial Curing Environment: Lab

Storage Schedule: 7 day Moist Room, 28 day 100°F / 32% RH

Sample I.D.	7 Day Soak	7 Day Dry	Length Change (%)	14 Day Dry	Length Change (%)	21 Day Dry	Length Change (%)	28 Day Dry	Length Change (%)
Actual Age	7	14		21		28		35	
Date	02/13/25	02/20/25		02/27/25		03/06/25		03/13/25	
1	0.0020	0.0009	-0.011	0.0002	-0.018	-0.0005	-0.025	-0.0010	-0.030
2	0.0330	0.0323	-0.007	0.0317	-0.013	0.0309	-0.021	0.0302	-0.028
3	0.0090	0.0082	-0.008	0.0075	-0.015	0.0067	-0.023	0.0061	-0.029
Average			-0.009		-0.015		-0.023		-0.029





WORKSHEET OF DRY UNIT WEIGHTS FOR STRUCTURAL LIGHTWEIGHT CONCRETE

ASTM C567, Standard Test Method for Density of Structural Lightweight Concrete, Oven-Dry Method

Project: Holcim Utah Utelite Plant

Cast Date: February 6, 2025

Job No.: CT17698.000

Sample I.D.: 3/8" Medium Aggregate

DATE OF WEIGHTS:		2/6/25	2/6/25	2/10/25	2/10/25	2/11/25	2/11/25
Ticket Number	Date Cast	24-32 hrs from cast Weight Suspended-Immersed (lbs)	Weight in Air (lbs)	72 hours Oven Dry (lbs)	72 hours Oven-Dry Density	96 hours Oven Dry (lbs)	96 hours Oven-Dry Density
Mix 2 #1	2/6/25	10.4650	22.8000	19.5030	98.5	19.4042	98.0
Mix 2 #2	2/6/25	10.4250	22.6950	19.2884	97.9	19.2664	97.8
Mix 2 #3	2/6/25	10.4250	22.7600	19.5830	98.9	19.4262	98.1
Average:	-	10.4383	22.7517	19.4581	98.5	19.3656	98.0

Ticket Number	Date Cast	120 hours Oven Dry (lbs)	120 hours Oven-Dry Density
Mix 2 #1	2/6/25	19.3672	98.0
Mix 2 #2	2/6/25	19.2584	97.8
Mix 2 #3	2/6/25	19.3496	98.1
Average:	-	19.3251	98.0