Mix ID Number:	LP4000 (line pump)	Date:	1/16/24
Design Strength:	4000 psi	Plant:	Estacada
	27.58 MPa	Designed By:	Ben Weber - Ash Grove
			English Units

MIX DESIGN QUANTITIES

Material	Product/Source	Spec Grav	Weight lb	Volume (ft3)
Cement	Ash Grove Durkee Type IL	3.12	620	3.18
GGBFS	Ash Grove Dura Slag FHS100	2.90	0	0.00
Silica Fume	Basf	2.20	0	0.00
Water (Total)	Municipal Well Source	1.00	330	5.29
3/4” - #4	Estacada Pit	2.68*	644	3.85
3/8” - #4	Estacada Pit	2.65*	644	3.89
Fine Aggregate	Estacada Pit	2.52*	1484	9.44
	Total Mix Weight		3722	
	Air (Entrap/Entrain)	5%		1.35
	Total Mix Volume			27.00

ADMIXTURES

Product	Product Name / Type	Dosage Rates	Dosage (English)
Air Entrainment	Euclid AEA 92S	0.55 oz/cwt**	3.6 oz/cy**
Water Reducer	Euclid Econ WR91	4.00 oz/cwt**	26.0 oz/cy**
Superplasticizer	Euclid Plastol 6400	0.00 oz/cwt**	0.0 oz/cy**
Waterproofing		0.00 oz/cwt**	0.0 oz/cy**
Hydration Stabilizer		0.00 oz/cwt**	0.0 oz/cy**
Fibers		0 lb/cy**	0.0 lb/cy**

MIX DESIGN PROPERTIES

Aggregate Properties:		SG	Abs	FM	Dry Rodded Unit Wt	
	3/4” - #4	2.87	3.1%	n/a	104.5	pcf
	3/8” - #4	2.65	3.8%	n/a	99.0	pcf
	Fine Aggregate	2.52	6.0%	2.90	n/a	

Plastic Properties:	Slump:	5.0 ±	1.0”			
	Air Content:	5.0 ±	1.0%			
	Unit Weight:	137.85	pcf		2205.63	kg/m3
Design Properties:	Total Cementitious:	620	lb		369	kg
	Slag Replacement:	0.00	%	W/C Ratio:	0.53	(Incl Admix)

Project:	
Contractor:	
Comments:	This mix design will exceed the required laboratory strength when slumps 6.0” or less.
Footnotes:	*SSD Weights and Spec Gravities. **Admixture dosage rates will be adjusted according to manufacturers recommendations to accommodate varying field conditions.

ASH GROVE CEMENT COMPANY

Durkee Plant
33060 Shirttail Creek Rd
Durkee, Oregon 97905
Phone #: (541)-877-2607

Blended Cement Type: IL(8) (HS)

Production Period February 1, 2024 - February 29, 2024 Date: March 11, 2024
ASTM C595/C595M
REQUIREMENTS

Lot: 224

CHEMICAL

Item	Spec. Limit	Test Result
Sulfate as SO_3 (%)	3.0 max[A]	3.0
Loss on ignition (%)	10.0 max	4.2
Equivalent alkali content of Portland Cement (Na_2O_{eq} %)[F]	[B]	0.49
Limestone (%)	>5 and ≤15	7.9
$CaCO_3$ in limestone (%)	70 min	97
Optional information		
Equivalent alkali content of finished cement (Na_2O_{eq} %)	[B]	0.49

PHYSICAL

Item	Spec. Limit	Test Result
Air content of mortar (volume %)	12 max	2.6
Blaine Fineness (m^2/kg)	[B]	407
Fineness, No. 325 sieve (% retained)	[B]	1.8
Density (g/cm^3)	[B]	3.12
Compressive strength (psi)		
1 day	[B]	2,169
3 days	1,890 min	4,347
7 days	2,900 min	5,376
28 days[E]	3,620 min	6,712
Time of initial setting (Vicat)		
Not less than (minutes)	45	112
Not more than (minutes)	420	
Heat of hydration, C1702/1702M, (kJ/kg)[C]		
3 days	[B]	291
Mortar Bar Expansion, C1038/C1038M, (%)[C]	0.020 max[D]	0.020
Sulfate resistance, C1012/1012M, (%)[C]		
Expansion at 180 days	0.05 max	0.03

[A] Default table maximum may be exceeded if Test Method ASTM C1038/C1038M limit is met.
[B] Not applicable.
[C] Test results for this production period not available. Most recent test result provided.
[D] Required only if percent SO_3 exceeds the limit in Table 1.
[E] Test result based on most recent monthly production time period.
[F] As per ASTM C1778, Portland Cement is defined as "Clinker + Gypsum" constituents and is to be used for calculating equivalent alkalis in the base cement.

NSF Certified to NSF/ANSI/CAN 61

We certify that the above described blended cement, at the time of shipment, meets the chemical and physical requirements of the ASTM C595/C595M Type IL(HS) and AASHTO M240 Blended Hydraulic Cement specifications.

Signature: Lucky Mclean
Name: Lucky Mclean

Title: Laboratory Supervisor