Concrete Mix Design — Volume Concrete — Dispatch (971) 219-8604 — www.volumeconcrete.com

Design Strength: 20.68 MPa Plant: Estacada Designed By: Ben Weber - Ash Grove English Units Designed By: Ben Weber - Ash Grove English Units Designed By: Ben Weber - Ash Grove De									
### Designed By: Ben Weber - Ash Grove #### English Units ###################################	Mix ID Number:	TG3000 (tailgate)			Date:	1/16/24			
MIX DESIGN QUANTITIES English Units Material Product/Source Spec Grav of Grav Weight (ft3) Volume (ft3) Cement Ash Grove Durkee Type IL 3.12 488 2.46 GGBFS Ash Grove Dura Slag FHS100 2.90 0 0 0.00 60 51tica Fune 8 asf 2.20 0 0 0.00 60 <td>Design Strength:</td> <td></td> <td>3000</td> <td>psi</td> <td>Plant:</td> <td>Estacad</td> <td>a</td> <td></td> <td></td>	Design Strength:		3000	psi	Plant:	Estacad	a		
Material Product/Source Spec Grav Height (ft3)			20.68	MPa	Designed By:	: Ben Web	er - Ash Gr	ove	
Cement	MIX DESIGN QUANTI	TIES			English Unit	t s			
GGBFS Ash Grove Dura Slag FHS100 2.90 0 0.00 Silica Fume Basf 2.20 0 0.00 Water (Total) Municipal Well Source 1.00 275 4.41 3/4" - #4 Estacada Pit 2.68* 1210 7.23 3/8" - #4 Estacada Pit 2.65* 586 3.54 Fine Aggregate Estacada Pit 2.52* 1259 8.01 ADMIXTURES Total Mix Weight 3810 ADMIXTURES Product Name / Type Dosage Rates Dosage (English) Air Entrainment Euclid AEA 92S 0.80 oz/cwt** 3.7 oz/cy** Water Reducer Euclid Plastol 6400 9.00 oz/cwt** 22.5 oz/cy** Water Reducer Euclid Plastol 6400 9.00 oz/cwt** 9.00 oz/cy** Waterproofing 9.00 oz/cwt** 9.00 oz/cy** Hydration Stabilizer 0.00 oz/cwt** 9.00 oz/cy** Fibers 0 lb/cy** 9.0 lb/cy** MAZ 8.6 3.8% n/a 19.0 oz/cwt**	Material	Product/Source							
Silica Fume	Cement	Ash Grove Durkee Typ	e IL	3.12		480		2.46	
Water (Total) Municipal Well Source 1.00 275 4.41 3/4" - #4 Estacada Pit 2.68* 1210 7.23 3/8" - #4 Estacada Pit 2.65* 586 3.54 Fine Aggregate Estacada Pit 2.52* 1259 8.01 Total Mix Weight 3810 ADMIXTURES Product Mix Volume 5% 1.35 ADMIXTURES Product Product Name / Type Dosage Rates Dosage (English) AIT Entrainment Euclid AEA 92S 0.80 oz/cwt** 3.7 oz/cy** Water Reducer Euclid Econ WR91 5.00 oz/cwt** 22.5 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** Hydration Stabilizer SG Abs FM Dry Rodded Unit Wt Aggregate Properties: SG Abs FM Dry Rodded Unit Wt Algency Services SO ± 1.0* <td>GGBFS</td> <td>Ash Grove Dura Slag</td> <td>FHS100</td> <td>2.90</td> <td></td> <td>Θ</td> <td></td> <td>0.00</td> <td></td>	GGBFS	Ash Grove Dura Slag	FHS100	2.90		Θ		0.00	
Stacada Pit 2.68* 1210 7.23	Silica Fume	Basf		2.20		Θ		0.00	
### Bistacada Pit	Water (Total)	Municipal Well Sourc	e	1.00		275		4.41	
Fine Aggregate	3/4" - #4	Estacada Pit		2.68*		1210		7.23	
Total Mix Weight	3/8" - #4	Estacada Pit		2.65*		586		3.54	
Air (Entrap/Entrain) 5%	Fine Aggregate	Estacada Pit		2.52*		1259		8.01	
### Total Mix Volume ### Type Dosage Rates Dosage (English) Air Entrainment Euclid AEA 92S 0.80 oz/cwt** 3.7 oz/cy** Water Reducer Euclid Econ WR91 5.00 oz/cwt** 22.5 oz/cy** Superplasticizer Euclid Plastol 6400 0.00 oz/cwt** 0.0 oz/cy** Water Proofing 0.00 oz/cwt** 0.0 oz/cy** Hydration Stabilizer 0.00 oz/cwt** 0.0 oz/cy** Hydration Stabilizer 0.00 oz/cwt** 0.0 oz/cy** #### The Properties SG		Total Mix Weight				3810	-		
ADMIXTURES Product		Air (Entrap/Entrain)		5%				1.35	
Product Product Name / Type Dosage Rates Dosage (English) Air Entrainment Euclid AEA 925 0.80 oz/cwt** 3.7 oz/cy** Water Reducer Euclid Econ WR91 5.00 oz/cwt** 22.5 oz/cy** Superplasticizer Euclid Plastol 6400 0.00 oz/cwt** 0.0 oz/cy** Water proofing 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" Air Content: 5.0 ± 1.0% Unit Weight: 141.11 pcf 2257.78 kg/m3 Design Properties: Total Cementitious: 480 lb 286 kg Slag Replacement: 0.00 % W/C Ratio: 0.57 (Incl Admix) Project: Comments: This mix design will exceed the required laboratory strength when slumps 6.0" or less. *55D Weights and Spec Gravities. **Admixture dosage rates will be adjusted according to		Total Mix Volume						27.00	•
Air Entrainment	ADMIXTURES								
Water Reducer Euclid Econ WR91 5.00 oz/cwt** 22.5 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** 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: 141.11 pcf 2257.78 kg/m3 Design Properties: Total Cementitious: 480 lb 286 kg Slag Replacement: 0.00 % W/C Ratio: 0.57 (Incl Admix) Project: Comments: This mix design will exceed the required laboratory strength when slumps 6.0" or less. **S50 Weights and Spec Gravities: **Admixture dosage rates will be adjusted according to	Product	Product Name / Type		Dosage	Rates		Dosage (Er	ıglish)	
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: 141.11 pcf 2257.78 kg/m3 Design Properties: Total Cementitious: 480 lb 286 kg Slag Replacement: 0.00 % W/C Ratio: 0.57 (Incl Admix) Project: Contractor: Comments: This mix design will exceed the required laboratory strength when slumps 6.0" or less. *SSD Weights and Spec Gravities. **Admixture dosage rates will be adjusted according to	Air Entrainment	Euclid AEA 92S		0.80	oz/cwt**		3.7	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" Air Content: 5.0 ± 1.0% Unit Weight: 141.11 pcf 2257.78 kg/m3 Design Properties: Total Cementitious: 480 lb 286 kg Slag Replacement: 0.00 % W/C Ratio: 0.57 (Incl Admix) Project: Contractor: Comments: This mix design will exceed the required laboratory strength when slumps 6.0" or less. *55D Weights and Spec Gravities: **Admixture dosage rates will be adjusted according to	Water Reducer	Euclid Econ WR91		5.00	oz/cwt**		22.5	oz/cy**	
Hydration Stabilizer 0.00 oz/cwt** 0.0 oz/cy**	Superplasticizer	Euclid Plastol 6400		0.00	oz/cwt**		0.0	oz/cy**	
### Properties: ### Aggregate Properties: ### Aggregate Properties: ### Aggregate Properties: ### Bine Aggregate	Waterproofing			0.00	oz/cwt**		0.0	oz/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: 141.11 pcf 2257.78 kg/m3 Design Properties: Total Cementitious: 480 lb 286 kg Slag Replacement: 0.00 % W/C Ratio: 0.57 (Incl Admix) Project: Contractor: Comments: This mix design will exceed the required laboratory strength when slumps 6.0" or less. *SSD Weights and Spec Gravities: **Admixture dosage rates will be adjusted according to	Hydration Stabilizer			0.00	oz/cwt**		0.0	oz/cy**	
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3/4" - #4	MIX DESIGN PROPER	TIES							
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: 141.11 pcf 2257.78 kg/m3 Design Properties: Total Cementitious: 480 lb 286 kg Slag Replacement: 0.00 % W/C Ratio: 0.57 (Incl Admix) Project: Contractor: Comments: This mix design will exceed the required laboratory strength when slumps 6.0" or less. *SSD Weights and Spec Gravities. **Admixture dosage rates will be adjusted according to	Aggregate Properties:			SG	Abs	FM	Dry Rodded	l Unit Wt	
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Design Properties: Total Cementitious: 480 lb 286 kg Slag Replacement: 0.00 % W/C Ratio: 0.57 (Incl Admix) Project: Contractor: Comments: This mix design will exceed the required laboratory strength when slumps 6.0" or less. *SSD Weights and Spec Gravities. **Admixture dosage rates will be adjusted according to			Air Co	ntent:	5.0 ±	1.0%			
Project: Contractor: Comments: This mix design will exceed the required laboratory strength when slumps 6.0" or less. *SSD Weights and Spec Gravities. **Admixture dosage rates will be adjusted according to			Unit W	eight:	141.11	pcf		2257.78	kg/m3
Project: Contractor: Comments: This mix design will exceed the required laboratory strength when slumps 6.0" or less. *SSD Weights and Spec Gravities. **Admixture dosage rates will be adjusted according to	Design Properties:	Total (Cementi	tious:	480	lb		286	kg
Contractor: Comments: This mix design will exceed the required laboratory strength when slumps 6.0" or less. *SSD Weights and Spec Gravities. **Admixture dosage rates will be adjusted according to		Slag	Replac	ement:	0.00	%	W/C Ratio:	0.57	(Incl Admix)
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*SSD Weights and Spec Gravities. **Admixture dosage rates will be adjusted according to	Contractor:								
	Comments:	This mix design will ex	xceed th	ne requi	red laboratory	y strength	n when slump	s 6.0" or	less.
	Footnotes:							sted acco	rding to

This mix design is predicated on the specific information and/or materials provided by the customer and therefore, Ash Grove makes no representation or warranties concerning their application to general field use where other variables may occur. Change in design components or proportions, material gradations and/or field placement and curing practices will all strongly affect the ultimate quality of the concrete. User should confirm each laboratory design with concrete batched on site and then routinely run quality control checks to verify yield, air content and compressive strength because the physical and chemical characteristics of materials may vary.

Visit www.volumeconcrete.com to learn more (i.e., policies, MSDS, about us, and additional mix designs. Now offering LDCC Low density Cellular Concrete for pipe abandonment, sewer abandonment and excellent for backfill thanks to a low lateral pressure and weight. LDCC is available in 27 lbs. per cubic foot & up to 100 lbs. per cubic foot. Permeable and non-permeable LDCC depending on application.

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 ASTM C595/C595M REQUIREMENTS

Date: March 11, 2024

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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 ₂ O _{eg} %) ^F	В	0.49			
Limestone (%)	>5 and ≤15	7.9			
CaCO ₃ in limestone (%)	70 min	97			

PHYSICAL					
Item	Spec. Limit	Test Result			
Air content of mortar (volume %)	12 max	2.6			
Blaine Fineness (m ² /kg)	В	407			
Fineness, No. 325 sieve (% retained)	В	1.8			
Density (g/cm ³)	В	3.12			
Compressive strength (psi)					
1 day	В	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	112			
Heat of hydration, C1702/1702M, (kJ/kg) ^C					
3 days	В	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			

cement (Na₂O_{eq} %)

A Default table maximum may be exceeded if Test Method ASTM C1038/C1038M limit is met.

Optional information Equivalent alkali content of finished

0.49

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.

Title: Laboratory Supervisor Signature: Lucky Mclean Name:

^B Not applicable.

^c Test results for this production period not available. Most recent test result provided.

 $^{^{\}rm D}$ Required only if percent ${\rm SO_3}$ exceeds the limit in Table 1.

 $^{^{\}rm E}$ 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.