

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

| Mix ID Number: | LP4000 (line pump) | Date: | 1/16/24 | | |
|---|----------------------------|---------------------|-----------------------|---------------------------|--------------------|
| Design Strength: | 4000 psi 27.58 MPa | Plant: | Estacada | | |
| | | Designed By: | Ben Weber - Ash Grove | | |
| MIX DESIGN QUANTITIES | | English Units | | | |
| Material | Product/Source | Spec Grav | Weight lb | Volume (ft ³) | |
| 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. | | | | | |

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

Lot: 224

| CHEMICAL | | | PHYSICAL | | |
|--|----------------------|-------------|--|------------------------|-------------|
| Item | Spec. Limit | Test Result | Item | Spec. Limit | Test Result |
| Sulfate as SO ₃ (%) | 3.0 max ^A | 3.0 | Air content of mortar (volume %) | 12 max | 2.6 |
| Loss on ignition (%) | 10.0 max | 4.2 | Blaine Fineness (m ² /kg) | ^B | 407 |
| Equivalent alkali content of Portland | ^B | 0.49 | Fineness, No. 325 sieve (% retained) | ^B | 1.8 |
| Cement (Na ₂ O _{eq} %) ^F | | | Density (g/cm ³) | ^B | 3.12 |
| Limestone (%) | >5 and ≤15 | 7.9 | Compressive strength (psi) | | |
| CaCO ₃ in limestone (%) | 70 min | 97 | 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 |
| Optional information | | | Mortar Bar Expansion, C1038/C1038M, (%) ^C | 0.020 max ^D | 0.020 |
| Equivalent alkali content of finished cement (Na ₂ O _{eq} %) | ^B | 0.49 | 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 SO₃ 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.



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: 
Name: Lucky Mclean

Title: Laboratory Supervisor