Recognized Procedures for Achieving Quality Pervious Concrete

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These recognized procedures can help achieve a quality portland cement pervious concrete pavement. For descriptions of concrete mixtures and production, tools and equipment, design principles, construction, maintenance and troubleshooting, please refer to the National Ready Mixed Concrete Association's *'Text Reference for Pervious Concrete Contractor Certification' available at* www.nrmca.org.

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1. **Mixture Proportions:** The composition of the proposed concrete mixtures shall be submitted to the owner's representative for review and/or approval and shall comply with the following provisions unless an alternative composition is demonstrated to comply with the project requirements.
   - **A.** **Cementitious Content:** The concrete producer shall determine the cement content based upon the available aggregate gradation.
   - **B.** **Supplementary cementitious content:** Fly ash, if used, shall be a maximum of 25% of the total cementitious material. Blast furnace slag, if used, shall be a maximum of 40% of the total cementitious material.
   - **C.** **Water / Cementitious Ratio** Shall range between 0.27 lb/lb and 0.31 lb/lb.
   - **D.** **Aggregate Content:** The bulk volume of aggregate per cubic yard shall be equal to 27 cubic foot when calculated from the dry rodded density (unit weight) determined in accordance with ASTM C29 rodding procedure.
   - **E.** **Admixtures:** Admixtures shall be used in accordance with the manufacturer's recommendations and dosage determined by the concrete producer.
   - **F.** **Mix Water:** The quantity of mixing water shall be established to produce a pervious concrete mixture of the desirable workability to facilitate placing, compaction and finishing to the desired surface characteristics.

2. Mixing and Hauling:

A. **Production:** Pervious concrete shall be manufactured and delivered in accordance with the applicable sections of ASTM C94 or C685.

B. **Mixing:** Pervious concrete shall be produced in central mixers, transit mixers, or volumetric mixers. The manufacturers of mixing equipment shall specify mixing speed and revolutions to produce a homogeneous mix. Pervious concrete produced in transit mixers shall be mixed at least 70 revolutions.

C. **Prior to Discharge:** The contractor shall visually evaluate the homogeneous uniformity of each load and either approve the concrete or add water. All persons authorized to add water shall be identified prior to the start of each day's placement. Added water shall be recorded on the delivery ticket and communicated to the batch plant.

D. **Discharge:** Pervious concrete shall be discharged directly from the mixer to the grade or to a belt conveyor. The discharge shall be as close as possible to its final position and such that the discharged concrete is incorporated into previously placed plastic concrete. Discharge of individual loads of pervious concrete shall be completed as quickly as possible: within one hour from the time of introduction of cement to water or 90 minutes when a hydration stabilizer is used.

E. **Additional Water Additions:** Throughout the placement, the contractor shall visually monitor the appearance of the concrete. Job site water addition during placement is allowed to maintain the required mix consistency. Added water shall be thoroughly mixed into the concrete.

F. Immediately after screeding, if the pervious concrete is susceptible to plastic shrinkage according to ACI 305, the surface shall be kept moist with one or more of the following actions: an external fogging device, or application of a spray applied curing compound, or application of a sacrificial evaporation compound.

3. Placing and Finishing:

A. The Contractor shall provide equipment to place and finish the pervious concrete. Internal vibration shall not be permitted. Placement proc**e**dures shall utilize mechanical screed equipment such as a motorized roller screed or a vibratory truss screed. Hand screeds are prohibited except in confined and small areas. Hand compaction tools are also used in such areas to compact the pervious concrete to proper density and elevation.

B. **Motorized Roller Screed Construction:** Pervious concrete shall be manually compacted at the lower form edges prior to screed operation. The motorized roller screed is supported by edge forms and powered to spin counter to the direction of travel. The counter-rotating tube is drawn over the slab surface to strike the surface elevation and compress the surface

materials. Screed rollers shall be minimum 6 inches in diameter and capable of configuration to a weight of 37 pounds per linear foot. Strike-off is followed by cross roller tooling to apply mild compression and uniformity to the surface materials. The pervious concrete pavement shall be compacted to the required cross-section and shall not deviate more than +/- 3/8 inch in 10 feet from profile grade.

C. **Vibratory Truss Screed Construction.** Pervious concrete shall be manually compacted at the lower form edges prior to screed operation. The vibratory screed is supported by edge forms and ½ inch riser strips to elevate the screed ½ inch above finished elevation. The vibratory truss screed is drawn over the slab at low intensity vibration with care taken to stop vibration if travel movement is stopped. Riser strips are removed after screed operation is complete and a full width static roller is deployed on the slab surface to compress the pervious concrete down to finished elevation. The static roller shall exert a pressure of 10 psi per foot on the plastic pervious concrete. The pervious concrete pavement shall be compacted to the required cross-section and shall not deviate more than +/- 3/8 inch in 10 feet from profile grade. Care shall be taken to not seal the pervious concrete surface due to over vibration or excessive rolling.

D. **Cross-Rolling and Edging**: Immediately after screeding the finished surface shall be cross-rolled to remove any rolling and compaction marks. The longitudinal edges adjacent to the forms shall be manually compacted with a hand tamp and then edged with a ½" radius edger. No further finishing shall be performed on the concrete.

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