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MATERIAL SPECIFICATION  
MS-OR-513 PRECAST CONCRETE PILES

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513.1 SCOPE

This specification covers the quality of precast concrete piles.

513.2 GENERAL REQUIREMENTS

The piles shall conform to the details shown on the drawings. The piles shall be cast of Portland cement concrete mixed, placed, and cured by the methods specified in CS-OR-220, Reinforced Concrete, except as amended in the specification. The finished piles shall be true to line with a smooth surface free from stone pockets, honeycomb, or other surface defects.

513.3 CLASSES OF CONCRETE

Unless otherwise specified, Class 4000 concrete applies.

513.4 REINFORCEMENT

Reinforcement steel shall conform to the requirements of CS-OR-034, Steel Reinforcement.

513.5 FORMS

Forms shall be constructed of plywood, metal, or dressed lumber and shall have 1-inch chamfer strips at all corners. They shall be mortar tight, true to line, and adequately supported to prevent deformation or settlement during concrete placement. They shall be designed to be removable without damaging the completed piles.

513.6 PLACING CONCRETE

The concrete shall be placed in each pile in one continuous operation. The concrete shall be compacted and worked into the forms and around the reinforcement by procedures outlined in CS-OR-220, Reinforced Concrete.

513.7 CURING

The piles shall be cured for a minimum of 14 days by a method specified in CS-OR-220, Reinforced Concrete.

Test cylinders cast for the purpose of determining when the piles may be subjected to handling stresses shall be cured by the same method as the pile, at the same location, and under the same conditions as those applied to the piles.

The steam curing process may be used as an alternative to moist curing or membrane curing. The piles shall be cured in place on the casting bed by the introduction of steam into a steam-tight housing that completely encloses the casting bed. The first application of steam shall be applied after the concrete has gained an initial set, but in no case sooner than 2 hours after the concrete is placed unless a set-retarding admixture is an ingredient of the approved concrete mix. When a set-retarding admixture is used, the first application of steam shall be applied no sooner than 4 hours after the concrete is placed. Moist curing methods shall be applied during the interval between the placement of the concrete and the application of the steam.

The steam shall be at 100 percent relative humidity and shall not be applied directly on the concrete. During application of the steam, the ambient air temperature within the housing shall be increased at a maximum rate of 40 degrees Fahrenheit per hour until the maximum temperature is reached. The temperature within the housing shall be maintained between 140 and 160 degrees Fahrenheit until the concrete has reached the specified strength. In discontinuing the application of the steam, the ambient air temperature within the housing shall be decreased at a maximum rate of 40 degrees Fahrenheit per hour until the temperature within the housing does not exceed than 20 degrees Fahrenheit above the ambient air temperature outside the housing.

The concrete shall not be exposed to temperatures below freezing for a minimum of 6 days after placement.

#### 513.8 REMOVING FORMS

Side forms shall remain in place a minimum 24 hours.

#### 513.9 HANDLING AND STORING PILES

The contractor shall handle and store piles by methods that do not cause spalling, cracking, or other damage to the piles. The contractor shall furnish all bridles, slings, and other handling equipment as necessary.

Piles shall not be moved until the tests indicate a minimum compressive strength of 80 percent of the design 28-day compressive strength. Piles shall not be transported or driven until the field cure test cylinders indicate a minimum compressive strength equal to the design 28-day compressive strength.

Piles that are cracked, spalled, or otherwise damaged during handling will be rejected.