

## MATERIAL SPECIFICATION

### **513. Pre-Cast Concrete Piles**

#### **1. Scope**

This specification covers the quality of pre-cast concrete piles.

#### **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 Construction Specification [CONCRETE FOR MAJOR STRUCTURES 31](#), except as amended in the specification. The finished piles shall be true to line with smooth surfaces free from stone pockets, honeycomb or other surface defects.

#### **3. Classes of Concrete**

Unless otherwise specified, Class 4000 concrete applies.

#### **4. Reinforcement**

Reinforcement steel shall conform to the requirements of Construction Specification [STEEL REINFORCEMENT 34](#).

#### **5. Forms**

Forms shall be constructed of plywood, metal or dressed lumber and shall have one (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.

## **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 Construction Specification [CONCRETE FOR MAJOR STRUCTURES 31.](#)

## **7. Curing**

The piles shall be cured for a minimum period of 14 days by a method specified in Construction Specification [CONCRETE FOR MAJOR STRUCTURES 31.](#)

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 two (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 four (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°F per hour until the maximum temperature is reached. The temperature within the housing shall be maintained between 140°F and 160°F 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°F per hour until the temperature within the housing is not more than 20°F above the ambient air temperature outside the housing.

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

#### **8. Removing Forms**

Side forms shall remain in place a minimum 24 hours.

#### **9. Handling and Storing Piles**

The contractor shall handle and store piles by methods that will 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.