

Special Specification 4070

Steel Pipe Piling



1. DESCRIPTION

Furnish steel pipe piling in place of the size, type, length, and locations indicated in the plans. Fabricate, install, reinforce, and fill with concrete plug in accordance with these specifications and plans. This specification is suitable for pipe piling with outside diameters of 24" and greater.

2. MATERIALS

2.1. Steel Piles.

2.2. Provide metal for steel pipe piling that is not quenched and tempered, and conforms to one of the two following types:

2.2.1. **Type 1.** American Petroleum Institute (API) 5L, Grade X52, PSL1.

- Manufactured, welded, tested and inspected at a plant licensed to apply the API monogram
- Hydrostatic testing, flattening tests, and the API monogram are not required
- Alternate steels of ASTM A572 Grade 50 or ASTM A709 Grade 50 are also permitted

2.2.2. **Type 2.** ASTM A252, Grade 3 (45 ksi yield) or Grade 3 Modified (50 ksi yield)

- Underfill is not allowed
- Alternate steels of ASTM A572 Grade 50 or ASTM A709 Grade 50 are also permitted. Do not allow weld reinforcement greater than 1/8 inch

2.3. **Concrete Plug.** Furnish materials in accordance with this Item, the details in the plans, and the following Items from the Standard Specifications:

- Item 420, "Concrete Substructures,"
- Item 421, "Hydraulic Cement Concrete," and
- Item 440, "Reinforcement for Concrete."

3. CONSTRUCTION

3.1. **Shop Fabrication.** Fabricate steel pipe piling in accordance with this Item, the details in the plans, and Item 441, "Steel Structures." Provide seamless, submerged arc longitudinal seam welded (SAWL), or submerged arc helical-butt seam welded (SAWH) steel pipe piles. Seam welds shall be complete joint penetration (CJP) with at least one SAW pass on the inside and one SAW pass on the outside of the pipe. Fabricate SAWL with up to two longitudinal seam welds, spaced 180 degrees apart.

3.2. **Shop Drawings.** Submit shop drawings that depict the size, type, material, shop and field welding methods, piece lengths, and total lengths.

3.3. **Tolerances.** Adhere to the placement tolerances in Item 404.3.1.

3.4. **Storage and Handling.** Store and handle steel pipe piling to prevent damage to the piling and coating system. Place the stored piling on suitable blocking to prevent contact with the ground. Keep piling clean and fully drained at all times. Use a sufficient amount of blocking to prevent excessive deflection and stress

on the stored piling. Utilize fabric slings or other methods as approved by the Engineer to handle the steel pipe pile.

- 3.5. **Pile Driving.** Drive piling in accordance with Item 404, "Driving Piling" and Item 407, "Steel Piling." Test load in accordance with Item 405, "Foundation Load Test." Drive the spliced piling the additional depth required as soon as the splice is completed if the required penetration or bearing resistance has not been obtained. Weld spliced pile in a manner that will fully develop the section of the shell and also form a water-tight joint in accordance with Item 448, "Structural Field Welding." Any damaged, improperly driven, or otherwise defective piling will be evaluated by the Engineer and must be removed and replaced if deemed necessary.
- 3.6. **Field Welding.** Field weld sections using the details shown in the plans and in accordance with Item 448 "Structural Field Welding." Do not conduct radiographic inspection as described in Item 448.4.3.7.
- 3.7. **Concrete Plug.** After driving piling, remove soil from the interior by auguring or a method approved by the Engineer. Clean inside side faces of steel pipe pile in to be in contact with concrete plug by high pressure washing or a method approved by the Engineer. Capture all soil and water removed and dispose in a manner approved by the Engineer. Do not discharge into surrounding water bodies. Place reinforcing steel with sufficient chairs and blocking to maintain correct vertical position during and after concrete placement. Center the reinforcing steel cage in the steel piling using approved "roller" type centering device. Place concrete in accordance with Item 416.3.6 (if the plug hole is dry) and Item 416.3.7 (if the plug hole contains standing water).
- 3.8. **Coating.** Provide a protective coatings system as specified in the plans and as described in Item 407, "Steel Piling."

4. MEASUREMENT

Steel pipe piling will be measured by the linear foot of acceptable piling in place after all cut-offs and build-ups have been made. Cut-offs and build-ups will not be measured separately for payment.

If the Contractor elects to drive piling deeper than required to meet the specified penetration requirements, no measurement will be paid on the portion below the elevation at which length and bearing requirements were first obtained.

This is a plans quantity measurement Item. The quantity to be paid is the quantity shown in the proposal unless modified by Article 9.2, "Plans Quantity Measurement." Additional measurements or calculations will be made if adjustments of quantities are required.

5. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Steel Pipe Piling," of the size specified. This price is full compensation for furnishing and driving the steel pipe pile, including alignment holes, pilot holes, jetting, and drilling/cleaning operations in preparation for concrete plugs, and for all materials, tools, labor, equipment and incidentals necessary to complete the work. The work performed and materials furnished for the concrete plug will be paid for at the unit price bid for "Class SS Concrete (Pile Plug)." This price is full compensation for materials, labor, equipment incidentals necessary to complete the work including fabricating and placing reinforcing steel, supplying and placing concrete, and finishing and curing operations.