

412.04.02 When subfoundation investigation is specified, it will be measured and paid for in conformance with 419.04.

SECTIONS 413 — 417 RESERVED

SECTION 418 — PROTECTIVE JACKETS FOR PILES

418.01 DESCRIPTION. This work shall include cleaning piles, fabricating, furnishing and placing wire fabric, fabricating, furnishing, installing and sealing the protective jackets, and filling the void between pile and jacket with grout as specified in the Contract Documents or as directed by the Engineer.

418.02 MATERIALS.

Fine Aggregate	901.01
Portland Cement	902.03, Type II
Concrete Admixture	902.06
Water	921.01
Welded Wire Fabric	908.08
Fiberglass Protective Pile Jackets	921.11 and 418.02.01
Anchor/Standoff Devices	A 185
Stainless Steel Screws	A 193, Type 303

418.02.01 Jackets. The jackets for new piles shall be fabricated in one solid piece with no longitudinal joint. The closure joint on jackets for existing piles need not be self-locking provided the joint can be field formed with fiberglass and is approved by the Engineer. The field formed closure joint shall conform to the tensile strength of the jacket. All jackets shall be a minimum thickness of 1/4 in. The surfaces of the fiberglass shall be free of bond inhibiting agents.

Jackets for steel and concrete piles shall be provided with noncorrosive standoffs on the inside face to maintain the jackets in the required positions.

418.02.02 Closure Joint Warranty. When closure joints are used for existing piles, the manufacturer and Contractor shall both furnish the Administration a written 5 year warranty against manufacturing and installation defects prior to starting the installations.

418.02.03 Grout. The Contractor shall submit in writing the proposed grout mix design and method of installation to the Engineer for approval before ordering any material.

Steel and Concrete Piles. Grout shall consist of a minimum of 845 lb/yd³ of cement, 6 ± 1 percent of air entrainment by volume, and be proportioned with fine aggregate and water to provide a pumpable mixture. The minimum 28 day compressive strength shall be 3500 psi.

Ready mixed grout will be permitted by written permission of the Engineer. The ready mixed grout shall be furnished by a manufacturer approved by the Office of Materials and Technology.

Timber Piles. Grout shall consist of water insensitive epoxy and fine aggregate mixed in conformance with the manufacturer's recommendations.

418.03 CONSTRUCTION. Working drawings showing equipment, installation procedure including location of tremie pipes, injection port, method of sealing the bottom of the jacket, and method of support during placement of the grout, shall be prepared by the Contractor and submitted for approval prior to the start of field installations. Jackets shall not be installed until the Engineer approves the procedure and material in writing.

418.03.01 Cleaning Piles. The piles shall be cleaned of all surface contamination such as grease, oil, tar, loose rust, loose coatings, marine organisms, etc. to the satisfaction of the Engineer.

Piles shall be water blast cleaned with a nozzle pressure of 8000 to 20 000 psi, except that timber piles shall be cleaned with a nozzle pressure of 3000 to 3500 psi. The piles shall be cleaned a maximum of 24 hours prior to the placing the grout. Jackets shall not be placed until the Engineer has approved the cleaning of the piles.

418.03.02 Preparation of Protective Jackets. The inside faces of the jackets shall be cleaned and abrasive blasted to remove any agents which will inhibit attachment of anchor devices and bonding of the grout with the inside faces of the jackets. The Engineer may require these procedures to be redone if they are not acceptable at the time of placement.

Protective jackets will be inspected by the Engineer prior to placement. Loose or damaged anchor devices shall be repaired to the satisfaction of the Engineer. Protective jackets deemed unsatisfactory by the Engineer shall be replaced at no additional cost to the Administration.

The space between the pile and the jacket shall be sealed at the bottom. All temporary support devices used to position the protective jackets during installation shall be external and shall be removed before final acceptance.

418.03.03 Filling Void. The void between the pile and the protective jacket shall be filled with grout placed by the tremie method using two tremie pipes or by pumping using an injection port located at the bottom of the protective jacket. Depositing by means of bottom dump buckets is prohibited. Tremie pipes shall be equipped with hopper tops.

Only approved mixing equipment shall be used in preparation and handling of the grout. All oil and other rust inhibitors shall be removed from the mixing drums, stirring mechanisms and other portions of the equipment in contact with the grout before the mixers are used. All materials shall be accurately measured by volume or weight as they are fed into the mixer. Time of mixing shall not be less than one minute. The continuously agitated grout may be held in the mixer or agitator a maximum of one hour, or for 1-1/2 hours when the temperature falls below 70 F.

Grout placement shall be made as one continuous operation for each pile. Special care shall be taken in the placement of grout to obtain a satisfactory flow to ensure proper distribution around and bonding to the pile.

If emergency interruptions of continuous grout pumping become necessary, the Contractor shall stop the operations and remove the grout and the jacket. The pile shall be thoroughly cleaned as described in 418.03.01 prior to continuing the operation. The pile jacket shall not be reused unless it is removed prior to initial setting of the grout and is approved by the Engineer.

All excess grout shall be removed from the outside of the piles and jackets after the jackets are filled.

418.03.04 Protective Jacket Inspection. The Contractor's operations will be carefully observed during all phases of construction. In the presence of the Engineer, the Contractor shall remove the first two protective jackets installed to provide visual evidence that the Contractor's operations are obtaining the desired results. The removal shall not begin until the grout has set sufficiently to maintain its shape when the protective jacket is removed. The Engineer will examine the grout for cavities, honeycombing, and other defects.

- (a) If the grout is satisfactory upon removal of the protective jacket, the Contractor's operations will be approved. The Contractor

shall remove all grout as directed by the Engineer, and clean and reinstall a new jacket in conformance with these Specifications. Reuse of the original protective jacket is prohibited.

- (b) If the grout on only one of the installations is unsatisfactory upon removal of the protective jacket, the third protective jacket installed shall also be removed and inspected. If this inspection is satisfactory, the Contractor's operations will be approved. Protective jackets shall then be reinstalled as specified in (a).
- (c) If the grout is unsatisfactory upon removal of the protective jacket on both of the first two piles inspected, or on two out of the three piles inspected as specified in (b), the Contractor shall submit modifications to the operations to the Engineer for approval before continuing. These procedures shall continue until the Contractor's operations are satisfactory.
- (d) Additional inspections will be performed whenever required by the Engineer.

418.04 MEASUREMENT AND PAYMENT. The payment will be full compensation for fabricating, furnishing and installing protective jackets including welded steel wire fabric, grout, excavation, and all material, labor, equipment, tools and incidentals necessary to complete the work.

418.04.01 Protective jackets will be measured and paid for at the Contract unit price per each for the pertinent Protective Jacket for Pile item.

418.04.02 Protective jackets will be measured and paid for at the Contract unit price per linear foot (depth) for the pertinent Protective Jacket for Pile item.

418.04.03 Protective jacket inspections that are satisfactory and accepted by the Engineer will be measured and paid for at the Contract unit price per each for the pertinent Protective Jacket Inspection item. Payment will also be full compensation for removal of the jacket, removal of the grout, cleaning, and reinstalling a protective jacket, welded steel wire fabric, and grout.

418.04.04 Protective jacket inspections that are unsatisfactory and rejected by the Engineer will not be measured or paid for. The Contractor shall remove the protective jacket, grout, and welded steel wire fabric and clean the existing structure at no additional cost to the Administration.