

INTEGRAL PILE JACKETS.

(REV 9-12-94) (7-00)

PAGE 533. The following new Section is added after Section 455:

SECTION 457 INTEGRAL PILE JACKETS

457-1 Description.

Furnish, fabricate and install a permanent outer form made from durable, inert, corrosion resistant materials and fill the annular space between the pile and the permanent form with portland cement grout, concrete, epoxy compounds or combinations of these materials as indicated in the plans. Use integral pile jackets composed of compatible materials as described above, and install around a pile as indicated on the plans to furnish a durable, corrosion resistant pile protection system.

457-2 Materials.

457-2.1 Forms: Use forms composed of a durable, inert, corrosion resistant material with an interlocking joint along one side that permits the form to be assembled and sealed in place around the pile. Fabricate the forms from fiberglass and polyester resins, having a minimum thickness of 1/8 inch [3 mm] unless otherwise shown on the plans. The form dimensions shown in the plans are minimum dimensions permitted. Upon opening to place around a pile, ensure that the form is capable of returning to its original shape without assistance or damage. Ensure that the inside face of the jacket has no bond inhibiting agents in contact with the cementitious or epoxy grouts. Provide the forms with bonded-on, non-corrosive standoffs, which will maintain the forms in the required positions. Sandblast or score the inside surface of the forms with an abrasive material to provide a texture equal to a sandblasted surface. Equip the forms with a compressible sealing strip at the bottom which will effectively seal the annular space between the pile and form.

Meet the following physical property requirements:

Non SI Units	
(a) Water Absorption (ASTM D 570)	1% maximum
(b) Ultimate Tensile Strength (ASTM D 638)*	9,000 psi minimum
(c) Flexural Strength (ASTM D 5224)*	16,000 psi minimum
(d) Flexural Modulus of Elasticity (ASTM D 790)	700,000 psi minimum
(e) IZOD Impact (ASTM D 256)	15 lb/inch minimum (unnotched)
(f) Barcol Hardness (ASTM D 2583)	45 minimum
(g) Color: Similar to Federal Color Standard No. 595, Table VIII, Shade No. 36622. The color must be integral in the form material.	

SI Units	
(a) Water Absorption (ASTM D 570)	1% maximum

SI Units	
(b) Ultimate Tensile Strength (ASTM D 638M)*	62 MPa minimum
(c) Flexural Strength (ASTM D 5224)*	110 MPa minimum
(d) Flexural Modulus of Elasticity (ASTM D 790M)	4.8 GPa minimum
(e) IZOD Impact (ASTM D 256)	2.6 kN/m minimum (unnotched)
(f) Barcol Hardness (ASTM D 2583)	45 minimum
(g) Color: Similar to Federal Color Standard No. 595, Table VIII, Shade No. 36622. The color must be integral in the form material	

*On original specimen whose flat surfaces are not machined to disturb the fiberglass.

457-2.2 Epoxy Grout Filler: Use epoxy grout filler composed of a mixed epoxy binder and sand as follows:

(a) Binder: Use a two component binder material (any mix ratio allowing measurement and mixing on the job) meeting the following requirements:

(1) Ensure that it is moisture insensitive for application above and below water.

(2) Ensure that it adheres to wet concrete, steel, and the fiberglass jacket.

(b) Sand: Use kiln dried Silica sand meeting these gradation requirements:

Standard Sand		Alternate Sand	
Sieve Size	Passing	Sieve Size	Passing
No. 4 [4.75 mm]	100%	No. 4 [4.75 mm]	100%
No. 16 [1.18 mm]	90-100%	No. 10 [2.00 mm]	90-100%
No. 30 [600 µm]	30-50%	No. 20 [850 µm]	0-5%
No. 50 [300 µm]	0-10%	No. 40 [425 µm]	0%
No. 100 [150 µm]	0-5%		

(c) Mixing: Machine mix the binder in strict accordance with the manufacturer's instructions.

(1) Combine one part binder with a maximum of three parts of sand filler.

(2) When mixed in the ratio of one part binder to one part sand by weight, the minimum compressive strength of 2 inch [50 mm] cubes of this mix at seven days (curing at 66 to 74°F [19 to 23°C]) shall be 6,500 psi [45 MPa] when tested according to 926-3.2(b).

(3) Mix no more filler than can be incorporated into the form assembly in 20 minutes. Discard any excess on hand after this time.

457-2.3 Portland Cement Grout Filler: Use a mixture of portland cement, fine aggregate, water and an approved admixture containing a minimum of 940 pounds [560 kg] of cementitious material per cubic yard [cubic meter] of which up to 30%, by weight, may be replaced by an approved fly ash.

Use Silica Sand fine aggregate meeting the requirements of Section 902.

Use Portland cement meeting the requirement of Section 921.

Use admixtures meeting the requirements of AASHTO M 194, Types A and D.

Use air-entraining admixtures meeting the requirements of 924-2.1 and containing no chlorides or other salts corrosive to metals.

Use fly ash meeting the requirements of ASTM C 618, Type F, except that loss on ignition shall not exceed 4%.

Before mixing any grout, submit the design mix for approval. Incorporate only Department approved mixes into the work.

457-2.4 Class III Concrete Filler: Use Class III Concrete (Seal) in accordance with Section 346.

457-2.5 Special Filler: When required, furnish special fillers in accordance with the Contract Documents.

457-2.6 Shop Drawings: Prepare shop drawings showing locations of standoff spacers, method of fastening jacket form to piling, sealing the form after installation and bracing during placement of materials in the annular space between the form and the pile and submit for approval before any field installations. Include details of the access holes, fiberglass caps and construction methods for filling the annular void and capping the holes in the shop drawings for approval.

457-2.7 Certification and Material Tests: For materials to be used, other than materials for portland cement grout and Class III Concrete, furnish a certificate to the Engineer attesting that the materials meet all the requirements contained herein and conform in all respects to the materials subjected to the tests required. Attach copies of current test reports to the certificate. No test report for tests made more than one year prior to shipment will be accepted for the form material and no test reports for tests made more than six months prior to shipment will be accepted for epoxy grout filler.

Materials for portland cement grout and Class III Concrete shall be tested and accepted as required in the specifications.

457-3 Construction Methods.

Thoroughly clean all pile surfaces the integral pile jackets will cover of oil, grease, dirt, broken concrete and any other deleterious material that would prevent proper bonding. Remove all cracked and unsound concrete from the pile and sandblast all exposed reinforcing steel to SSPC-SP10, near white, per the Society of Protective Coatings, to remove all rust and scale before installing the pile jacket. Clean existing concrete surfaces by sandblasting, wetblasting, wire brushing, water laser, or other approved methods which will yield an equivalent result. Do not place the jackets until the pile cleaning has been approved.

Fabricate the pile jacket form in a workmanlike manner and have it inspected and approved prior to placement on piles. Remove any pile jacket form not approved from the project. Spread open the pile jacket form by disengaging the interlocking joint along the side; then place in position around the pile; secure the interlocking joint and seal the bottom of the jacket form against the pile surface with an approved epoxy adhesive. Fill the annulus between the pile and pile jacket form meeting the material Manufacturer's instructions and the Contract Documents. Remove external bracing and banding materials after completing the work and clean the exterior surfaces of the forms of any filler material or other extraneous material deposited on the forms.

457-4 Method of Measurement.

The quantities to be paid for under this Section will be the total feet [meters] of Integral Pile Jacket of the filler and size specified; furnished, installed, completed and accepted.

457-5 Basis of Payment.

The Contract unit price for Integral Pile Jacket measured as provided above will be full compensation for all work specified herein.

Payment will be made under:

- Item No. 457- 70- Integral Pile Jackets- per foot.
- Item No. 2457- 70- Integral Pile Jackets- per meter.