

ITEM 17203.1756 M - STEEL TIES (TEMPORARY)

ITEM 17203.1757 M - STEEL TIES (PERMANENT)

DESCRIPTION

Furnish and install steel ties including corrosion protection, conduit, couplings, bearing plates, nuts, washers and spacers, in accordance with this specification, capable of withstanding the design load(s) at the position(s) shown on the plans.

MATERIALS

A. General

Provide couplings, bearing plates, nuts, washers and spacers capable of developing 95 percent of the guaranteed ultimate tensile strength of the steel tie. Provide nuts conforming to the requirements of ASTM A-325, or the bar manufacturer's requirements. Provide bearing plates conforming to the requirements of ASTM A-36. Provide carrier conduit conforming to the requirements of subsection 706-15 PVC Plastic Drain Pipe System.

B. Steel Ties

Provide threaded steel bar or seven-wire strand cable ties as described below:

Threaded steel bars made from steel meeting the requirements of ASTM A-722, Grade 1035. Use 60% of guaranteed ultimate tensile strength to select the ties. Stop-type couplers are permitted if they are threaded and provide for an equal bar insertion on each side.

Seven-wire strand cables made from stress-relieved or low relaxation steel meeting the requirements of ASTM A-416, Grade 1860. Use 60% of guaranteed ultimate tensile strength of the wire strand cable to select the ties. Do not use splices.

C. Corrosion Protection

1. Provide a corrosion inhibitor meeting the following requirements:

Test	Test Method	Acceptance Criteria
Dropping Point, °C	ASTM D-566 or ASTM D-2265	Minimum 150
Oil Separation @ 70°C, % by weight	FTMS 791B Method 321.2	Maximum 0.5
Water, % maximum	ASTM D-95	0.1
Flash Point, °C (refers to oil component)	ASTM D-92	Minimum 150
Corrosion Test: 5% Salt Fog @ 38°C 5 mils coating, minimum hours (Q Panel Type S)	ASTM B-117	For normal environments: Rust grade 7 or better after 720 hours of exposure according to ASTM D-610.

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		For corrosive environments: Rust grade 7 or better after 1000 hours of exposure according to ASTM D-610. (1)
Water Soluble Ions (2) 1. Chlorides, ppm maximum 2. Nitrates, ppm maximum 3. Sulfides, ppm maximum	ASTM D-512 ASTM D-992 APHA 427D (15 th Ed.)	10 10 10
Soak Test: 5% Salt Fog @ 38°C 5 mils coating (Q Panel Type S) Immerse panels 50% in a 5% salt solution and expose to salt fog.	ASTM B-117 (Modified)	No emulsification of the coating after 720 hours of exposure.
Compatibility with Sheathing 1. Hardness and volume change of polymer with exposure to grease, 40 days @ 65°C. 2. Tensile strength change of polymer after exposure to grease, 40 days @ 65°C.	ASTM D-4289 ASTM D-638	Permissible change in hardness 15% Permissible change in volume 10% Permissible change in tensile strength 30%

- (1) Extension of exposure time to 1000 hours for greases used in corrosive environments requires use of more or better corrosion inhibiting additives.
 - (2) PROCEDURE: Thoroughly coat the inside (bottom and sides) of a 1 L Pyrex beaker, approximate O.D. 105 mm, height 145 mm, with 100 ± 10 g of corrosion preventive coating material. Fill the coated breaker with approximately 900 cc of distilled water and heat in an oven at a controlled temperature of $38^{\circ}\text{C} \pm 1^{\circ}\text{C}$ for four (4) hours. Test the water extraction by the noted test procedures for the appropriate water soluble ions. Report results as ppm in the extracted water.
2. Provide a seamless 1.5 mm thick polymer sheathing of Polypropylene, ASTM D-2146, Designation Type II 26500D or Polyethylene, ASTM D-3350, High Density Polyethylene Cell Classification 334413.
 3. Provide class A concrete conforming to the provisions of Section 501 - Portland Cement Concrete - General.

CONSTRUCTION DETAILS

Install steel ties at the positions and true to line and grade in accordance with the details shown on the plans or as directed by the Engineer. Do not bend or kink the steel ties. If couplers are used, insert bars an equal distance on each side.

Corrosion Protection

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A. Permanent Ties

1. Steel bar ties: Encase the steel bar with a minimum of 100 mm of concrete or coat with corrosion inhibiting grease and encapsulate in polymer sheathing.
2. Wire strand cable ties: Coat with corrosion inhibiting grease and encapsulate in polymer sheathing.

B. Temporary Ties

1. Steel bar ties: None required.
2. Wire strand cable ties: None required.

METHOD OF MEASUREMENT

The number of linear meters of steel ties satisfactorily installed in accordance with this specification.

BASIS OF PAYMENT

Include in the unit price bid the cost of furnishing all materials, equipment and labor required to complete the work including corrosion protection, conduit, couplings, bearing plates, nuts, washers and spacers and replacing any rejected materials. Pay for any required excavation and backfill under their respective items.