

SECTION 33 05 19  
PRESSURE PIPING TIED JOINT RESTRAINT SYSTEM

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
  - 1. Tied joint restraint system.
- B. Related Sections:
  - 1. Section 31 23 17 – Trenching: Excavation and backfill for Work of this Section.
  - 2. Section 33 11 16 - Water Utility Distribution Piping: Pipe to be restrained.
  - 3. Section 33 34 00 - Sanitary Utility Sewerage force Mains: Pipe to be restrained.

1.2 REFERENCES

- A. American National Standards Institute (ANSI):
  - 1. ANSI B1.1 - Unified Inch Screw Threads.
- B. ASTM International (ASTM):
  - 1. ASTM A36 - Standard Specification for Carbon Structural Steel.
  - 2. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - 3. ASTM A143 - Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
  - 4. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  - 5. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - 6. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
  - 7. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
  - 8. ASTM A588 - Specification for High Strength Low-Alloy Structural Steel with 50 ksi (345 MPa) Minimum Yield Point to 4 in. (100 mm) Thick.
  - 9. ASTM B633 - Specification for Electrodeposited Coating of Zinc on Iron and Steel.
  - 10. ASTM F436 - Specification for Hardened Steel Washers.

1.3 DESIGN REQUIREMENTS

- A. Provide pressure pipeline with restrained joints at bends, tees, and changes in direction.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Indicate restrained joint details and materials being utilized. Submit layout drawings showing piece numbers and locations. Also, indicate restrained joint locations.
- C. Product Data: Submit catalog data for restrained joint details and installation instructions.
- D. Design Data: Submit design calculations showing determination of restrained lengths and submit joint restraint details. Use joint restraint devices specifically designed for applications described in manufacturer's data.

- E. Manufacturer's Installation Instructions: Submit installation instructions.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- G. Project Record Documents: Record actual locations of joint restraints.

## 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3 years experience.
- B. Installer: Company specializing in performing work of this Section with minimum 3 years documented experience.

## PART 2 PRODUCTS

### 2.1 TIED JOINT RESTRAINT SYSTEM

- A. Manufacturers:
  - 1. Dresser Piping Specialties.
  - 2. Ebaa Iron Sales, Inc.
  - 3. Star Pipe Products, Inc.
  - 4. Substitutions: Equal per Section 01 60 00 - Product Requirements.

### 2.2 MATERIALS

- A. Steel Types:
  - 1. High Strength Low-Alloy Steel, ASTM A588, heat-treated.
  - 2. High Strength Low-Alloy Steel, ASTM A588.
  - 3. Carbon Steel ASTM A36.

### 2.3 COMPONENTS

- A. Tie Bolts:
  - 1. 5/8 inch for 2 inch and 3 inch mechanical joints, 3/4 inch for 4 inch to 12 inch mechanical joints and flanged joints, ASTM A588, Grade B; ASTM A325, Type 3, except increase tensile strength of full-body threaded section to 40,000 pounds minimum for 5/8 inch and 60,000 pounds minimum for 3/4 inch by heat-treating (quenching and tempering) to manufacturer's reheat and hardness specifications.
  - 2. 3/4 inch for 14 inch to 24 inch mechanical joints, ASTM A588, Grade B; ASTM A325, Type 3.
  - 3. 1 inch for 30 inches and larger mechanical joints and flanged joints, ASTM A588, Grade B; ASTM A325, Type 3; except increase tensile strength of full-body thread section to 100,000 pounds minimum by heat-treating (quenching and tempering) to manufacturer's reheat and hardness specifications.
- B. Tie Nut: Hex nut for each tie bolt and tie rods; ASTM A563, Grade C3; plain, zinc plated, or galvanized.
- C. Tiepin: 3/4 inch round bar stock for use on bends and hydrants, 6-inch hairpin shape, ASTM A588; ANSI B1.1; plain, zinc plated, or galvanized.
- D. Tie Coupling: Used to extend continuous threaded rods and provided with center stop to aid installation; ASTM A588; plain, zinc plated, or galvanized.

- E. Tie Clamp: Retainer clamp for ductile iron, asbestos cement and polyvinyl chlorite, push-on pipe in front of bell; ASTM A36; ASTM A307; ASTM A563, Grade A; plain, zinc plated, or galvanized.
- F. Tie Rod: Continuous threaded rod for cutting to desired lengths; ASTM A588, Grade B; ASTM A325, Type 3; ANSI B1.1; plain zinc plated, or galvanized.
- G. Tie Bar: Steel bar used to restrain push-in plugs; ASTM A36; plain, zinc plated, or galvanized.
- H. Tie Washer: Round flat washers; ASTM A588, ASTM F436, Type 3; plain, zinc plated, or galvanized.

## 2.4 FACTORY APPLIED FINISHES – STEEL

- A. Items to be zinc plated or galvanized to meet the following requirements:
  - 1. ASTM B633 for electrodeposited coating of zinc on steel.
  - 2. ASTM A153 for galvanizing iron and steel hardware.
  - 3. Galvanizing for rolled, pressed, and forged steel shapes: ASTM A123; minimum 2.0 ounces per square foot coating thickness; galvanize after fabrication.

## PART 3 EXECUTION

### 3.1 PREPARATION

- A. Verify pipe and fittings are ready to receive work.
- B. Field measure and verify conditions.
- C. Clean surfaces of pipe and fittings to receive tied joint restraint system.

### 3.2 INSTALLATION

- A. Excavate and Backfill in accordance with Section 31 23 17.
- B. Install pipe and fittings in accordance with [Section 33 11 16.] [and] [Section 33 34 00].
- C. Install joint restraint system so joints are mechanically locked together to prevent joint separation.

### 3.3 ERECTION TOLERANCES

- A. Torque nuts on mating threaded fasteners to 45-foot pounds to 60-foot pounds for 5/8 inch nut.
- B. Torque nuts on mating threaded fasteners to 75-foot pounds to 90-foot pounds for 3/4 inch nut.
- C. Torque 1 inch nuts to 100-foot pounds to 120-foot pounds.

END OF SECTION