Section 848—Pipe Appurtenances

848.1 General Description

This section includes the requirements for all pipe appurtenances, such as:

- Rubber gaskets
- Steel-bolted couplings
- Gate valves
- Sterilizing agents
- Bituminous plastic cement

848.1.01 Related References

A. Standard Specifications

Section 106—Control of Materials

Section 843—Concrete Pipe

B. Referenced Documents

AASHTO M 198

ASTM D 2000 3AA708Z-B-13

AWWA B 300

AWWA C 500

AWWA M 11

QPL 21

848.2 Materials

848.2.01 Rubber Gaskets for Concrete Pipe

A. Requirements

1. Type

   Use rubber-type gaskets and o-rings that meet the requirements of AASHTO M 198, Type A. However, pipe used in culvert construction does not need a hydrostatic pressure test.

   Ensure that pipe meets the applicable requirements of Section 843. If Section 843 and AASHTO M 198 differ, AASHTO M 198 governs.

   Use approved gaskets and o-rings listed in QPL 21

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

The Department will accept gaskets from approved QPL sources only.

D. Materials Warranty

General Provisions 101 through 150.

848.2.02 Steel-Bolted Couplings

A. Requirements

1. Coupling Types

   Use steel-bolted couplings for joining all types of plain end pipe. Ensure the couplings have the following characteristics:

   - Wedge gasket and flared sleeve
   - One steel middle ring, two steel followers, two wedge-shaped rubber-compounded gaskets, and steel bolts
   - Dimensions and type for the size and kind of pipe to be joined, including reducers if required

2. Middle Rings
   a. Ensure that middle rings size 0.375 in (10 mm) through 3 in (80 mm) are fabricated from tubing and cold-formed to provide proper flare at each end and to receive the wedge portion of the gasket.
   b. Ensure that middle rings size 4 in (100 mm) and larger are made from either bar or plate-flash-welded, cold-formed, cold-expanded beyond the yield point of the steel to size the ring and proof-test the weld.
   c. Air-test all welded rings to ensure the weld is porous-free.
   d. Use middle rings that have a bellowed portion between the flares provided for the gaskets to accommodate pipe deflection.
3. Followers
   a. Ensure the followers meet these requirements:

Size	Fabrication
0.375 in (10 mm) through 1.5 in (40 mm)	One piece steel forgings.
Above 1.5 in (40 mm) through 5 ¼ in(130 mm)	Cold-formed, two-piece construction.
5 ¼ in(140 mm) through 20 in (500 mm)	Hot forged from a single piece circular plate & water quenched after forging for maximum strength.
Above 20 in (500 mm)	Use a special contoured mill section - circle-rolled, flash-welded and cold-expanded beyond the yield point of the steel to size the ring and proof-test the weld.
All followers	Have solid formed gasket recess, free of seams or breaks, to confine the gasket.

4. Gaskets

   Use gaskets that meet the requirements of ASTM D 2000 3AA708Z-B-13, with the following exceptions:

Color	Jet black
Surface	Nonblooming
Shore “A” Durometer hardness	75 ± 5
Tensile strength	800 psi (5.5 MPa) minimum
Elongation	175% minimum

a. Use a rubber compound that will not deteriorate from age or exposure to air under normal storage or use conditions. Use natural or synthetic rubber that does not contain reclaimed rubber.

Use gaskets that are immune to impurities such as odorants, liquid hydrocarbons, carbon dioxide, and water normally found in natural gas.

To electrically bond the pipe ends to the center ring, make a permanent bond from material that cannot corrode or deteriorate and is molded into the tip of the gasket.

5. Bolts

Use bolts that have elliptical necks and track heads. Align the elliptical neck and the elliptical hole in the follower so the bolt will not turn.

a. Ensure that the shank of the bolts has enough threads to compress the gasket.

Submit to the Engineer the manufacturer's recommended torque for tightening the bolts.

6. Coating

a. Unless otherwise specified, coat all metal parts in the shop to protect them during shipping and storage.

After installation, apply a coat of coal-tar enamel to the coupling and uncoated ends of the pipe, according to AWWA M 11.

7. Certification

Submit a certification from the pipe, gasket, or joint manufacturer to the Engineer, according to Subsection 106.05, "Materials Certification." The certificate shall describe the physical properties of the rubber gasket and show the results on hydrostatic tests of the gasket and pipe used in the Work.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

The Department will accept the material based on the certification.

D. Materials Warranty

General Provisions 101 through 150.

848.2.03 Gate Valves

A. Requirements

Use gate valves that meet the requirements of AWWA C 500.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

The Department will accept the material based on the certification.

D. Materials Warranty

General Provisions 101 through 150.

848.2.04 Sterilizing Agents

A. Requirements

Use hypochlorites that meet the requirements of AWWA B 300 for sterilizing water systems.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

General Provisions 101 through 150.

D. Materials Warranty

General Provisions 101 through 150.

848.2.05 Bituminous Plastic Cement

A. Requirements

1. Type

   Use a bituminous compound composed of steam-refined petroleum asphalt or refined coal tar that is dissolved in a suitable solvent and stiffened with a mineral filler with short mineral fibers.

   a. Ensure that the material is smooth and uniform, not thick, livered, or separating to a degree that it cannot be remixed by stirring.

   Ensure that the material can be applied with a trowel, putty knife, or caulking gun without pulling or drawing and has good adhesive and cohesive properties when applied to joint surfaces.

   You may apply the material cold to seal the joints of bell-and-spigot or tongue-and-groove storm or culvert pipe.

   Ensure that the bituminous plastic cement sets to a tough, plastic coating, without blistering when applied 1/16 to 1/8 in (2 to 3 mm) thick on a tinned metal panel and cured at room temperature for 24 hours.

   Use bituminous plastic cement with these characteristics:

	Minimum	Maximum
Grease cone penetration	175.00	250
Weight, lbs/gal (kg/L)	9.75 (1.2)	—
Non-volatile, percent	75.00	—
Ash, by ignition, percent by weight	25.00	45

2. Use approved materials from those listed on QPL 21.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test as follows:

Test	Method
Grease cone penetration	AASHTO T 187
Non-Volatile	ASTM D 2939
Ash	ASTM D 128

D. Materials Warranty

General Provisions 101 through 150.

848.2.06 Preformed Plastic Gaskets

A. Requirements

1. Use cold-applied plastic gaskets that meet the requirements of AASHTO M 198, Type B to seal tongue-and-groove concrete culverts, precast manhole, and sewer pipes. However, do not perform the Flash Point COC and Fire Point COC tests.
2. Use approved materials from those listed in QPL 21.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

The Department will accept materials only from facilities listed in QPL 21

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D. Materials Warranty

General Provisions 101 through 150.