



Florida Department of Transportation

JEB BUSH
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

DENVER J. STUTLER, JR.
SECRETARY

May 25, 2006

Mr. Greg Williams
Program Operations Engineer
Federal Highway Administration
545 John Knox Road, Suite 200
Tallahassee, Florida 32303

Re: Office of Design, Specifications
Section 449
Proposed Specification: 4490600 – Requirements for Pipe Joints when Rubber Gaskets
are to be Used.

Dear Mr. Williams:

We are submitting, for your approval, two copies of a proposed Supplemental Specification for the Requirements for Pipe Joints when Rubber Gaskets are to be Used.

This change was proposed by Linda Seigle of the State Drainage Office to resolve conflict between Department documents and for clarification.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via Email to SP965DB or duane.brautigam@dot.state.fl.us.

If you have any questions relating to this specification change, please call Duane F. Brautigam, State Specifications Engineer at 414-4110.

Sincerely,

Signature on File

Duane F. Brautigam, P.E.
State Specifications Engineer

DFB/ft

Attachment

cc: General Counsel
Florida Transportation Builders' Assoc.
State Construction Engineer

REQUIREMENT FOR PIPE JOINTS WHEN RUBBER GASKETS ARE TO BE USED.

(REV 3-9-06)

ARTICLE 449-6 (pages 415 and 416) is deleted and the following substituted:

449-6 Requirements For Pipe Joints When Rubber Gaskets Are To Be Used:

449-6.1 Design of Joint: Use pipe of the joint of the bell-and-spigot type or the double spigot and sleeve type, meeting the requirements called for in the Design Standards. Ensure the joint is so proportioned that the spigot, or spigots, will readily enter the bell or sleeve of the pipe.

Ensure the joint ring forms for forming the joint surface are made of either heavy steel, cast iron, or aluminum, and accurately machined to the dimensions of the joint. They must be a true circular form within a tolerance of 1/32 inch [~~1 mm~~]. Dimensional checks of joint ring form will indicate for each size pipe a length of spigot, or tongue, not more than 1/8 inch [~~3 mm~~] shorter than the bell, or groove, depth. The pipe will be so manufactured that joint surfaces are concentric with the inside of the pipe within a tolerance of 3/32 inch [~~2.5 mm~~]. The shape and dimensions of the joint must be such as to provide compliance with the following requirements:

(a) The joint must be so dimensioned that when the gasket is placed on the spigot it will not be stretched more than 20% of its original length, or the maximum stretch length that is recommended by the manufacturer, whichever is lower.

(b) The space provided for the gasket must be a groove in the spigot end of the pipe and such space, when the joint is made, it cannot be more than 110% of the volume of the gasket.

(c) The joint must be designed so that when the outer surface of the spigot and the inner surface of the bell come into contact at some point on the periphery, the diametric deformation in the gasket at the point of contact cannot be greater than 50% of the normal gasket diameter, and the diametric deformation in the gasket at a point opposite the contact point cannot be less than 20% of the normal gasket diameter.

(d) When the pipes are joined, there must be parallel surfaces on both the bell and the spigot, extending from the outside edge of the gasket toward the bell face for a distance of not less than 3/4 inch [~~19 mm~~]. These parallel surfaces cannot be farther apart than 1/8 inch [~~3 mm~~], when the spigot is centered in the bell. The tapers on these surfaces cannot exceed three degrees.

(e) The inside surface of the bell at the end of the bell must be flared to facilitate joining the pipe sections without damaging or displacing the gasket.

449-6.2 When Rubber gaskets are Used: *Ensure that the pipe joints have been tested at the plant hydrostatically at the specified pressure using test methods in ASTM C 443 and witnessed by the State Materials Office* ~~The gasket is the sole element relied on to maintain a tight joint. Perform hydrostatic tests on pipe joints at the plant in accordance with ASTM C 443 [ASTM C 443M] test methods. Soil tight joints must be watertight to 2 psi [13.8 kPa]. Watertight joints must be watertight to 5 psi [34.5 kPa] unless a higher pressure rating is required in the plans.~~

449-6.3 When Profile Rubber Gaskets are Used: ~~The gaskets will be the sole element relied on to maintain a tight joint.~~ Ensure the joint design meets the requirements set forth in Article 7 of ASTM C 443 ~~[ASTM C 443M]~~.

449-6.4 Tolerances in Imperfections, and Permissible Repairs for Joint of Concrete Gasketed Pipe: Ensure that all surfaces of near-contact of the jointed pipes are free from air holes, chipped or spalled concrete, laitance, and other such defects.

Pipes showing minor manufacturing imperfections or handling injuries to the bell or spigot may be acceptable if such defects are acceptably repaired as prescribed below.

Individual air holes (trapped air), or spalled areas with a length of up to one-half the pipe radius, or 12 inches ~~[300 mm]~~ whichever is less, may be repaired by careful use of a hand-placed, stiff, pre-shrunk, 1-to-1 mortar of cement and fine sand, and with no additional preparation other than a thorough washing with water of the defect. Curing will be done either by moisture curing under wet burlap or by application of an approved membrane curing compound. Such repaired pipe which is sound, properly finished and cured, and which otherwise conforms to specification requirements will be acceptable.

Exposed reinforcing and minor spalling in the spigot groove may be accepted if repaired in the following manner: The spalled areas will be chipped back to solid concrete. Exposed reinforcing will be cleaned of all laitance and scale. The entire area is to be coated with an approved epoxy at a thickness of 5 to 10 mils ~~[125 to 250 μ m]~~. The coating must be smooth and conform to the shape of the groove. The epoxy must be a Type F-1 as specified in Section 926.

REQUIREMENT FOR PIPE JOINTS WHEN RUBBER GASKETS ARE TO BE USED.(REV 3-9-06)

ARTICLE 449-6 (pages 415 and 416) is deleted and the following substituted:

449-6 Requirements For Pipe Joints When Rubber Gaskets Are To Be Used:

449-6.1 Design of Joint: Use pipe joint of the bell-and-spigot type or the double spigot and sleeve type, meeting the requirements called for in the Design Standards. Ensure the joint is so proportioned that the spigot, or spigots, will readily enter the bell or sleeve of the pipe.

Ensure the joint ring forms for forming the joint surface are made of either heavy steel, cast iron, or aluminum, and accurately machined to the dimensions of the joint. They must be a true circular form within a tolerance of 1/32 inch. Dimensional checks of joint ring form will indicate for each size pipe a length of spigot, or tongue, not more than 1/8 inch shorter than the bell, or groove, depth. The pipe will be so manufactured that joint surfaces are concentric with the inside of the pipe within a tolerance of 3/32 inch. The shape and dimensions of the joint must be such as to provide compliance with the following requirements:

(a) The joint must be so dimensioned that when the gasket is placed on the spigot it will not be stretched more than 20% of its original length, or the maximum stretch length that is recommended by the manufacturer, whichever is lower.

(b) The space provided for the gasket must be a groove in the spigot end of the pipe and such space, when the joint is made, it cannot be more than 110% of the volume of the gasket.

(c) The joint must be designed so that when the outer surface of the spigot and the inner surface of the bell come into contact at some point on the periphery, the diametric deformation in the gasket at the point of contact cannot be greater than 50% of the normal gasket diameter, and the diametric deformation in the gasket at a point opposite the contact point cannot be less than 20% of the normal gasket diameter.

(d) When the pipes are joined, there must be parallel surfaces on both the bell and the spigot, extending from the outside edge of the gasket toward the bell face for a distance of not less than 3/4 inch. These parallel surfaces cannot be farther apart than 1/8 inch, when the spigot is centered in the bell. The tapers on these surfaces cannot exceed three degrees.

(e) The inside surface of the bell at the end of the bell must be flared to facilitate joining the pipe sections without damaging or displacing the gasket.

449-6.2 When Rubber gaskets are Used: Ensure that the pipe joints have been tested at the plant hydrostatically at the specified pressure using test methods in ASTM C 443 and witnessed by the State Materials Office.

449-6.3 When Profile Rubber Gaskets are Used: Ensure the joint design meets the requirements set forth in Article 7 of ASTM C 443.

449-6.4 Tolerances in Imperfections, and Permissible Repairs for Joint of Concrete Gasketed Pipe: Ensure that all surfaces of near-contact of the jointed pipes are free from air holes, chipped or spalled concrete, laitance, and other such defects.

Pipes showing minor manufacturing imperfections or handling injuries to the bell or spigot may be acceptable if such defects are acceptably repaired as prescribed below.

Individual air holes (trapped air), or spalled areas with a length of up to one-half the pipe radius, or 12 inches whichever is less, may be repaired by careful use of a hand-placed, stiff, pre-shrunk, 1-to-1 mortar of cement and fine sand, and with no additional preparation other than a thorough washing with water of the defect. Curing will be done either by moisture curing under wet burlap or by application of an approved membrane curing compound. Such repaired pipe which is sound, properly finished and cured, and which otherwise conforms to specification requirements will be acceptable.

Exposed reinforcing and minor spalling in the spigot groove may be accepted if repaired in the following manner: The spalled areas will be chipped back to solid concrete. Exposed reinforcing will be cleaned of all laitance and scale. The entire area is to be coated with an approved epoxy at a thickness of 5 to 10 mils. The coating must be smooth and conform to the shape of the groove. The epoxy must be a Type F-1 as specified in Section 926.