



Member of the FM Global Group

Approval Standard for Pipe Joints and Anchor Fittings for Underground Fire Service Mains

Class Number 1620

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Foreword

The FM Approvals certification mark is intended to verify that the products and services described will meet FM Approvals' stated conditions of performance, safety and quality useful to the ends of property conservation. The purpose of Approval Standards is to present the criteria for FM Approval of various types of products and services, as guidance for FM Approvals personnel, manufacturers, users and authorities having jurisdiction.

Products submitted for certification by FM Approvals shall demonstrate that they meet the intent of the Approval Standard, and that quality control in manufacturing shall ensure a consistently uniform and reliable product. Approval Standards strive to be performance-oriented. They are intended to facilitate technological development.

For examining equipment, materials and services, Approval Standards:

- a) must be useful to the ends of property conservation by preventing, limiting or not causing damage under the conditions stated by the Approval listing; and
- b) must be readily identifiable.

Continuance of Approval and listing depends on compliance with the Approval Agreement, satisfactory performance in the field, on successful re-examinations of equipment, materials, and services as appropriate, and on periodic follow-up audits of the manufacturing facility.

FM Approvals LLC reserves the right in its sole judgment to change or revise its standards, criteria, methods, or procedures.

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I INTRODUCTION

- 1.1 This standard covers cast grey iron, ductile iron and asbestos-cement pipe joints and anchor fittings that are used in underground fire protection service mains.
- 1.2 FM Approval is based upon evaluation of the product and the manufacturer in three major areas:
- examination and tests on production samples are performed to evaluate (1) suitability of the product, (2) proper operation and performance of the product as specified by the manufacturer and required by FM Approvals and (3) reasonable durability and reliability of the product.
 - an examination of manufacturing facilities and quality control procedures is conducted to evaluate the manufacturer's ability to produce the product. This includes an evaluation of the production facilities, a specific evaluation of the procedures employed to ensure proper quality control and a check of sufficient availability of parts and service. These examinations are repeated as part of FM Approvals' product follow-up program.
 - satisfactory field experience is also an important requirement. Unsatisfactory field experience may necessitate withdrawal of FM Approval.
- 1.3 The requirements of this standard are guidelines reflecting current FM Approval tests and practices. Items which do not precisely conform to these requirements may be Approved if shown to perform as well as or superior to Approved items and to meet the intent of this standard. In the same way, items that do conform to these requirements may not be Approved if other factors seriously affect performance.

II GLOSSARY

Bell and Spigot Pipe – A pipe design where one end of a length of pipe is straight (spigot) and the other larger end is bell shaped. The spigot end of one pipe is designed to fit into the bell end of another.

Standardized Mechanical Joint Pipe – A pipe design where one end of a pipe length is straight (spigot) and the other larger end is bell shaped and flanged. The spigot end of one pipe is inserted into the bell end of the connecting pipe.

Standardized Mechanical Joint – A method of joining standard mechanical joint pipe by means of a metal gland attached to the flanged end of the pipe which, when tightened, forces a gasket into the joint.

Standardized Mechanical Joint Retainer Gland – An anchor fitting with a flange shape and function which fits over the spigot end of standardized mechanical joint pipe. The gland is secured to the spigot by tightening its set screws against the pipe wall. Bolt holes along the flanged section of the gland provide the means by which it is secured to the flanged bell of standardized mechanical joint pipe.

Push-On Joint – A method of joining pipe by forcing the spigot end of a pipe into the bell of another pipe suitably equipped with a "push-on" gasket. As the spigot end passes into the bell end of the receiving pipe, the "push-on" gasket is forced between the spigot and bell end of the pipe joint.

Lead Joint – A method of joining bell and spigot pipe by inserting the spigot into the bell and then inserting gasketing material into the joint and pouring and packing lead in the space between the spigot and bell.

Self Locking Joint – A combination anchor fitting and joint gasket. A rubber gasket which contains toothed metal strips inserted along the perimeter of the gasket. The gasket is initially inserted into the bell end of the joint. As the spigot end is forced into the bell and through the gasket, the metal teeth engage the grooved section of the spigot so that the joint is adequately secured.

Tie Rods – A rod type anchor fitting that secures standardized mechanical joint pipe by the connection of a bolt to the flanges of each pipe. When bell and spigot pipe is used, tie rods can be connected to pipe clamps which are readily attached to the pipe wall. For anchorage purposes, clamps serve the same function as flanges on mechanical joint pipe.

III GENERAL DESCRIPTION

3.1 Pipe Joints

Pipe joints are watertight means for connecting the components of underground fire protection piping systems. The following are the most common types of joints:

- Mechanical
- Push-on
- Lead or lead-compound

Other types may be tested and Approved if they meet the requirements of this standard.

3.2 Anchor Fittings

Anchor fittings are used at bends, tees, plugs and hydrants in pipelines under pressure where there is an unbalanced thrust that must be overcome to keep joints from separating. The most common types of anchor fittings used with their respective type of pipe are:

<i>Anchor Fitting</i>	<i>Pipe Type</i>
Standardized mechanical joint retainer gland	Standardized mechanical joint pipe
Self-locking joint	Cast-gray-iron and ductile-iron pipe
Tie rods and pipe clamps	Standardized mechanical joint pipe; bell and spigot pipe

Other types of anchor fittings may be tested and Approved if they meet the requirements of this standard.

IV PERFORMANCE REQUIREMENTS

4.1 Pipe Joints

Pipe joints shall provide a durable, watertight seal and a secure connection between piping components. They shall withstand the internal and external forces expected by application of rated working pressure, pressure surges, building movement due to settling, earth loads and vehicle loads.

4.2 Anchor Fittings

Anchor fittings shall provide a durable restraint against movement of an underground piping system due to rapid changes in water velocity within the pipe to which the fitting is attached.

V DESIGN REQUIREMENTS

- 5.1 All pipe joints and anchor fittings shall be designed to fit standard sizes of the type of pipe with which they will be used.
- 5.2 Installation of a joint shall not require a torque in excess of 100 lb ft (135.5 N-m).
- 5.3 All materials used in the construction of the pipe joint and associated anchor hardware shall be suitable for the intended application.
- 5.4 The rated working pressure shall be 175 psi (1206.6 kPa) or greater.

VI MARKING REQUIREMENTS

- 6.1 All joints and associated hardware shall be plainly marked with the following information:
 - Name or trademark of the manufacturer
 - Identifying model or part number
 - Size
- 6.2 Products or parts which cannot be completely marked due to their size shall have complete identification on the shipping container, including the complete name and address of the manufacturer.
- 6.3 The manufacturer of pipe joints and anchor fittings shall furnish appropriate installation instructions. Each shipping container or tags attached to the parts shall contain these instructions.

VII TESTS

7.1 General

- 7.1.1 The extent of test work involved and samples needed will be determined after examination of design drawings. Tests other than those listed in this standard, may be required. The extent of additional tests will be at the discretion of FM Approvals.
- 7.1.2 Bell and spigot pipes supplied for testing shall have the inside diameter of the bell end machined to maximum tolerance and have the outside diameter of the spigot end machined to minimum tolerance.
- 7.1.3 Anchor assemblies will be tested utilizing two pipe sections with suitable end fittings.
- 7.1.4 Pipe joints will be tested by using suitable anchor assemblies and end fittings.
- 7.1.5 Rubber or rubber-like materials utilized in a pipe joint may be subjected to a special investigation to evaluate their suitability.
- 7.1.6 Manufacturer's installation instructions will be followed for all test arrangements.

7.2 Performance

7.2.1 Pipe Joints

- 7.2.1.1 Sample pipe joints will be subjected to a hydrostatic pressure of 700 psi (4826.4 kPa) or four (4) times the rated working pressure, whichever is greater, for at least 5 minutes. No cracking or permanent distortion shall result from this test.
- 7.2.1.2 The following two test arrangements will be used to determine compliance with paragraph 7.2.1.1:
 - Sample joints will be aligned and held in place so that they cannot deflect under pressure.
 - Sample joints will be angled in accordance with the manufacturer's recommendations for maximum allowable deflection and held against movement.
- 7.2.1.3 Gasket tightness shall be evaluated by the application of two (2) times the rated working pressure or 350 psi (2413 kPa), whichever is greater, for a period of 5 minutes. No observable leakage shall occur. Test arrangements will be as outlined in paragraph 7.2.1.2.

7.2.2 Anchor Fittings

Sample anchor fittings, installed at a pipe joint, will be subjected to a test in which the pipe is hydrostatically pressurized to 700 psi (4826.4 kPa) or four (4) times rated working pressure, whichever is greater, and held for a period of at least 5 minutes. The anchor fitting shall remain intact and prevent the joint from separating.