

Internal Use Only

INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS

STANDARD FOR

GAS SUPPLY CONNECTORS FOR MANUFACTURED HOMES¹

IAPMO TS 9-2003

1. SCOPE

- 1.1** This Standard applies to connectors for outdoor use consisting of flexible tubing depending on all-metal construction for gas tightness and having a fitting at each end provided with tapered pipe threads for connecting manufactured home¹ gas piping to a manufactured home lot gas outlet or a crossover in multiple unit manufactured homes as permitted in the Federal Standards.
- 1.2** This Standard covers connectors having a maximum rated capacity of two hundred and fifty thousand (250,000) BTU/hr. except that listed gas connectors, complying with ANSI² Z21.24 (latest edition), Metal Connectors for Gas Appliances, may be certified under this Standard provided they also meet the requirements for a minimum rated capacity of one hundred thousand (100,000) BTU/hr.

2. TEST SAMPLES

- 2.1** Connectors submitted for examination under this Standard shall be representative samples.
- 2.2** Eight (8) samples shall be provided: Three (3) six (6) ft. long; three (3) two (2) ft. long; and two (2) one (1) ft. long.

3. MATERIALS

- 3.1** Materials used in the construction of connectors and fittings shall comply with Table 1, within commercial tolerances; and satisfactory evidence of this fact shall be furnished to the testing agency for all tubing and fittings.

TABLE 1
MATERIAL FOR TUBING AND FITTINGS

<u>ITEM</u>	<u>SPECIFICATION</u>
Brass Tubing and Flare Ferrule	70% Cu. min. - 85% Max.
Brass Machine Fittings	60% Cu. min. - 85% Max.
Stainless Steel Tubing	300 Series Stainless Steel or equivalent
Carbon Steel fittings	Zinc Plating with Chromate Coating

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- 3.2** For manufactured home cross-over connectors, a full port ball valve complying with ANSI Z21.15 or a quick disconnect device complying with ANSI Z21.41 may be included. Satisfactory evidence of compliance shall be furnished to the testing agency.

4. COATINGS

- 4.1** The manufacturer shall supply evidence suitable to the testing agency that materials used in the exterior construction of a connector are resistant to deterioration from the following conditions or substances:
- (a) Moisture
 - (b) Dirt
 - (c) Ozone
 - (d) Fertilizers
 - (e) Minerals and vegetable oils and grease
 - (f) Common household chemicals likely to be used outdoors
 - (g) Prolonged exposure to sunlight
 - (h) Prolonged exposure to freezing temperatures

5. TUBING STRUCTURE

- 5.1** Tubing shall be constructed of metal of uniform thickness (commercial tolerances allowed), but no section of such tubing shall be less than one-thousandths (.010) in. in thickness. Tubing shall be free from dents, flaws or other defects.

6. CONNECTOR DIMENSIONS

- 6.1** The nominal length of a connector shall refer to the overall length, including fittings. The actual length of any sample shall be within $\pm$ two (2) in. of its nominal indicated length.

7. FITTINGS - DESIGN AND DIMENSIONS

- 7.1** Fittings shall be faced or otherwise finished externally to provide an adequate hexagonal wrench grip.
- 7.2** Surfaces of fittings, which normally may come in contact with the tubing, shall have a smooth finish.
- 7.3** Thread on pipe-end connections of fittings shall be three-quarters (3/4) in. minimum NPT conforming to the ANSI/ASME³ B1-20.1 (latest edition), Pipe Threads General

Purpose (inch).

- 7.4** Both ends of each connector shall be equipped with a union fitting.
- 7.5** Connectors shall not incorporate a connector nut which can mistakenly be assembled to a pipe thread.
- 7.6** Union seats shall not depend upon gaskets for gas tightness.

8. GENERAL

- 8.1** The construction of tubing and fittings, not specifically covered by this Standard, shall be in accordance with reasonable concepts of safety, substantiality and durability.
- 8.2** All specifications as to construction set forth herein maybe satisfied by the construction actually prescribed or such other construction as will provide at least equivalent performance.
- 8.3** A ferrule or other end fitting that is affixed by soldering, brazing or welding to the flexible tube shall have a centering or retention skirt that shall extend to a minimum of one-eighth (1/8) in. into or over the tube to form a shelf and cup to engage with the tube end.
- 8.4** Porosity in brazes and welds shall be held to a minimum consistent with good manufacturing practice.
- 8.5** Connectors shall be free from scale, loose oxides and acid residue.
- 8.6** The connector shall be provided with a protective coating. The connector shall comply with this Standard with or without the coating except for Section 4.1. The coating shall be such that it shall not continue to burn after an ignition source has been removed; it shall not react with the metal of the connector and shall have no adverse effect upon the performance of the connector. This test shall be done as described in Section 11.1.

9. INSTRUCTIONS

- 9.1** Instructions, covering proper usage and installation, shall be attached to each connector. The instructions shall include, as a minimum, statements to the effect that:
 - (a) The final assembly shall be tested for leaks.
 - (b) Contact with foreign objects or substances shall be avoided.
 - (c) This connector is for connecting manufactured home gas pipe to the gas supply

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or as a crossover in multiple wide units.

(d) The capacity of this connector on natural gas is (rating) in BTU/hr.

(e) The connector shall not be kinked, twisted or torqued.

(f) Connectors are not designed for continuous movement.

9.2 The instructions shall be sufficiently durable and attached in a manner that will reach the individual who will install the connector. A tag, wired or affixed to the connector, or a label wrapped around and affixed to the connector, will be acceptable. If a tag or a label is used, its minimum dimensions should be two (2) in. by four (4) in.

9.3 These instructions shall be examined by the testing agency for accuracy and compatibility with the results of test from a technical standpoint.

10. MARKINGS

10.1 Connectors shall bear a permanent marking on either a non-removable ring or a portion of a non-removable fitting not subject to tool usage, on which shall appear the following:

(a) Manufactured home connector manufactured by: (Manufacturer's name)

(b) Symbol of the organization making the tests for compliance with this Standard.

10.2 Removable end fittings of connectors shall be stamped, etched or otherwise permanently marked with the connector manufacturer's recognizable trademark or symbol.

11. PERFORMANCE

11.1 Non-Metallic Exterior Coating

11.1.2 Method of Test

11.1.2.1 This test shall be conducted in a draft-free location.

11.1.2.2 One two (2) feet sample connector shall be used for test purposes. The connector shall not be exposed to a relative humidity greater than seventy (70) percent during the twenty-four (24) hour period prior to the test.

11.1.2.3 The connector under test shall be supported at one end and hung with its axis vertical.

11.1.2.4 A Bunsen burner having a nominal three-eighths (3/8) inch diameter tube and with means of controlling the primary air and gas input shall be used as an ignition source. The gas at the burner shall be ignited and adjusted to produce a flame two