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ASME A112.19.5-1999

[Revision of ANSI A112.19.5-1979(R1990)]

TRIM FOR WATER-CLOSET BOWLS, TANKS, AND URINALS

AN AMERICAN NATIONAL STANDARD



The American Society of Mechanical Engineers

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The American Society of Mechanical Engineers

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TRIM FOR WATER-CLOSET BOWLS, TANKS, AND URINALS

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FOREWORD

In a letter dated April 8, 1965, the Plumbing Fixture Manufacturers Association requested the cooperation of the Office of Commodity Standards [now the Office of Engineering Standards Services, National Institute of Standards and Technology (NIST)] in the revision of Commercial Standard CS172-50, Brass Trim for Water-Closet Bowls, Tanks, and Urinals (Dimensional Standards) and submitted a draft of the proposed revision prepared by the Standards Committee of that organization. The principal changes in the revision consisted of the standardization of the threads of such trim to comply with latest requirements of Screw Thread Standards for Federal Services and American Standards Association Specification B1.1-1960, Screw Threads (R1974), and B2.1-1960, Pipe Threads (Except Dryseal) (R1968). The word "brass" was deleted from the title of the standard to provide latitude for the use of plastics for such trim.

A draft of the recommended revision was prepared by the Office of Commodity Standards and approved by a majority of the Standing Committee. Subsequently, the Office of Commodity Standards circulated the Recommended Revision of Commercial Standard CS172-50, Trim for Water-Closet Bowls, Tanks, and Urinals (Dimensional Standards), TS-5677A, to the trade for comment and acceptance on January 21, 1966. Acceptances were received representing a satisfactory majority of the industry. The Office of Engineering Standards Services announced on September 26, 1966 that the standard had been approved for publication and designated Product Standard PS6-66, effective November 1, 1966. In 1977, American National Standard Committee A112, Panel 19, undertook to revise and update the standard to reflect current industry practice. The new standard was approved as ANSI A112.19.5 on January 4, 1979. In accordance with the then National Bureau of Standards (NBS) policy to avoid duplication of standardization activities by nationally recognized consensus standards-developing bodies, NBS withdrew PS6-66.

In 1996, The American Society of Mechanical Engineers (ASME) A112.19.5 Task Group began to revise the standard to update it with current practice. The task group moved the requirements for the fill valve shank, locknut, and coupling nut from this Standard to the American Society of Sanitary Engineers (ASSE) 1002, Performance Requirements for Anti-Siphon Fill Valves (Ballcocks) for Gravity Water Closet Flush Tanks. Also, the exterior dimensions for spud and flush valve locknuts and 2 in. coupling nuts were deleted from the standard to facilitate the use of new materials; and performance requirements were added for assembling flush valves as an alternative to a thread and locknut.

Suggestions for improvement of this Standard will be welcomed. They should be sent to The American Society of Mechanical Engineers; Attn: Secretary, A112 Main Committee; Three Park Avenue; New York, NY 10016.

This Standard was approved as an American National Standard on January 12, 1999.

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TRIM FOR WATER-CLOSET BOWLS, TANKS, AND URINALS

1 GENERAL

1.1 Scope

This Standard establishes criteria for those items of trim for water-closet bowls, tanks, and urinals known as spuds, locknuts for spuds, flush valves, and flush elbows. Requirements for fill valves (ballcocks) are defined in ANSI/ASSE 1002.

This Standard does not address the compatibility of materials. Nothing stated herein shall preclude the production of special design flush valves with unique non-standard features for use in low consumption plumbing fixtures.

1.2 Units of Measurement

Values are stated in the International System of Units (SI) and U.S. Customary units. The U.S. Customary units shall be considered as the standard.

2 REFERENCE STANDARDS

The following documents form a part of this Standard to the extent specified herein. The latest issue shall apply.

ANSI/ASSE 1002, Water Closet Flush Tank Ballcocks

Publisher: American Society of Sanitary Engineers (ASSE), 28901 Clemens Road, Westlake, OH 44145

ASME B1.20.1, Pipe Threads, General Purpose (Inch)

Publisher: The American Society of Mechanical Engineers (ASME), Three Park Avenue, New York, NY 10016

ASTM F 409, Thermoplastic Accessible and Replaceable Plastic Tube and Tubular Fittings

Publisher: American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA 19428

3 DESIGN REQUIRMENTS

Thread dimensions shall be as given in Tables 1 and 2. The information provided in Appendix A is the result of a series of calculations that are specified in ASME B1.20.1. Dimensions for regular and reducing spuds shall be as shown in Tables 1A, 1B, 2A, and 2B.

Standard flush valves for gravity flush tanks shall conform to the dimensions of Fig. 1.

Flush elbows shall conform to the dimensions in Fig. 2.

4 PERFORMANCE REQUIREMENTS

4.1 Dimensional Criteria for Spuds

Dimensions for spuds shall be as shown in Tables 1 and 2. Thread dimensions shall be 2-11.5 NPSM-1, $1\frac{1}{2}$-11.5 NPSM-1, $1\frac{1}{4}$-11.5 NPSM-1, and $\frac{3}{4}$-14 NPSM-1 in accordance with ASME B1.20.1. (All thread dimensions are Class 1.) Thread dimensions shall be inspected using ring and plug gages.

4.2 Flush Valve — Means of Assembly

4.2.1 If a flush valve is threaded and is intended to be assembled to the fixture using a flush valve nut, the threads shall be either:

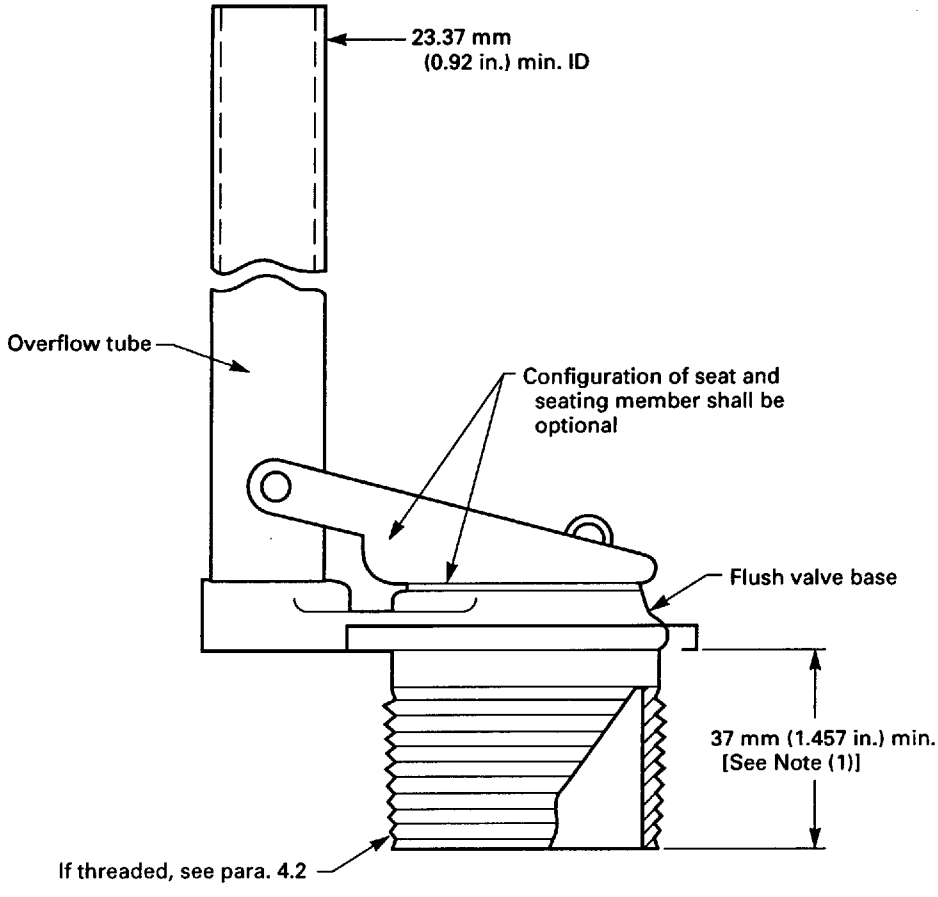
(a) 2-11.5 NPSM Class 1 in accordance with ASME B1.20.1. They shall be inspected using ring and plug gages; or

(b) an alternated thread configuration with a maximum outside diameter of 60 mm (2.37 in.). The flush valve and flush valve nut that use an alternate thread configuration shall be capable of being tightened to 14 N·m (10 lbf-ft) of torque when tested in accordance with para. 5.1.2.

4.2.2 If a flush valve is to be assembled to the flush tank by any means other than a threaded attachment, it shall withstand a pull-out force of 267 N (60 lbf) when tested in accordance with para. 5.2. The joint between the fixture and flush valve shall not leak when tested in accordance with para. 5.3.

Flush valves assembled to one-piece water closets by other means shall only be subjected to the leak test.

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NOTE:
(1) The minimum shall be permitted to vary for close-coupled tanks.

FIG. 1 STANDARD FLUSH VALVE FOR GRAVITY FLUSH TANKS

5 TEST PROCEDURES

5.1 Flush Valve Assembly — Alternate Thread Torque Test

5.1.1 Criteria. The flush valve and flush valve nut with an alternative thread shall withstand a torque of 14 N·m (10 lbf-ft).

5.1.2 Test Method. Using a smooth 13 mm (0.5 in.) thick aluminum plate with a 61 mm (2.375 in.) diameter hole bored through it, assemble the flush valve to the plate using the flush valve nut. Tighten the flush valve nut to a torque of 14 N·m (10 lbf-ft). Wait one minute and disassemble the flush valve and flush valve nut and examine for signs of damage.

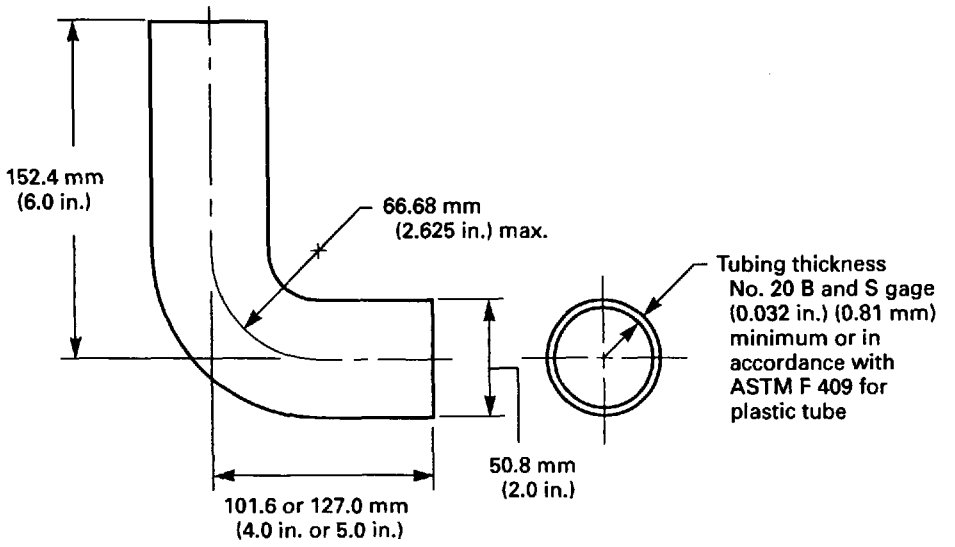
5.1.3 Performance Requirement. The flush valve and flush valve nut shall not have jumped threads nor shall they show signs of damage when disassembled.

5.2 Flush Valve Assembly — Nonthreaded Assembly Test

5.2.1 Criteria. The flush valve shall withstand a pull-out force of 267 N (60 lbf).

5.2.2 Test Method. Assemble the flush valve in an appropriate fixture and mount the fixture normally. A 267 N (60 lbf) vertical force shall be applie to the flush valve and held for one minute.

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GENERAL NOTE: A locknut and washer assembly within the elbow shall be permitted.

FIG. 2 FLUSH ELBOWS

5.2.3 Performance Requirement. The flush valve shall not pull loose from the fixture nor shall it show signs of damage.

5.3 Flush Valve Assembly — Threaded Leak Test

5.3.1 Criteria. The joint between the fixture and the flush valve shall not leak.

5.3.2 Test Method. Assemble the flush valve into a 61 mm (2.375 in.) diameter hole in the floor of a container that is at least 534 mm (21 in.) tall from the floor to the lowest spill point. Fill the container with water to a height of 534 mm (21 in.) measured from the container floor. Wait for 10 minutes and inspect for leaks between the flush valve and the container.

5.3.3 Performance Requirement. No water shall leak from the joint between the flush valve and the container. Leakage through the flapper opening shall be disregarded.

6 IDENTIFICATION

Flush valves shall be marked with the manufacturer's name or registered trademark; or, in case of private labeling, of the customer for whom the unit was manufactured. This mark shall be legible, readily identified, and permanently affixed.

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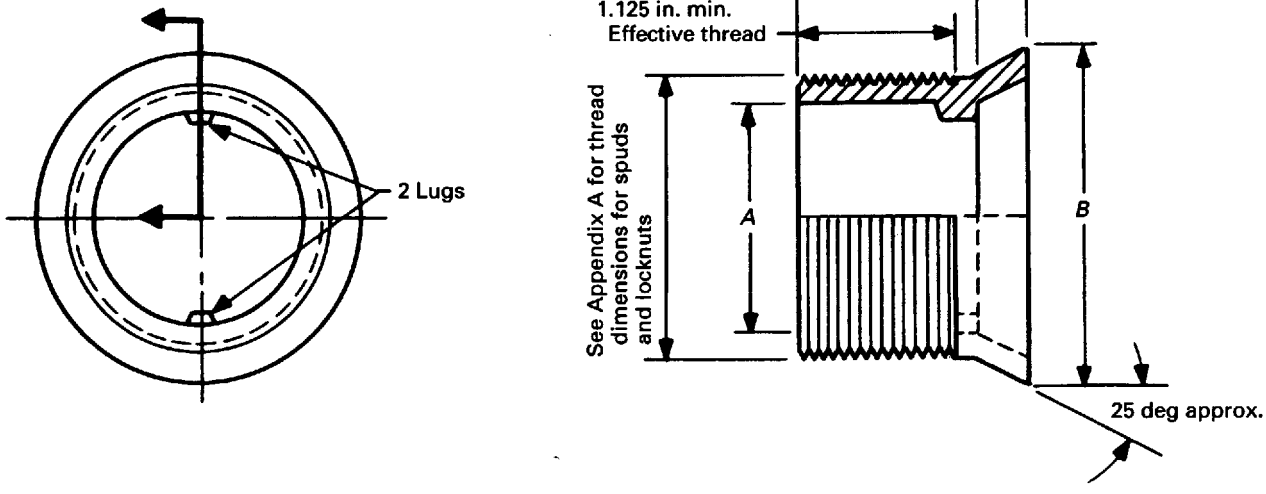


TABLE 1A DIMENSIONS OF REGULAR SPUDS (in.)

Nominal Spud Size	A, in.		B, in.		C, in. (Nominal)
	Maximum	Minimum	Maximum	Minimum	
2	2.06	2.03	2.72	2.62	1.75
1½	1.59	1.53	2.25	2.16	1.62
1¼	1.31	1.28	2.00	1.93	1.62

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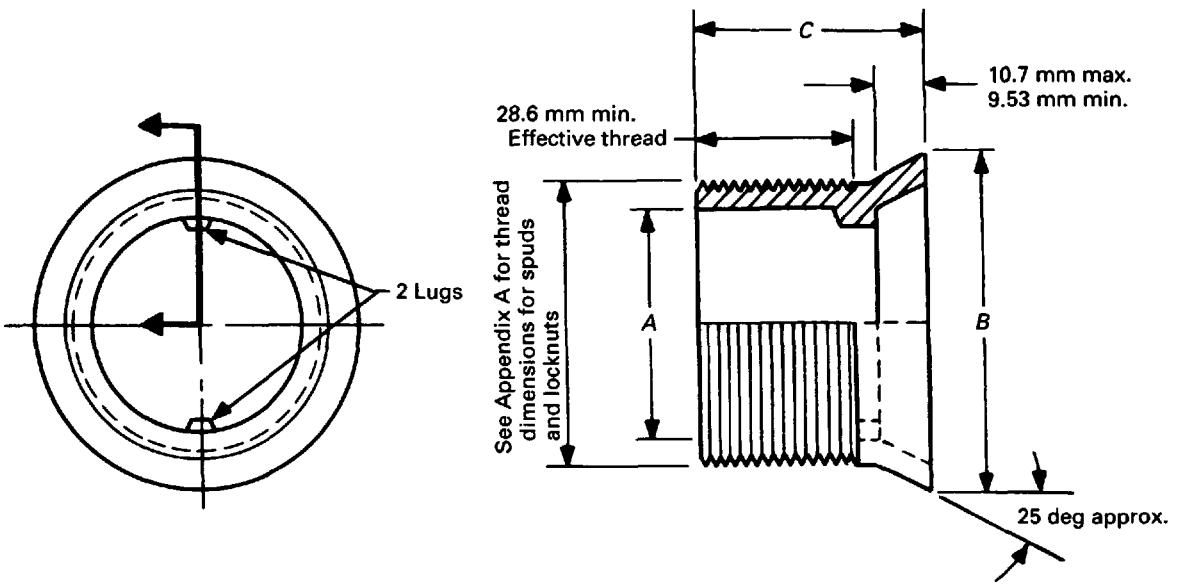


TABLE 1B DIMENSIONS OF REGULAR SPUDS (mm)

Nominal Spud Size	A, mm		B, mm		C, mm (Nominal)
	Maximum	Minimum	Maximum	Minimum	
2	52.3	51.6	69.1	66.5	44.5
1½	40.4	38.9	57.2	54.9	41.1
1¼	33.3	32.5	50.8	49.0	41.1

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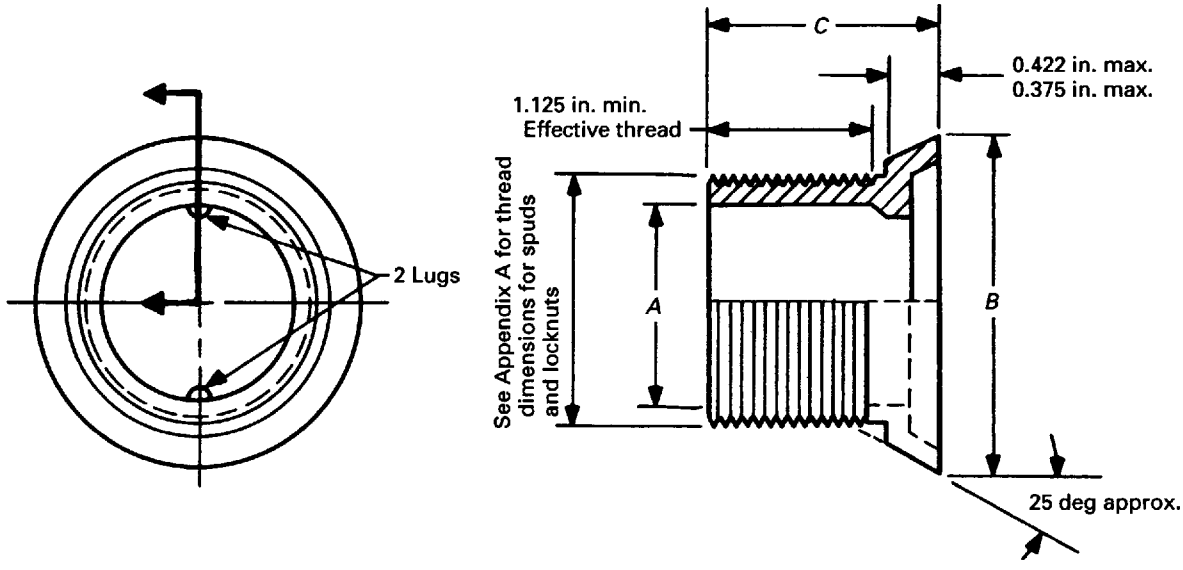


TABLE 2A DIMENSIONS OF REDUCING SPUDS (in.)

Nominal Reducing Spud Size [Note (1)]	A, in.		B, in.		C, in. (Nominal)
	Maximum	Minimum	Maximum	Minimum	
2 × 1½	1.58	1.53	2.72	2.62	1.62
2 × 1¼	1.38	1.28	2.72	2.62	1.62
1½ × 1¼	1.38	1.28	2.25	2.16	1.62
1¼ × ¾	0.81	0.78	2.00	1.93	1.50
1 × ¾	0.81	0.78	1.57	1.50	1.50

NOTE:
(1) The smaller dimension is the thread size (nominal).

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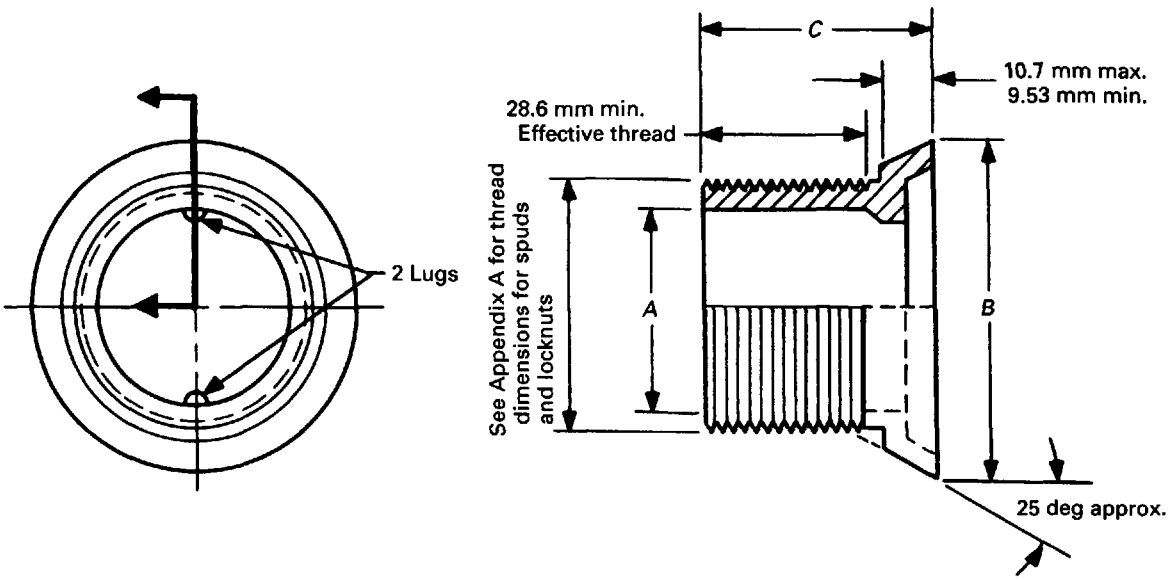


TABLE 2B DIMENSIONS OF REDUCING SPUDS (mm)

Nominal Reducing Spud Size [Note (1)]	A, mm		B, mm		C, mm (Nominal)
	Maximum	Minimum	Maximum	Minimum	
2 × 1½	40.1	38.9	69.1	66.5	41.1
2 × 1¼	35.1	32.5	69.1	66.5	41.1
1½ × 1¼	35.1	32.5	57.2	54.9	41.1
1¼ × ¾	20.6	19.8	50.8	49.0	38.1
1 × ¾	20.6	19.8	39.9	38.1	38.1

NOTE:
(1) The smaller dimension is the thread size (nominal).

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APPENDIX A
NONMANDATORY

Table A1 below is the result of a series of calculations specified in ASME B1.20.1.

TABLE A1 THREAD DIMENSIONS (CLASS 1)

External Threads					
Nominal Shank Size	External Thread Designation	Major Diameter, in.		Pitch Diameter, in.	
		Max.	Min.	Max.	Min.
3/4	3/4–14 NPSM-1	1.034	1.0185	0.9873	0.9794
1 1/4	1 1/4–11.5 NPSM-1	1.638	1.6225	1.5816	1.5725
1 1/2	1 1/2–11.5 NPSM-1	1.877	1.8615	1.8205	1.8113
2	2–11.5 NPSM-1 [Note (1)]	2.351	2.3355	2.2944	2.285

Internal Threads					
Nominal Size	External Thread Designation	Minor Diameter, in.		Pitch Diameter, in.	
		Max.	Min.	Max.	Min.
3/4	3/4–14 NPSM-1	0.974	0.958	0.9992	0.9889
1 1/4	1 1/4–11.5 NPSM-1	1.564	1.546	1.5952	1.5834
1 1/2	1 1/2–11.5 NPSM-1	1.803	1.785	1.8343	1.8223
2	2–11.5 NPSM-1	2.277	2.259	2.3085	2.2963

NOTE:
(1) National Pipe and Straight Thread for Mechanical Joints or American Standard for Straight Thread for Mechanical Joints.

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ASME STANDARDS RELATED TO PLUMBING

Air Gaps in Plumbing Systems ..... A112.1.2-1991(R1998)
Performance Standard and Installation Procedures for Stainless Steel Drainage Systems for Sanitary, Storm, and Chemical Applications, Above and Below Ground A112.3.1-1993
Water Heater Relief Valve Drain Tubes A112.4.1-1993
Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use A112.6.1M-1997
Backwater Valves ..... A112.14.1-1975(R1998)
Plumbing Fixture Fittings A112.18.1M-1996
Performance Requirements for Backflow Protection Devices and Systems in Plumbing Fixture Fittings A112.18.3M-1996
Enameled Cast Iron Plumbing Fixtures A112.19.1M-1994
Vitreous China Plumbing Fixtures A112.19.2M-1998
Stainless Steel Plumbing Fixtures (Designed for Residential Use) ..... A112.19.3M-1987(R1996)
Porcelain Enameled Formed Steel Plumbing Fixtures A112.19.4M-1994
Trim for Water-Closet Bowls, Tanks, and Urinals A112.19.5-1999
Hydraulic Requirements for Water Closets and Urinals A112.19.6-1995
Whirlpool Bathtub Appliances A112.19.7M-1995
Suction Fittings for Use in Swimming Pools, Wading Pools, Spas, Hot Tubs, and Whirlpool Bathtub Appliances ..... A112.19.8M-1987(R1996)
Non-vitreous Ceramic Plumbing Fixtures ..... A112.19.9M-1991(R1998)
Dual Flush Devices for Water Closets A112.19.10-1994
Floor Drains ..... A112.21.1M-1991(R1998)
Roof Drains A112.21.2M-1983
Hydrants for Utility and Maintenance Use ..... A112.21.3M-1985(R1995)
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