



Standard Specification for Brass, Copper, and Chromium-Plated Pipe Nipples¹

This standard is issued under the fixed designation B 687; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope *

1.1 This specification establishes the requirements for brass and copper pipe nipples in standard pipe sizes from $\frac{1}{8}$ to 8 in., inclusive, in standard lengths, and chromium-plated pipe nipples in standard pipe sizes from $\frac{1}{8}$ to 2 in., inclusive, in standard lengths.

1.1.1 Chromium-plated pipe nipples ordered under this specification are intended for interior use in decorative applications.

1.2 The values stated in inch-pound units are the standard. The values given in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

B 42 Specification for Seamless Copper Pipe, Standard Sizes²

B 43 Specification for Seamless Red Brass Pipe, Standard Sizes²

B 456 Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium³

B 846 Terminology for Copper and Copper Alloys²

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications⁴

2.2 ANSI/ASME Standard:

B1.20.1 Pipe Threads, General Purpose (Inch)⁵

2.3 Military Standard:

MIL-STD-105 Sampling Procedures and Tables for Inspection by Attributes⁶

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terminology used in this standard, refer to Terminology B 846.

3.1.1.1 *nipple, close, n*

3.1.1.2 *nipple, pipe, n*

3.1.1.3 *threads, short plumbing (hospital), n*

4. Ordering Information

4.1 Contracts and purchase orders for product under this specification are to contain the following information:

4.1.1 ASTM specification designation and year of issue,

4.1.2 Type of material (Section 5),

4.1.3 Weight of material; regular or extra strong,

4.1.4 Diameter; nominal or actual outside diameter,

4.1.5 Length; standard or special (8.2 and Table 2), and

4.1.6 Quantity; number of pieces or total weight of each material and size.

4.2 The following options are available under this specification and are to be specified in the contract or purchase order when required:

4.2.1 Chromium plated finish,

4.2.2 Short Plumbing (hospital) threads,

4.2.3 Certification (Section 16), and

4.2.4 Test and Inspection Reports, if required (Section 17).

4.3 In addition, when material is purchased for agencies of the U.S. government, it shall conform to the supplementary requirements as defined herein when specified in the contract or purchase order.

5. Materials and Manufacture

5.1 Product under this specification shall be produced from pipe conforming to the requirements of Specification B 42 or B 43, respectively.

¹ This specification is under the jurisdiction of ASTM Committee B05 on Copper and Copper Alloys and is the direct responsibility of Subcommittee B05.04 on Pipe and Tube.

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² *Annual Book of ASTM Standards*, Vol 02.01.

³ *Annual Book of ASTM Standards*, Vol 02.05.

⁴ *Annual Book of ASTM Standards*, Vol 14.02.

⁵ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

⁶ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, ATTN: NPODS.

*A Summary of Changes section appears at the end of this standard.

TABLE 1 Short Plumbing (Hospital) Threads^{A,B}

NOTE—Short plumbing (hospital) threads are normally used only on chromium-plated nipples. The purpose of such threads is that a minimum of thread shall remain exposed after the nipple is screwed into a fitting.

Nominal Pipe Size, NPS	Outside Diameter of Pipe, <i>D</i>	Threads per in., <i>N</i>	Overall External Thread Length, <i>L₄</i>	
			Inches	Threads
1/8	0.405	27	0.26	7
1/4	0.540	18	0.33	6
3/8	0.675	18	0.33	6
1/2	0.840	14	0.43	6
3/4	1.050	14	0.43	6
1	1.315	11½	0.52	6
1¼	1.660	11½	0.52	6
1½	1.900	11½	0.52	6
2	2.375	11½	0.52	6

^A All dimensions, except threads per inch, in inches.

^B This table represents a modification of Table 2 of ANSI B1.20.1; *L₄* is modified as shown. *E₂*, *L₂*, and *V* are modified accordingly. The threads shall meet the gaging requirements of Sections 6 and 11 of this specification.

5.1.1 Copper pipe nipples shall be produced from regular or extra strong pipe conforming to the requirements of Specification B 42.

5.1.2 Brass pipe nipples shall be produced from regular or extra strong pipe conforming to the requirements of Specification B 43.

5.1.3 Chromium-plated pipe nipples shall be produced from regular weight brass pipe conforming to the requirements of Specification B 43.

6. Chemical Composition

6.1 The chemical composition shall conform to the requirements of the specification under which the pipe was ordered.

7. Temper

7.1 The product temper and its properties and characteristics shall conform to the requirements of the specification under which the pipe was ordered.

8. Dimensions, Mass and Permissible Variations

8.1 Lengths:

8.1.1 The standard lengths and sizes of nipples generally available are shown in Table 2. The availability of such nipples indicated by pipe size are shown in Table 3.

8.1.2 Special lengths and sizes of nipples are permitted to be specified when required. Standard and special lengths shall conform to the tolerance requirements of 8.1.3.

8.1.3 *Tolerances*—Nipples with lengths up through 12 in. (305 mm) long shall have a length tolerance of $\pm 1/16$ in. (1.6 mm). Nipples over 12 in. long shall have a tolerance of $\pm 1/8$ in. (3.2 mm).

8.2 Threads:

8.2.1 Pipe nipples shall be threaded on both ends with NPT Taper Pipe Threads conforming to the requirements of ANSI B1.20.1, except for close nipples where *L₄* and *V* are shorter, due to fewer imperfect threads. It is standard manufacturing practice on all other nipple lengths to vary the *L₄* \pm two threads. All other dimensions, tolerances, and gaging practices remain the same as ANSI B1.20.1, and the Annex.

8.2.1.1 Threads shall be right hand on both ends, except when otherwise specified.

8.2.2 *Threads, Chromium-Plated Nipples*—Threads on chromium-plated nipples shall be gaged after plating. Threads on 1/8 to 1-in. standard pipe size nipples shall be NPT Taper Pipe Threads, in accordance with 8.2.1. Threads on 1¼ to 2-in. standard pipe size nipples shall be short plumbing (hospital) threads, in accordance with Table 1. On 1/8 to 1-in. standard pipe size nipples, short plumbing (hospital) threads, if specified, shall be in accordance with Table 1.

9. Workmanship, Finish and Appearance

9.1 *End Finish*—The ends of the pipe nipples shall be chamfered on the outside at an angle of $35 \pm 10^\circ$ to the central axis. (It is standard practice that the 1/8-in. nominal size nipples need not be chamfered.) Ends shall be cut reasonably square to the central axis. All burrs on the outside shall be removed.

9.2 *Chromium Plating*—Chromium plate on brass nipples shall meet the requirements of service condition SC I of Specification B 456, except the equivalent nickel thickness shall be 0.003 mm.

10. Sampling

10.1 A random sample of pipe nipples shall be selected from one production lot in accordance with MIL-STD-105 at Inspection Level II. In terms of defects per 100 units, the Acceptable Quality Level (AQL) shall be 1.5.

10.1.1 *Production Lot*—A production lot shall be as determined by the manufacturer, provided that all of the pipe used in a single production lot shall comply with the provisions of Section 5 and all of the nipples shall be of the same size, length, type, weight, finish, and thread form.

11. Number of Tests and Retests

11.1 Allowances for resampling and retesting shall be in accordance with the Inspection Level and Acceptable Quality Levels detailed in 10.1.

12. Significance of Numerical Limits

12.1 For the purpose of determining compliance with the specified limits for the requirements listed in the following table, an observed value shall be rounded as indicated in accordance with the rounding method of Practice E 29:

Property	Rounded Unit for
	Observed or Calculated Value
Linear Dimensions Tolerances	nearest unit in the last right-hand significant digit used in expressing the limiting value

13. Inspection

13.1 Each sample nipple shall be examined visually to verify conformance with each of the following requirements:

13.1.1 The material is the type and weight of material specified,

13.1.2 The finish is as specified, if chromium-plated,

13.1.3 The ends are reasonably square to the central axis and all burrs have been removed, and

13.1.4 Threads are not burred or damaged.

13.2 Each sample nipple shall be inspected to verify conformance with each of the following requirements:

TABLE 2 Pipe Nipples by Length and Pipe Size

Type of Nipple	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8
	Pipe Nipple Lengths, in. ^{A, B}															
Close (cl)	3/4	7/8	1	1 1/8	1 3/8	1 1/2	1 5/8	1 3/4	2	2 1/2	2 5/8	2 3/4	2 7/8	3	3 1/8	3 1/2
1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
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6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Right and left	4	4	4	4	4	4	4

^A Nipples shorter than close nipples are not recommended for pressure application.
^B 1 in. = 25.4 mm.

TABLE 3 Pipe Nipple Sizes According to Material

Weight	Nominal Pipe Sizes, in.			
	1/8 to 2 in., incl	2 1/4 to 4 in., incl	5 and 6 in.	8 in.
Regular weight brass	X	X	X	X
Extra strong brass	X	X	X	X
Regular copper	X	X	X	X
Extra strong copper	X	X
Chromium-plated regular brass	X

- 13.2.1 Pipe size,
- 13.2.2 Length,
- 13.2.3 Thread dimensions, and
- 13.2.4 Chamfer.

13.3 *Chromium Plating*—Unless otherwise specifically agreed upon between the manufacturer and the purchaser, the individual samples need not be individually inspected as to their chromium plating. It shall be sufficient for the manufacturer to certify that (a) random nipples from the chromium plating process have been tested for conformance with Specification B 456 (which records shall be retained by the manufacturer) and do in fact conform and (b) there has been no significant change in the chromium plating process since the tests were last run.

13.3.1 If inspection of the individual nipples is agreed upon, then it shall be conducted by any method allowed by Specification B 456.

13.4 *Pipe*—The pipe from which each production lot is manufactured shall be of the same size, type, and weight and shall be tested in accordance with the applicable ASTM pipe specification. At the option of the manufacturer, the pipe may be tested by the manufacturer itself, by the pipe mill that produced the pipe, or by an independent laboratory.

13.5 *Source Inspection*—If required, source inspection of the product by the purchaser shall be established by agreement between the manufacturer or supplier and purchaser at the time of placing the order. In such cases, the nature of the facilities necessary for the inspector to determine that the product is in

conformance to this specification shall be included in the agreement. The inspection shall be conducted so as not to unnecessarily interfere with normal operations.

14. Rejection and Rehearing

14.1 Rejection:

14.1.1 Product that fails to conform to the requirements of this specification when inspected by the purchaser or purchaser's agent, shall be subject to rejection.

14.1.2 Rejection shall be reported to the manufacturer or supplier promptly and in writing.

14.1.3 In case of dissatisfaction with the results upon which rejection is based, the manufacturer or supplier is permitted to make claim for a rehearing.

14.2 Rehearing:

14.2.1 As a result of product rejection, the manufacturer or supplier is permitted to make claim for a retest to be conducted by the manufacturer or supplier and the purchaser. Samples of the rejected product shall be taken in accordance with this product specification, and subjected to test by both parties using the test methods specified in the product specification, or, alternatively, upon agreement of both parties, an independent laboratory shall be selected.

15. Certification

15.1 When specified in the contract or purchase order, the purchaser shall be furnished certification that samples representing each lot have been tested or inspected as directed in this specification and the requirements have been met.

16. Test and Inspection Reports

16.1 When specified in the contract or purchase order, a report of test and inspection results shall be furnished.

17. Packaging and Package Marking

17.1 Individual nipples are not normally identified. Nipples packaged shall have their containers legibly marked to show

brand or name of manufacturer, quantity, size, length, type of material, weight of material (if other than regular), and finish (if chromium-plated).

17.1.1 At the manufacturer's option, large size, extra long nipples and odd lots are bagged or bundled with tags identifying the product as specified in 15.1.

17.2 *Chromium-Plated Nipples*—Except for close nipples, chromium-plated nipples shall be individually packaged, wrapped, or otherwise protected to ensure against nicking or other cosmetic damage in transit.

17.3 Nipples shall be packaged and prepared for shipment in such a manner as to ensure acceptance by common carrier for transportation at the lowest rate applicable and to afford protection from the normal hazards of transportation.

18. Keywords

18.1 close nipple; pipe nipple; short plumbing (hospital) threads

SUPPLEMENTARY REQUIREMENTS

The following supplementary requirements shall apply only when specified by the purchaser in the inquiry, contract, or order for agencies of the U.S. government.

S1. Part Numbering System

S1.1 This supplement provides a part numbering system for the identification of standard items for government use of Specification B 687.

NOTE —The government encourages the general use of this part numbering system to achieve maximum parts standardization.

S1.2 The part number consists of the document identifier followed by the code for the weight of material (regular or extra strong), a dash, dash number (Table S1.1), material code, and, if applicable, finish code (see example).

Example—Part Identifying Number “B687R-198BP” is constructed as follows in Fig. S1.1:

TABLE S1.1 Dash Numbers for Regular and Extra Strong Brass or Copper Pipe Nipples

Nominal Pipe Size (in.)	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Length ± 1/16	Dash Numbers										
3/4	1 ^A										
7/8		20 ^A									
1			39 ^A								
1-1/8				58 ^A							
1-3/8					77 ^A						
1-1/2	6 ^B	24 ^B	42 ^B	60 ^B		96 ^A					
1-5/8							115 ^A				
1-3/4								134 ^A			
2	9	27	45	63	81 ^B	99 ^B			152 ^A		
2-1/2	10	28	46	64	82	100	118 ^B	136 ^B	154 ^B	172 ^A	
2-5/8											191 ^A
3	12	30	48	66	84	102	120	138	156	174 ^B	192 ^B
3-1/2	13	31	49	67	85	103	121	139	157	175	193
4	14	32	50	68	86	104	122	140	158	176	194
4-1/2	15	33	51	69	87	105	123	141	159	177	195
5	16	34	52	70	88	106	124	142	160	178	196
5-1/2	17	35	53	71	89	107	125	143	161	179	197
6	18	36	54	72	90	108	126	144	162	180	198

^A Close type nipples.

^B Short type nipples.

All others are long type nipples.

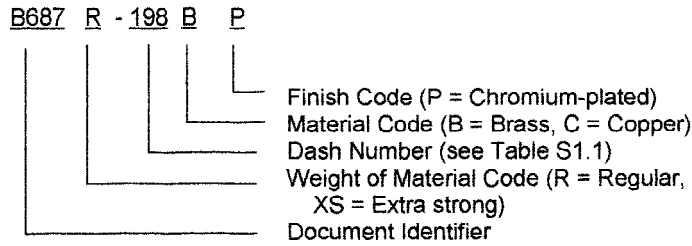


FIG. S1.1 Example of Part Identifying Number

ANNEX

(Mandatory Information)

A1. GAGING TECHNIQUES FOR MALE THREADS

A1.1 An NPT working ring gage, in accordance with ANSI B1.20.1, shall be turned hand tight on the nipple threads. The gage shall be tapped or rapped against a solid surface and the gage again turned hand tight into the thread. Hand tight means turning the gage until moderate resistance is encountered—no excessive force shall be used. After the second tightening operation, the end of the thread should be flush to the gage face, plus or minus one turn.

A1.2 The usual technique for tapping or rapping the gage is to swing the end of the fitting with the ring gage attached through an arc of approximately 4 to 6 in. (102 to 152 mm) to allow the gage to strike against a solid metal surface. This tapping procedure is used to eliminate any binding due to slight nicks or foreign matter in the threads.

APPENDIX

(Nonmandatory Information)

X1. METRIC EQUIVALENTS

X1.1 The SI unit for strength properties now shown is in accordance with the International System of Units (SI). The derived SI unit for force is the newton (N), which is defined as that force which when applied to a body having a mass of one kilogram gives it an acceleration of one metre per second squared ($N = kg \cdot m/s^2$). The derived SI unit for pressure or

stress is the newton per square metre (N/m^2), which has been named the pascal (Pa) by the General Conference on Weights and Measures. Since $1 \text{ ksi} = 6\,894\,757 \text{ Pa}$ the metric equivalents are expressed as megapascal (MPa), which is the same as MN/m^2 and N/mm^2 .

SUMMARY OF CHANGES

The following changes have been incorporated since the 1996 issue as follows:

(1) A Supplementary Requirements section was added to incorporate a Part Identification System for use with purchases

for the agencies of the U.S. Government.

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