



Designation: B687 – 99 (Reapproved 2023)

# Standard Specification for Brass, Copper, and Chromium-Plated Pipe Nipples<sup>1</sup>

This standard is issued under the fixed designation B687; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

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

## 1. Scope

1.1 This specification establishes the requirements for brass and copper pipe nipples in standard pipe sizes from 1/8 to 8 in., inclusive, in standard lengths, and chromium-plated pipe nipples in standard pipe sizes from 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 to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

[B42 Specification for Seamless Copper Pipe, Standard Sizes](#)

[B43 Specification for Seamless Red Brass Pipe, Standard Sizes](#)

[B456 Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium](#)

<sup>1</sup> 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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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[B846 Terminology for Copper and Copper Alloys](#)

[E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications](#)

2.2 *ANSI/ASME Standard:*

[B1.20.1 Pipe Threads, General Purpose \(Inch\)](#)<sup>3</sup>

2.3 *Military Standard:*

[MIL-STD-105 Sampling Procedures and Tables for Inspection by Attributes](#)<sup>4</sup>

## 3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of terms relating to copper and copper alloys, refer to Terminology [B846](#).

## 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.

<sup>3</sup> Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

<sup>4</sup> Available from DLA Document Services, Building 4/D, 700 Robbins Ave., Philadelphia, PA 19111-5094, <http://quicksearch.dla.mil>.

**TABLE 1 Short Plumbing (Hospital) Threads<sup>A, B</sup>**

NOTE 1—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>L<sub>4</sub></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

<sup>A</sup> All dimensions, except threads per inch, in inches.

<sup>B</sup> This table represents a modification of Table 2 of ANSI B1.20.1; *L<sub>4</sub>* is modified as shown. *E<sub>2</sub>*, *L<sub>2</sub>*, and *V* are modified accordingly. The threads shall meet the gaging requirements of Sections 6 and 11 of this specification.

## 5. Materials and Manufacture

5.1 Copper pipe nipples shall be produced from regular or extra strong pipe conforming to the requirements of Specification B42.

5.2 Brass pipe nipples shall be produced from regular or extra strong pipe conforming to the requirements of Specification B43.

5.3 Chromium-plated pipe nipples shall be produced from regular weight brass pipe conforming to the requirements of Specification B43.

## 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 *L<sub>4</sub>* and *V* are shorter, due to fewer imperfect threads. It is standard manufacturing practice on all other nipple lengths to vary the *L<sub>4</sub>*  $\pm$  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 in. to 1 in. standard pipe size nipples shall be NPT Taper Pipe Threads, in accordance with 8.2.1. Threads on 1¼ in. to 2 in. standard pipe size nipples shall be short plumbing (hospital) threads, in accordance with Table 1. On 1/8 in. 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  $35^\circ \pm 10^\circ$  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 B456, 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 E29:

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,

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. <sup>A, B</sup>																
Close (cl)	3/4	7/8	1	1 1/8	1 1/4	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 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 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	...	...	...	...	...
4	4	4	4	4	4	4	4	4	4	4	4	4	4	...	...	...
4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	...
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2
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	4	...	...	...	...	...	...	...

<sup>A</sup> Nipples shorter than close nipples are not recommended for pressure application.  
<sup>B</sup> 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	...	...	...

13.1.3 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:

- 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 B456 (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 B456.

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, 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.