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An American National Standard

# Standard Practice for Selecting Bolting Lengths for Piping System Flanged Joints[1]

This standard is issued under the fixed designation F 704; 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 practice covers bolt and stud bolt lengths, quantities, and thread series for pipe to pipe and pipe to valve flanged joints (Note 1) in the nominal pipe size ranges of ½- through 48-in. (12.7- through 1219-mm) diameter and pressure range of 125 through 2500 psi (0.8 through 17 236 kPa).

NOTE 1—This is applicable when flange of valve has the same thickness as mating flange.

1.2 The values stated in inch-pound units are to be regarded as 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 *ANSI Standards:*

B1.1 Unified Screw Threads[2]

B16.1 Cast Iron Pipe Flanges and Flanged Fittings (25, 125, 250, and 800 lb)[2]

B16.5 Steel Pipe Flanges and Flanged Fittings (150, 300, 400, 600, 900, 1500, and 2500 lb Including Reference to Valves)[2]

B16.24 Bronze Flanges and Flanged Fittings (150 and 300 lb)[2]

B18.2.1 Square and Hex Bolts and Screws[2]

B18.2.2 Square and Hex Nuts[2]

2.2 *Other Standard:*

MSS SP-44 Steel Pipe Flanges[3]

## 3. Bolting Criteria

3.1 Bolt and stud bolt lengths are computed using the following (see Annex A1):

3.1.1 Includes maximum nut thickness in accordance with ANSI B18.2.2.

3.1.2 Does not include washer thickness.

3.1.3 Does not include bolt or stud bolt point height.

3.1.4 Includes allowance for up to ⅛-in. (3.2-mm) thick gaskets, except butterfly valves.

3.1.5 Includes ¼-in. (6.3-mm) raised face in addition to flange thickness listed in tables for flanges rated at 400 psi (2.8 kPa) and above.

3.1.6 Includes use of heavy hex nut and bolt design.

3.1.7 Includes plus tolerance for flange thickness in accordance with ANSI B16.5.

3.2 All bolts and stud bolts have threads in accordance with ANSI B1.1, Class 2A dimensioning and nuts Class 2B.

3.3 The material requirements for bolts, stud bolts, and nuts are obtained from the material specifications of individual system diagrams.

3.4 Alloy steel bolting 1-in. (25.4-mm) nominal diameter and smaller and all carbon steel bolting has threads of the UNC Series; alloy steel bolting above 1-in. nominal diameter has threads of the 8-UN Series.

3.5 For detailed descriptions of flange bolting assemblies, butterfly valve bolting assemblies, and tapped lug-type butterfly valve bolting assemblies, refer to Figs. 1–7.

## 4. List of Tables

4.1 The tables are arranged in the following sequence:

| | |
|---|---|
| 150-lb Steel Flanged Joints | Table 1 |
| 300-lb Steel Flanged Joints | Table 2 |
| 400-lb Steel Flanged Joints | Table 3 |
| 600-lb Steel Flanged Joints | Table 4 |
| 900-lb Steel Flanged Joints | Table 5 |
| 1500-lb Steel Flanged Joints | Table 6 |
| 2500-lb Steel Flanged Joints | Table 7 |
| 150-lb Bronze Flanged Joints | Table 8 |
| 300-lb Bronze Flanged Joints | Table 9 |
| 150-lb Steel Flat Face to 150-lb Bronze Flanged Joints | Table 10 |
| 300-lb Steel Flat Face to 300-lb Bronze Flanged Joints | Table 11 |

[1] This practice is under the jurisdiction of ASTM Committee F25 on Ships and Marine Technology and is the direct responsibility of Subcommittee F25.11 on Machinery and Piping Systems.

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[2] Available from American National Standards Institute, 25 W. 43rd St., 4th Floor, New York, NY 10036.

[3] Available from Manufacturer's Standardization Society of the Valve and Fittings Industry, 1815 N. Fort Myer Dr., Arlington, VA 22209.

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