Butterfly Valves: Double Flanged, Lug- and Wafer-Type

API STANDARD 609
SIXTH EDITION, MAY 2004

American Petroleum Institute

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Downstream Segment

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FOREWORD

This standard is a purchase specification for butterfly valves designed for installation between flanges specified in ASME B16.1, B16.5, B16.24, and B16.42, Classes 125-600; MSS SP-44, Class 150; and ASME B16.47 Series A, Class 150 (was MSS SP-44 except for certain materials) or Series B (was API 605), Class 150 for the NPS sizes defined herein.

This standard requires the purchaser to specify certain details and features. Although it is recognized that the purchaser may desire to modify, delete, or amplify sections of this standard, it is strongly recommended that such modifications, deletions, and amplifications be made by supplementing this standard, rather than by rewriting or incorporating sections thereof into another complete standard.

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Asbestos is specified or referenced for certain components of the equipment described in some API standards. It has been of extreme usefulness in minimizing fire hazards associated with petroleum processing. It has also been a universal sealing material, compatible with most refining fluid services.

Certain serious adverse health effects are associated with asbestos, among them the serious and often fatal diseases of lung cancer, asbestosis, and mesothelioma (a cancer of the chest and abdominal linings). The degree of exposure to asbestos varies with the product and the work practices involved.

Consult the most recent edition of the Occupational Safety and Health Administration (OSHA), U.S. Department of Labor, Occupational Safety and Health Standard for Asbestos, Tremolite, Anthophyllite, and Actinolite, 29 Code of Federal Regulations Section 1910.1001; the U.S. Environmental Protection Agency, National Emission Standard for Asbestos, 40 Code of Federal Regulations Sections 61.140 through 61.156; and the U.S. Environmental Protection Agency (EPA) rule on labeling requirements and phased banning of asbestos products (Sections 763.160-179).

There are currently in use and under development a number of substitute materials to replace asbestos in certain applications. Manufacturers and users are encouraged to develop and use effective substitute materials that can meet the specifications for, and operating requirements of, the equipment to which they would apply.

SAFETY AND HEALTH INFORMATION WITH RESPECT TO PARTICULAR PRODUCTS OR MATERIALS CAN BE OBTAINED FROM THE EMPLOYER, THE MANUFACTURER OR SUPPLIER OF THAT PRODUCT OR MATERIAL, OR THE MATERIAL SAFETY DATA SHEET.

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NOTES TO PURCHASER

1 If the purchaser needs a butterfly valve that deviates from this standard, the deviating requirements shall be stated in the purchase order.

2 If no exceptions are to be taken to this standard, the purchase order need only refer to API Standard 609 and specify the items listed in 2.1 (below) and any optional items listed in 2.2 (below). Paragraph 2.3 lists items where agreement between purchaser and manufacturer is required.

2.1 Required on the Purchase Order

2.1.1 Valve size and class (see 1.1).

2.1.2 Valve Category: A or B (see 1.1).

2.1.3 Type of body style (double flanged, lug- or wafer-type) (see 1.2 and 4.2.1-4.2.3).

2.1.4 For double flanged valves specify either: (a) long pattern (see Table 2-B) or short pattern (see Table 2-C). Note Class 300 short pattern has two sets of dimensions. Purchaser must specify which is required.

2.1.5 Type of mating flange (slip-on, welding-neck, or other), mating flange specification, and flange bore or pipe inside diameter, as applicable. The purchaser should verify disc clearances with the valve manufacturer (see 1.2 and 4.4).

2.1.6 Unidirectional or bidirectional flow and pressure shutoff requirement (see 4.7.3).

2.1.7 Whether dead-end service is required (see 4.7.4).

2.1.8 Operator type: lever or other (see 4.8).

2.1.9 On-off or throttling service (see 3.4 and 4.8.1).

2.1.10 Materials of construction, including those for trim and those for packing or shaft seals (see Section 5).

2.1.11 Operating conditions including maximum operating temperature, flow rate or line velocity, maximum pressure drop, fluid media, and specific gravity (see 4.8.2).

2.2 Items That May Be Specified

2.2.1 Conformance with API Standard 607 for applications where a fire tested valve is required (see 4.1.2).

2.2.2 Lockable device (see 4.1.3).

2.2.3 End flanges attached by welding (see 4.2.3).

2.2.4 Drain or bypass connections (see 4.2.4).

2.2.5 Through drilling or special tapping of lug bolt holes (see 4.6).

2.2.6 Electrical continuity requirement (see 4.9).

2.2.7 Packing or shaft seal materials (see 5.4).

2.2.8 Inspection by the purchaser (see 6.2).

2.2.9 Export packaging (see 8.3).

2.2.10 Special external coating (see 8.1).

2.2.11 Recommended spare parts information (see 8.4).

2.3 Where Agreement Between the Purchaser and the Manufacturer is Required

2.3.1 Gasket surface interruptions for NPS 4 and smaller (see 4.7.2).

2.3.2 Seat ratings for materials not listed in Table 3 (see 3.3.1).

2.3.3 Use of welded on body extensions or flanges (See 5.1.2).

3 Refer to API Standard 598 for additional items that may need to be specified, including supplementary examination, the extent of inspection by the purchaser, the inspector's address, and optional high-pressure closure test.

Butterfly Valves: Double Flanged, Lug- and Wafer-Type

1 Scope

1.1 This standard covers design, materials, face-to-face dimensions; pressure-temperature ratings; and examination, inspection, and test requirements for gray iron, ductile iron, bronze, steel, nickel-base alloy, or special alloy butterfly valves that provide tight shutoff in the closed position and are suitable for flow regulation. Two categories of butterfly valves are included:

a. Category A: Manufacturer's rated cold working pressure (CWP) butterfly valves, usually with a concentric disc and seat configuration. Sizes covered are NPS 2 to NPS 48 for valves having ASME Class 125 or Class 150 flange bolting patterns.

b. Category B: Pressure-temperature rated butterfly valves that have an offset seat and either an eccentric or a concentric disc configuration. These valves may have a seat rating less than the body rating. For lug and wafer, Class 150, 300, and 600, sizes covered are NPS 3 to NPS 24 . For double flanged long pattern, Class 150, 300, and 600, sizes covered are NPS 3 to NPS 36. For double flanged short pattern, Class 150 and 300, sizes covered are NPS 3 to NPS 48. For double flanged short pattern, Class 600, sizes covered are NPS 3 to NPS 24.

1.2 Valve configurations include double flanged, lug- and wafer-types with facings that permit installation between ASME and MSS flanges that conform to the standards and specifications listed in Section 2.

2 References

The most recent edition or revision of the following standards or specifications shall, to the extent specified in this standard, form a part of this standard. Text in brackets after a publication title indicates a restriction on the classes to which the publication applies.

API

Std 598	*Valve Inspection and Testing*
Std 607	*Fire Test for Soft-Seated Quarter-Turn Valves*

ASME[1]

B1.1	*Unified Inch Screw Threads (UN and UNR Thread Form)*
B16.1	*Cast Iron Pipe Flanges and Flanged Fittings [Class 125 only]*
B16.5	*Pipe Flanges and Flanged Fittings [Class 150, 300, and 600 only]*
B16.20	*Metallic Gaskets for Pipe Flanges-Ring Joint, Spiral Wound, and Jacketed*
B16.24	*Cast Copper Alloy Pipe Flanges and Flanged Fittings [Class 150 and 300]*
B16.34	*Valves-Flanged, Threaded, and Welding End [Standard Class 150, 300, and 600 only]*
B16.42	*Ductile Iron Pipe Flanges and Flanged Fittings, Class 150 and 300*
B16.47	*Large Diameter Steel Flanges: NPS 26 Through NPS 60 [Class 150 only]*
B31.3	*Process Piping*
B46.1	*Surface Texture (Surface Roughness, Waviness, and Lay)*

MSS[2]

SP-6	*Standard Finishes for Contact Faces of Pipe Flanges and Connecting-End Flanges of Valves and Fittings*
SP-25	*Standard Marking System for Valves, Fittings, Flanges, and Unions*
SP-44	*Steel Pipe Line Flanges [Class 150 only]*
SP-45	*Bypass and Drain Connections*
SP-91	*Guidelines For Manual Operation of Valves*

ISO[3]

5752	*Face to Face and Center to Face Dimensions*

3 Pressure-Temperature Ratings

3.1 VALVE RATING

Valves shall have a pressure-temperature rating or cold working pressure rating for Category A valves that is the lesser of its shell rating, seat rating, or differential pressure rating.

3.2 SHELL RATING

3.2.1 Category A valve bodies and related pressure boundary elements shall have the cold working pressure (CWP) rating assigned by the manufacturer.

3.2.2 Category B valve bodies and related pressure boundary elements shall have the pressure-temperature rating as

[1]ASME International, 345 East 47th Street, New York, New York 10017.

[2]Manufacturers Standardization Society of the Valve Fittings Industry, Inc., 127 Park Street, N.E., Vienna, Virginia 22180.

[3]International Organization for Standardization. ISO publications are available from the American National Standards Institute, 11 West 42nd Street, New York, New York 10036.