This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.

Metal Plug Valves—Flanged, Threaded, and Welding Ends

API STANDARD 599

NINTH EDITION, TBD

Special Notes

API publications necessarily address problems of a general nature. With respect to particular circumstances, local, state, and federal laws and regulations should be reviewed.

Neither API nor any of API's employees, subcontractors, consultants, committees, or other assignees make any warranty or representation, either express or implied, with respect to the accuracy, completeness, or usefulness of the information contained herein, or assume any liability or responsibility for any use, or the results of such use, of any information or process disclosed in this publication. Neither API nor any of API's employees, subcontractors, consultants, or other assignees represent that use of this publication would not infringe upon privately owned rights.

API publications may be used by anyone desiring to do so. Every effort has been made by the Institute to ensure the accuracy and reliability of the data contained in them; however, the Institute makes no representation, warranty, or guarantee in connection with this publication and hereby expressly disclaims any liability or responsibility for loss or damage resulting from its use or for the violation of any authorities having jurisdiction with which this publication may conflict.

API publications are published to facilitate the broad availability of proven, sound engineering and operating practices. These publications are not intended to obviate the need for applying sound engineering judgment regarding when and where these publications should be used. The formulation and publication of API publications is not intended in any way to inhibit anyone from using any other practices.

Any manufacturer marking equipment or materials in conformance with the marking requirements of an API standard is solely responsible for complying with all the applicable requirements of that standard. API does not represent, warrant, or guarantee that such products do in fact conform to the applicable API standard.

API is not undertaking to meet the duties of employers, manufacturers, or suppliers to warn and properly train and equip their employees, and others exposed, concerning health and safety risks and precautions, nor undertaking their obligations to comply with authorities having jurisdiction.

Users of this standard should not rely exclusively on the information contained in this document. Sound business, scientific, engineering, and safety judgment should be used in employing the information contained herein.

Foreword

Nothing contained in any API publication is to be construed as granting any right, by implication or otherwise, for the manufacture, sale, or use of any method, apparatus, or product covered by letters patent. Neither should anything contained in the publication be construed as insuring anyone against liability for infringement of letters patent.

The verbal forms used to express the provisions in this document are as follows.

Shall: As used in a standard, "shall" denotes a minimum requirement to conform to the specification.

Should: As used in a standard, "should" denotes a recommendation or that which is advised but not required to conform to the specification.

May: As used in a standard, "may" denotes a course of action permissible within the limits of a standard.

Can: As used in a standard, "can" denotes a statement of possibility or capability.

This document was produced under API standardization procedures that ensure appropriate notification and participation in the developmental process and is designated as an API standard. Questions concerning the

For API committee review only

This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.

interpretation of the content of this publication or comments and questions concerning the procedures under which this publication was developed should be directed in writing to the Director of Standards, American Petroleum Institute, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001. Requests for permission to reproduce or translate all or any part of the material published herein should also be addressed to the director.

Generally, API standards are reviewed and revised, reaffirmed, or withdrawn at least every five years. A one-time extension of up to two years may be added to this review cycle. Status of the publication can be ascertained from the API Standards Department, telephone (202) 682-8000. A catalog of API publications and materials is published annually by API, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001.

Suggested revisions are invited and should be submitted to the Standards Department API, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001, standards@api.org.

1 Scope

1.1 This standard specifies the requirements for quarter turn metal plug valves, including the lift plug type, for petroleum, petrochemical, and industrial applications.

1.2 This standard is applicable to:

- steel, nickel base, and other alloy plug valves with flanged or butt-welding ends and ductile iron plug valves with flanged ends in sizes $15 \leq DN \leq 900$ ($1/2 \leq NPS \leq 36$);
- threaded or socket-welding end plug valves in sizes $15 \leq DN \leq 50$ ($1/2 \leq NPS \leq 2$);
- plug valve bodies conforming to ASME B16.34, which may have any combination of flanged, threaded, socket welding, or butt-welding ends;
- lubricated and non-lubricated plug valves that have two-way coaxial ports.

NOTE Three-way and four-way plug valves do not fall under the scope of this standard.

- tandem plug valves that have two independently operating plugs in a single body.

1.3 This standard covers plug valves of the nominal diameter sizes DN:

- 15, 20, 25, 32, 40, 50, 65, 80, 100, 150, 200, 250, 300, 350, 400, 450, 500, 600, 650, 700, 750, 800, 850, 900;

corresponding to nominal pipe sizes NPS:

- 1/2, 3/4, 1, 1 1/4, 1 1/2, 2, 2 1/2, 3, 4, 6, 8, 10, 12, 14, 16, 18, 20, 24, 26, 28, 30, 32, 34, 36;

and applies to pressure class designations:

- 150, 300, 600, 900, 1500, 2500.

1.4 This standard includes requirements for plug valves fitted with internal body, plug, and port linings or applied hard facings on the body, body ports, plug, and plug port.

1.5 This standard also provides additional requirements for plug valves that are in full conformance to the requirements of ASME B16.34 for Standard Class 150 through 2500. Ductile iron valves and Class 150 and 300 shall follow the additional requirements of ASME B16.42 for pressure/temperature ratings, wall thickness, flange dimensions, and material grade.

1.6 Plug valves covered in this standard belong to one of four general design groups that in many cases have different face-to-face and end-to-end dimensions. Some types of plug valves are not made to all patterns. The four groups of valve design are described below:

- short pattern design found only in Class 150 and 300 where flanged plug valves match the ASME B16.10 face-to-face dimensions of steel-flanged gate valves in sizes $40 \leq DN \leq 300$ ($1\ 1/2 \leq NPS \leq 12$);
- regular pattern design with a plug port area that is greater than the venturi pattern;

For API Committee Review Only

This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.

- venturi pattern designed for minimum pressure loss consistent with the reduced port area used in this type of valve. Venturi valves have a configuration of body and plug ports that approximate a venturi throat.
- round-port full-bore pattern design with a circular port through both the plug and the body that is not smaller than that specified in Appendix A of ASME B16.34 for the applicable valve size and pressure class, unless otherwise agreed between the manufacturer and the purchaser.

2 Normative References

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any addenda) applies.

API Standard 598, *Valve Inspection and Testing*

API Standard 602, *Gate, Globe, and Check Valves for Sizes DN 100 (NPS 4) and Smaller for the Petroleum and Natural Gas Industries*

API Standard 607, *Fire Test for Quarter-turn Valves and Valves Equipped with Nonmetallic Seats*

API Standard 641, *Type Testing of Quarter-turn Valves for Fugitive Emissions*

ASME B1.1,[1] *Unified Inch Screw Threads (UN and UNR Thread Form)*

ASME B1.12, *Class 5 Interference-Fit Thread*

ASME B1.13M, *Metric Screw Threads: M Profile*

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

ASME B16.5, *Pipe Flanges and Flanged Fittings: NPS 1/2 Through 24 Metric/Inch Standard*

ASME B16.10, *Face-to-Face and End-to-End Dimensions of Valves*

ASME B16.11, *Forged Fittings, Socket-welding and Threaded*

ASME B16.25, *Buttwelding Ends*

ASME B16.34, *Valves—Flanged, Threaded, and Welding End*

ASME B16.42, *Ductile Iron Pipe Flanges and Flanged Fittings, Classes 150 and 300*

ASME B16.47, *Large Diameter Steel Flanges: NPS 26 Through NPS 60 Metric/Inch Standard*

ASME B18.2.2, *Nuts for General Applications: Machine Screw Nuts, Hex, Square, Hex Flange, and Coupling Nuts (Inch Series)*

ASME B18.2.6, *Fasteners for Use in Structural Applications*

ASME B31.3, *Process Piping*

[1] American Society of Mechanical Engineers, Two Park Avenue, New York, New York 10016, www.asme.org.

For API Committee Review Only

This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.

ASME B46.1, *Surface Texture (Surface Roughness, Waviness and Lay)*

ASME *Boiler and Pressure Vessel Code (BPVC)*

ASTM A307,[2] *Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength*

ASTM A395, *Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures*

MSS SP-25,[3] *Standard Marking System for Valves, Fittings, Flanges, and Unions*

MSS SP-91, *Guidelines for Manual Operation of Valves*

MSS SP-xxx*, Valves for Hydrogen Fluoride (HF) Alkylation Service*

MSS SP-155*, Plastic-Lined Metal Valves*

NACE MR0103,[4] *Petroleum, petrochemical and natural gas industries—Metallic materials resistant to sulfide stress cracking in corrosive petroleum refining environments*

3 Terms and Definitions

For the purposes of this document, the following definitions apply.

3.1
bonnet/cover
A valve body closure component that contains an opening for the stem. It is also described as the cover for the opening in the valve body.-

3.2
Class
An numeric designation that is used for reference purposes relating to valve pressure/temperature capability per ASME B16.34, taking into account valve material mechanical properties and valve dimensional characteristics. It comprises the word “Class” followed by a dimensionless whole number. The number following “Class” does not represent a measurable value and is not used for calculation purposes except where specified in this standard. The allowable pressure for a valve having a class number depends on the valve material and its application temperature, and it is to be found in tables of pressure/temperature ratings.

3.3
DN
An numeric designation of size that is common for components used in a piping system, used for reference purposes, comprising the letters “DN” followed by a dimensionless number indirectly related to the physical size of the bore or outside diameter of the end connection as appropriate. The dimensionless number following “DN” does not represent a measurable value and is not used for calculation purposes except where specified.

3.4
NPS
A numeric designation of size that is common for components used in a piping system, used for reference purposes, comprising the letters “NPS” followed by a dimensionless number indirectly related to the physical size of the bore or outside diameter of the end connection as appropriate. The dimensionless number may be used as a valve size identifier without the prefix “NPS.” The dimensionless size identification number does not represent a measurable value and is not used for calculation purposes.

[2] American Society for Testing and Materials, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, www.astm.org.

[3] Manufacturers Standardization Society of the Valve and Fittings Industry, Inc., 127 Park Street, NE, Vienna, Virginia 22180-4602, www.msshq.org.

[4] Association for Materials Protection and Performance (AMPP), 15835 Park Ten Place, Houston, Texas 77084, www.nace.org.

For API Committee Review Only

This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.

3.5
shell
The shell is comprised of the body and bonnet/cover..

3.6
surface conversion treatment
A surface treatment applied to metals in which the metal undergoes a chemical reaction at the surface (i.e., phosphating).

4 Pressure/Temperature Ratings

4.1 Valve Rating
The valve pressure-temperature rating shall be the lesser of the shell rating or the seat and seal rating (e.g. seals, sleeves, liners, diaphragms, seats, and sealants). The sealant selection can limit the temperature rating of the valve.

Restrictions of temperature and concurrent pressure, or pressure and concurrent temperature (e.g., those imposed by special soft seals or special trim materials), shall be marked on the valve identification plate (see Section 9).

4.2 Shell Rating
The valve shell pressure-temperature rating shall be the rating for the shell material as listed for Standard Class in ASME B16.34 or ASME B16.42 as appropriate for the shell material.

The valve shell pressure/temperature ratings for intermediate Class 800 valves shall be as shown in Table 2a, Table 2b, Table 2c, Table 2d, Table 2e, and Table 2f of API 602 (2016).

4.3 Seat and Seal Rating
4.3.1 Seat Ratings
Seat pressure-temperature ratings for seat materials other than shall be the manufacturer's standard. Seats made from hard materials such as solid cobalt-chromium alloy, ceramics, or metal seats coated with hard materials such as carbide coatings are also acceptable and shall have seat pressure-temperature ratings per the manufacturer's standard.

5 Design

5.1 General

5.1.1 Valves manufactured in accordance with this standard shall also meet the requirements of ASME B16.34 for Standard Class, except that in the case of Class 150 and 300 ductile iron valves, the requirements of the ASME B16.42 for pressure/temperature ratings, wall thickness, flange dimensions, and ductile iron material specification shall be used.

5.1.2 The standard nomenclature for valve parts is shown in Annex B. Figure B.1, Figure B.2, Figure B.3, Figure B.4, and Figure B.5 illustrate typical plug valve designs and are not to be construed as precluding other available designs that comply with the requirements of this standard. The only purpose of these figures is to identify part names. The construction of a valve is acceptable only when it complies with this standard in all respects.

5.2 Body

For API Committee Review Only

This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.

5.2.1 The minimum thickness of the body wall shall be in accordance with the following:

- Table 1 below for lubricated plug valves with valve bodies of ASME B16.34, Group 1 material;
- ASME B16.34 for lubricated plug valves with valve bodies of ASME B16.34, Group 2 and 3 materials;
- ASME B16.34 for nonlubricated plug valves with bodies of ASME B16.34, Group 1, 2, or 3 materials;— ASME B16.42 minimum wall thickness for fittings shall be used as a minimum wall thickness for equivalent size valve bodies constructed of ductile iron.

When heavy wall valves are specified on the purchase order, the minimum wall thickness shall be per Table 1.

5.2.2 Face-to-face dimensions for raised-face and ring-joint flanged end valves and end-to-end dimensions for butt-welding end valves shall conform to ASME B16.10 unless otherwise agreed to between the manufacturer and the purchaser.

5.2.3 Plug valve end flanges and bonnet flanges shall be cast or forged integral with the body, except that cast or forged flanges attached by full penetration butt-welding or inertia welding may be used if agreed by the purchaser. Flanges for ductile iron valves shall only be the integral type. When a flange is attached by welding, the welding procedure and the welder or welding operator shall be qualified in accordance with ASME *BPVC*, Section IX. Alignment rings, integral or loose, employed as a welding aid or upset weld curls created by inertia welding shall be completely removed following welding, while care shall be taken that the minimum wall thickness is maintained. Valves fabricated by welding shall meet the requirements of ASME B16.34.

Table 1—Heavy Wall Minimum Body Thickness Millimeters (Inches):

Class Designation	150	300	600	900	1500	2500	Class Designation
Nominal Size DN	Minimum Wall Thickness t_m mm (in.)						Nominal Pipe Size NPS
15	4.6 (0.18)	4.6 (0.18)	5.3 (0.21)	5.3 (0.31)	5.3 (0.31)	5.3 (0.31)	1/2
20	4.6 (0.18)	4.6 (0.18)	6.4 (0.25)	10.2 (0.40)	10.2 (0.40)	10.2 (0.40)	3/4
25	6.4 (0.25)	6.4 (0.25)	7.9 (0.31)	12.7 (0.50)	12.7 (0.50)	15.0 (0.59)	1
32	6.4 (0.25)	6.4 (0.25)	8.6 (0.34)	14.2 (0.56)	14.2 (0.56)	17.5 (0.69)	1 1/4
40	6.4 (0.25)	7.9 (0.31)	9.4 (0.37)	15.0 (0.59)	15.0 (0.59)	19.1 (0.75)	1 1/2
50	8.6 (0.34)	9.7 (0.38)	11.2 (0.44)	19.1 (0.75)	19.1 (0.75)	22.4 (0.88)	2
65	9.7 (0.38)	11.2 (0.44)	11.9 (0.47)	22.4 (0.88)	22.4 (0.88)	25.4 (1.00)	2 1/2
80	10.4 (0.41)	11.9 (0.47)	12.7 (0.50)	19.1 (0.75)	23.9 (0.94)	30.2 (1.19)	3
100	11.2 (0.44)	12.7 (0.50)	16.0 (0.63)	21.3 (0.84)	28.7 (1.13)	35.8 (1.41)	4
150	11.9 (0.47)	16.0 (0.63)	19.1 (0.75)	26.2 (1.03)	38.1 (1.50)	48.5 (1.91)	6
200	12.7 (0.50)	17.5 (0.69)	25.4 (1.00)	31.8 (1.25)	47.8 (1.88)	62.0 (2.44)	8
250	14.2 (0.56)	19.1 (0.75)	28.7 (1.13)	36.6 (1.44)	57.2 (2.25)	67.6 (2.66)	10
300	16.0 (0.63)	20.6 (0.81)	31.8 (1.25)	42.2 (1.66)	66.8 (2.63)	86.6 (3.41)	12
350	16.8 (0.66)	22.4 (0.88)	35.1 (1.38)	46.0 (1.81)	69.9 (2.75)	—	14

For API Committee Review Only

This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.

400	17.5 (0.69)	23.9 (0.94)	38.1 (1.50)	52.3 (2.06)	79.5 (3.13)	—	16
450	18.3 (0.72)	25.4 (1.00)	41.4 (1.63)	57.2 (2.25)	88.9 (3.50)	—	18
500	19.1 (0.75)	26.9 (1.06)	44.5 (1.75)	63.5 (2.50)	98.6 (3.88)	—	20
600	20.6 (0.81)	30.2 (1.19)	50.8 (2.00)	73.2 (2.88)	114.3 (4.50)	—	24
650	21.4 (0.84)	31.6 (1.24)	—	—	—	—	26
700	22.2 (0.87)	33.3 (1.31)	—	—	—	—	28
750	23.0 (0.91)	34.9 (1.37)	—	—	—	—	30
800	23.8 (0.94)	36.0 (1.41)	—	—	—	—	32
850	24.6 (0.97)	38.1 (1.50)	—	—	—	—	34
900	25.3 (1.00)	39.6 (1.56)	—	—	—	—	36

5.2.4 Steel and nickel-based body end flanges shall comply with the dimensional requirements of ASME B16.5 for sizes up to and including DN 600 (NPS 24). For sizes over DN 600 (NPS 24), body end flanges shall comply with the dimensional requirements of ASME B16.47 Series A or Series B as specified by the purchase order. Unless otherwise specified, raised face end flanges shall be provided. The purchaser may specify a flange facing other than that specified in ASME B16.5 or ASME B16.47, as applicable.

5.2.5 The dimensions and finish of ductile iron end flanges shall be as specified in ASME B16.42 for the type of facing specified in the purchase order.

5.2.6 Socket-welding end preparation, including the internal ends of extended-body valves, shall conform to ASME B16.11. The bottom of the socket shall be square and flat except in the case where a threaded end valve is converted to a socket-weld end valve. The minimum wall thickness of internal socket-welding ends shall be in accordance with Table 4 of ASME B16.34.

5.2.7 Butt-welding ends for valve sizes greater than DN 50 (NPS 2) shall conform to the requirements of ASME B16.25 and ASME B16.34 for the bore specified for use without backing rings. Butt-welding end valves DN 50 (NPS 2) and smaller shall conform to the butt-welding end requirements of API 602. Conversion of a flanged end valve to a butt-welding end valve is not permitted except by agreement between the purchaser and manufacturer.

The chemical composition of carbon steel welding ends shall meet the following requirements unless otherwise agreed.

- The carbon content shall not exceed 0.23 % by mass.
- The carbon equivalent, CE, shall not exceed 0.43 as determined by the following formula:

$$CE = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Ni + Cu}{15}$$

where

C is weight % carbon
Mn is weight % manganese
Cr is weight % chromium
Mo is weight % molybdenum
V is weight % vanadium
Ni is weight % nickel
Cu is weight % copper

For API committee review only

This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.

5.2.8 Threaded end valves shall be threaded as specified in ASME B1.20.1. All internal threads shall be chamfered a distance of one half the pitch of the thread at an angle of 40 to 50 degrees with the axis of the thread.

5.2.9 If drain, bypass, or other types of auxiliary connections are specified in the purchase order, they shall conform to ASME B16.34.

5.2.10 If a vented body cavity is specified, the area within a closed plug and the area below the plug shall be vented by drilling or by other positive means validated through type testing. For lift plug valves, both the area above and below the plug shall be vented by drilling or by other positive means and validated through type testing. For lubricated tapered plug valves, the area below the small end of the plug need not be vented if it prevents the sealant injection system from performing its intended function. If this venting affects the sealing direction of the valve, the body shall be marked with the preferred shut-off direction and be marked per the unidirectional valve requirements in 9.5.

5.2.11 The dimensions of a flared lining covering the flange facing on a fully lined valve shall be according to MSS SP-155.

5.3 Bonnet/Cover

5.3.1 Bonnet/Cover shall have nut bearing surfaces for bolting that are parallel to the cover face within one degree. Spot-facing or back-facing for heavy hex head and internal hex head cap screws shall accommodate the dimensions of these fastener types.

5.3.2 The bonnet/cover is usually cast or forged of the same material as the body. The bonnet/cover typically screws into or is bolted to the valve body, however, may be integral to the valve body.

5.4 Stem and Plug

5.4.1 The stem shall be of an anti-blowout design and a stem seal retaining device shall not be the sole means used for stem retention. The design shall ensure the stem cannot be ejected from the valve by removal of gland bolting or actuator mounting hardware.

5.4.2 Stem-to-plug connection and all parts of the stem within the pressure boundary shall under torsional load exceed the strength of the stem that lies outside the pressure boundary by more than 10 %. This shall be verified by destructive testing or calculation methods that have been verified by destructive testing on items of the same geometric configuration.

5.4.3 The stem and connection between stem and plug shall be designed to resist permanent deformation or failure of any part when a force applied to lever or gear operator produces a torque equal to the greater of 20 N m (15 ft-lb) or two times the manufacturer's maximum published torque at maximum differential pressure at 21 °C (70 °F) on dry air service. This shall be verified by destructive testing or calculation methods that have been verified by destructive testing on items of the same geometric configuration.

5.4.4 The surface finish of un-lined/un-coated plugs which rotate against elastomeric or plastic sleeves, liners, seals, gaskets, or seats shall be no rougher than Ra of 0.40 micro-meter (16 microinch) in accordance with ASME B46.1Lubricated plug valves shall have a surface finish between the seat and plug that will ensure maximum retention of lubricant as determined by the manufacturer.

5.4.5 Stem surface area in contact with the stem seal or packing shall be no rougher than Ra of 0.8 μm (32 μin.) in accordance with ASME B46.1. Energized seals may have surface finish requirements that fall outside of this range.

5.4.6 Sealing for lubricated taper plug valves shall be a metal-to-metal seated design.

5.4.7 The position of the plug bore shall be indicated on the stem. This indication shall be parallel to the plug bore and may be by permanent marking on the top or side of the stem, keyways, or by the shape of the exposed stem portion.

For API Committee Review Only

This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.

5.5 Glands

5.5.1 Adjustable glands or gland followers may be a threaded type, a bolted one-piece type, or a bolted two-piece, self-aligning type.

5.5.2 Packing glands that are threaded into bodies or covers or onto stems shall not be used for valve sizes greater than DN 100 (NPS 4) unless otherwise specified by purchase order.

5.5.3 The gland shall be of a design that allows entry into the stuffing box while minimizing the potential for seal extrusion when compressing the packing rings.

5.6 Bolting

5.6.1 Covers shall be bolted with studs, stud bolts, or cap screws. Studs and stud bolts shall be equipped with heavy hex nuts that conform to ASME B18.2.2 or ASME B18.2.6 and sizing in accordance with ASME B16.34 or ASME *BPVC* Section VIII, Division 1, Appendix 2.

5.6.2 Bonnet/cover/gland bolting with diameters 25 mm (1 in.) and smaller shall have coarse (UNC) threads or the most nearly corresponding metric thread. Bolting with diameters larger than 25 mm (1 in.) shall be 8-thread series (8 UN) or the most nearly corresponding metric threads. Bolt threads shall be Class 2A and nut threads shall be Class 2B, in accordance with ASME B1.1. When wrench-fit studs are furnished, the wrench-fit end of these studs and the threaded hole shall have threads in accordance with a Class 5 interference fit, as specified in ASME B1.12. When metric bolting is used, metric bolt threads shall be tolerance Class 6g and nuts tolerance Class 6H in accordance with ASME B1.13M.

5.6.3 Through holes shall be used in the bonnet, cover flange, cover, adjuster, or gland. Open slots shall not be used.

5.6.4 Packing gland bolts shall be designed so that the bolt stress shall not exceed one third (1/3) of the minimum tensile stress of the bolt due to average packing compressive stress required to retain the maximum cold working pressure of the valve (CWP rating).

5.7 Operation

5.7.1 Unless otherwise specified on the purchase order, the length of the lever or the gear ratio, efficiency, and handwheel diameter of gear operators shall be designed so that the required input force to fully open and close the valves shall not exceed 360 N (80 lbf) when operating the valve at the manufacturer's maximum published torque as described in 5.4.3. . The maximum output of the gear operator, when provided, shall be less than the valve Maximum Allowable Stem Torque (MAST).

5.7.2 A lever-type handle shall be furnished as a separate item and shall be supplied only when specified in the purchase order. A lever may be of an integral design or may consist of a head that fits onto the stem and is provided with a socket or another suitable means of accommodating an extended lever. The head shall be designed so that the lever can be permanently attached. The head shall be secured to the stem or operating mechanism with a set screw of ample size or by another positive means.

5.7.3 A spoked handwheel shall be furnished with each gear-operated valve; webbed or disked handwheels shall not be used. Spokes that extend beyond the wheel rim (tiller type) are permissible.

5.7.4 Gear mechanisms may be operated manually or by means of an electric motor or another similar power device. Keys or pins shall be used to secure gears or pinions to separate shafts. On power-operated valves, the gear assembly shall be suitably guarded.

5.7.5 When specified in the purchase order, valves shall be furnished with a lockable device, that accepts a purchaser-supplied lock that enables the valve to be locked in the open and closed positions. The lockable device shall be designed such that a lock with an 8 mm (^{5}/16 in.) diameter shank, not more than 100 mm (4 in.) long, can be inserted directly through appropriate holes and locked. Provisions for a lockable device are permitted even when it is not specified in the purchase order.

For API Committee Review Only

This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.

5.7.6 Valves shall be provided with a suitable stop for the plug assembly in both the open and the closed position. The open and closed position of the plug in the body shall be shown by an indicator. Cast or integrally forged indicators shall be raised rather than recessed. If the position indicators are not integral with the plug, they shall be designed to prevent the plug and indicators from being assembled in any way other than with the indicator in its proper position with respect to the plug port. Stem wrench flats in line with the plug port are also a suitable integral position indicator.

5.7.7 The lever shall be mounted parallel to the flow passage through the plug if the valve is supplied with a lever-type handle. The lever design shall not permit incorrect assembly.

5.7.8 Valves shall be closed by rotating the closure device (lever or handwheel) in a clockwise direction.

5.7.9 When automating valves, components such as intermediate supports (brackets), couplings, and fasteners shall be appropriately sized for the output of the actuator. ISO 5115 may be used for additional guidance.

5.7.10 Gear operators, actuators, and extension mounted actuators shall be bolted to the valve and removable without requiring the loosening or removal of the cover bolting, packing gland bolting, or other valve assembly bolting that would expose the valve to leakage while under pressure. Pressure retaining fasteners shall be identified (e.g., stamping, etching, tags, etc.).

Warning: See CSB report 2021-05-I-TX for safety considerations regarding attachment of gear operators, actuators, and extension mounted actuators. Figure 5.1, Figure 5.2, and Figure 5.3 provide common examples of pressure retaining fasteners and gearbox mounting brackets.

For API Committee Review Only

This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.

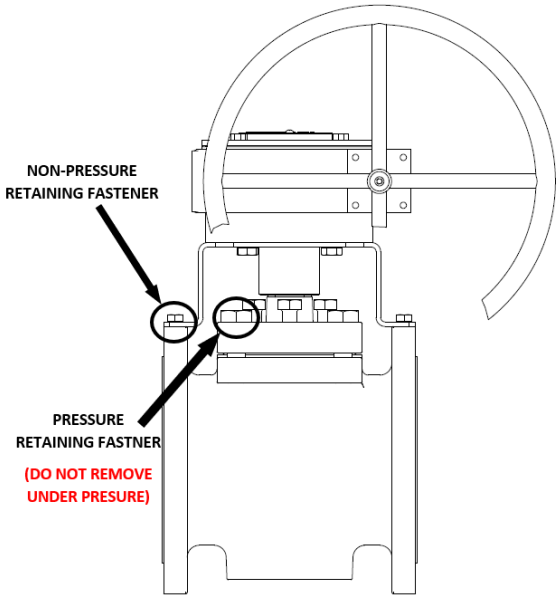


Figure 5.1 – Preferred Method for Attaching Mounting Bracket

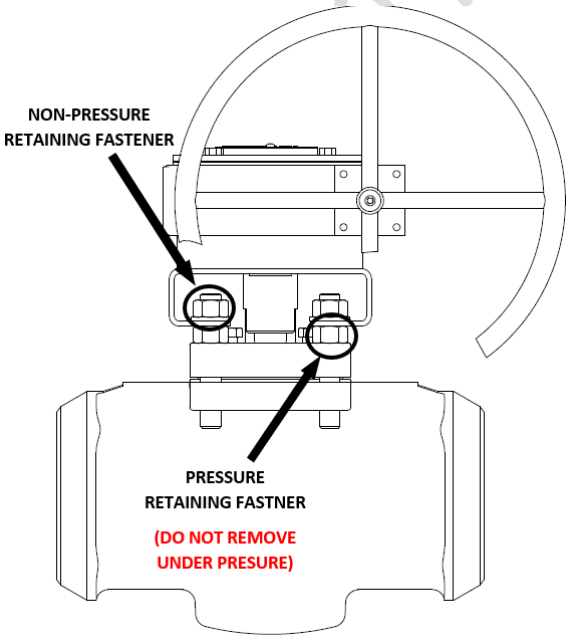


Figure 5.2 – Acceptable Method for Attaching Mounting Bracket

For API Committee Review Only

This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.

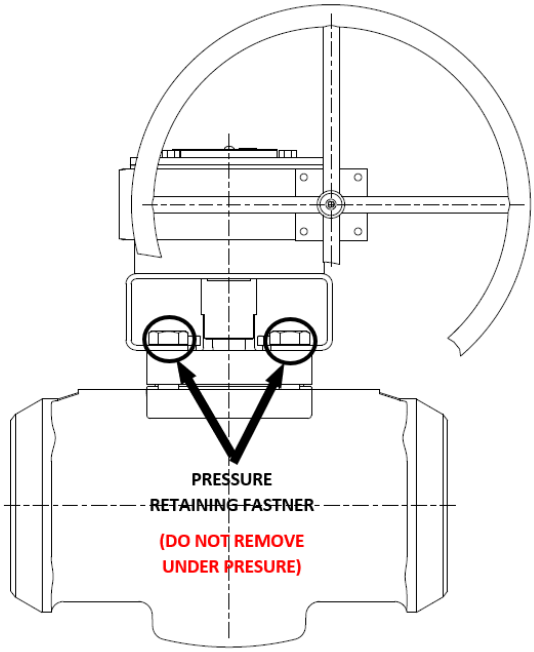


Figure 5.3 – Nonconforming Method for Attaching Mounting Bracket

5.8 Electrical Continuity

Valves shall incorporate an antistatic feature that ensures electrical continuity between the plug and the body of valves that use a one-piece stem/plug design, and between the plug, stem, and body of valves that use a two piece stem/plug design. The anti-static feature shall have electrical continuity across the discharge path, with a resistance not exceeding 10 ohms from a power source not exceeding 12 volts direct current (Vdc) when type tested on a new, dry as-built valve after open-closed position cycling of the valve at least five time.

6 Materials

6.1 General

When service or environmental conditions, such as low temperatures or a corrosive environment, make special considerations necessary in choosing valve materials, the purchaser shall indicate this on the purchase order, and the materials shall be as agreed upon by the purchaser and the manufacturer.

6.2 Shell

6.2.1 The shell shall be of a material listed in ASME B16.34 or of a ductile iron listed in ASME B16.42.

6.2.2 A metallographic examination shall not be substituted for the tensile test required by ASTM A395.

6.3 Body-to-Cover Seals, Diaphragms, or Gaskets

6.3.1 When body-to-cover seals, metallic or nonmetallic diaphragms, or gaskets are used, they shall be suitable for the service conditions and the valve's pressure/temperature ratings. Where necessary, compression of the seals,

For API Committee Review Only

This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.

diaphragms, or gaskets shall be controlled by a compression ring or by the body-to-cover design. The corrosion resistance of any metal in contact with the service fluid shall at least equal that of the body. The seal or gasket may be made of a material listed in Table B-1 in Appendix B of ASME B16.5 - 2017, or the seal or gasket may be made of a hydrocarbon-resistant plastic or elastomer.

If we mention the edition of one standard, should all standards have a edition call? ASME B16.34 for example.

6.3.2 When a spiral wound gasket is used, it shall be fully confined or provided with an anti-buckling design. In addition, the design shall prevent over compression.

6.4 Trim

6.4.1 Plugs shall be made of one of the materials specified in ASME B16.34 or ductile iron specified in ASME B16.42. Other materials may be used if they are specified in the purchase order. The corrosion resistance of the plug shall be at least equal to that of the body. The plug surfaces shall have bearing properties that will resist galling. Plugs may be hard-surfaced to provide the desired resistance to abrasion and galling. When ductile iron plugs are hard-surfaced, hard surfacing shall not be applied by welding or brazing.

6.4.2 Stem material, when not integral with plug, shall have a corrosion resistance at least equal to the body and meet the strength requirements of 5.4.2.

6.5 Operating Mechanisms

6.5.1 Handwheels and chainwheels shall be made of carbon steel, ductile iron, or malleable iron. Unless otherwise specified in the purchase order, handwheels and chainwheels shall be cast or forged, or they may be fabricated from other carbon steel product forms. All handwheels shall be free from burrs and sharp edges. Levers shall be made of steel, ductile iron, malleable iron, bronze, or other ductile metals. Chains shall be made of steel.

6.5.2 Material of the gearbox housing shall be cast iron, ductile iron, carbon steel, or stainless steel.

6.6 Glands

Glands or gland followers shall be same nominal chemical composition as the trim and have mechanical and corrosion resistance properties equivalent to or better than those of the trim, unless otherwise specified by the purchaser..

6.7 Stem Seal or Packing

6.7.1

Materials for stem seals, body seals, and gaskets shall be suitable for use at the maximum operating temperature and corresponding maximum pressure rating of the valve as stated by the valve manufacturer, unless otherwise specified on the purchase order.

6.7.2 Wetted metallic gasket components shall have corrosion resistance equal to or superior to shell material.

6.7.3 Injector fittings of injectable packing points shall include a non-return valve and plunger.

6.7.4 Injection fittings shall have a MAWP not less than the greater of the MAWP of the valve or the injection pressure.

6.7.5 API 599 valves within the scope of API 641 shall be qualified by type testing to meet the fugitive emission requirements of API 641.

For API Committee Review Only

This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.

6.8 Bolting

6.8.1

Body, cover, body joint, packing gland, and adjustment bolting shall be as specified in Table 2, unless an alternate bolting material is specified by the purchaser. Purchaser may specify higher grades of bolting materials.

Table 2 – Bolting Materials

High Strength Bolting Materials				Intermediate Strength Bolting Materials		
Spec. No.	**Grade**	**Maximum Temp ˚F (˚C)**		**Spec. No.**	**Grade**	**Maximum Temp ˚F (˚C)**
A193	B7	1100 (538)		A193	B5	1250 (649)
A193	B16	1150 (593)		A193	B6	950 (482)
				A193	B6X	(Note 3)
A320	L7	750 (371)		A193	B7M	1050 (538)
A320	L7A	700 (343)				
A320	L7B	700 (343)		A193	B8 Cl. 2	1050 (538)
				A193	B8 Cl. 2B	(Note 3)
A320	L7C	700 (343)		A193	B8C Cl. 2	1050 (538)
A320	L43	750 (371)		A193	B8M Cl. 2	1050 (538)
				A193	B8M Cl. 2B	(Note 3)
				A193	B8T Cl. 2	1050 (538)
A354	BC	650 (343)				
A354	BD	650 (343)		A320	B8 Cl. 2	1050 (538)
				A320	B8C Cl. 2	1050 (538)
A540	B21	(Note 3)		A320	B8F Cl. 2	(Note 3)
A540	B22	(Note 3)		A320	B8M Cl. 2	1050 (538)
A540	B23	(Note 3)		A320	B8T Cl. 2	1050 (538)
A540	B24	(Note 3)				
				A449		(Note 3)
				A453	651	1050 (538)
				A453	660	1050 (538)

Note:
1. Bolting specification and grade/class per ASME B16.5 Table 1.1-2.
2. Maximum temperature of bolting materials per ASME B31.3 Table A-2 / A-2M.
3. Maximum temperature of bolting material is not included in ASME B31.3 Table A-2 / A-2M.

6.8.2 Valve bolting material is subject to the minimum and maximum temperature limitations specified in ASME B31.3 Table A-2.

6.9 NACE Requirements

6.9.1 When specified in the purchase order, valves shall comply with NACE MR0103.

6.10 Identification Plate

6.10.1 The identification plate material shall be 18Cr-8Ni stainless steel or nickel alloy.

6.10.2 Except for ductile iron body valves, the identification plate shall be attached to the valve shell by welding. Alternatively, attachment by pins made of a material similar to that of the nameplate is allowed for all materials.

6.11 Lining

For API committee Review only

This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.

6.11.1 Lining materials for fully lined plug valves shall as a minimum be in accordance with MSS-155.

7 Sealing System

7.1 Lubricated Plug Valves

7.1.1 Lubricated plug valves shall be furnished with an internal lubricating system that is capable of delivering lubricant to the body and plug contact surfaces in the seating and seal areas.

7.1.2 Grooves shall be provided in the body and plug surfaces. The grooves shall be arranged so that lubricant under pressure will be transmitted to all parts of the lubrication system when the valve is fully open or closed, thereby sealing the ports and facilitating operation.

7.1.3 The design of the sealant (lubricant) fitting shall be a lubricant screw, a sealant (lubricant) fitting, or a combination (lubricant) fitting and screw. The sealant fitting, including the screw, shall be made of steel.

7.1.4 For valves that are supplied with a lubricant screw or a combination lubricant fitting and lubricant screw, a minimum of two independent check elements are required. See Figure B1.4 as an example.

Lubricant fittings shall be equipped with a minimum of one integral check element.

The material for the check valves, including the check elements and the housing, shall be metallic and at least as corrosion resistant as the metal of the valve body.

Lubrication fittings shall have a MAWP not less than the greater of the MAWP of the valve or the injection

pressure.

7.1.5 Unless otherwise specified in the purchase order, lubricated plug valves shall be furnished with hydrocarbon-resistant lubricating sealant/lubricant that is suitable to meet the maximum rated design temperature of the valve. This sealant/lubricant shall have both proper viscosity for tight sealing and lubricity for ease of operation.

7.2 Nonlubricated Plug Valves

7.2.1 Nonlubricated plug valves may use metal seats or plastic or elastomer sleeves, seats, or complete or partial linings or coatings as sealing elements that are compatible with the service.

7.2.2 Sleeves shall be mechanically restrained to prevent displacement (cold flow), sleeve rotation, or dislodging while valves are in service.

7.2.3 Linings or coatings of the plug shall be bonded or mechanically locked. Linings or coatings of the shell shall also be bonded or mechanically locked unless the strength and rigidity of the lining or coating are sufficient to prevent displacement or dislodging while valves are in service.

7.2.4 In sleeved, lined, and soft-seated plug valves, a means shall be provided to adjust, either manually or automatically, the position of the plug as wear occurs.

8 Inspection, Examination, and Testing

8.1 Inspection and Examination

For API Committee Review Only

This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.

8.1.1 Inspection and examination shall be in accordance with API 598.

8.1.2 Additional inspection and examination requirements should be specified in the purchase order, if required by the purchaser.

8.2 Testing

8.2.1 Plug valves that use a coating, liner, or sleeve shall have the valve body pressure tested in-process prior to installation of the coating, liner, or sleeve. The shell test media may be liquid or gas. The test pressure shall be 1.5 x the valve maximum working pressure for liquids or 1.1 x the valve maximum working pressure for gas shell test. The minimum test durations shall be per API 598. Plug valves manufactured in accordance with section 8.4.1 only require in-process testing per MSS SP-xxx.

8.2.2 Each valve shall be pressure tested in accordance with API 598. Valves shall be tested at the factory in the fully assembled condition, including auxiliary components, fitting, and gland packing, and before coating or painting. During the pressure test, the valve body shall be free of external constraints applied in the direction of the pipe axis. Valves having surface conversion treatment may be tested with the treatment applied. **8.2.3** When fire-tested valves are specified by the purchaser, the requirements of API 607 shall apply unless otherwise agreed by the purchaser.

8.2.4 Lubricant injectors and body cavity plugs that are not pressure retaining shall be removed during the API 598 shell test.

8.2.5 Liners for fully lined valves shall be electrostatic (spark) tested per MSS SP-155.

8.3 Repair of Defects

8.3.1 When examination, inspection, or testing reveals defects in the body of a steel or alloy valve, the defect may be repaired as permitted by the applicable ASTM material specification

8.3.2 No repair, including plugging or impregnation, of defects found in ductile iron castings is permitted. Welding or brazing of ductile iron shall not be permitted.

8.4 Special Services

8.4.1 Plug valves for Hydrogen Fluoride (HF) Alkylation Service shall be manufactured in accordance MSS SP-160.

9 Marking

9.1 Valves other than ductile iron valves shall be marked in accordance with ASME B16.34 and shall be marked API 599.

9.2 Ductile iron valves shall be marked in accordance with MSS SP-25 and shall be marked API 599.

9.3 Valves that are qualified in accordance with API 641 shall also be marked in accordance with API 641.

9.4 Valve identification plate marking shall include the pressure rating at 38 °C (100 °F) and manufacturer's figure number.

9.5 Valve identification plate marking shall include the maximum temperature limit and its corresponding limiting pressure for any seal, sleeve, liner, diaphragm, or seat that causes the valve to be limited to a pressure/temperature rating that is lower than that listed in applicable ASME B16.34 or ASME B16.42.

For API Committee Review Only

This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.

9.6 Unidirectional valves shall be marked with the designation “HP” on the high-pressure side of the valve, either by cast or stamped characters or on a permanently attached nameplate (see 6.10). In addition, unidirectional valves shall have a warning label or tag that states, “Unidirectional Valve”.

10 Shipment

10.1 Cleanliness

Prior to packaging or shipping, each valve shall be drained of test fluid, including draining of the body cavity.

10.2 Coatings

10.2.1 Unless otherwise specified in the purchase order, non-machined external surface of valve bodies and cover of non-corrosion resistant materials shall be protected against atmospheric corrosion via paint or other surface coating.

10.2.2 Machined surfaces of flange faces and welding ends of ferrous materials shall be coated with easily removable rust preventive.

10.2.3 All coatings and paints shall not contain lead. Lead-free is defined by the Consumer Product Safety Act, CPSA 15 USC 2057-8, 1978, as less than 0.06 % (600 ppm by dry weight).

10.3 Openings

10.3.1 End flanges or welding ends shall be covered to protect the gasket surfaces or welding ends and the valve internals during shipment and storage, except on small, individually packaged valves where the packaging provides such protection. The protective covers shall be made of plastic, wood (with protective barrier), or metal and shall be securely attached to the valve ends by bolts, steel straps, steel clips, or suitable friction-locking devices. Flange protectors in direct contact with flange faces shall not be of a porous (e.g. wood) material. The protective cover shall be designed so that the valve cannot be installed without complete removal of the protective cover (e.g., adhesive sheet material on the raised face).

10.3.2 Tapped auxiliary connections shall be fitted with fully tightened, threaded solid metal plugs that have corrosion resistance at least equal to that of the shell. Cast iron plugs shall not be used. However, ductile iron plugs may be used in ductile iron valves. Any thread sealant used to seal the plug shall be suitable for the full pressure and temperature rating of the valve or as specified in the purchase order.

10.4 Plug Position

Valves shall be shipped with the valve plug or plugs in the open position.

10.5 Packing

If adjustable stem packing is used, valves shall be shipped with the stem packing installed and torqued to specification. The remaining packing adjustment, with the gland tight, shall be greater than one cross-sectional packing width.

10.6 Packaging

10.6.1 Valves shall be packaged to prevent damage during shipment.

10.6.2 When export packaging is specified in the purchase order, valves shall be shipped in wooden boxes or crates in a manner that will prevent their shifting within the package.

For API Committee Review Only

This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.

11 Recommended Spare Parts

When specified on the purchase order, the vendor shall submit a recommended list of spare parts. The list shall be accompanied by cross-sectional or assembly type drawings for identification with part numbers.

For API Committee Review Only

This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.

Annex A

(informative)

Information to Be Specified by the Purchaser

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

A.2 If no exceptions are to be taken to this standard, the purchase order need only refer to API 599 and specify the items included in A.2.1. Optional items included in A.2.2 may also be specified.

A.2.1 Items required on the purchase order are as follows:

a) nominal valve size (see Section 1);

b) nominal pressure class (see Section 1);

c) type (lubricated or nonlubricated) and pattern (short, regular, venturi, or full bore) or tandem plug (see Section 1);

d) end connections:

(1) flanged, including facing type (e.g., raised, ring joint, or flat);

(2) welding end, including bore dimensions;

(3) threaded;

(4) socket weld (SW) or SW/threaded;

(5) flanged/welding ends (see Section 1 and 5.2.3 through 5.2.8). For flanged sizes over DN 600 (NPS 24), specify ASME B16.47 Series A or B;

e)

f) type of operator required (e.g., lever, handwheel, or gear operator) and whether supply of operator is included in the purchase order (see 5.7 and 6.5);

g) shell (body and bonnet/cover) material (see 6.1 and 6.2);

h) plug material (see 6.4).

A.2.2 Optional items are as follows:

a) increase the minimum wall thickness to meet Table 1 (see 5.2.1)

b) flanged ends attached by welding (see 5.2.3);

c) conversion of flanged end valve to a butt welding end valve (see 5.2.7)

d) auxiliary connections (see 5.2.9);

e) threaded packing glands for greater than NPS 4 (see 5.5.2)

f) lockable device (see 5.7.5);

g) materials for operating mechanisms (see 6.5);

h) stem seal or packing material (see 6.7);

i) bolting material for temperatures beyond the limits specified in ASME B31.3 or for increased resistance to corrosive environments (see 6.8);

j) lubricating sealant (see 7.1.5). (Specify sealant and/or operating temperature if temperature is outside the rated design of the valve.);

For API Committee Review Only

This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.

k) compliance with NACE Requirements (see 6.9);

l) special paint or coating (see 10.2);

m) API 607 fire-tested design (see 8.2.3);

n) sealant injection fittings (see 7.1.3);

o) specific requirements for sealant/lubricant (see 7.1.5 and 10.3.2);

p) required input force (see 5.7.1);

q) thread sealant (see 10.3.2);

r) thread style (see 5.2.8);

s) inspection (see 8.1);

t) supplementary examinations (see 8.1);

u) coating for ductile iron valves (see 10.2);

v) export packaging (see 10.6.2);

w) vented body cavity (see 5.2.10);

x) recommended spare parts (see Section 11);

y) special service preparations, such as for chlorine, oxygen, etc.

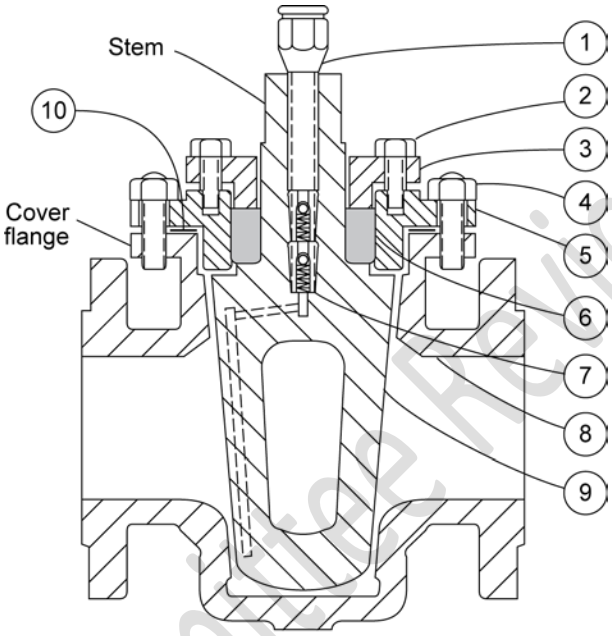
For API Committee Review Only

This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.

Annex B

(informative)

Standard Nomenclature for Valve Parts



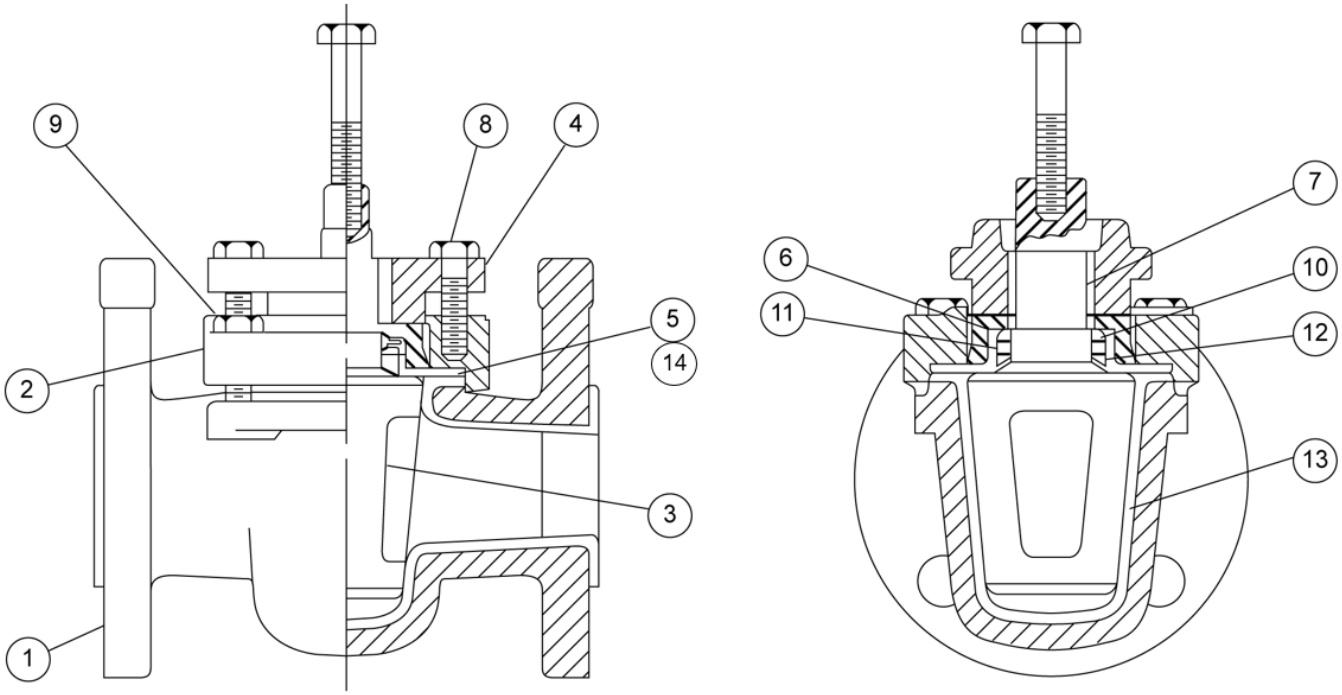
Key

1	lubricant fitting	6	stem packing
2	gland bolting	7	lubricant check valves
3	gland	8	body
4	cover bolting	9	plug
5	cover	10	cover gasket

Figure B.1—Parts Identification for Lubricated Plug Valve

For API Committee Review Only

This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.



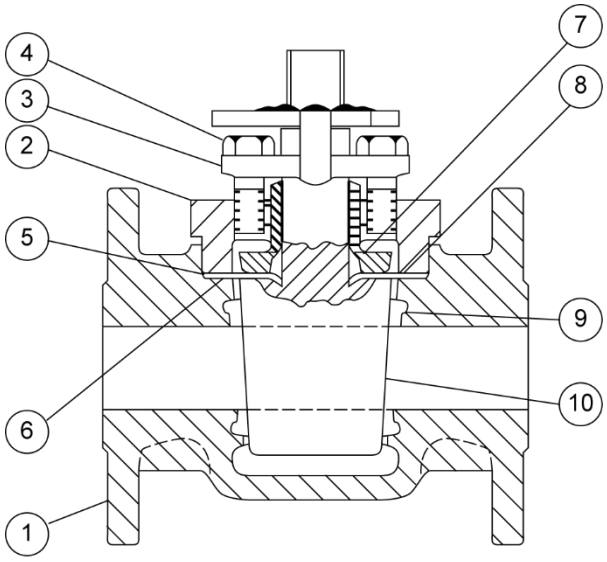
Key

1	body	8	gland bolting
2	cover	9	cover bolting
3	plug	10	spring washers
4	gland	11	support ring
5	non-metallic diaphragm	12	cup seal
6	thrust washer	13	lining
7	antistatic device	14	metallic diaphragm

Figure B.2—Parts Identification for Nonlubricated Fully-lined Plug Valve

For API Committee

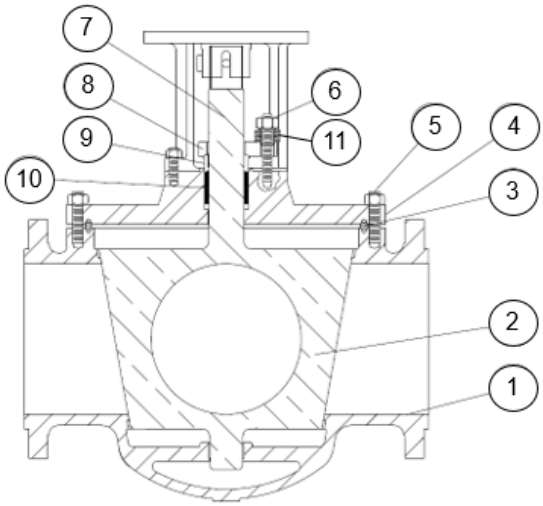
This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.



Key

1	body	6	nonmetallic diaphragm
2	cover	7	stem seal or packing
3	adjuster	8	metallic diaphragm
4	adjuster bolting	9	sleeve
5	cover gasket or seal	10	plug

Figure B.3—Parts Identification for Nonlubricated Sleeve-lined Plug Valve



Key

1	body	7	stem
2	plug	8	packing gland flange
3	gasket, bonnet	9	packing gland
4	bonnet	10	packing
5	bonnet bolting	11	spring washers (optional)
6	packing gland bolting		

Figure B.4—Parts Identification for Nonlubricated Lift Plug Valve

For API Image Review Only

This document is not an API Standard; it is under consideration within an API technical committee but has not received all approvals required to become an API Standard. It shall not be reproduced or circulated or quoted, in whole or in part, outside of API committee activities except with the approval of the Chairman of the committee having jurisdiction and staff of the API Standards Dept. Copyright API. All rights reserved.

Annex C

(informative)

API 591 Inspection Checklist

In addition to the standard inspection requirements in API 591, the additional requirements in Table C.1 shall be included specifically for API 599 plug valves.

Table C.1 – Inspection Requirements for Plug Valves

Surface finish of plug
Construction as per API standard
Port pattern
Type of packing gland
Closure Element Type
Anti-static Device
Cavity vent: (yes/no)
Lubricated plug adjustment method
Plug Design: lubricated/non-lubricated
Lined plug valve: fully lined or sleeve lined
Method of securing lining
One-piece stem and plug: (yes/no)
Packing gland, lantern ring, and spacer ring material
Position stops not integral with packing gland, gland flange, or gland bolting

For API Committee Only