Butterfly Valves: Double-flanged, Lug- and Wafer-type, and Butt-welding Ends

API STANDARD 609
TENTH EDITION, MAY 2026

API MONOGRAM PROGRAM EFFECTIVE DATE: DECEMBER 1, 2026



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. The use of API publications is voluntary. In some cases, third parties or authorities having jurisdiction may choose to incorporate API standards by reference and may mandate compliance.

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.

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.

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.

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 utilized. 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.

All rights reserved. No part of this work may be reproduced, translated, stored in a retrieval system, or transmitted by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission from the publisher. Contact the publisher, API Publishing Services, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001.

Copyright © 2026 American Petroleum Institute

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 in order to conform to the standard.

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

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 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.

Contents

1 Scope 1

2 Normative References 1

3 Terms and Definitions 3

4 Pressure-temperature Ratings 4
4.1 Valve Rating 4
4.2 Shell Rating 4
4.3 Differential Pressure Rating 4

5 Design 5
5.1 General 5
5.2 Body 7
5.3 Face-to-face Dimensions 8
5.4 Valve Body Flange Facings 8
5.5 Disc Clearance 8
5.6 Shaft and Shaft Seals 13
5.7 Piping Connection External Bolt Holes 13
5.8 Valve Body Seat Retainer—Category B Valves Only 13
5.9 Operating Mechanisms 15
5.10 Antistatic Design 16
5.11 Packing Gland Bolting—Category B Valves Only 16

6 Materials 16
6.1 Body 16
6.2 Pressure Boundary Elements 16
6.3 Process Wetted Parts 17
6.4 Packing or Shaft Seal Materials 17
6.5 Gland Bolting 17
6.6 Operating Mechanisms—Category B Valves Only 17
6.7 Nameplate 17

7 Testing, Inspection, and Examination 17
7.1 Inspection and Examination 17
7.2 Pressure Tests 17
7.3 Antistatic Testing 17
7.4 Repair of Defects 18

8 Markings 18

9 Packaging and Shipping 19
9.1 Coatings 19
9.2 Shaft Packing 19
9.3 Packaging 19
9.4 Spare Parts 20

10 Special Services 20
10.1 NACE Service 20
10.2 Cryogenic Service 20
10.3 Hydrogen Fluoride (HF) Alkylation Service 20
10.4 Hydrogen Service 20

Annex A 21

Annex B (normative) **Information to be Specified by Purchaser** 22

Annex C (informative) **Typical Butterfly Valve Construction and Nomenclature** 25

Annex D (normative) **Disc-to-pipe Clearances** 29

Figures

1 External Bolting Options for Lug- and Wafer-type Valves 14
2 Limitations for Flange Face Interruptions That Fall Within the Gasket Seating Area 15
C.1 Typical Part Nomenclature for Category A Concentric Disc Type 25
C.2 Typical Part Nomenclature for Category B Offset Disc Type—Design Without Extension 26
C.3 Typical Part Nomenclature or Category B Offset Disc Type—Design with Bonnet Extension 27
C.4 Typical Offset-type Constructions 28
D.1 Disc-to-pipe Clearance for Category A Concentric Disc Type 30
D.2 Disc-to-pipe Clearance for Category B Offset Disc Type 31

Tables

1 Minimum Differential Pressure Rating vs Temperature for Category B Valves (Soft Seated) 5
2 Face-to-face Dimensions for Category A Valves (Lug- and Wafer-type) 9
3 Face-to-face Dimensions for Category B Valves (Lug- and Wafer-type) 10
4 Face-to-face Dimensions for Category B Valves (Double-flanged Long Pattern) 11
5 Face-to-face Dimensions for Category B Valves (Double-flanged Short Pattern) 12
6 Maximum Lever Lengths 16
7 Maximum Handwheel Diameters 16
D.1 Nominal Radial Clearances 30
D.2 Relationship of Unlined Steel Pipe Schedule to Valve Category, Size, and ASME Class 32

Introduction

In the 10th edition, the following significant changes were made:

— added Class 900 for Category B valves;

— updated Category B valves to require API 641;

— updated testing requirements of valves for dead-end service;

— added differential pressure rating clarifications;

— added maximum lever lengths and maximum handwheel diameters;

— updated requirements for nameplate marking;

— added special services section.

Butterfly Valves: Double-flanged, Lug- and Wafer-type, and Butt-welding Ends

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-based alloy, or special alloy butterfly valves.

1.2 The following 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 construction. Sizes covered are DN 50 to DN 1500 (NPS 2 to NPS 60) for valves having ASME Class 125 or Class 150 flange bolting patterns.

b) Category B—ASME class and pressure-temperature-rated butterfly valves that have an offset seat and either an eccentric or a concentric disc construction. Sizes covered are listed below:

   — for lug- and wafer-type, Classes 150, 300, and 600: DN 50 to DN 1500 (NPS 2 to NPS 60);

   — for lug- and wafer-type, Class 900: DN 50 to DN 1200 (NPS 2 to NPS 48);

   — for double-flanged short and long pattern, Classes 150, 300, and 600: DN 80 to DN 1500 (NPS 3 to NPS 60);

   — for double-flanged short and long pattern, Class 900: DN 80 to DN 1200 (NPS 3 to NPS 48);

   — for butt-welding ends, Classes 150, 300 and 600: DN 80 to DN 1500 (NPS 3 to NPS 60);

   — for butt-welding ends, Class 900: DN 150 to DN 1200 (NPS 6 to NPS 48).

Information to be specified by the purchaser is shown in Annex B.

1.3 Valve configurations include double-flanged, lug- and wafer-type with facings that permit installation between ASME and MSS flanges and butt-welding ends. Typical valve construction and nomenclature for valve parts are shown in Annex C.

1.4 Users of this standard should refer to API 615 for background, guidance, and definitions related to butterfly valves.

2 Normative References

The following referenced 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 Specification 6D, *Specification for Valves*