# Metal Ball Valves—Flanged, Threaded, and Welding Ends

API STANDARD 608
SEVENTH EDITION, APRIL 2025

API MONOGRAM PROGRAM EFFECTIVE DATE: OCTOBER 2, 2025



## 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.

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 20001-5571.

Copyright © 2025 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 to conform to the standard.

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

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


Page

**1** Scope ..... 1

**2** Normative References ..... 1

**3** Terms and Definitions ..... 2

**4** Pressure-temperature Ratings ..... 4
**4.1** Valve Rating ..... 4
**4.2** Shell Rating ..... 4
**4.3** Seat and Seal Rating ..... 4

**5** Design ..... 5
**5.1** General ..... 5
**5.2** Flow Passageway ..... 5
**5.3** Body ..... 5
**5.4** Antistatic Design (Electrical Continuity between Ball-Stem-Body) ..... 7
**5.5** Ball-stem Design and Construction ..... 8
**5.6** Ball Construction ..... 8
**5.7** Packing Glands and Gland Bolting ..... 8
**5.8** Operation ..... 9
**5.9** End Flange Face Interruptions ..... 10
**5.10** Valve Shell Joints ..... 11
**5.11** Stem Extension Assemblies ..... 11

**6** Materials ..... 12
**6.1** Shell ..... 12
**6.2** Trim ..... 12
**6.3** Bolting ..... 12
**6.4** Stem Seals, Body Seals, and Gaskets ..... 12
**6.5** Identification Plate(s) ..... 12
**6.6** Threaded Plugs and Auxiliary Components ..... 12
**6.7** NACE Requirements ..... 12

**7** Inspection, Examination, and Testing ..... 12
**7.1** Inspection and Examination ..... 12
**7.2** Assembly ..... 12
**7.3** Pressure Testing ..... 13
**7.4** Fire Testing ..... 13
**7.5** Fugitive Emission Testing ..... 13

**8** Marking ..... 14

**9** Packaging and Shipping Requirements ..... 15

**10** Spare Parts ..... 16

Annex A. ..... 17

Annex B (normative) Information to Be Specified by the Purchaser ..... 18

## Contents

Page

Annex C (informative) Typical Floating and Trunnion Ball Valve Component Nomenclature ..... 20

Annex D (informative) Validation Testing of Pressure-Temperature Rating of Nonmetallic Seats ..... 22

Bibliography ..... 26

### Figures

**1** Flange Face Interruption Limits ..... 10
**2** Sample Stem Extension Assembly ..... 11
**3** Typical Fire-resistant Seats ..... 14
**C.1a** Typical Floating Ball Valve Components (One-piece Body/Unibody Illustrated)—Nomenclature ..... 20
**C.1b** Typical Floating Ball Valve Components (Two-piece Body/Split-body Illustrated)—Nomenclature ..... 20
**C.2** Typical Trunnion-mounted Ball Valve Components (Split-body Valve Illustrated)—Nomenclature ..... 21

### Tables

**1** Minimum Seat Pressure-Temperature Rating—bar ..... 4
**2** Minimum Seat Pressure-Temperature Rating—psig ..... 5
**3** Cylinder Diameter for Categorizing Bore Size ..... 6

## Introduction

In the seventh edition, the following significant changes were made:

— Limitations on pressure classes were increased for valve sizes DN 50 (NPS 2) and smaller.

— Double reduced bore was removed, but bore sizes smaller than standard reduced bore are permitted when specified by the purchaser.

— Seat ratings for PTFE and R-PTFE in Table 1 and Table 2 were increased.

— An informative annex (Annex D) was added to provide a method for validation testing of pressure-temperature rating of non-metallic seats.

— Table 3 for bore sizes was revised to include the higher-pressure classes and remove the double reduced bore.

— Dimensional limitations were introduced for lever handle length and handwheel diameter of manually operated valves.

— Design of stem extension assemblies was addressed.

# Metal Ball Valves—Flanged, Threaded, and Welding Ends

## 1 Scope

**1.1** This standard specifies the requirements for metal ball valves suitable for petroleum, petrochemical, and industrial applications—corresponding to the nominal pipe sizes in ASME B36.10—that have:

— flanged ends in sizes DN 15 through DN 600 (NPS $^1/_2$ through NPS 24);

— butt-welding ends in sizes DN 15 through DN 600 (NPS $^1/_2$ through NPS 24);

— socket-welding ends in sizes DN 8 through DN 50 (NPS $^1/_4$ through NPS 2); and

— threaded ends in sizes DN 8 through DN 50 (NPS $^1/_4$ through NPS 2).

**1.2** This standard applies to metal ball valves with pressure classes as follows:

— flanged ends in Classes 150, 300, and 600;

— flanged ends in Classes 900, 1500, and 2500 in sizes DN 15 through DN 50 (NPS $^1/_2$ through NPS 2) only;

— butt-welding ends in Classes 150, 300, and 600;

— butt-welding ends in Classes 800, 900, 1500, and 2500 in sizes DN 15 through DN 50 (NPS $^1/_2$ through NPS 2) only;

— socket-welding ends and socket-welding by threaded ends in Classes 150, 300, 600, 800, 900, 1500, and 2500;

— threaded ends in Classes 150, 300, 600, and 800.

**1.3** This standard establishes requirements for bore sizes described as:

— full bore;

— reduced bore.

**1.4** This standard applies to floating (seat-supported) ball (Figure C.1a and Figure C.1b) and trunnion ball valve designs (Figure C.2). These figures are to be used only for the purpose of establishing standard nomenclature for valve components; other floating and trunnion designs also exist.

**1.5** This standard establishes additional requirements for ball valves that are otherwise in full conformance to the requirements of ASME B16.34 (Standard Class).

**1.6** Trunnion ball valves equipped with double piston effect seats are outside of the scope of this standard.

**1.7** Users of this standard should refer to API RP 615 for background and further guidance and definitions on API 608 valves.

## 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.