

Reconditioning of Metallic Gate, Globe, and Check Valves

API RECOMMENDED PRACTICE 621
FOURTH EDITION, OCTOBER 2018



AMERICAN PETROLEUM INSTITUTE

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 assure 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, 1220 L Street, NW, Washington, DC 20005.

Copyright © 2018 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, 1220 L Street, NW, Washington, DC 20005. 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, 1220 L Street, NW, Washington, DC 20005.

Suggested revisions are invited and should be submitted to the Standards Department, API, 1220 L Street, NW, Washington, DC 20005, standards@api.org.

Contents

	Page
1	Scope 1
2	Normative References 1
3	Terms and Definitions 2
4	Owner Access and Responsibilities 3
5	Inspection, Identification, and Disassembly of Valves 3
5.1	General 3
5.2	Identification Number 4
5.3	Traveler Documents 4
5.4	Disassembly and Cleaning of Valves 4
6	Repair of Valve Parts 5
6.1	General 5
6.2	Inspection of Valve Parts 6
6.3	Handwheel Nut 6
6.4	Handwheel 6
6.5	Yoke 7
6.6	Stem Nut and Stem Nut Housing 7
6.7	Stem Nut Retainer 7
6.8	Packing Gland Flange 7
6.9	Packing Gland 7
6.10	Backseat Bushing 8
6.11	Body and Bonnet 8
6.12	Body Guides 13
6.13	Body Seat Ring(s) 13
6.14	Wedge Guides 14
6.15	Obturator (Wedge, Globe, Disc, and Clapper) 14
6.16	Stem 15
6.17	Body-to-bonnet Joint Bolting 16
6.18	Packing Gland Eye Bolts 16
6.19	Packing 17
6.20	Body-to-bonnet Joint Gasket 17
7	Post-repair Assembly 17
8	Pressure Test 18
9	Preparation for Shipment to Owner 18
10	Tagging and Reconditioning Facility Identification 18
	Annex A (normative) Weld Overlay of Stems 20
	Annex B (normative) Stem Packing 22
	Annex C (normative) Tests 26
Figures	
1	Wear Travel 15
B.1	Stuffing Box Clearances 23
B.2	Lantern Ring Arrangement 24
B.3	Graphite Packing Ring Arrangement 24

Contents

	Page
B.4 PTFE V-ring Packing Arrangement	25
B.5 Braided Packing Arrangement	25

Tables

1 Allowable Pitting and Localized Corrosion	10
2 Minimum Thickness of Shell Wall	11
3 Gasket Surface Finish	12
4 Face-to-face Dimensions	13
5 Minimum Wear Travel and Maximum Stem Projection (from API 600)	14
6 Permitted Stem Undertolerance (from API 600, Table 6 and API 623, Table 5)	16
7 Nominal Radial Width of Packing (from API 600 and API 623)	17

Reconditioning of Metallic Gate, Globe, and Check Valves

1 Scope

1.1 This recommended practice (RP) provides guidelines for reconditioning heavy wall (API 600, API 623, and API 594 type) carbon steel, ferritic alloy (up to 9 % Cr), stainless steel, and nickel alloy gate, globe, and check valves for ASME pressure classes 150, 300, 400, 600, 900, 1500, and 2500. Guidelines contained in this RP apply to flanged and butt weld cast or forged valves.

1.2 It is an expectation of this RP that a contractual agreement shall be established between the Owner and the valve reconditioning facility. The reconditioning facility may be original equipment manufacturer (OEM) owned/operated, or directly associated and approved by the OEM. At the Owner's option, an independent facility may be used. The Owner shall determine that the facility selected for valve reconditioning has a documented and established working Quality Assurance Program. The Quality Assurance Program should include the essential elements described in the ISO 9001 standard.

1.3 This RP does not cover reconditioning or remanufacturing of used or surplus valves intended for resale. The only intent of this RP is to provide guidelines for refurbishing an end user's (Owner) valves for continued service in the Owner's facility. Valves reconditioned or remanufactured to this RP may not meet API Standard requirements for new valves. The correct application of a valve reconditioned to this RP remains the responsibility of the Owner.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

API Recommended Practice 591, *Process Valve Qualification Procedure*

API Standard 594, *Check Valves: Flanged, Lug, Wafer, and Butt-welding*

API Standard 598, *Valve Inspection and Testing*

API Standard 600 *Steel Gate Valves—Flanged and Butt-welding Ends, Bolted Bonnets*

API Standard 622, *Type Testing of Process Valve Packing for Fugitive Emissions*

API Standard 623, *Steel Globe Valves—Flanged and Butt-welding Ends, Bolted Bonnets*

ASME B1.5¹, *Acme Screw Thread*

ASME B1.8, *Stub Acme Screw Threads*

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

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

ASME *Boiler and Pressure Vessel Code, Section V: Nondestructive Examination*

ASME *Boiler and Pressure Vessel Code, Section IX: Welding, Brazing, and Fusing Qualifications*

¹ ASME International, Two Park Avenue, New York, New York 10016, www.asme.org.