Type Testing of Quarter-turn Valves for Fugitive Emissions

API STANDARD 641
SECOND EDITION, OCTOBER 2023

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.

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.

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 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

Page

1 Scope 1

2 Normative References 1

3 Terms, Definitions, and Symbols 1
3.1 Terms and Definitions 1
3.2 Symbols 3

4 Packing Pre-qualification 3

5 Valve Selection and Test Preparation 3

6 Safety Considerations for Type Testing 3

7 Type Testing 4

8 Acceptance Criteria 7

9 Leak Test Equipment and Calibration 7

10 Valves Qualified 8
10.1 Original Test 8

11 Valves Previously Qualified to this Standard 9

12 Valve Marking 9

Annex A (normative) Fugitive Emissions Test Report 10

Annex B (normative) Testing Profile 13

Annex C (Informative) High Temperature Testing Procedure 15

Figures

1 Valve Cycling 5
2 Calibration Setup 8
A.1a Fugitive Emissions Test Report 10
A.1b Fugitive Emissions Test Report 11
A.1c Fugitive Emissions Test Report 12

Type Testing of Quarter-turn Valves for Fugitive Emissions

1 Scope

This standard specifies the requirements and acceptance criteria for fugitive emission type testing of quarter-turn valves.

Valves larger than NPS 60 or valves greater than ASME B16.34 class 1500 are outside the scope of this standard. Valves with a pressure rating at ambient temperature less than 6.89 barg (100 psig) are outside the scope of this standard.

For all valves rated greater than or equal to 400 °C (750 °F), an additional high temperature test may be performed in accordance with Annex C or when specified by the purchaser.

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

ASME B16.34,[1] *Valves—Flanged, Threaded, and Welding End*

3 Terms, Definitions, and Symbols

3.1 Terms and Definitions

For the purposes of this standard, the following terms and definitions apply.

3.1.1
ambient temperature
A temperature that is between 15 °C to 40 °C (59 °F to 104 °F).

3.1.2
auxiliary connection(s)
Drain(s), vent(s), thermal relief(s), or injection port(s).

3.1.3
closing torque
The amount of torque required to achieve valve closure and seat leakage tightness meeting manufacturer's published acceptance criteria at maximum pressure differential.

3.1.4
dynamic leak measurement
Measurement of leakage taken at the valve stem while the stem is traveling through both an opening and closing cycle.

3.1.5
emissions
Gaseous leak given off by a piece of equipment used in reference to volatile organic compounds and expressed in parts per million volumetric (ppmv or ppm) for methane.

[1] ASME International, 2 Park Avenue, New York, New York 10016-5990, www.asme.org.