
**Industrial valves — Isolating valves for
low-temperature applications —**

**Part 1:
Design, manufacturing and production
testing**

*Robinetterie industrielle — Robinets d'isolement pour application à
basses températures —*

Partie 1: Conception, essais de fabrication et de production





COPYRIGHT PROTECTED DOCUMENT

© ISO 2022

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

| | Page |
|---|-----------|
| Foreword | iv |
| Introduction | v |
| 1 Scope | 1 |
| 2 Normative references | 1 |
| 3 Terms and definitions | 2 |
| 4 Requirements | 5 |
| 4.1 Materials..... | 5 |
| 4.1.1 General..... | 5 |
| 4.1.2 Metallic materials..... | 5 |
| 4.1.3 Internal non-metallic materials..... | 5 |
| 4.2 Design..... | 5 |
| 4.2.1 General..... | 5 |
| 4.2.2 Body/bonnet wall thickness..... | 6 |
| 4.2.3 Valve body extension and extended bonnet..... | 6 |
| 4.2.4 Stem..... | 11 |
| 4.2.5 Seats and seating surfaces..... | 11 |
| 4.2.6 Provision for internal pressure relief..... | 11 |
| 4.2.7 Operating means..... | 12 |
| 4.2.8 Electric continuity and fire-safe design..... | 12 |
| 5 Testing | 12 |
| 5.1 Production testing with low-temperature test..... | 12 |
| 5.2 Type-testing..... | 12 |
| 6 Sampling | 13 |
| 6.1 Lot requirements..... | 13 |
| 6.2 Sample size..... | 13 |
| 6.3 Lot acceptance..... | 13 |
| 7 Marking, labelling and packaging | 13 |
| Annex A (normative) Test procedure for production testing of valves at low temperature | 15 |
| Annex B (informative) Low-temperature test record | 25 |
| Bibliography | 27 |

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 153, *Valves*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 69, *Industrial valves*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 28921-1:2013), which has been technically revised.

The main changes are as follows:

- extension of the scope to include sizes DN 950 to 1 800, NPS 38 to 72, and pressure designations PN 400 and Class 2 500;
- addition of a new terminological entry for shell ([3.14](#));
- addition of a new terminological entry for drip plate ([3.15](#));
- exclusion of safety valves and control valves;
- in [5.2](#), addition of type test requirement in accordance with ISO 28921-2;
- update of [Annex A](#) giving the test procedure for production testing of valves at low temperature.

A list of all parts in the ISO 28921 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The purpose of this document is the establishment of basic requirements and practices for design, fabrication, material selection and production testing of valves used in low-temperature services. The intention is to provide requirements for design, material selection and valve preparation for valves to be used in low-temperature service.

Industrial valves — Isolating valves for low-temperature applications —

Part 1: Design, manufacturing and production testing

1 Scope

This document specifies requirements for design, dimensions, material, fabrication and production testing of gate, globe, ball/plug and butterfly valve design types used as isolation valves and check valves for low-temperature applications.

This document is applicable to isolation valves for use in low and cryogenic temperature service where the design low-temperature service is -50 °C down to -196 °C .

This document does not apply to valves for cryogenic services, designed in accordance with ISO 21011, used with cryogenic vessels.

Where the requirements of this document vary from those given in the valve product standards, the requirements of this document apply.

This document is applicable to valves with body, bonnet, bonnet extension or cover made of metallic materials.

This document is applicable to:

- valves of nominal sizes DN: 10; 15; 20; 25; 32; 40; 50; 65; 80; 100; 125; 150; 200; 250; 300; 350; 400; 450; 500; 600; 650; 700; 750; 800; 850; 900; 950; 1 000; 1 050; 1 200; 1 350; 1 400; 1 500; 1 600; 1 650; 1 800,
- corresponding to nominal pipe sizes NPS: $\frac{3}{8}$; $\frac{1}{2}$; $\frac{3}{4}$; 1; $1\frac{1}{4}$; $1\frac{1}{2}$; 2; $2\frac{1}{2}$; 3; 4; 5; 6; 8; 10; 12; 14; 16; 18; 20; 24; 26; 28; 30; 32; 34; 36; 38; 40; 42; 48; 54; 56; 60; 64; 66; 72,

and applies to pressure designations:

- PN 16; 25; 40; 100; 160; 250; 400,
- Class 150; 300; 600; 800; 900; 1 500; 2 500.

NOTE Not all type and size combination are available in all pressure ratings.

This document does not apply to safety valves and control 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 amendments) applies.

ISO 5208, *Industrial valves — Pressure testing of metallic valves*

ISO 5209, *General purpose industrial valves — Marking*

ISO 10434, *Bolted bonnet steel gate valves for the petroleum, petrochemical and allied industries*