BS ISO 21157:2018

BSI Standards Publication

Ships and marine technology — Ball valves for use in low temperature applications — Design and testing requirements

Documents
Document Sharing Hub

Full document details: BS ISO 21157:2018

National foreword

This British Standard is the UK implementation of ISO 21157:2018.

The UK participation in its preparation was entrusted to Technical Committee SME/32, Ships and marine technology - Steering committee.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2018
Published by BSI Standards Limited 2018

ISBN 978 0 580 92657 0

ICS 47.020.30

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 October 2018.

Amendments/corrigenda issued since publication

Date	Text affected

Documents
Document Sharing Hub

Full document details: BS ISO 21157:2018

INTERNATIONAL STANDARD

ISO 21157

First edition
2018-11

Ships and marine technology — Ball valves for use in low temperature applications — Design and testing requirements

Navires et technologie maritime — Robinets à boisseau sphérique destinés aux applications à basse température — Exigences de conception et d'essai

Reference number
ISO 21157:2018(E)

Documents
Document Sharing Hub

© ISO 2018

Full document details: BS ISO 21157:2018

COPYRIGHT PROTECTED DOCUMENT

© ISO 2018

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
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

© ISO 2018 – All rights reserved

Documents
Document Sharing Hub

Full document details: BS ISO 21157:2018

Contents

Page

Foreword ..... **v**

1 Scope **1**

2 Normative references **1**

3 Terms and definitions **2**

4 Pressure-temperature rating **3**

5 Structure **3**
5.1 General 3
5.1.1 Structure 3
5.1.2 Materials 3
5.2 Design and materials of the body 4
5.2.1 Design 4
5.2.2 Materials 4
5.2.3 Manufacturing 4
5.3 Design and materials of the extended bonnet 5
5.3.1 Design 5
5.3.2 Materials 5
5.4 Design and materials of ball 5
5.4.1 Design 5
5.4.2 Materials 5
5.5 Design and materials of the stem 5
5.5.1 Design 5
5.5.2 Materials 5
5.6 Stem sealing 6
5.7 Design and materials of the seat 6
5.7.1 Design 6
5.7.2 Materials 6
5.8 Design and materials of bolting 6
5.8.1 Design 6
5.8.2 Materials 6
5.9 Requirement of operating device and actuators 7
5.10 Surface treatment 7
5.11 Welding and heat treatment 7
5.11.1 Welding 7
5.11.2 Heat treatment 7
5.12 Repair welding 8

6 Test and inspection **8**
6.1 General 8
6.2 Material test 8
6.3 Non-destructive inspection 8
6.3.1 General 8
6.3.2 Radiographic testing (RT) 8
6.3.3 Penetrant testing (PT) 9
6.3.4 Ultrasonic testing (UT) 9
6.3.5 Retest 9
6.3.6 Submission of inspection results 9
6.4 Dimension check 9
6.5 Visual inspection 10
6.6 Heat treatment inspection 10
6.7 Operating tests 10
6.8 Pressure test 10
6.8.1 Pressure test in ambient temperature 10
6.8.2 Test procedure and method 10

AVA Documents
Document Sharing Hub

© ISO 2018 – All rights reserved

Full document details: BS ISO 21157:2018

6.8.3 Test of cavity pressure relief ... 11
6.9 Fire-resistance test (if necessary) ... 11
6.10 Anti-static testing ... 11
6.11 Cryogenic tests ... 11
6.11.1 General ... 11
6.11.2 Scope of tests ... 11
6.11.3 Test procedure ... 12
6.11.4 Submission of test result ... 13
7 Marking ... 13
Annex A (informative) **Examples of ball valve construction ... 14**

© ISO 2018 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS ISO 21157:2018

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 on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 3, *Piping and machinery*.

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.

© ISO 2018 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO 21157:2018

Ships and marine technology — Ball valves for use in low temperature applications — Design and testing requirements

1 Scope

This document specifies requirements for design, manufacture and test methods of cryogenic ball valves in order to have an excellent quality leakage stability in a very low temperature service (–196 °C to 80 °C).

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 5211, *Industrial valves — Part-turn actuator attachments*

ISO 28921-1, *Industrial valves — Isolating valves for low-temperature applications — Part 1: Design, manufacturing and production testing*

API 6D, *Specification for Pipeline Valves/ Petroleum and natural gas industries — Pipeline transportation systems — Pipeline*

API 6FA, *Specification for Fire Test for Valves*

ASME B16.5 *Pipe Flanges and Flanged Fittings*

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

ASME B16.11, *Forged Fittings, Socket-Welding and Threaded*

ASME B16.25, *Butt welding Ends*

ASME B16.34:2007, *Valves — Flanged, Threaded, and Welding End*

Sec ASME VIII, *Pressure vessels*

ASTM A182/A182M, *Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings and Valves and Parts for High-temperature Service*

ASTM A193/A193M, *Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications*

ASTM A194/A194M, *Carbon and Alloy Steel Nuts and Bolts for High-Pressure and High-Temperature Service*

ASTM A276, *Standard Specification for Stainless Steel Bars and Shapes*

ASTM A312/A312M,*Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes*

ASTM A320/A320M, *Alloys-Steel Bolting material for Low-Temperature service*

© ISO 2018 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO 21157:2018