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BSI Standards Publication

Testing of valves — Fire type-testing requirements

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National foreword

This British Standard is the UK implementation of EN ISO 10497:2022. It is identical to ISO 10497:2022. It supersedes BS EN ISO 10497:2010, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PSE/18/1, Industrial valves, steam traps, actuators and safety devices against excessive pressure - Valves - Basic standards.

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

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Essais des appareils de robinetterie - Exigences
de l'essai au feu (ISO 10497:2022)

Prüfung von Armaturen - Anforderungen an die
Typprüfung auf Feuersicherheit (ISO 10497:2022)

This European Standard was approved by CEN on 2 October 2022.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN ISO 10497:2022) has been prepared by Technical Committee ISO/TC 153 "Valves" in collaboration with Technical Committee CEN/TC 69 "Industrial valves" the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2023, and conflicting national standards shall be withdrawn at the latest by May 2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 10497:2010.

Any feedback and questions on this document should be directed to the users' national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Endorsement notice

The text of ISO 10497:2022 has been approved by CEN as EN ISO 10497:2022 without any modification.

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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 fourth edition cancels and replaces the third edition (ISO 10497:2010), which has been technically revised.

The main changes compared are as follows:

- clarification and emphasised importance around the monitoring of cavity pressure during testing for double-seated valves;
- catering for the testing of valves with more than one obturator;
- update of the qualification of other valves by “materials of construction” and inclusion of a new “design” clause;
- accepted fire test certificates of valves tested according to ISO 10497:2010.

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.

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Introduction

This document covers the requirements and method for evaluating the performance of valves when they are exposed to specified fire conditions. The performance requirements establish limits of acceptability of a valve, regardless of size, material or pressure rating. The burn period has been established to represent the maximum time required to extinguish most fires. Fires of longer duration are considered to be of major magnitude, with consequences greater than those anticipated in the test.

The test pressure during the burn is set at 0,2 MPa (2 bar) for soft-seated valves rated PN 10, PN 16, PN 25 and PN 40, Class 150 and Class 300, to better simulate the conditions that would be expected in a process plant when a fire is detected, and pumps are shut down. In this case, the source of pressure in the system is the hydrostatic head resulting from liquid levels in towers and vessels. This situation is approximated by this lower test pressure.

In production facilities, valves are typically of a higher rating and the pressure source is not easily reduced when a fire is detected. Therefore, for all other valves, the test pressure during the burn is set at a higher value to better simulate the expected service conditions in these facilities.

Use of this document assumes that the execution of its provisions is entrusted to appropriately qualified and experienced personnel, because it calls for procedures that can be injurious to health, if adequate precautions are not taken. This document refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage of the procedure.

This document highlights the importance of accurate monitoring and recording of test data during fire testing. The monitoring and measuring of cavity pressure has been emphasised for all double-seated valves. Empirical evidence has shown that the cavity pressure during a fire test can increase significantly unless relieved internally (by design) or externally. Without meeting the minimum requirements of the test report, valves cannot be certified as a fire safe design to this document.

It is recognised by this document that not all combinations of potential trim arrangements can be covered by a single fire test report. Certain design or material differences can be accepted by the purchaser if they do not influence sealing or operating performance. Further clarification on soft materials grouping and bolting has been included in this document.

Valves with more than one obturator are regularly used for in-line isolation and instrumentation service. As such, the need to qualify such designs as fire safe certified is now a common requirement. This document now caters for such valve designs.

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Testing of valves — Fire type-testing requirements

1 Scope

This document specifies fire type-testing requirements and a fire type-test method for soft- and metal-seated isolation valves with one or more obturators. It is not applicable to the testing requirements for valve actuators other than manually operated gearboxes or similar mechanisms when these form part of the normal valve assembly. Other types of valve actuators (e.g. electrical, pneumatic or hydraulic) can need special protection to operate in the environment considered in this valve test, and the fire testing of such actuators is outside the scope of this document.

This document specifies the measurement and assessment criteria for:

- a) through-seat leakage;
- b) external leakage;
- c) cavity overpressure relief of double-seated valves;
- d) operability.

This document specifies the rules whereby the fire-type testing qualification for a valve can be extended to untested sizes, pressure ratings and materials of construction of the same basic design type.

Fire test reports of valves tested according to previous editions of this document are acceptable when submitted together with the full and compliant fire test report as per 6.7 of the edition under which it was tested. Any data missing as required from 6.7 within the fire test report are accepted or rejected at the purchaser's discretion.

NOTE For the purposes of this document, the terms "fire type-test" and "fire test" are synonymous.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

nominal size

DN

alphanumeric designation of size for components of a pipework system, which is used for reference purposes, comprising the letters DN followed by a dimensionless whole number which is indirectly related to the physical size, in millimetres, of the bore or outside diameter of the end connections

[SOURCE: ISO 6708:1995, 2.1, modified — The Notes 1 and 2 to entry have been removed and the term "nominal size" has been added.]