International Standard

ISO 10295-1

Second edition
2026-06

Fire tests for building elements and components — Fire testing of service installations —

Part 1: Penetration seals

Essais au feu pour les éléments et composants de bâtiment — Essai au feu des installations de service —

Partie 1: Joints d'étanchéité

Reference number
ISO 10295-1:2026(en)

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

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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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 92, *Fire safety*, Subcommittee SC 2, *Fire Resistance*.

This second edition cancels and replaces the first edition (ISO 10295-1:2007), which has been technically revised.

The main changes are as follows:

— details of an optional water leakage test and an optional air leakage test have been added in Annex A;

— the Terms and definitions have been revised (Clause 3);

— Clause 8, Test construction, has been updated to include language for both specific construction and standard construction;

— typical thermocouple location figures have been updated;

— the direct field of application for pipe services has been revised.

A list of all parts in the ISO 10295 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

This document has been prepared to provide a test method for assessing the contribution of a penetration sealing system to the fire resistance of separating elements when they have been penetrated by a service. It should be read in conjunction with ISO 834-1. This document contains specific requirements for fire resistance testing that are unique to the elements of building construction described as a penetration sealing system. The requirements for these penetration sealing systems are intended to be applied as appropriate in conjunction with the detailed and general requirements contained in ISO 834-1.

Fire tests for building elements and components — Fire testing of service installations —

Part 1: Penetration seals

WARNING 1 — The attention of all persons concerned with managing and carrying out this fire resistance test is drawn to the fact that fire testing can be hazardous and there is a possibility that toxic and/or harmful smoke and gases can be evolved during the test. Mechanical and operational hazards can also arise during the construction of the test elements or structures, their testing and disposal of test residues.

WARNING 2 — An assessment of all potential hazards and risks to health shall be made and safety precautions shall be identified and provided. Written safety instructions shall be issued. Appropriate training shall be given to relevant personnel. Laboratory personnel shall ensure that they follow written safety instructions at all times.

1 Scope

This document specifies the heating condition, method of test and criteria for the evaluation of the ability of a penetration sealing system to maintain the integrity and insulation of a fire-separating element at the position at which it has been penetrated.

This document assesses:

a) the effect of such penetrations on the integrity and insulation performance of the element concerned,

b) the integrity and insulation performance of the penetration sealing system, and

c) the insulation performance of the penetrating service or services, and where appropriate, the integrity failure of a service.

NOTE 1 Optional water and air leakage tests are included in Annex A.

NOTE 2 Explanatory notes are included in Annex B.

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 834-1, *Fire-resistance tests — Elements of building construction — Part 1: General requirements*

ISO 13943, *Fire safety — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13943, ISO 834-1 and the following 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
fire-separating element
floors, walls and other separating elements of construction having a period of fire resistance

Note 1 to entry: The period of fire resistance is determined in accordance with ISO 834-1.

3.2
penetration
aperture within a *fire-separating element* (3.1) usually present to accommodate the passage of a service through that element

3.3
service
penetrating item for example a cable, conduit, pipe with or without any insulation, duct, chimney, or trunking, excluding air ventilation systems and fire-rated ventilation ducts, smoke extract ducts and fire-rated service ducts and shafts

3.4
penetration seal
system used to maintain the fire resistance of a separating element at the position where one or more *services* (3.3) pass through or where there is provision for *services* (3.3) to pass through a separating element

3.5
penetration sealing system
assembly for test consisting of the penetrating *service* (3.3) or services and the *penetration seal* (3.4), materials or devices, together with any *service support* (3.6) construction, designed to maintain the integrity and insulation performance of the separating element for the duration of the fire test

3.6
service support
mechanical support provided in the form of clips, ties, hangers, ladder racks of trays, or any device designed to carry the load imposed by the penetrating *services* (3.3)

3.7
blank penetration seal
system sealing or closing an aperture in the *fire-separating element* (3.1) without services passing through

3.8
test construction
complete assembly, consisting of the separating element and *penetration sealing system* (3.5)

3.9
air-flow metering system
device used to measure the air flow such as a rotameter or equivalent air flow meter.

Note 1 to entry: The device shall have a measurement resolution better than 3 % of the measured value.

3.10
air leakage
q
volume of air flowing, per unit of time, through the openings around the test sample under a test pressure difference

Note 1 to entry: Air leakage is expressed as m^3/s.

Note 2 to entry: Within the test method described in Annex A, air leakage volume is reported under standardized conditions.

3.11
air leakage test chamber
sealed chamber or box with an opening, a removable mounting panel, or one open side in which or against which the test sample is installed and sealed

3.12
air system
controllable blower, compressed air supply, exhaust system, or reversible blower designed to provide an essentially constant required air flow at the specified fixed test pressure difference for the period required to obtain readings of air leakage

3.13
ambient temperature exposure
ambient temperature at the exposed face of the test sample

3.14
elevated temperature exposure
elevated temperature at the exposed face of the test sample

3.15
extraneous leakage rate
q_L
difference between the metered air flow, q_m, and the air leakage, q

3.16
metered air flow rate
q_m
volume of air flowing per unit of time through the air flow metering system

Note 1 to entry: Metered air flow is expressed as m^3/s.

3.17
rate of air leakage
L
total air leakage per sample

Note 1 to entry: The rate of air leakage is expressed as l/s per m^2 of opening or l/s per unit.

3.18
replacement air
volume of air, at ambient temperature, added to the test chamber, to replace the air leakage, q, volume of air in either the ambient or elevated temperature exposure tests

4 Symbols and abbreviated terms

Symbols and designations appropriate to this test are given in ISO 834-1.

5 Test equipment

5.1 Equipment employed in the conduct of this test consists of a furnace, restraint and support frames and instrumentation as specified in ISO 834-1 and in this document.

5.2 The internal dimensions of the test furnace shall have a minimum size of 1 m × 1 m × 1 m and shall be such that a distance of at least 200 mm exists between any point of the periphery of any penetration seal and the wall of the furnace.