PD ISO/TR 10295-3:2012

BSI Standards Publication

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

Part 3: Single component penetration seals — Guidance on the construction and use of test configurations and simulated services to characterise sealing materials

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National foreword

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TECHNICAL REPORT

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

Part 3: Single component penetration seals — Guidance on the construction and use of test configurations and simulated services to characterise sealing materials

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

Partie 3: Joints de pénétration à composant unique — Lignes directrices sur la construction et l'utilisation des configurations d'essai et des processus de simulation permettant de caractériser les matériaux d'étanchéité

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

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.

ISO/TR 10295-3 was prepared by Technical Committee ISO/TC 92, *Fire safety*, Subcommittee SC 2, *Fire containment*.

ISO/TR 10295 consists of the following parts, under the general title *Fire tests for building elements and components — Fire testing of service installations*:

— *Part 1: Penetration seals*

— *Part 2: Linear joint (gap) seals*

— *Part 3: Single component penetration seals — Guidance on the construction and use of test configurations and simulated services to characterize sealing materials*

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Introduction

This Technical Report describes a range of standard test configurations and associated testing procedures designed to determine the relevant characteristics of a penetration seal composed of one material when subjected to the standard fire exposure conditions outlined in ISO 834-1. It is used in conjunction with ISO 10295-1 in order to establish relationships between the parameters that influence the performance of the seal in use. The test data generated by this procedure are intended to assist in the classification of penetration seals based on their intended use and fire resistance under the specified acceptance criteria of this part of ISO 10295, i.e. their field of extended application by use of the methodology given in ISO/TR 12470.

In addition, the methodology is recommended to manufacturers for use when developing new sealing products, as it provides a way of establishing the limiting characteristics of the sealing system in a quantifiable manner. This report describes a procedure intended to be followed utilizing a well selected series of test configurations, which can be used to generate a data set to characterize the fire sealing capabilities of a single component penetration seal material. The data set is intended to contain enough information to provide users with engineering data to determine the suitability of the material in applications other than that in which the material was originally tested.

A wide variety of product types is used to reinstate the integrity of a fire-separating element when penetrated by a service or group of services. These product types include, for example

a) soft fillers (sealants or ‘mastics’);

b) semi-rigid intumescent strip materials on their own or in combination with elastomeric foam materials;

c) rigid fibrous batts;

d) rigid board systems;

e) rigid fillers (epoxies or cementicous);

f) cementicous plasters/clay/vermiculite systems.

A wide variety of materials is used to “firestop” penetrations through which building services pass. These materials all fail at some time during a fire, but the nature of the method of failure; melting, slumping, charring through etc., needs to be fully understood if a field of application is to be determined with any confidence. Standard configurations and their associated test procedures need, in due course, to be derived to replicate the appropriate failure modes and also to increase the range of simulated services so the range of tests and configurations described in this part of ISO 10295 are not exhaustive.

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

Part 3:
Single component penetration seals — Guidance on the construction and use of test configurations and simulated services to characterize sealing materials

1 Scope

This part of ISO 10295 provides guidance in respect of a structured method of characterizing the penetrating seal under test utilizing a series of defined parameters, each one being determined by the use of a selected series of test configurations in conjunction with simulated services. The level of characterization being sought is dependent upon the classification requirement of the system, which in turn determines the complexity of the test program. It is also intended the test method addresses the influence the supporting construction has on the performance of the seal system.

The methods described apply to the determination of data relating to single component penetration seals where the penetration service does not melt out within the appropriate period of exposure to a fully developed fire.

The selection of the appropriate system depends upon many factors. Of particular importance is the size of the penetration, since penetration seal systems are frequently penetration size (or size range) specific.

This is a guidance document, its purpose being to determine the critical parameters relating to the performance of the seal being evaluated. Such parameters can then be used as a basis for interpolation and/or extrapolation of the seal's performance. The procedures used have been developed utilizing small square penetrations, single component penetration seals, and cylindrical conductors; however it is possible to generate a similar series of tests using rectangular cross-section conductors if this is more appropriate to end use.

This part of ISO 10295 provides a structured approach designed to establish

— the mode of failure;

— the parameters critical to the performance of the penetration seal under test.

The mode of failure and critical parameters are ascertained using test configurations appropriate to the potential performance of the product, in conjunction with clearly defined standard penetrations.

The results gained from the application of this technical report are designed to assist a suitably qualified person to develop a direct and extended field of application for the penetration seal under test using in particular, the principles and methodology given in ISO/TR 12470. Using the field(s) of application so generated, it should be possible to classify the penetration seal, thus facilitating its incorporation into specifications.

The test configurations recommended in this part of ISO 10295 are not appropriate for evaluating multi-component penetration seals.

This part of ISO 10295 is not appropriate for characterizing all types of penetration seals, e.g. pipe closers/collars and some gland systems, for which evaluation using ISO 10295-1 is more appropriate.

This part of ISO 10295 does not address the distance required between services that can generate their own heat. When a live service is being evaluated, it is necessary to give consideration to the distance required between penetrations.

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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.

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

ISO 13943, *Fire safety — Vocabulary*

ISO 10295-1, *Fire tests for building elements and components — Fire testing of service installations — Part 1: Penetration seals*

ISO 10295-2, *Fire tests for building elements and components — Fire testing of service installations — Part 2: Linear joint (gap) seals*

ISO/TR 12470, *Fire resistance tests — Guidance on the application and extension of results*

ISO 13943, *Fire safety — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10295-1, ISO 10295-2, ISO 13943 and the following apply.

3.1
single component penetration seal
penetration seal with either a single simulated service, i.e. a cable or pipe, or multiple simulated services passing through it, where the free space between the simulated service(s) and the supporting construction are filled by a single material

3.2
multi-component penetration seal
penetration seal with either a single simulated service, i.e. a cable or pipe, or multiple simulated services passing through it, where the free space between the simulated service(s) and the supporting construction are filled by more than one material

3.3
pipe closer device/collar
pre-fabricated heat activated device which under fire exposure acts to crush plastic pipes or ducts which pass through vertical or horizontal separating elements

NOTE The device normally consists of a metal canister containing pressure producing intumescent material.

3.4
associated supporting construction
supporting construction which is specially designed to replace the element to be sealed in practice and which, when tested in conjunction with the seal, forms the direct field of application

3.5
fire barrier bulkhead
product normally rigid in form, which fills the bulk of the penetration when the simulated services fill a relatively small area of the hole in the separating element

3.6
intumescent
phenomenon of expansion considerably in excess of normal thermal expansion under the action of heat, normally generated by fire

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