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Reaction to fire tests — Spread of flame —

Part 1: Guidance on flame spread

Essais de réaction au feu — Propagation du feu —

Partie 1: Lignes directrices sur la propagation de la flamme



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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 other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of normative document:

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
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An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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/TS 5658-1 was prepared by Technical Committee ISO/TC 92, *Fire safety*, Subcommittee SC 1, *Fire initiation and growth*.

This first edition of ISO/TS 5658-1 cancels and replaces ISO/TR 5658-1:1997, which has been technically revised.

ISO 5658 consists of the following parts, under the general title *Reaction to fire tests — Spread of flames*:

- *Part 1: Guidance on flame spread* (Technical Specification)
- *Part 2: Lateral spread on building and transport products in vertical configuration*
- *Part 4: Intermediate-scale test of vertical spread of flame with vertically oriented specimens*

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Introduction

The rate and extent of flame spread are important properties to be characterized when evaluating the reaction to fire hazards of products that can be used in diverse applications such as in buildings, transport, furniture, electrical enclosures, etc. Historically, there have been many approaches taken to the measurement of flame spread and most of these have evolved with little fundamental justification. This Technical Specification describes different modes of flame spread and proposes some theoretical principles to assist with the relevant application of the data obtained from flame spread tests.

This guidance document is about flame spread and as such it fits within the scope of ISO/TC 92/SC 1. Flames are a major cause of fires being initiated (usually described as ignitability) and fire growth (usually physically observed as flames spreading from the initial seat of the fire where the ignition source was applied). Also, within the scope of ISO/TC 92/SC 1, it is generally assumed that fire growth applies up to the point of a developed fire after which the fire can spread (for example) from one compartment to another. This concept is usually covered by the scope of ISO/TC 92/SC 2 (fire containment).

Many flame-spread tests measure the rate and extent of the flame front as the flame moves over the surface of a large area, flat products such as linings on walls, ceilings and floors. Usually the orientation of the test specimen is related to the end-use application (for example, exposed face upwards for floor-coverings). This requirement for end-use relevance is satisfied by ISO 5658-2 and ISO 5658-4 when wall linings are evaluated.

Flame spread over construction and transport products is related to the fire scenario. ISO/TC 92/SC 1 have initially concentrated on the development of tests to simulate flame spread in rooms and along corridors. Other important scenarios where flame spread data are required are façades (both front and behind), shafts, stairs and roofs; much of the theoretical guidance given in this Technical Specification can be applied to these scenarios even though ISO test procedures might not be available as of the date of publication of this Technical Specification.

Flame spread can also occur over non-planar products (e.g. pipes) and within assemblies (e.g. along joints or inside air-gaps). Whilst this Technical Specification concentrates on the theory pertinent to flat products, some of the theory outlined can be applied to improve the understanding of these more complex situations.

The results of small-scale flame-spread tests (e.g. ISO 5658-2 [1] and ISO 9239-1 [2]) and large-scale tests (e.g. ISO 9705 [3]) can be used as components in a total hazard analysis of a specified fire scenario. The theoretical basis of these tests is explained so that relevant conclusions or derivations can be made from the test results.