
**Fire tests — Open calorimetry —
Measurement of the rate of production of
heat and combustion products for fires of
up to 40 MW**

*Essais au feu — Calorimétrie ouverte — Mesurage de la vitesse de
production de chaleur et de produits de combustion dans le cas de feux
ayant un débit thermique inférieur ou égal à 40 MW*



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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.

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 24473 was prepared by Technical Committee ISO/TC 92, *Fire safety*, Subcommittee SC 1, *Fire initiation and growth*.

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Fire tests — Open calorimetry — Measurement of the rate of production of heat and combustion products for fires of up to 40 MW

WARNING — So that suitable precautions can be taken to safeguard health, the attention of all concerned in fire tests is drawn to the possibility that toxic or harmful gases can be evolved during combustion of test specimens.

The test procedures involve high temperatures. Hazards can therefore exist for burns and ignition of extraneous objects or clothing. The operators should use protective clothing, helmets, face-shields and breathing equipment for avoiding exposure to toxic gases.

Laboratory safety procedures should be set up to ensure the safe termination of tests. Adequate means of extinguishing such a fire must be provided.

Specimen collapse may also occur in the laboratory space. Laboratory safety procedures should be set up to ensure safety of personnel with due consideration to such situations.

1 Scope

This International Standard specifies a series of test methods that simulate a real scale fire on a test object or group of objects under well-ventilated conditions. A range of different fire sizes can be studied according to the scale of the equipment available.

The method is intended to evaluate the contribution to fire growth provided by an object or group of objects using a specified ignition source.

A test performed in accordance with the method specified in this International Standard provides data for all stages of a fire.

NOTE When the data are used in relation to specific situations the effect of the environment, including the effects of feedback and restricted ventilation, needs to be taken into account.

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 5660-1, *Reaction-to-fire tests — Heat release, smoke production and mass loss rate — Part 1: Heat release rate (cone calorimeter method)*

ISO 5725-2, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*

ISO 9705:1993, *Fire tests — Full-scale room test for surface products*

ISO 13784-1, *Reaction-to-fire tests for sandwich panel building systems — Part 1: Test method for small rooms*

ISO 13784-2, *Reaction-to-fire tests for sandwich panel building systems — Part 2: Test method for large rooms*

ISO 13785-1, *Reaction-to-fire tests for façades — Part 1: Intermediate-scale test*

ISO 13943, *Fire safety — Vocabulary*

ISO/TS 14934-1, *Fire tests — Calibration and use of radiometers and heat flux meters — Part 1: General principles*

ISO 14934-2, *Fire tests — Calibration and use of heat flux meters — Part 2: Primary calibration methods*

ISO 14934-3, *Fire tests — Calibration and use of heat flux meters — Part 3: Secondary calibration method*

ISO/TS 14934-4, *Fire tests — Calibration of heat flux meters — Part 4: Guidance on the use of heat flux meters in fire tests*

ISO 19702, *Toxicity testing of fire effluents — Guidance for analysis of gases and vapours in fire effluents using FTIR gas analysis*

EN 13823, *Reaction to fire tests for building products — Building products excluding floorings exposed to the thermal attack by a single burning item*

3 Terms and definitions

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

3.1

assembly

fabrication of materials and/or composites, e.g., sandwich panel systems

3.2

material

single substance or uniformly dispersed mixture, e.g., metal, stone, timber, concrete, mineral fibre or polymers

3.3

product

material, composite or assembly about which information is required

3.4

test specimen

representative piece of the product that is to be tested together with any substrate or treatment

NOTE The test specimen may include an air gap.

4 Principle

The potential for the contribution of a single object or group of objects to the hazard of heat release and spread of fire, without being influenced by the effects of any surrounding structure, is evaluated over the period of combustion using a calorimeter. The rate of heat release of the fire is based on calculation of oxygen consumption.

NOTE 1 Procedures to determine the heat release rate (HRR) based on the rate of production of carbon dioxide, can also be used, but are not covered in this International Standard.

The hazard of reduced visibility is estimated by the measurement of the production of light-obscuring smoke.

The fire growth is visually documented by photographic and/or video recording.