
Reaction to fire test for sandwich panel building systems —

Part 1: Small room test

*Essais de réaction au feu des systèmes de fabrication de panneaux de
type sandwich —*

Partie 1: Essais pour des chambres de petite taille



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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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 92, *Fire safety*, Subcommittee SC 1, *Fire initiation and growth*.

This second edition cancels and replaces the first edition (ISO 13784-1:2002), which has been technically revised.

ISO 13784 consists of the following parts, under the general title *Reaction-to-fire tests for sandwich panel building systems*:

- *Part 1: Test method for small rooms*
- *Part 2: Test method for large rooms*

Introduction

Fire is a complex phenomenon; its behaviour and effects depend upon a number of interrelated factors. The behaviour of materials and products depends upon the characteristics of the fire, the method of use of the materials, and the environment in which they are exposed. The philosophy of reaction to fire tests is explained in ISO/TR 3814.

The need for improved insulation of buildings has led to the increased use of insulating sandwich panel systems in different parts of the building industry.

Sandwich panel systems are applied as external cladding of factory buildings, in internal envelopes with controlled atmospheres, and in cold stores which can vary from small rooms to large cool houses. Another application is the use for modular building rooms and sometimes for retail premises. They can also be used for roof applications in a traditional construction. Multi-layered panels with other facings (for example, plasterboard) or sandwich panel systems can be applied to walls as internal linings or insulation but this is not within the scope of this part of ISO 13784.

With free-standing or frame supported types of sandwich panel systems, there are three primary fire threats to the insulated walls and ceilings/roofs of the building:

- a) an interior compartment fire impinging directly onto the joints of the wall (typical ignition sources are welding torches, burning items near the wall, fire in an adjacent room);
- b) an external fire of combustibles accumulated near the wall, i.e. rubbish, vegetation, vehicles, etc.;
- c) fire spread to outside spaces.

Fire can spread in several ways:

- over a combustible exterior surface;
- fire travelling vertically and horizontally through the combustible cores of cavities within the external wall or ceiling/roof;
- through combustible gases which have developed due to the pyrolysis of the combustible components and which will ignite on the surface;
- burning debris or flaming droplets.

This part of ISO 13784 deals with a simple representation of one fire scenario with this type of product, such as that typified by a local fire impinging directly on the internal face of a sandwich panel building construction.

This part of ISO 13784 provides a test method which should be used to provide a small-room scale, end-use evaluation of all aspects of sandwich panel systems, which include constructional techniques such as supporting frameworks, jointing detail etc.

This method is intended to evaluate products which, due to their nature, are not normally used as internal linings and are not suitable to be assessed using ISO 9705, which evaluates fire growth from a surface product. This part of ISO 13784, however, provides a method by which a free-standing or frame supported sandwich panel building construction may be built and evaluated within the room.

Tests of this type may be used for comparative purposes or to ensure the existence of a certain quality of performance considered to generally have a bearing on fire performance.

These tests do not rely on the use of asbestos-based materials.

Reaction to fire test for sandwich panel building systems —

Part 1: Small room test

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 the combustion of test specimen. The test procedures involve high temperatures and combustion processes, from ignition to a fully developed room fire. Therefore, hazards can exist for burns, ignition of extraneous objects or clothing. The operators should use protective clothing, helmet, face-shield, and equipment for avoiding exposure to toxic gases. Laboratory safety procedures shall be set up which ensure the safe termination of tests on sandwich panel products. Specimen with combustible content burning inside metallic facings may be difficult to extinguish with standard laboratory fire fighting equipment. Adequate means of extinguishing such a fire shall be provided. When tests are conducted using the free-standing room construction, specimens can emit combustion products from their back face, especially if joints open up. Specimen collapse can also occur into the laboratory space. Laboratory safety procedures shall be set up to ensure safety of personnel with due consideration to such situations.

1 Scope

This part of ISO 13784 specifies a method of test for determining the reaction to fire behaviour of sandwich panel building systems, and the resulting flame spread on or within the sandwich panel building construction, when exposed to heat from a simulated internal fire with flames impinging directly on the internal corner of the sandwich panel building construction.

The test method described is applicable to free-standing, self-supporting, and frame-supported sandwich panel systems. This part of ISO 13784 is not intended to apply to sandwich panel products which are glued, nailed, bonded, or similarly supported by an underlying wall or ceiling construction. For products used as internal linings, the ISO 9705 test method should be used.

This part of ISO 13784 provides for small room testing of sandwich panel building systems. For large-room testing of sandwich panel building systems, ISO 13784-2 should be used.

This method is not intended to evaluate the fire resistance of a product, which should be tested by other means.

NOTE Because of their design, some systems may be unsuitable for testing with this part of ISO 13784. These systems may be suitable for testing with ISO 13784-2 and the latter test method should be considered. In this case application area of the test report is restricted.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

ISO 13943:2008, *Fire safety — Vocabulary*

ISO 14934-3:2012, *Fire tests — Calibration and use of heat flux meters — Part 3: Secondary calibration method*