
**Reaction-to-fire tests — Heat release,
smoke production and mass loss
rate —**

**Part 1:
Heat release rate (cone calorimeter
method) and smoke production rate
(dynamic measurement)**

AMENDMENT 1

*Essais de réaction au feu — Débit calorifique, taux de dégagement de
fumée et taux de perte de masse —*

*Partie 1: Débit calorifique (méthode au calorimètre à cône) et taux de
dégagement de fumée (mesurage dynamique)*

AMENDEMENT 1





COPYRIGHT PROTECTED DOCUMENT

© ISO 2019

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

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 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 1, *Fire initiation and growth*.

A list of all parts in the ISO 5660 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.

STANDARDSISO.COM : Click to view the full PDF of ISO 5660-1:2015/Amd 1:2019

Reaction-to-fire tests — Heat release, smoke production and mass loss rate —

Part 1:

Heat release rate (cone calorimeter method) and smoke production rate (dynamic measurement)

AMENDMENT 1

Page 7, 6.10

Replace subclause 6.10 with the following:

6.10 Ignition circuit

External ignition is accomplished by a spark plug powered from a 10 kV transformer or spark igniter. The spark plug shall have a gap of $(3,0 \pm 0,5)$ mm. The electrode length and location of the spark plug shall be such that the spark gap is located (13 ± 2) mm above the centre of the specimen, except for dimensionally unstable materials for which the distance is (48 ± 2) mm (see 7.5). The ignition spark should be visible as continuous to the naked eye.

Page 9, 7.5

Replace subclause 7.5 with the following:

7.5 Dimensionally unstable materials

Samples that intumesce or deform so that they contact the spark plug prior to ignition, or reach the level of the heater base plate after ignition, shall be tested with a separation of 60 mm between the base plate of the cone heater and the upper surface of the specimen. In this case the heater calibration (see 10.2.5) shall be performed with the heat flux meter positioned 60 mm below the cone heater base plate. It shall be stressed that the time to ignition measured with this separation is not comparable to that measured with the separation of 25 mm. If, when tested with a separation of 60 mm between the cone heater base plate and the upper surface of the specimen, the specimen still intumesces or deforms such that it contacts the spark plug prior to ignition, or the upper specimen surface reaches the level of the cone heater baseplate, the specimen is not suitable for the testing to this document.

Other dimensionally unstable products, for example products that warp or shrink during testing, shall be restrained against excessive movement. This shall be accomplished with 4 tie wires, as described below. Metal wires of $(1,0 \pm 0,1)$ mm diameter and at least 350 mm long shall be used. The sample shall be prepared in the standard way as described in Clause 8. A tie wire is then looped around the sample holder and retainer frame assembly, so that it is parallel to and approximately 20 mm away from one of the 4 sides of the assembly. The ends of the wire are twisted together such that the wire is pulled firmly against the retainer frame. Excess wire is trimmed from the twisted section before testing. The 3 remaining wires shall be fitted around the specimen holder and retainer frame assembly in a similar manner, parallel to the three remaining sides.

Materials that distort so extensively that they cannot be held by 4 wires should be tested using the fine wire grid made of $(0,8 \pm 0,1)$ mm with wire spacing of (20 ± 2) mm shown in Figure 8.

Materials that intumesce in a fluid phase such that molten materials overflow the edge frame or seep between the edge frame and the specimen holder invalidate the test. Therefore, such materials should be tested without the edge frame and should be housed in 0,1 mm thick aluminium tray wrappings which extend 10 mm above the top edge of the test specimen.

Page 16, after subclause 11.2.6

Add new subclause 11.2.7.

11.2.7 Clean the igniter rods prior to test if soot or other debris has accumulated on them.

Page 17, 11.3.7

Replace subclause 11.3.7 with the following:

11.3.7 Three specimens shall be tested and reported as described in Clause 13. The 180 s mean heat release readings shall be compared for the three specimens. If any of these mean readings differ by more than 10 % from the arithmetic mean of the three readings, then a further set of three specimens shall be tested unless the mean value is less than 10 kW m⁻². In such cases, the arithmetic mean of the set of six readings shall be reported.

The smoke production rate test data shall not be discarded if piloted ignition does not occur, because the production rate data may have relevance under non-flaming conditions. The zero value of the extinction coefficient shall be verified prior to every test as part of the procedures specified in 11.2.

The test data is not valid if the specimen melts sufficiently to overflow the sample holder, if explosive spalling occurs, or if the specimen swells excessively and touches the spark igniter or the upper specimen surface reaches the level of the cone heater base plate.

NOTE The heat release rate measurements described within this document, normally utilize piloted ignition. Separate non-standard tests can be conducted for research purposes without piloted ignition to evaluate smoke production rates under non-flaming conditions.