

INTERNATIONAL STANDARD

**Fire hazard testing -
Part 5-2: Corrosion damage effects of fire effluent - Summary and relevance of
test methods**

get full document from standards.iteh.ai



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2026 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search -

webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD	3
INTRODUCTION	5
1 Scope	6
2 Normative references	6
3 Terms and definitions	6
4 Classification of test methods	7
4.1 General	7
4.2 Test specimen	7
4.2.1 Product testing	7
4.2.2 Material or composite sample testing	8
4.3 The physical fire model	8
4.4 The nature of the corrosivity measurement	10
4.4.1 Product as target	10
4.4.2 Simulated product as target	10
4.4.3 Material as target	10
4.4.4 Indirect assessment	10
5 Published test methods	10
5.1 General	10
5.2 Tests for the determination of halogen acid in combustion gases	10
5.2.1 Standards	10
5.2.2 Purpose and principle	10
5.2.3 Test specimen	11
5.2.4 Test method	11
5.2.5 Repeatability and reproducibility	11
5.2.6 Relevance of test data to corrosion hazard assessment	11
5.3 Tests for the determination of the acidity and conductivity of combustion gases dissolved in an aqueous solution	11
5.3.1 Standards	11
5.3.2 Purpose and principle	11
5.3.3 Test specimen	12
5.3.4 Test method	12
5.3.5 Repeatability and reproducibility	12
5.3.6 Relevance of test data to corrosion hazard assessment	12
5.4 Tests for the determination of corrosive gases by evaluation of copper corrosion	12
5.4.1 Purpose and principle	12
5.4.2 Test specimen	12
5.4.3 Test methods	13
5.4.4 Special observations	13
5.4.5 Repeatability and reproducibility	13
5.4.6 Relevance of test data to corrosion hazard assessment	13
5.5 Cone corrosimeter method	13
5.5.1 Standards	13
5.5.2 Purpose and principle	13
5.5.3 Test specimen	13
5.5.4 Corrosion target	14
5.5.5 Test method	14

5.5.6	Special observation	15
5.5.7	Repeatability and reproducibility	15
5.5.8	Relevance of test data to corrosion hazard assessment.....	15
6	Overview of methods and relevance of data	15
Annex A (informative) Acidity and conductivity of aqueous solutions – Test methods		18
Annex B (informative) Determination of repeatability and reproducibility – Comparative tests of solutions of combustion gases		19
Bibliography.....		23
Figure 1 – Schematic drawing of a typical corrosion target of defined metal thickness		15
Table 1 – Characteristics of fire stages (from Table 1 in ISO 19706:2011 [12])		9
Table 2 – Overview of corrosivity test methods		17
Table A.1 – Test methods for the measurement of acidity and conductivity of aqueous solutions obtained after bubbling combustion effluent through water		18
Table B.1 – Determination of repeatability and reproducibility – Comparative pH tests on solutions of combustion gases		20
Table B.2 – Determination of repeatability and reproducibility – Comparative resistivity tests on solutions of combustion gases		21
Table B.3 – Results obtained on brominated polycarbonate		22

Sample Document

get full document from standards.iteh.ai

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**Fire hazard testing -
Part 5-2: Corrosion damage effects of fire effluent -
Summary and relevance of test methods**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 60695-5-2 has been prepared by IEC technical committee 89: Fire hazard testing. It is an International Standard.

This first edition cancels and replaces the third edition of IEC TS 60695-5-2 published in 2021. This edition constitutes a technical revision. This edition includes the following significant technical changes with respect to IEC TS 60695-5-2:

- a) 4.4, The nature of the corrosivity measurement, has been added to follow recent technological developments;
- b) 5.2, Tests for the determination of halogen acid in combustion gases, has been updated following the recent development of IEC 60754.

The text of this International Standard is based on the following documents:

Draft	Report on voting
89/1672/FDIS	89/1680/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

This International Standard is to be read in conjunction with IEC 60695-5-1.

A list of all parts in the IEC 60695 series, published under the general title *Fire hazard testing*, can be found on the IEC website.

IEC 60695-5 consists of the following parts:

Part 5-1: *Corrosion damage effects of fire effluent - General guidance*

Part 5-2: *Corrosion damage effects of fire effluent - Summary and relevance of test methods*

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

In the design of an electrotechnical product the risk of fire and the potential hazards associated with fire need to be considered. In this respect the objective of component, circuit and equipment design, as well as the choice of materials, is to reduce the risk of fire to a tolerable level even in the event of reasonably foreseeable (mis)use, malfunction or failure. IEC 60695-1-10 [1]¹, IEC 60695-1-11 [2] and IEC 60695-1-12 [3] provide guidance on how this is to be accomplished.

Fires involving electrotechnical products can also be initiated from external non-electrical sources. Considerations of this nature are dealt with in an overall fire hazard assessment.

The aim of the IEC 60695 series is to save lives and property by reducing the number of fires or reducing the consequences of the fire. This can be accomplished by:

- trying to prevent ignition caused by an electrically energised component part and, in the event of ignition, to confine any resulting fire within the bounds of the enclosure of the electrotechnical product.
- trying to minimise flame spread beyond the product's enclosure and to minimise the harmful effects of fire effluents including heat, smoke, and toxic or corrosive combustion products.

All fire effluents are corrosive to some degree and the level of potential to corrode depends on the nature of the fire, the combination of combustible materials involved in the fire, the nature of the substrate under attack, and the temperature and relative humidity of the environment in which the corrosion is taking place. There is no evidence that fire effluent from electrotechnical products offers greater risk of corrosion damage than the fire effluent from other products such as furnishings, building materials, etc.

The performance of electrical and electronic components can be adversely affected by corrosion damage when subjected to fire effluent. A wide variety of combinations of small quantities of effluent gases, smoke particles, moisture and temperature can provide conditions for electrical component or system failures from breakage, overheating or shorting.

Evaluation of potential corrosion damage is particularly important for high value and safety-related electrotechnical products and installations.

Technical committees responsible for the products will choose the test(s) and specify the level of severity.

The study of corrosion damage requires an interdisciplinary approach involving chemistry, electricity, physics, mechanical engineering, metallurgy and electrochemistry. In the preparation of this document, all of the above have been considered.

IEC 60695-5-1 defines the scope of the guidance and indicates the field of application.

IEC 60695-5-2 provides a summary of test methods including relevance and usefulness.

¹ Numbers in square brackets refer to the bibliography.