
**Plastics — Smoke generation —
Determination of the corrosivity of
fire effluents —**

**Part 1:
General concepts and applicability**

*Plastiques — Production de fumées — Détermination de la corrosivité
des effluents du feu —*

Partie 1: Concepts généraux et applicabilité





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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).

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For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 4, *Burning behaviour*.

This second edition cancels and replaces the first edition (ISO 11907-1:1998), which has been technically revised.

The main changes compared to the previous edition are as follows:

- update of the existing test methods;
- clarification of differences between acidity, corrosivity and toxicity;
- clarification of the importance of fire scenarios and global approach for corrosivity assessment.

A list of all parts in the ISO 11907 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.

Introduction

Corrosivity of smoke is important in the evaluation of fire damages^{[1][2][3]}. This document constitutes the guidance part of the ISO 11907 series. [Clause 3](#) defines smoke corrosivity as well as smoke acidity and smoke toxicity. [Clause 4](#) details the objectives of this document. [Clause 5](#) presents the scenario-based approach that governs smoke corrosivity. [Clause 6](#) categorizes the different test methods to assess smoke corrosivity at laboratory scale. [Clauses 7](#) and [8](#) respectively deal with the applicability and post-exposure conditions.

ISO 11907-4^[4] describes a dynamic test procedure. Any standard method within the ISO 11907 series should be used solely to measure and describe the properties of materials, products or systems in response to heat or flame under controlled laboratory conditions and should not be considered or used by itself for describing or appraising the fire hazard of materials, products or systems under actual fire conditions or as the sole source on which regulations pertaining to corrosivity of fire effluents are based.

NOTE Two other methods, named ISO 11907-2^[5] and ISO 11907-3^[6], existed in the past but are no longer used. Related International Standards have been withdrawn.

Smoke corrosivity represents the measured effect of material or product reduction in functionality due to the corrosive effects of smoke. These corrosive effects are an essential factor in the assessment of the extent and cost of fire damage. All fire effluents and effects, including the released heat, are corrosive to some degree. Their potential to cause damage depends on a series of factors including:

- the rate of fire growth, which determines effluent concentrations;
- the volume into which the effluents disperse;
- the conditions of ventilation of the enclosure, including windows, smoke vents and mechanical ventilation;
- the nature of the combustible materials involved in the fire;
- the nature and composition of the exposed surfaces;
- the time of exposure;
- the conditions where pyrolysis occurs (heat flux, oxygen) as well as where combustion occurs;
- the specific environmental conditions at the exposed surfaces (temperature and humidity);
- the efficacy of active and passive fire protection, extinction and smoke management systems.

The corrosive effects of combustion products are not connected to the effect of fire effluents to people such as fire effluents toxicity.

The corrosive effects of fire effluents are not only material or product dependent, but also a systemic parameter. A scenario-based approach is then needed for assessment, i.e. using CFD models in a fire safety engineering approach. Corrosivity tests at laboratory scale might be relevant to assess the corrosion behaviour of smoke. In any given corrosivity test, the effects of the combustion products on the target depend on:

- their concentration;
- their chemical and physical nature;
- the chemical and physical nature of the corrosion target;
- the time of exposure and post-exposure conditions;
- the environmental conditions at the target-effluent interface (humidity, temperature, flow regime);
- condensation phenomena at the target;