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Corrosion of metals and alloys — Classification of low corrosivity of indoor atmospheres —

Part 1: Determination and estimation of indoor corrosivity

Corrosion des métaux et alliages — Classification de la corrosivité faible des atmosphères d'intérieur —

Partie 1: Détermination et estimation de la corrosivité des atmosphères d'intérieur

Reference number
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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 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 156, *Corrosion of metals and alloys*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 262, *Metallic and other inorganic coatings, including for corrosion protection and corrosion testing of metals and alloys*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 11844-1:2006), which has been technically revised. The main changes compared with the previous edition are as follows:

— a reference to the ISO 16000 series in Clause 7 has been added;

— a model that estimates the indoor concentration and deposition of pollutants originating from outdoors has been added;

— lead has been included as a standard specimen with high sensitivity to vapour organic acids.

A list of all parts in the ISO 11844 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.

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Introduction

Metals, alloys and metallic coatings are subject to atmospheric corrosion under the impact of air humidity, especially when gaseous and solid substances of atmospheric pollution co-impact. Corrosivity data are of fundamental importance for derivation of suitable corrosion protection, or for evaluation of serviceability of metal elements of a product.

ISO 9223 classifies the atmospheric environment into six corrosivity categories.

Low corrosivity indoor atmospheres are indoor atmospheres with C 1 (very low) or C 2 (low) corrosivity categories in accordance with ISO 9223.

The classification in ISO 9223 is too broad for some purposes in low corrosivity indoor atmospheres, e.g. places where electronic devices, sophisticated technical products, or works of art and historical objects are stored.

For such purposes, it is necessary to subdivide the corrosivity categories C 1 (very low) and C 2 (low) into the indoor corrosivity categories given in this document.

The evaluation of low corrosivity indoor atmospheres can be accomplished by direct determination of corrosion attack of selected metals (see ISO 11844-2) or by measurement of environmental parameters (see ISO 11844-3) that can cause corrosion on metals and alloys.

This document describes general procedures for derivation and estimation of indoor corrosivity categories.

The aim of this document is to characterize indoor atmospheric environments of low corrosivity that can affect metals and metallic coatings during storage, transport, installation or operational use, to set a consistent way of indoor corrosivity classification, and to prescribe procedures for derivation and estimation of indoor corrosivity categories.

A general approach to the classification of corrosivity of indoor atmospheres is given in the scheme shown in Figure 1.

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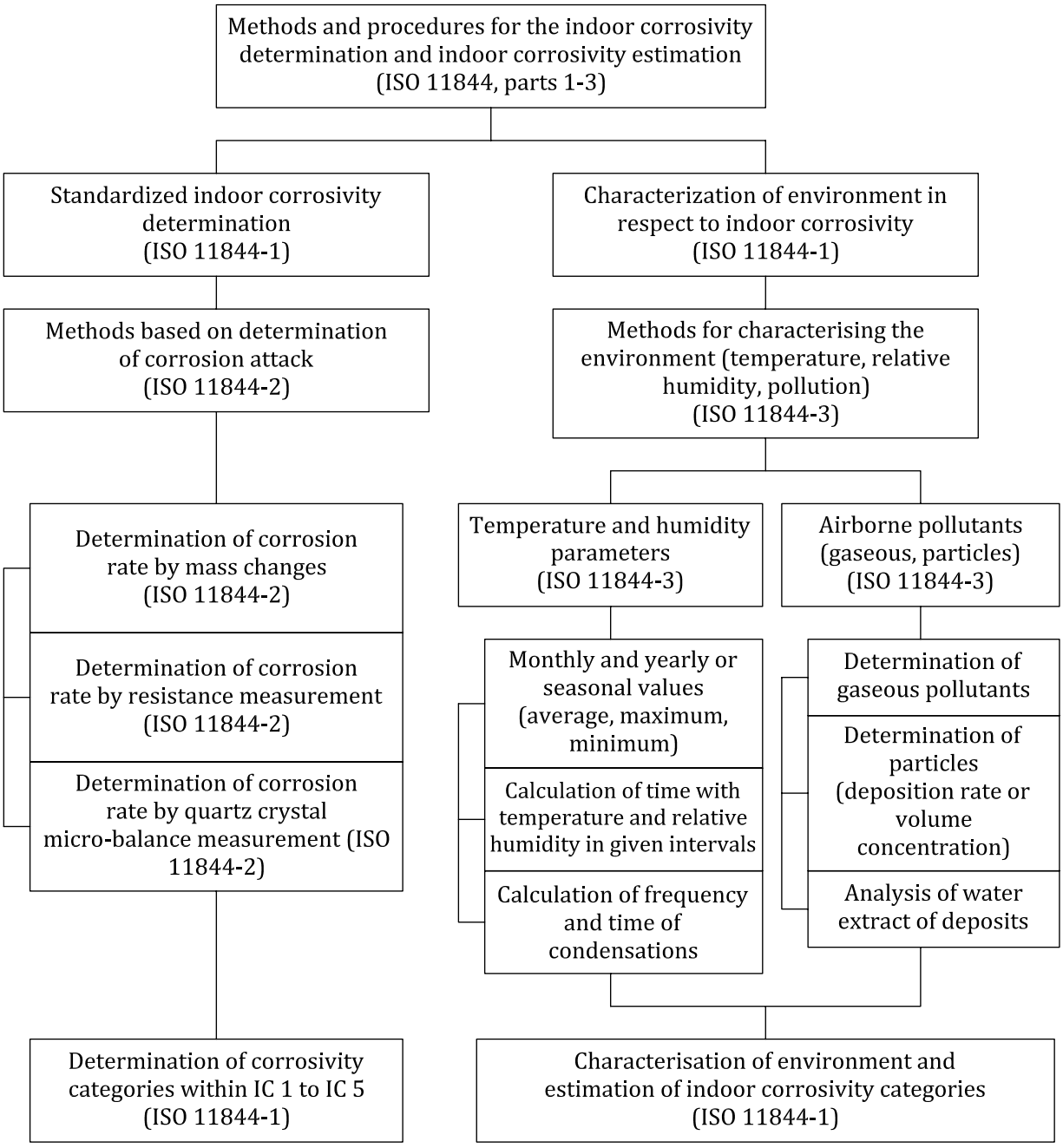


Figure 1 — Scheme for classification of low corrosivity of indoor atmospheres

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Corrosion of metals and alloys — Classification of low corrosivity of indoor atmospheres —

Part 1: Determination and estimation of indoor corrosivity

1 Scope

This document establishes a classification of low corrosivity of indoor atmospheres.

It specifies the reference metals for which a corrosion attack after a defined exposure period is used for determining corrosivity categories of indoor atmospheres of low corrosivity.

It defines corrosivity categories of indoor atmospheres according to corrosion attack on standard specimens.

It indicates important parameters of indoor atmospheres that can serve as a basis for an estimation of indoor corrosivity.

The selection of a method for the determination of corrosion attack, description of standard specimens, exposure conditions and evaluation are given in ISO 11844-2. The measurement of environmental parameters affecting indoor corrosivity is given in ISO 11844-3.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
climate
statistics of temperature, humidity, atmospheric pressure, wind, rainfall, and other meteorological elements in a given location over a long period of time

[SOURCE: EN 15759-1:2011, 3.1]

3.2
atmosphere
mixture of gases, aerosols and particles that surrounds a given material, object or structure

3.3
indoor atmosphere
environment [combined effect of *climate* (3.1) and *atmosphere* (3.2)] inside a box, a room or a building

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3.4
microclimate
climate (3.1) of a small area, specific rooms, part of building, etc., which may be different from that in the general region

3.5
temperature-humidity complex
combined effect of temperature and relative humidity on the *corrosivity of the atmosphere* (3.10)

[SOURCE: ISO 9223:2012, 3.4]

3.6
time of wetness
period when a metallic surface is covered by adsorptive and/or liquid films of electrolyte to be capable of causing atmospheric corrosion

[SOURCE: ISO 9223:2012, 3.5]

3.7
atmospheric pollution
specific corrosion-active substances, gases or suspended particles in the air (both natural and the result of human activity)

3.8
corrosion system
system consisting of one or more metals and those parts of the environment that influence corrosion

[SOURCE: ISO 8044:2020, 3.4, modified — Note 1 to entry has been deleted.]

3.9
corrosivity
ability of an environment to cause corrosion of a metal in a given *corrosion system* (3.8)

[SOURCE: ISO 8044:2020, 3.14]

3.10
corrosivity of atmosphere
ability of the atmosphere to cause corrosion in a given *corrosion system* (3.8)

EXAMPLE Atmospheric corrosion of a given metal or alloy.

[SOURCE: ISO 9223:2012, 3.1, modified — An example has been added.]

4 Symbols and abbreviated terms

IC indoor corrosivity

r_{corr} corrosion rate derived from mass-loss measurement after an exposure of one year

r_{mi} rate of mass increase after an exposure of one year

5 Classification of corrosivity

5.1 General

The corrosivity of indoor atmospheres can be classified either by a determination of the corrosion attack on standard specimens of selected standard metals as given in Clause 6 or, where this is not possible, by an estimation of corrosivity based on the knowledge of humidity, temperature and pollution conditions as described in Clause 7 and Annexes B, C and D.

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