Corrosion of metals and alloys - Corrosivity of atmospheres - Classification, determination and estimation (ISO 9223:2012)

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NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 9223:2012 sisaldab Euroopa standardi EN ISO 9223:2012 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 9223:2012 consists of the English text of the European standard EN ISO 9223:2012.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 01.02.2012.	Date of Availability of the European standard is 01.02.2012.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

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Corrosion of metals and alloys - Corrosivity of atmospheres - Classification, determination and estimation (ISO 9223:2012)

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Korrosion von Metallen und Legierungen - Korrosivität von Atmosphären - Klassifizierung, Bestimmung und Abschätzung (ISO 9223:2012)

This European Standard was approved by CEN on 22 January 2012.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN ISO 9223:2012) has been prepared by Technical Committee ISO/TC 156 "Corrosion of metals and alloys" in collaboration with Technical Committee CEN/TC 262 “Metallic and other inorganic coatings” the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2012, and conflicting national standards shall be withdrawn at the latest by August 2012.

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Endorsement notice

The text of ISO 9223:2012 has been approved by CEN as a EN ISO 9223:2012 without any modification.

Contents

Page

Introduction

Metals, alloys and metallic coatings can suffer atmospheric corrosion when their surfaces are wetted. The nature and rate of the attack depends upon the properties of surface-formed electrolytes, particularly with regard to the level and type of gaseous and particulate pollutants in the atmosphere and to the duration of their action on the metallic surface.

The character of the corrosion attack and the corrosion rate are consequences of the corrosion system, which comprises the metallic materials, the atmospheric environment, technical parameters and operation conditions.

The corrosivity category is a technical characteristic which provides a basis for the selection of materials and protective measures in atmospheric environments subject to the demands of the specific application, particularly with regard to service life.

Data on the corrosivity of the atmosphere are essential for the development and specification of optimized corrosion protection for manufactured products.

The corrosivity categories are defined by the first-year corrosion effects on standard specimens as specified in ISO 9226. The corrosivity categories can be assessed in terms of the most significant atmospheric factors influencing the corrosion of metals and alloys.

The measurement of relevant environmental parameters is specified in ISO 9225.

The ways of determining and estimating the corrosivity category of a given location according to this International Standard and the relationships among them are presented in Figure 1. It is necessary to distinguish between corrosivity determination and corrosivity estimation. It is also necessary to distinguish between corrosivity estimation based on application of a dose-response function and that based on comparison with the description of typical atmospheric environments.

This International Standard does not take into consideration the design and mode of operation of the product, which can influence its corrosion resistance, since these effects are highly specific and cannot be generalized. Steps in the choice of optimized corrosion protection measures in atmospheric environments are defined in ISO 11303.

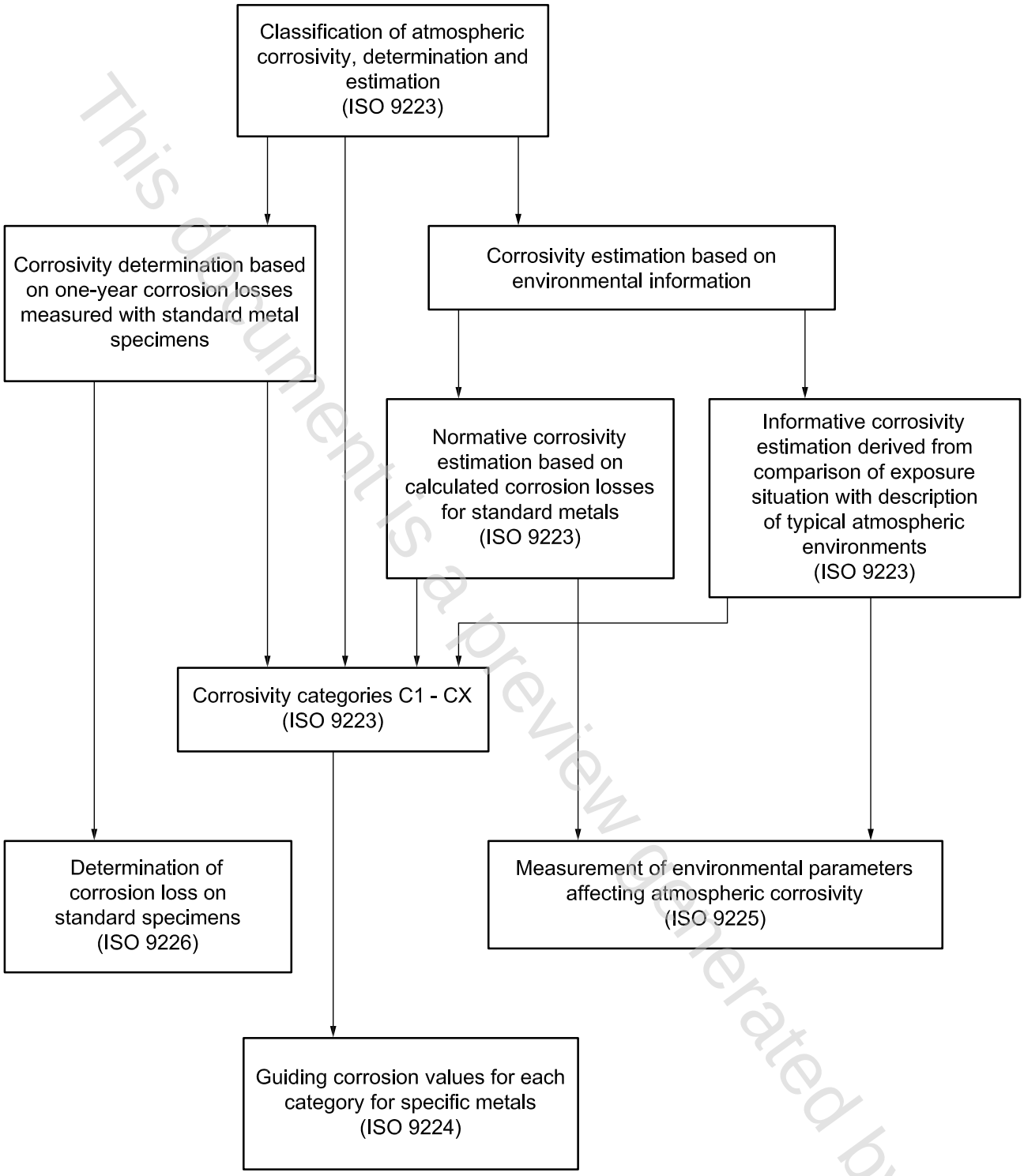

Figure 1 — Classification of atmospheric corrosivity

Corrosion of metals and alloys — Corrosivity of atmospheres — Classification, determination and estimation

1 Scope

This International Standard establishes a classification system for the corrosivity of atmospheric environments. It

— defines corrosivity categories for the atmospheric environments by the first-year corrosion rate of standard specimens,

— gives dose-response functions for normative estimation of the corrosivity category based on the calculated first-year corrosion loss of standard metals, and

— makes possible an informative estimation of the corrosivity category based on knowledge of the local environmental situation.

This International Standard specifies the key factors in the atmospheric corrosion of metals and alloys. These are the temperature-humidity complex, pollution by sulfur dioxide and airborne salinity.

Temperature is also considered an important factor for corrosion in areas outside the temperate macroclimatic zone. The temperature-humidity complex can be evaluated in terms of time of wetness. Corrosion effects of other pollutants (ozone, nitrogen oxides, particulates) can influence the corrosivity and the evaluated one-year corrosion loss, but these factors are not considered decisive in the assessment of corrosivity according to this International Standard.

This International Standard does not characterize the corrosivity of specific service atmospheres, e.g. atmospheres in chemical or metallurgical industries.

The classified corrosivity categories and introduced pollution levels can be directly used for technical and economical analyses of corrosion damage and for a rational choice of corrosion protection measures.

2 Normative references

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

ISO 8044, *Corrosion of metals and alloys — Basic terms and definitions*

ISO 9224, *Corrosion of metals and alloys — Corrosivity of atmospheres — Guiding values for the corrosivity categories*

ISO 11844-1, *Corrosion of metals and alloys — Classification of low corrosivity of indoor atmospheres — Part 1: Determination and estimation of indoor corrosivity*

ISO 11844-2, *Corrosion of metals and alloys — Classification of low corrosivity of indoor atmospheres — Part 2: Determination of corrosion attack in indoor atmospheres*

ISO 11844-3, *Corrosion of metals and alloys — Classification of low corrosivity of indoor atmospheres — Part 3: Measurement of environmental parameters affecting indoor corrosivity*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 8044 and the following apply.

3.1
corrosivity of atmosphere
ability of the atmosphere to cause corrosion in a given corrosion system

3.2
category of corrosivity of atmosphere
standardized rating of corrosivity of atmosphere in relation to the one-year corrosion effect

3.3
type of atmosphere
characterization of the atmosphere on the basis of appropriate classification criteria other than corrosivity or of complementary operation factors

EXAMPLE Rural, urban, industrial, marine, chemical, etc.

3.4
temperature-humidity complex
combined effect of temperature and relative humidity on the corrosivity of the atmosphere

3.5
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

3.6
pollution level
numbered rank based on quantitative measurements of specific chemically active substances, corrosive gases or suspended particles in the air (both natural and the result of human activity) that are different from the normal components of the air

3.7
category of location
conventionally defined typical exposure conditions of a component or structure

EXAMPLE Exposure in the open air, under shelter, in a closed space, etc.

3.8
dose-response function
relationship derived from results of field tests for calculation of corrosion loss from average values of environmental parameters

4 Symbols and abbreviated terms

4.1 Symbols

r_{corr} Corrosion rate for the first year of atmospheric exposure

T Air temperature