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Corrosion of metals and alloys — Rating method by appearance of rust and stains of atmospheric corrosion for stainless steels

Corrosion des métaux et alliages — Méthode de cotation par l'apparence de la rouille et des taches de corrosion atmosphérique pour les aciers inoxydables

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Foreword

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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 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*.

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

Stainless steels contain at least 10,5 % Cr and are widely used in domestic electric utilities, kitchen utensils, transportation vehicles, and industrial plants. Corrosion-resistant stainless steels are also used as architectural materials, e.g. exterior parts and roofs of buildings. Furthermore, stainless steels are used as braid materials for automotive parts.

Corrosion loss and pitting depth are important factors for selecting, deciding the thickness and estimating the lifetime of materials. Aesthetic appearance is also important for stainless steels used in exterior parts. Therefore, a method for evaluating the appearance of stainless steels under atmospheric exposure is required.

Corrosion of metals and alloys — Rating method by appearance of rust and stains of atmospheric corrosion for stainless steels

1 Scope

This document specifies a method for evaluating the aesthetic appearance of stainless steels qualitatively by rating rust and stains formed by atmospheric corrosion. The rust and stains on stainless steels formed by atmospheric corrosion are rated by using 10 photographic standards.

This method is especially suitable for evaluating the appearance of specimens and structures made of stainless steels under atmosphere exposure.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 — Vocabulary*

3 Terms and definitions

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

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

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

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

3.1
stain
visible mark of corrosion products consisting mainly of hydrated iron and chromium oxides

3.2
rating number
RN
number rated according to the degree of rust and *stains* (3.1) formed by atmospheric corrosion

4 Principle

4.1 Photographic standard

Rust and stains on stainless steels formed by atmospheric corrosion shall be rated by using 10 photographic standards, in which the total area of rust and stains changes in the range of 0 % to 100 %. The photographic standards are shown in Figures 1 to 10. The specimen size in the figures is 100 mm in width and 150 mm in length.

Each of these photos is assigned a rating number (RN) of 0, 1, 2, 3, 4, 5, 6, 7, 8 or 9. RN 0 corresponds to the total area of rust and stains of substantially 100 % and RN 9 corresponds to the total area of rust and stains of 0,01 % or less (see Table A.1).

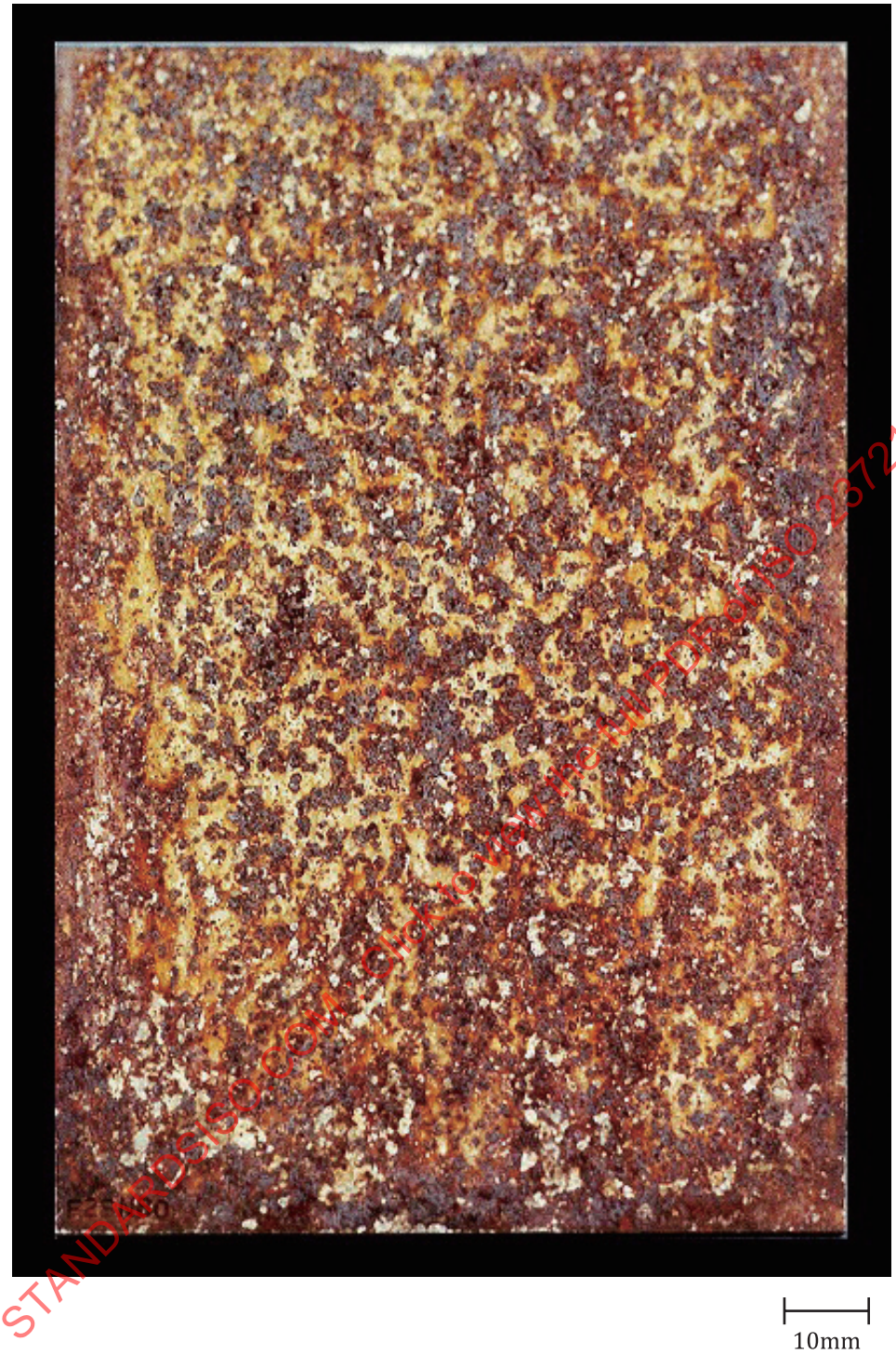

Figure 1 — Rating number RN 0

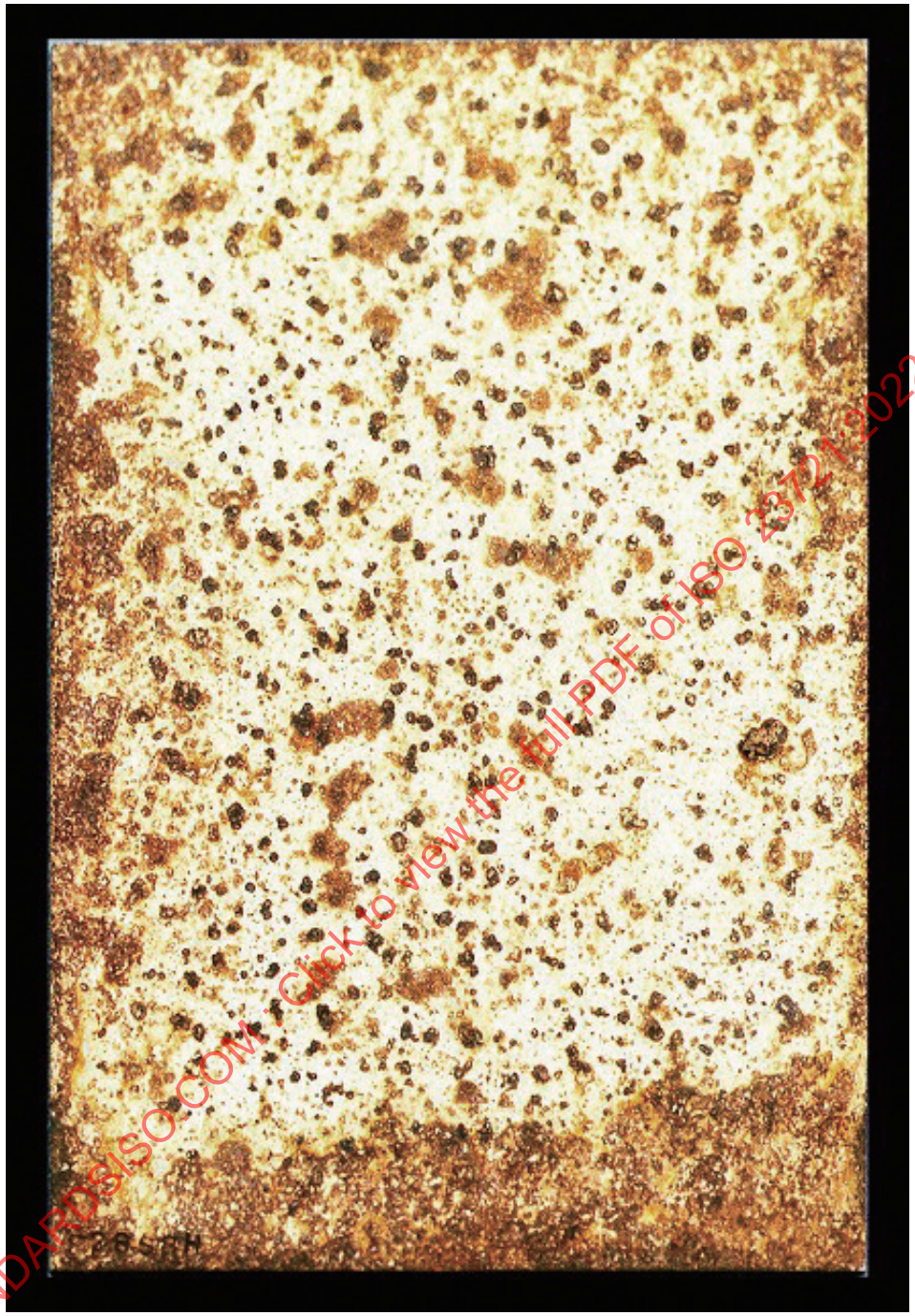

Figure 2 — Rating number RN 1

Figure 3 — Rating number RN 2

Figure 4 — Rating number RN 3

Figure 5 — Rating number RN 4

Figure 6 — Rating number RN 5

Figure 7 — Rating number RN 6

Figure 8 — Rating number RN 7

Figure 9 — Rating number RN 8

Figure 10 — Rating number RN 9

4.2 Rating method

Rust and stains formed by atmospheric corrosion on a specimen shall be rated by comparison with the 10 photographic standards shown in Figures 1 to 10. The middle part of the photographs should be used for rating excluding the 5 mm area close to the perimeter and around the markings. The rating should be conducted by two or more people.

Rust and stains formed by atmospheric corrosion on a particular part of a real structure shall be rated by evaluating the object by the same procedure as used for rating rust and stains on a specimen.