SLOVENSKI STANDARD
oSIST prEN ISO 8407:2020

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Korozija kovin in zlitin - Odstranjevanje produktov korozije s preskusnih vzorcev (ISO/DIS 8407:2020)

Corrosion of metals and alloys - Removal of corrosion products from corrosion test specimens (ISO/DIS 8407:2020)

Korrosion von Metallen und Legierungen - Entfernen von Korrosionsprodukten von Korrosionsprobekörpern (ISO/DIS 8407:2020)

Corrosion des métaux et alliages - Élimination des produits de corrosion sur les éprouvettes d'essai de corrosion (ISO/DIS 8407:2020)

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Corrosion of metals and alloys — Removal of corrosion products from corrosion test specimens

Corrosion des métaux et alliages — Élimination des produits de corrosion sur les éprouvettes d'essai de corrosion

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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 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 *156*, *Corrosion of metals and alloys*., WG 6, *General principles of testing and data interpretation*.

This third edition cancels and replaces the second edition (ISO 8407:2009), which has been technically revised.

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

— Annex A

A list of all parts in the ISO 8407:2009 series can be found on the ISO website.

Corrosion of metals and alloys — Removal of corrosion products from corrosion test specimens

WARNING — Safety rules for personnel: handling of the solutions used for removal of corrosion products must be left to skilled personnel or conducted under their control. The equipment must be used and maintained by skilled personnel, not only so that the procedures can be performed correctly, but also because of the hazards to health and safety that are involved.

1 Scope

This document specifies procedures for the removal of corrosion products formed on metal and alloy corrosion test specimens during their exposure in corrosive environments. For the purpose of this document, the term "metals" refers to pure metals and alloys.

The specified procedures are designed to remove all corrosion products without significant removal of base metal. This allows an accurate determination of the mass loss of the metal, which occurred during exposure to the corrosive environment.

These procedures may, in some cases, also be applied to metal coatings. However, possible effects from the substrate must be considered.

NOTE If a significant portion of the substrate is visible after the pickling procedure is completed, the results will be unreliable.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

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

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

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

4 Procedures

4.1 General

4.1.1 A light mechanical cleaning treatment by brushing with a soft bristle brush under running water should first be applied to remove lightly adherent or bulky corrosion products.

4.1.2 If the treatment described in 4.1.1 does not remove all corrosion products, it will be necessary to use other procedures. These are of three types:

a) chemical;

b) electrolytic;

c) more vigorous mechanical treatments.

NOTE These treatments will also remove some base metal.

Whichever method is used, it might be necessary to repeat the cleaning treatment to ensure complete removal of the corrosion products. Removal shall be confirmed by visual examination. The use of a low-power microscope (i.e. x7 to x30) is particularly helpful with a pitted surface since corrosion products may accumulate in pits.

4.1.3 An ideal procedure should remove corrosion products and not result in removal of any base metal. Two procedures can be used to confirm this point. One procedure uses a control specimen (4.1.3.1) and the other requires a certain number of cleaning cycles on the corroded specimen (4.1.3.2). The procedures shall be maintained during the entire service life of the cleaning solutions listed in Tables A.1 and A.2.

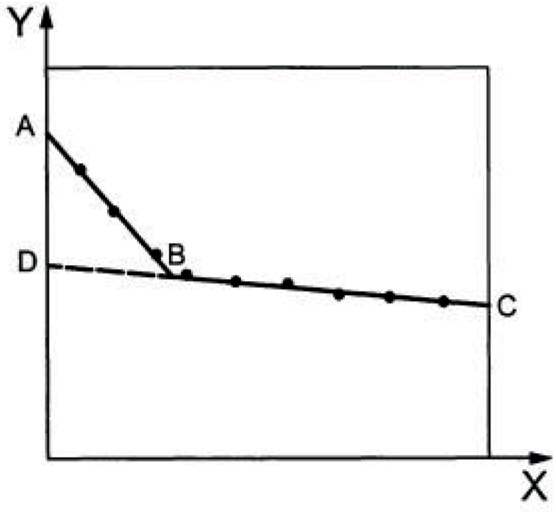
NOTE 1 Indications that the solution needs to be discarded can be discoloration or significant amount of corrosion products in the solution.

NOTE 2 Some solutions might need some "running in" before working without etching the substrate.

4.1.3.1 Uncorroded control specimens, which should be similar chemically, metallurgically, and geometrically to the test specimens, should be cleaned by the same procedure as used for the test specimen. By weighing the control specimen before and after cleaning (weighing to the fifth significant figure is suggested, e.g. a 70 g specimen should be weighed to three decimal places), the metal loss resulting from cleaning may be determined. The mass loss of the control specimen will reflect the mass loss of test specimens resulting from the cleaning procedure.

4.1.3.2 The cleaning of each corroded test specimen should be repeated several times after the removal of the corrosion products is completed. The mass shall be plotted as a function of the number of equal cleaning cycles (see Figure 1). Point A represents the mass of corroded specimens before the start of the cleaning. In many cases two straight lines, AB and BC, will be obtained. Line AB characterizes the removal of corrosion products and may not always be visible. Line BC characterizes the removal of substrate after the corrosion products are gone. Point D, which characterizes the mass of the pure metal at zero number of cleaning cycles, is obtained by extrapolation of line BC to the ordinate axis. In some cases, the relation may not be linear and the most appropriate extrapolation shall then be made.

If no intervals of equal cleaning cycles are used during one cleaning procedure, the x-axis should be expressed in time units.



Key

X numbers of cleaning cycles or time units

Y mass

Figure 1 — Mass of corroded specimens after repetitive cleaning cycles

NOTE The number of points needed to establish the line BC can be less than indicated in the figure for the specific case, especially if there is significant experience for the pickled material and solution.

4.1.3.3 The true mass of the specimen, after removal of the corrosion products, will be a value between the masses represented by the points B and D, depending on the degree of protection furnished by the corrosion products during the cleaning procedure. If the relation from B to C is not linear, the point D should be obtained by a mathematical formula such as a least square method from reliable last points of cleaning cycles

4.1.4 The preferred cleaning method will be that which

a) provides efficient removal of corrosion products,

b) provides low or zero mass loss when applied to new uncorroded specimens (see 4.1.3.1), and

c) provides a curve of mass as a function of the number of cleaning cycles or time of pickling, which is close to horizontal when the latter is plotted as the abscissa (see 4.1.3.2).

4.1.5 When chemical or electrolytic procedures are used, solutions freshly prepared with distilled or deionized water and reagent grade chemicals shall be used.

4.1.6 After cleaning, the specimen should be thoroughly rinsed with tap water, a light brushing during this procedure will help to remove any remaining surface products resulting from the cleaning process. Finally, the specimens shall be rinsed with distilled or deionized water. The specimen shall then be rinsed thoroughly in ethanol and dried using a hot air blower or an oven. After that, the specimens shall be allowed to cool in a dessicator to the balance room temperature before weighing.

4.2 Chemical procedures

4.2.1 Chemical procedures involve immersion of the corrosion test specimen in a chemical solution which is specifically designed to remove the corrosion products with minimal dissolution of any base metal. Several procedures are listed in Annex A (see Table A.1). To facilitate the cleaning, it is strongly recommended to use an ultrasonic bath treatment.

