



SLOVENSKI STANDARD

SIST ISO 8407:2010

01-april-2010

Nadomešča:
SIST ISO 8407:1999

Korozija kovin in zlitin - Odstranjevanje korozijskih produktov s preskušancev

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

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

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Ta slovenski standard je istoveten z: **ISO 8407:2009**

ICS:

77.060

Korozija kovin

Corrosion of metals

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en,fr

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INTERNATIONAL STANDARD

ISO 8407

Second edition
2009-11-01

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 8407 was prepared by Technical Committee ISO/TC 156, *Corrosion of metals and alloys*.

This second edition cancels and replaces the first edition (ISO 8407:1991), which has been technically revised.

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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 International Standard 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 International Standard, 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.

2 Procedures

2.1 General

2.1.1 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.

2.1.2 If the treatment described in 2.1.1 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. $\times 7$ to $\times 30$) is particularly helpful with a pitted surface since corrosion products may accumulate in pits.

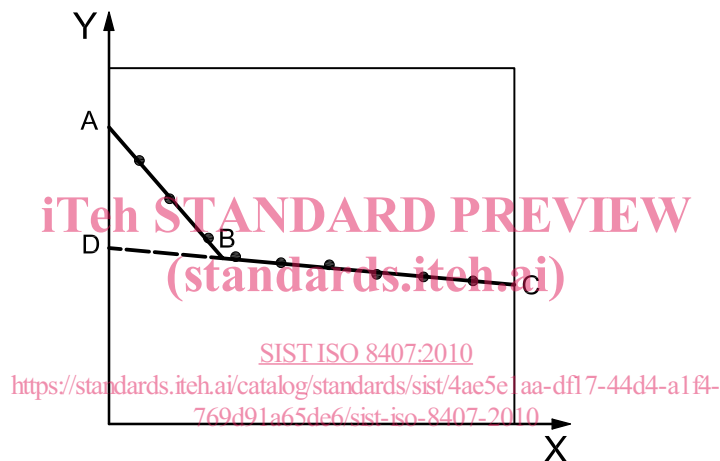
2.1.3 An ideal procedure should remove corrosion products and not result in removal of any base metal. Two procedures can be used to confirm this point. One procedure uses a control specimen (2.1.3.1) and the other requires a certain number of cleaning cycles on the corroded specimen (2.1.3.2).

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2.1.3.1 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.

2.1.3.2 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

2.1.3.3 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.

2.1.4 The preferred cleaning method will be that which

- provides efficient removal of corrosion products,
- provides low or zero mass loss when applied to new uncorroded specimens (see 2.1.3.1), and
- 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 2.1.3.2).

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

2.1.6 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.

2.2 Chemical procedures

2.2.1 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.

2.2.2 Chemical cleaning is often preceded by light brushing of the test specimen to remove lightly adherent, bulky corrosion products.

2.2.3 Before the chemical treatment, clean the specimens as described in 2.1.1. In connection with the intermittent removal of specimens for weighing, brush the specimens, if necessary, to facilitate the removal of tightly adherent corrosion products.

2.3 Electrolytic procedures

Electrolytic cleaning can also be used to remove corrosion products. Several methods of electrolytic cleaning of corrosion test specimens are given in Annex A (see Table A.2). To facilitate the cleaning, it is strongly recommended to use an ultrasonic bath treatment.

Electrolytic cleaning should be preceded by light brushing of the test specimen to remove lightly adherent, bulky corrosion products. Brushing should also follow electrolytic cleaning to remove any loose slime or deposits. This will help to minimize any redeposition of metal from reducible corrosion products, which would reduce the mass loss.

2.4 Mechanical procedures

Mechanical procedures can include scraping, scrubbing, brushing, ultrasonic methods, mechanical shock and impact blasting (grit blasting, water-jet blasting, etc.). These methods are often used to remove heavily encrusted corrosion products. Scrubbing with a bristle brush and a mild abrasive/distilled water slurry can also be used to remove corrosion products.

Vigorous mechanical cleaning will result in the removal of some base metal, so care should be exercised. These methods should be used only when others fail to provide adequate removal of corrosion products. As with the other methods, correction for metal loss due to the cleaning method is recommended. The mechanical forces used in cleaning shall be maintained as constant as possible.

3 Test report

The test report shall include the following information:

- a) a reference to this International Standard;
- b) the procedure used to remove corrosion products;
- c) for chemical procedures, the composition and concentration of the chemicals employed or the designation according to Table A.1, the solution temperature and the duration of each cleaning cycle or number of equal cleaning cycles;
- d) for electrolytic procedures, the composition and concentration of chemicals employed or the designation according to Table A.2, the solution temperature, the anode material and current density, and the duration of cleaning;