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**NATIONAL STANDARD OF THE  
PEOPLE'S REPUBLIC OF CHINA**

**GB/T 16545-2015**

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

金属和合金的腐蚀

**(English Translation)**

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### 1 Scope

#### 1.1

This Standard specifies procedures for the removal of corrosion products formed on metal and alloy corrosion test specimens during their exposure in corrosive environments.

NOTE For the purpose of this Standard, the term "metals" refers to pure metals and alloys.

#### 1.2

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.

#### 1.3

This Standard may, in some cases, also be applied to metal coatings.

However, possible effects from the substrate must be considered.

#### 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.

2.1.3 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 ~ x30) is particularly helpful with a pitted surface since corrosion products

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#### **2.1.4.3 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.

#### **2.1.5 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 2.1.4.1), 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 2.1.4.2).

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

2.1.7 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.

#### **2.2.1 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

### 2.3.1

Electrolytic cleaning can also be used to remove corrosion products.

Several methods of electrolytic cleaning of corrosion test specimens are given

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Annex A (Informative)

Chemical and electrolytic cleaning procedures for removal of corrosion products

#### A.1 General

This annex summarizes the selected chemical and electrolytic cleaning procedures.

Prior to adopting these cleaning procedures, the user should conduct a test on control samples to ensure the efficiency of the chosen method.

#### A.2 Procedures

A.2.1 Tables A.1 and A.2 summarize various chemical and electrolytic cleaning procedures for removal of corrosion products. The specific choice of procedure for a given material will depend on many factors, including previous experience. If more than one chemical or electrolytic cleaning procedure is given for a metal, the procedures are usually listed in preferred order. This

Standard should be consulted for guidance in the proper application of the procedures in Tables A.1 and A.2.

A.2.2 For all the cleaning procedures listed, it is recommended that the surfaces should be maintained vertical during cleaning. This will minimize retention of any gases released during the cleaning procedure.

A.2.3 The times specified represent recommendations appropriate for mass-loss studies in the context of Figure 1. However, when the cleaning procedure is adopted for other purposes (e.g. cleaning of fracture surfaces for inspection, using a microscope), the exposure time may be longer.

NOTE When working with dangerous substances (such as cyanide, chromium trioxide, zinc dust), all necessary safety precautions shall be taken.