STANDARD **11463**

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Corrosion of metals and alloys — Evaluation of pitting corrosion

Corrosion des métaux et alliages — Évaluation de la corrosion par piqûres

Reference number
ISO 11463:1995(E)

Foreword

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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.

International Standard ISO 11463 was prepared by Technical Committee ISO/TC 156, *Corrosion of metals and alloys.*

Annexes A and B of this International Standard are for information only.

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Introduction

It is important to be able to determine the extent of pitting, either in a service application where it is necessary to estimate the remaining life in a metal structure, or in laboratory test programmes that are used to select pitting-resistant materials for a particular service (see [1] in annex B).

The application of the materials to be tested will determine the minimum pit size to be evaluated and whether total area covered, average pit depth, maximum pit depth or another criterion is the most important to measure.

Corrosion of metals and alloys — Evaluation of pitting corrosion

1 Scope

This International Standard gives guidance on the selection of procedures that can be used in the identification and examination of pits and in the evaluation of pitting corrosion.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 8407:1991, *Corrosion of metals and alloys - Removal of corrosion products from corrosion test specimens.*

3 Identification and examination of pits

3.1 Visual inspection

A visual examination of the corroded metal surface with or without the use of a low-power magnifying glass may be used to determine the extent of corrosion and the apparent location of pits. It is often advisable to photograph the corroded surface so that it can be compared with the clean surface after the removal of corrosion products.

3.1.1 If the metal specimen has been exposed to an unknown environment, the composition of the corrosion products may be of value in determining the cause of corrosion. Recommended procedures in the removal of particulate corrosion products should be followed and reserved for future identification.

3.1.2 To expose the pits fully, it is recommended that cleaning procedures should be used to remove the corrosion products and avoid solutions that attack the base metal excessively (see ISO 8407). It may be advisable during cleaning to probe the pits with a pointed tool to determine the extent of undercutting or subsurface corrosion (see figure 1). However, scrubbing with a stiff-bristle brush will often enlarge the pit openings sufficiently by removal of corrosion products or undercut metal to make the pits easier to evaluate.

3.1.3 Examine the cleaned metal surface to determine the approximate size and distribution of pits. Follow this procedure by a more detailed examination through a microscope using low magnification (approximately × 20).

3.1.4 Determine the size, shape and density of pits.

3.1.4.1 Pits may have various sizes and shapes. A visual examination of the metal surface may show a round, elongated or irregular opening, but it seldom provides an accurate indication of corrosion beneath the surface. Thus it is often necessary to cross-section the pit to see its actual shape and to determine its true depth. Several variations in the cross-sectioned shape of pits are shown in figure 1.

3.1.4.2 It is difficult to determine pit density by counting pits through a microscope eyepiece, but the task may be made easier by the use of a plastic grid. Place the grid, containing 3 mm to 6 mm squares, on the metal surface. Count and record the number of pits in each square, and move across the grid in a systematic manner until all the surface has been covered. This approach minimizes eye-strain because the eyes can be taken from the field of view without fear of losing the area of interest. Enlarged photographs of the area of interest may also be used to reduce eye-strain.