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**Corrosion of metals and alloys —  
Guidelines for the corrosion testing  
of metals and alloys exposed in deep-  
sea water**

*Corrosion des métaux et alliages — Lignes directrices pour les essais  
de corrosion des métaux et alliages exposés en eau profonde*



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Published in Switzerland

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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](http://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](http://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 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](http://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](http://www.iso.org/members.html).

## Introduction

With the developments of the offshore oil and gas industry, the activities of exploration and production of oil and gas have been extended into deep sea. Many subsea equipment and systems for oil/gas production have been deployed in deep-sea water. There are also some instruments placed in the subsea for environmental observation and scientific exploration. Corrosion is a crucial problem for these valuable installations because it seriously affects the performance, reliability and safety of these equipment and systems.

This document gives guidance on the corrosion testing of metals and alloys exposed in deep-sea water. The testing can be conducted based on the specified conditions and procedures, and meaningful comparisons may be made for different tests.



# Corrosion of metals and alloys — Guidelines for the corrosion testing of metals and alloys exposed in deep-sea water

## 1 Scope

This document gives guidelines for the corrosion testing of metals and alloys exposed in deep-sea water, including the selection of the test site, components and assembly of the test system, specimen preparation, testing procedure, evaluation after the retrieval from exposure sites and test report.

This document is applicable to the general corrosion exposure testing of metals and alloys as well as localized corrosion tests such as stress corrosion cracking (SCC) testing, galvanic corrosion testing and crevice corrosion testing of specimens exposed in deep-sea water.

Testing with exposure in deep sea of other materials such as composites and elastomers can also be carried out with reference to these guidelines, but the evaluation of these materials after the retrieval is different from that of metals and alloys.

This document does not include the performance testing of sacrificial anodes for cathodic protection in the field of deep sea, which can be conducted using specified testing cells and equipment in the deep-sea exposure. However, this guidance can also provide useful information as reference for conducting performance testing of sacrificial anodes in deep-sea water.

## 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 terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

### 3.1

#### deep-sea water

sea water zone with a depth generally ranging from 200 meters to thousands of meters

Note 1 to entry: Deep-sea water has a corrosive environment with parameters such as temperature, salinity, dissolved oxygen content, microorganism and biofouling that are quite different from those in surface sea water.

### 3.2

#### test site

location where corrosion tests exposed in deep sea are performed