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BSI Standards Publication

Corrosion of metals and alloys — Guidelines and requirements for corrosion testing in simulated environment of deep-sea water

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Corrosion des métaux et alliages — Lignes directrices et recommandations relatives aux essais de corrosion dans l'environnement simulé des eaux profondes

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Foreword

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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 document 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).

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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.

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Introduction

Corrosion is a crucial problem for subsea equipment and systems for oil/gas production, environmental observation, and scientific exploration due to exposure in deep-sea water. Guidelines for corrosion testing of metals and alloys exposed in deep-sea water have been given in ISO 23226.

This document provides guidelines and requirements for the corrosion testing of metals and alloys under the conditions of simulating the environment of deep-sea water. Thereby, the testing can be conducted based on the specified conditions and procedures, and the meaningful comparisons can be made for different tests.

This document applies to the immersion testing of specimens related to general corrosion and localized corrosion, stress corrosion cracking (SCC) testing and electrochemical testing in the simulated environment of deep-sea water in the laboratory.

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Corrosion of metals and alloys — Guidelines and requirements for corrosion testing in simulated environment of deep-sea water

1 Scope

This document provides guidelines and requirements for the corrosion testing of metals and alloys in the simulated environment of deep-sea water, including principle, testing equipment, specimen preparation, testing procedure and evaluation after test. This document applies to the immersion testing, corrosion testing under stress condition and electrochemical testing in the simulated environment of deep-sea water in the laboratory.

Testing of other materials such as composites and elastomers can also be carried out in the simulated environment of deep-sea water with reference to this document, but the evaluation of these materials after the testing is different from that of metals and alloys.

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 terminology databases for use in standardization at the following addresses:

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

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

3.1
deep-sea water
sea water zone with a depth generally ranging from 200 m 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
simulated environment
environment for which the main corrosion factors are simulated

4 Principle

This document provides guidelines and requirements on corrosion tests in the simulated environment of deep-sea water using a suitable apparatus. The apparatus should be able to form a corrosive environment similar to the practical deep-sea water. The main environmental factors should include at least hydrostatic pressure, temperature, dissolved oxygen content and compositions of deep-sea water.

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