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Corrosion of metals and alloys — Corrosion and fouling in industrial cooling water systems —

Part 2: Evaluation of the performance of cooling water treatment programmes using a pilot-scale test rig

Corrosion des métaux et alliages — Corrosion et encrassement des circuits de refroidissement à eau industriels —

Partie 2: Évaluation des performances des programmes de traitement de l'eau de refroidissement sur banc d'essai pilote

Reference number
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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 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*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 262, *Metallic and other inorganic coatings, including for corrosion protection and corrosion testing of metals and alloys,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 16784-2:2006), which has been technically revised.

The main changes are as follows:

— the Introduction has been modified;

— the Scope has been modified;

— Normative references have been added;

— the Terms and definitions have been updated;

— Clause 4 has been modified to include principles on the simulation process of cooling water treatments;

— the title of Clause 5 has been changed from “Reagents and materials” to “Water for test”;

— the apparatus has been modified: the components and their descriptions have been added;

— the assessment of results has been modified to be divided into three aspects: corrosion phenomena and type of corrosion, pitting corrosion and corrosion rate;

— the bibliography has been modified.

A list of all parts in the ISO 16784 series can be found on the ISO website.

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

There is an industrial need to improve the safety, reliability and cost-effectiveness of open recirculating cooling water systems. This is due to the rise in stringent environmental requirements as well as the rise in the costs of water. It is therefore important to establish a standard framework for evaluating the performance of cooling water treatment programmes. The aim is to provide users of cooling systems and vendors of treatment materials for those systems with a procedure to make consistent evaluations of cooling water treatment programmes on a pilot scale.

With the continuous development of circulating water treatment technology, some new circulating water treatment technologies, such as reverse osmosis treatment and electrochemical treatment, have become an important part of cooling water treatment schemes.

This document has been revised and updated to add a new test device along with more detailed descriptions of the components. The simulation device uses steam to heat the heat exchange tube, which solves the problem of uneven heating caused by electric heating and is closer to the actual operating conditions on site.

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Corrosion of metals and alloys — Corrosion and fouling in industrial cooling water systems —

Part 2: Evaluation of the performance of cooling water treatment programmes using a pilot-scale test rig

1 Scope

This document specifies the principles, reagents and materials, test apparatus, test methods, evaluation of results and requirements for test reports using pilot tests for industrial cooling water systems.

This document specifies a method to evaluate the performance of treatment programmes for open recirculating cooling water systems. It is based primarily on laboratory testing, but the heat exchanger testing facility can also be used for on-site evaluation. This document does not include heat exchangers with cooling water on the shell-side (i.e. external to the tubes).

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 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 8044, *Corrosion of Metals and Alloys — Basic Terms and Definitions*

ISO 8407, *Corrosion of metals and alloys — Removal of corrosion products from corrosion test specimens*

ISO 16784-1, *Industrial cooling water systems — Testing and performance — Part 1: Guidelines for conducting pilot-scale evaluation of corrosion and fouling control additives for open recirculating cooling water systems*

ISO 11463, *Corrosion of metals and alloys — Guidelines for the evaluation of pitting corrosion*

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 https://www.electropedia.org/

3.1
adenosine tri-phosphate
ATP
active chemical present in living bacteria

Note 1 to entry: ATP concentrations can be indirectly measured and are used as an indicator for the presence of biology in cooling water.

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