

ICS 77.060
CCS H 25



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

GB/T 47554.1-2026

Corrosion of metals and alloys - Corrosion and fouling in industrial cooling water systems - Part 1: Guidelines and requirements for conducting pilot-scale evaluation of corrosion and fouling control additives for open recirculating cooling water systems

金属和合金的腐蚀 工业冷却水系统的腐蚀和污垢 第1部分：开式循环冷却水阻垢
缓蚀剂中试评估指南和要求

(English Translation)

Issued on: April 30, 2026

Implemented on: November 1, 2026

Issued by: State Administration for Market Regulation

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Foreword

This document conforms to GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting is scheduled.

This document is Part 1 of GB/T 47554 "Corrosion of Metals and Alloys - Corrosion and Fouling of Industrial Cooling Water Systems".

GB/T 47554 has published the following parts.

--Part 1: Guidelines and requirements for pilot-scale evaluation of scale and corrosion inhibitors for open-loop cooling water;

--Part 2: Evaluation of cooling water treatment solutions using pilot-scale test benches.

This document is equivalent to ISO 16784-1:2024 "Corrosion of metals and alloys - Corrosion and fouling of industrial cooling water systems - Part 1".

Part. Pilot-scale evaluation guidelines for scale and corrosion inhibitors in open-loop cooling water.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Iron and Steel Association.

This document is under the jurisdiction of the National Steel Standardization Technical Committee (SAC/TC 183).

Introduction

The global industrial environment has undergone numerous changes, including advancements in related technologies. With industry development and intensified competition, Pollution control requirements are becoming stricter, and water resources are becoming increasingly scarce, forcing businesses to operate in safer, more environmentally friendly, and more economical ways.

In many cases, the quality of industrial cooling water is declining, leading to higher ion concentrations, increased corrosion, and greater scaling.

Cooling water treatment technology is constantly developing, and its application scope is gradually expanding. However, water pollution caused by scale and corrosion inhibitors used in cooling water systems is a growing concern.

Wastewater pollution has drawn public attention. To achieve zero wastewater discharge, the application of green and environmentally friendly scale and corrosion inhibitors has become a development trend. Industrial cooling water...

Treatment is an effective way to maintain efficient equipment operation, extend its lifespan, inhibit corrosion, and prevent scaling, microbial contamination, and deposit accumulation on heat transfer surfaces.

measure.

GB/T 47554 "Corrosion of Metals and Alloys - Corrosion and Fouling of Industrial Cooling Water Systems" consists of two parts.

--Part 1: Guidelines and Requirements for Pilot-Scale Evaluation of Scale and Corrosion Inhibitors for Open-Circulation Cooling Water. The purpose is to specify the requirements for open-circulation cooling water...

General requirements and parameters for pilot-scale testing and evaluation of scale and corrosion inhibitors for systems.

--Part 2: Evaluation of Cooling Water Treatment Solutions Using Pilot-Scale Test Bench. The purpose is to specify the criteria for evaluating the treatment performance of open-loop cooling water systems.

A possible method.

Corrosion of metals and alloys in industrial cooling water systems Corrosion and Fouling
Part 1: Open-Circulation Cooling Water Guidelines and requirements for pilot-scale evaluation of scale and corrosion inhibitors

1 Scope

This document specifies the general requirements and parameters for pilot-scale testing and evaluation of scale and corrosion inhibitors for open-loop cooling water systems. This document covers...

The content includes the design and operation of the experimental device, water quality and its pollution, as well as the evaluation of pilot-scale test parameters, device design, and operation.

This document covers pilot-scale testing standards for selecting water treatment solutions in specific circulating cooling water systems.

This document applies only to open-loop cooling water systems, and not to closed-loop or direct-flow cooling water systems.

This document applies only to shell-and-tube heat exchanger systems using standard uncoated bare tubes with cooling water on the tube side. This document does not apply to water-cooled systems.

Shell-side heat exchangers, plate and frame or spiral heat exchangers, and other heat exchangers. More complex models can be simulated if the test conditions are set properly.

When the surface temperature and shear stress of the heat exchanger are measured, the test results can also predict the operating performance of the heat exchanger design.

The test methods established in this document are not intended to prescribe laboratory and pilot-scale testing procedures for water treatment companies developing their proprietary products.

Testing requirements. However, water treatment companies may choose to use this document as a guide for their own product development and testing.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are listed below.

For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies.

This document.

ISO 8044 Corrosion of metals and alloys - Basic terms and definitions) Note. GB/T 10123-2022 Corrosion terminology for metals and alloys (ISO 8044:2020, IDT)

3 Terms and Definitions

The terms and definitions defined in ISO 8044, as well as the following terms and definitions, apply to this document.

dirt fouling

Any substance deposited on a heat transfer surface.

surface-to-volume ratio the ratio of the total surface area of metal in contact with water in a cooling system to the volume of water in the system.

4.1.1 Laboratory and field testing

In some cases, selecting a cooling water chemical treatment solution requires laboratory or field testing. Such testing can be used for new construction projects.