FINAL DRAFT
International Standard

# ISO/FDIS 23225

# Corrosion control engineering life cycle in nuclear power plants — General requirements

ISO/TC **156**/SC **1**

Secretariat: **SAC**

Voting begins on:
**2025-04-17**

Voting terminates on:
**2025-06-12**





Reference number
ISO/FDIS 23225:2025(en)



ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

# Contents

Page

# 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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.

This document was prepared by Technical Committee ISO/TC 156, *Corrosion of metals and alloys*, Subcommittee SC 1, *Corrosion control engineering life cycle*.

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.

# Corrosion control engineering life cycle in nuclear power plants — General requirements

## 1 Scope

This document specifies the general requirements of corrosion control engineering life cycle in nuclear power plants.

This document applies to the corrosion control engineering in nuclear power plants.

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions 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**
**corrosion control engineering life cycle in nuclear power plants**
entire process of identification of the corrosion sources in nuclear power plants to control of corrosion behaviour

Note 1 to entry: The entire process refers to the systematic engineering of selecting corrosion control materials and technologies, as well as the design, construction, inspection, assessment and maintenance.

**3.2**
**direct corrosion source**
various factors that cause corrosion in direct contact with materials, such as environmental mediums and acid solutions, alkali solutions and salt solutions

**3.3**
**indirect corrosion source**
various factors that cause corrosion without direct contact with materials, such as environmental conditions and mediums working conditions

## 4 Principle

This document defines the corrosion control activities conducted throughout the entire engineering life cycle in nuclear power plants. It identifies all related elements including the objectives, corrosion sources, materials, technology, development, design, manufacturing, transportation and storage, construction and installation, commissioning and acceptance, operation, testing and inspection, maintenance and repair, life extension and scrapping, documents and records, resource management and comprehensive assessment. The requirements of those elements are specified in accordance with holistic, systematic, coordinated and optimized principles. The purpose of the requirements is to achieve the objectives (see Clause 5) under the premise of ensuring public health, lives and property safety, national security and ecological environment safety.

## 5 Objectives

The corrosion control activities specified in this document aim at controlling corrosion effectively during the entire engineering life cycle in nuclear power plants, and achieving the optimum benefits of safety, cost-effectiveness, long-term operation and environmental protection.

## 6 Corrosion sources

**6.1** The corrosion sources of nuclear power plants are classified as follows:

— direct corrosion sources, such as light water, heavy water, liquid metal, helium, boric acid solution, steam, seawater, fresh water, soil, acid solution, alkali solution and salt solution, waste liquid, atmosphere, dissolved hydrogen, dissolved oxygen and humidity;

— indirect corrosion sources, such as pressure, temperature, flow rate, radiation, stress field, microorganisms and their metabolites and other working conditions;

— environmental corrosion sources, such as stray current interference and dissimilar metal contact resulting in galvanic corrosion current interference;

— corrosion sources generated during corrosion.

**6.2** Systematic, comprehensive and accurate investigation and identification should be carried out on the corrosion sources involved at all stages.

**6.3** When identifying corrosion sources, the differences between different reactor types of nuclear power plant should be taken into account (see Appendix A). This process should cover the normal operating and accident conditions of equipment and facilities in nuclear power plants.

**6.4** Check and recognition of corrosion sources in nuclear power plants should be carried out through the appropriate procedures.

## 7 Materials

**7.1** Corrosion control materials may include the following:

— metallic materials, such as zirconium alloys, nickel-based alloys, stainless steel, carbon steel, low-alloy steel, cast iron, copper alloys, titanium alloys and aluminium alloys;

— non-metallic materials, such as rubber, glass fibre reinforced plastics, plastics and coatings;

— composite materials, such as steel-plastic composites.

**7.2** Select materials that can resist the corrosion sources identified in Clause 6 to ensure they are compatible with processes such as design, manufacturing and operation.

**7.3** The selection of materials should take into account:

— corrosion resistance, physical properties (such as heat resistance and electrical conductivity), mechanical properties (such as strength, hardness and plasticity) and processing performance (such as machining, casting and welding) of the materials;

— the scientific nature, technicality, economy and green environmental protection of the materials;

— materials performance in similar project;