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Essential technical requirements for mechanical components and metallic structures foreseen for Generation IV nuclear reactors (ISO 18229:2018)

Exigences techniques essentielles pour les composants mécaniques et les structures métalliques destinés aux réacteurs nucléaires de quatrième génération (ISO 18229:2018)

Grundsätzliche technische Anforderungen an mechanische Komponenten und metallische Strukturen vorgesehen für Kernkraftwerke der Generation IV (ISO 18229:2018)

This European Standard was approved by CEN on 25 July 2021.

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European foreword

The text of ISO 18229:2018 has been prepared by Technical Committee ISO/TC 85 "Nuclear energy, nuclear technologies, and radiological protection" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 18229:2021 by Technical Committee CEN/TC 430 "Nuclear energy, nuclear technologies, and radiological protection" the secretariat of which is held by AFNOR.

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Essential technical requirements for mechanical components and metallic structures foreseen for Generation IV nuclear reactors

*Exigences techniques essentielles pour les composants mécaniques et
les structures métalliques prévus pour les réacteurs nucléaires de la
quatrième génération*



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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).

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For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 85, *Nuclear energy, nuclear technologies, and radiological protection*, Subcommittee SC 6, *Reactor technology*.

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Introduction

GEN IV reactors' objectives are to meet reinforced requirements (compared to GEN II to III reactors) concerning safety and reliability and linked with design and fabrication of equipment:

- to excel in safety and reliability;
- to eliminate the need for offsite emergency response;
- to have a very low likelihood and degree of reactor core damage.

This is supported with the use of codes or standards with a proven history of supporting public safety.

The purpose of this document is not to replace these codes or standards but to identify the essential technical requirements which need to be addressed by the design and fabrication codes in order to allow to meet such safety requirements at the expected level for the GEN IV reactors.

It enables these standards to co-exist, providing an approach that can accommodate technical innovations, existing national frameworks and market needs.

Essential technical requirements for mechanical components and metallic structures foreseen for Generation IV nuclear reactors

1 Scope

This document defines the essential technical requirements that are addressed in the process of design and construction of Generation IV (GEN IV) nuclear reactors. It does not address operation, maintenance and in-service inspection of reactors.

Six reactor concepts are considered for GEN IV: the sodium fast reactor, the lead fast reactor, the gas fast reactor, the very high temperature reactor, the supercritical water reactor and the molten salt reactor.

[Annex A](#) details the main characteristics for the different concepts.

The scope of application of this document is limited to mechanical components related to nuclear safety and to the prevention of the release of radioactive materials

- that are considered to be important in terms of nuclear safety and operability,
- that play a role in ensuring leaktightness, partitioning, guiding, securing and supporting, and
- that contain and/or are in contact with fluids (such as vessels, pumps, valves, pipes, bellows, box structures, heat exchangers, handling and driving mechanisms).

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/IEC 17050-1, *Conformity assessment — Supplier's declaration of conformity — Part 1: General requirements*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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

certification

third-party attestation related to products, processes, systems or persons

[SOURCE: ISO 17000:2004, 5.5 modified — notes deleted]

3.2

component

part of equipment which can be considered as an individual item