

Nuclear energy - Fuel technology - Trunnion systems
for packages used to transport radioactive material
(ISO 10276:2019)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 10276:2021 sisaldab Euroopa standardi EN ISO 10276:2021 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 10276:2021 consists of the English text of the European standard EN ISO 10276:2021.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 04.08.2021.	Date of Availability of the European standard is 04.08.2021.
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English Version

**Nuclear energy - Fuel technology - Trunnion systems for
packages used to transport radioactive material (ISO
10276:2019)**

Énergie nucléaire - Technologie du combustible -
Systèmes de tourillons pour colis de transport de
matières radioactives (ISO 10276:2019)

Kerntechnik - Brennstofftechnologie -
Tragzapfensysteme für Transportbehälter für
radioaktives Material (ISO 10276:2019)

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

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

The text of ISO 10276:2019 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 10276:2021 by Technical Committee CEN/TC 430 "Nuclear energy, nuclear technologies, and radiological protection" the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2022, and conflicting national standards shall be withdrawn at the latest by February 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 10276:2019 has been approved by CEN as EN ISO 10276:2021 without any modification.

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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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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 85, *Nuclear energy*, Subcommittee SC 5, *Nuclear installations, processes and technologies*.

This second edition cancels and replaces the first edition (ISO 10276:2010), which has been technically revised. The main changes compared to the previous edition are as follows:

- The scope is extended to trunnion attachment components (trunnion systems are defined as being the trunnions and their attachment components);
- The normative references have been updated (IAEA TS-R-1 replaced by IAEA SSR-6) and enlarged to the IAEA SSG-26 (Appendix IV-1 - Package stowage and retention during transport);
- Quality Assurance is replaced by Management Systems;
- The load cases are to be defined by use of the minimum acceleration factors given in table IV-1 of the Appendix IV of IAEA SSG-26;
- The calculation methods (analytical and finite element analysis) and the minimum associated criteria are more precisely detailed;
- The bibliography has been updated and enlarged to the most recent recommendations, guidance and standards as acceptable by most of the Competent Authorities;
- The structure of the document has been slightly modified to enhance its legibility and understanding.

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.

Introduction

This document has been produced to enable package owners, designers, users and regulatory organizations to have at their disposal a comprehensive document covering all aspects of trunnion systems. Experience has been drawn from the extensive knowledge of owners, designers, users and competent authorities. This document contains the minimum requirements and makes recommendations covering various aspects of trunnion systems.

Intermediate devices (sometimes referred to as transport frames, supports or cradles) can be used between the packaging trunnions and the transport conveyance to support and secure the package during transport; however, the energy-absorbing effects that may be provided by these intermediate devices are not taken into consideration in this document.

Nuclear energy — Fuel technology — Trunnion systems for packages used to transport radioactive material

1 Scope

This document covers trunnion systems used for tie-down, tilting and/or lifting of a package of radioactive material during transport operations.

Aspects included are the design, manufacture, maintenance, inspection and management system. Regulations which can apply during handling operation in nuclear facilities are not addressed in document.

This document does not supersede any of the requirements of international or national regulations, concerning trunnions used for lifting and tie-down.

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.

IAEA SSR-6, *International Atomic Energy Agency (IAEA) Safety Standard No. SSR-6, Regulations for the Safe Transport of Radioactive Material*

IAEA SSG-26, *International Atomic Energy Agency (IAEA) No. SSG-26, Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material*

3 Terms, abbreviated terms, symbols and definitions

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IAEA SSR-6 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 <http://www.electropedia.org/>

3.1.1

bending stress

variable component of *normal stress* (3.1.10), which might not be linear across the thickness

3.1.2

bolts

fasteners including bolts, screws and studs

3.1.3

designer

organization responsible for the design of the package