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Fixed energy high intensity proton cyclotron within the energy range of 10 MeV to less than 30 MeV

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FIXED ENERGY HIGH INTENSITY PROTON CYCLOTRON WITHIN THE ENERGY RANGE OF 10 MeV TO LESS THAN 30 MeV

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IEC 63175 has been prepared by IEC technical committee 45: Nuclear instrumentation. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
45/930/FDIS	45/932/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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INTRODUCTION

Particle accelerators have a wide application in the field of nuclear physics, radiation hardening, accelerator-driven energy system (nuclear reactor), and of course radioisotopes production, etc.. Proton cyclotron is one particular class of particle accelerators used for example for the acceleration of negative hydrogen ions.

This document specifies the performance and safety requirements, structure, technical requirements, test methods, identification, packing, transportation, storage and accompanying documents for proton cyclotrons.

Annex A and Annex B are both informative.

FIXED ENERGY HIGH INTENSITY PROTON CYCLOTRON WITHIN THE ENERGY RANGE OF 10 MeV TO LESS THAN 30 MeV

1 Scope

This document is applicable to hydrogen ion H^- acceleration proton cyclotrons with one or more fixed energies within the range of 10 MeV to less than 30 MeV and a beam intensity equal to or greater than 300 μA.

This document specifies the performance and safety requirements, structure, technical requirements, test methods, identification, packing, transportation, storage and accompanying documents for such cyclotrons.

This type of cyclotrons is intended for industrial use, including medical isotope and neutron production. Therapeutic medical applications are excluded from the scope of this document.

This document is intended for manufacturers of high intensity proton cyclotron within the energy range of 10 MeV to less than 30 MeV, and responsible organizations where such cyclotrons are installed.

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.

IEC 60038:2009, *IEC standard voltages*

IEC 60204-1:2016, *Safety of machinery – Electrical equipment of machines – Part 1: General requirements*

IEC 60243-1:2013, *Electric strength of insulating materials – Test methods – Part 1: Tests at power frequencies*

IEC 60364-1:2005, *Low-voltage electrical installations – Part 1: Fundamental principles, assessment of general characteristics, definitions*

IEC 60364-5-51:2005, *Electrical installations of buildings – Part 5-51: Selection and erection of electrical equipment – Common rules*

IEC 61000-4-4:2012, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5:2014, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-6-2:2016, *Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity standard for industrial environments*

IEC 61000-6-4:2018, *Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments*

IEC 61010-1:2010, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements*
IEC 61010-1:2010/AMD1:2016

IEC 61140:2016, *Protection against electric shock – Common aspects for installation and equipment*

IEC 62305 (all parts), *Protection against lighting*

ISO/IEC Guide 37:2012, *Instructions for use of products by consumers*

ISO 780:2015, *Packaging – Distribution packaging – Graphical symbols for handling and storage of packages*

ISO 8573-1:2010, *Compressed air – Part 1: Contaminants and purity classes*