

INTERNATIONAL STANDARD



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



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CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	8
4 Cyclotron composition and operational conditions.....	9
4.1 Composition.....	9
4.2 Normal operating conditions.....	9
4.2.1 Environmental requirements	9
4.2.2 Electricity requirements	9
4.2.3 Compressed air	9
4.2.4 Nitrogen	9
4.2.5 Lightning and electric shock protection	10
4.2.6 Ion source media	10
5 Technical requirements	10
5.1 Warning signs	10
5.2 Performance index.....	10
5.3 Main subsystems performance index	10
5.3.1 Ion source	10
5.3.2 Radio frequency system	10
5.3.3 Vacuum system	10
5.3.4 Control system	11
5.3.5 Interlock system for radiation safety	11
5.3.6 Water cooling system	11
5.3.7 Stripping extraction efficiency	12
5.4 Electrical safety	12
5.4.1 Protective grounding	12
5.4.2 Insulation resistance	12
5.4.3 Dielectric strength.....	12
5.4.4 Touch current.....	12
5.5 Radiation safety	12
5.6 EMC	12
5.6.1 Surge immunity.....	12
5.6.2 EFT immunity	12
5.6.3 Emission.....	12
5.6.4 Immunity.....	13
5.7 Operation.....	13
6 Test methods.....	13
6.1 General requirements	13
6.1.1 Test environmental conditions	13
6.1.2 Test equipment.....	13
6.2 Warning signs check.....	13
6.3 Performance test	14
6.3.1 Beam nominal energy	14
6.3.2 Beam intensity.....	14
6.3.3 Beam spot size	14

6.3.4	Comprehensive beam efficiency	15
6.4	Main subsystem performance test.....	16
6.4.1	Ion source beam intensity.....	16
6.4.2	Radio frequency system	16
6.4.3	Vacuum system	17
6.4.4	Control system	17
6.4.5	Interlock system for radiation safety	17
6.4.6	Water cooling system	18
6.4.7	Stripping extraction efficiency	18
6.5	Electrical safety	18
6.5.1	Protective grounding.....	18
6.5.2	Insulation resistance.....	18
6.5.3	Dielectric strength.....	18
6.5.4	Touch current	18
6.6	Radiation safety	19
6.7	Operation test.....	19
7	Inspection rules	19
7.1	Summary	19
7.2	Inspection items.....	19
7.3	Criterion rule.....	20
8	Signage, packing, transportation, storage and accompanying documents	20
8.1	Signage	20
8.1.1	Cyclotron signs.....	20
8.1.2	Labels	20
8.2	Packing.....	20
8.3	Transportation	20
8.4	Storage.....	21
8.5	Accompanying documentation	21
8.5.1	Instructions.....	21
8.5.2	Supplier's declaration of conformity	21
8.5.3	Other documentation	21
Annex A (informative) Measurement of unloaded quality factor by the manufacturer		22
Annex B (informative) Magnetic field mapping		23
Figure 1 – Schematic diagram of beam spot diameter test		15
Figure 2 – Schematic diagram of beam spot diameter test result.....		15
Figure A.1 – Connection of resonant cavity and network analyzer.....		22
Figure A.2 – S_{21} curve measured with a network analyzer		22
Figure B.1 – Distribution of measuring points in the cyclotron central plane		24
Table 1 – Environmental conditions of the test.....		13
Table 2 – Inspection items of 10 MeV to less than 30 MeV cyclotron.....		19

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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.

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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.

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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*