INTERNATIONAL STANDARD

IEC 61788-5

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Superconductivity –

Part 5:
Matrix to superconductor volume ratio measurement – Copper to superconductor volume ratio of Cu/Nb-Ti composite superconductors

Supraconductivité –

Partie 5:
Mesure du rapport volumique matrice/supraconducteur – Rapport volumique cuivre/supraconducteur des composites supraconducteurs de Cu/Nb-Ti

International Electrotechnical Commission 3, rue de Varembé Geneva, Switzerland
Telefax: +41 22 919 0300 e-mail: inmail@iec.ch IEC web site http://www.iec.ch

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

1) The IEC (International Electrotechnical Commission) is a world-wide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international cooperation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standard. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

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5) The IEC provided no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.

6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61788-5 has been prepared by IEC technical committee 90: Superconductivity.

The text of this standard is based on the following documents:

FDIS	Report on voting
90/81/FDIS	90/87/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

Annex A forms an integral part of this standard.

Annexes B, C and D are for information only.

The committee has decided that the contents of this publication will remain unchanged until 2005. At this date, the publication will be

- confirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

A bilingual version of this standard may be issued at a later date.

INTRODUCTION

The copper to superconductor volume ratio of composite superconductors is used mainly to calculate the critical current density of superconducting wires. The test with the method given in this International Standard may be used to provide part of the information needed to determine the suitability of a specific superconductor. Moreover, this method is useful for quality control, acceptance or research testing if the precautions given in this standard are observed.

The test method given in this International Standard is based on the condition that the specific mass of Nb-Ti is known. If the specific mass of Nb-Ti and/or the fraction of Nb barrier are unknown, another method to determine the copper to superconductor volume ratio of composite superconductors is described in annex A.

SUPERCONDUCTIVITY –

Part 5: Matrix to superconductor volume ratio measurement – Copper to superconductor volume ratio of Cu/Nb-Ti composite superconductors

1 Scope

This part of IEC 61788 covers a test method for the determination of copper to superconductor volume ratio of Cu/Nb-Ti composite superconducting wire.

This test method is intended for use with Cu/Nb-Ti composite superconducting wires with a cross-sectional area of 0,1 mm^2 to 3 mm^2, a diameter of the Nb-Ti filament(s) of 1 µm to 200 µm, and a copper to superconductor volume ratio of 0,5 or more.

The Cu/Nb-Ti composite test conductor discussed in this method has a monolithic structure with a round or rectangular cross-section. This test method is carried out by dissolving the copper with nitric acid. Deviations from this test method that are allowed for routine tests and other specific restrictions are given in this standard.

Cu/Nb-Ti conductors beyond the limits in the cross-sectional area, the filament diameter and the copper to superconductor volume ratio could be measured with this present method with an anticipated reduction in precision. Other, more specialized specimen test geometries may be more appropriate for conductors beyond the limits and have been omitted from this present standard for simplicity and to retain precision.

The test method given in this standard is expected to apply to other superconducting composite wires after some appropriate modifications.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61788. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 61788 are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60050-815:2000, International Electrotechnical Vocabulary (IEV) – Part 815: Superconductivity