### **EESTI STANDARD**

### EVS-EN IEC 61788-4:2020

Superconductivity - Part 4: Residual resistance ratio measurement - Residual resistance ratio of Nb-Ti and Nb3Sn composite superconductors



#### EESTI STANDARDI EESSÕNA

#### NATIONAL FOREWORD

| See Eesti standard EVS-EN IEC 61788-4:2020<br>sisaldab Euroopa standardi EN IEC 61788-4:2020<br>ingliskeelset teksti.     | This Estonian standard EVS-EN IEC 61788-4:2020 consists of the English text of the European standard EN IEC 61788-4:2020.          |
|---------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Standard on jõustunud sellekohase teate<br>avaldamisega EVS Teatajas.                                                     | This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation. |
| Euroopa standardimisorganisatsioonid on teinud<br>Euroopa standardi rahvuslikele liikmetele<br>kättesaadavaks 15.05.2020. | Date of Availability of the European standard is 15.05.2020.                                                                       |
| Standard on kättesaadav Eesti<br>Standardikeskusest.                                                                      | The standard is available from the Estonian Centre for Standardisation.                                                            |
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#### ICS 17.220.20, 29.050

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## EUROPEAN STANDARD

### EN IEC 61788-4

### NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2020

ICS 17.220.20; 29.050

Supersedes EN 61788-4:2016 and all of its amendments and corrigenda (if any)

**English Version** 

#### Superconductivity - Part 4: Residual resistance ratio measurement - Residual resistance ratio of Nb-Ti and Nb3Sn composite superconductors (IEC 61788-4:2020)

Supraconductivité - Partie 4: Mesurage du rapport de résistance résiduelle - Rapport de résistance résiduelle des composites supraconducteurs de Nb-Ti et de Nb3Sn (IEC 61788-4:2020)

Supraleitfähigkeit - Teil 4: Messung des Restwiderstandsverhältnisses - Restwiderstandsverhältnis von Nb-Ti und Nb3Sn Verbundsupraleitern (IEC 61788-4:2020)

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#### **European foreword**

The text of document 90/448/FDIS, future edition 5 of IEC 61788-4, prepared by IEC/TC 90 "Superconductivity" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61788-4:2020.

The following dates are fixed:

- latest date by which the document has to be implemented at national (dop) 2021-01-24 level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with the (dow) 2023-04-24 document have to be withdrawn

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#### Annex ZA

(normative)

# Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

| www.cenelec.eu. |             | $\mathcal{O}_{\mathbf{x}}$                                               |       |      |
|-----------------|-------------|--------------------------------------------------------------------------|-------|------|
| Publication     | <u>Year</u> | <u>Title</u>                                                             | EN/HD | Year |
| IEC 60050-815   | -           | International Electrotechnical Vocabulary<br>Part 815: Superconductivity |       | -    |
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#### INTERNATIONAL ELECTROTECHNICAL COMMISSION

#### SUPERCONDUCTIVITY -

#### Part 4: Residual resistance ratio measurement – Residual resistance ratio of Nb-Ti and Nb<sub>3</sub>Sn composite superconductors

#### FOREWORD

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International Standard IEC 61788-4 has been prepared by IEC technical committee 90: Superconductivity.

This fifth edition cancels and replaces the fourth edition published in 2016. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) change in the suitable distance of voltage taps on the specimen for reliable measurement,
- b) new report on the result of the round robin test of the residual resistance ratio of Nb<sub>3</sub>Sn superconductors that proves the validity of the measurement method in this standard,
- c) revision of the confusing definitions of the copper ratio and copper fraction.

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

| FDIS        | Report on voting |
|-------------|------------------|
| 90/448/FDIS | 90/451/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 2.

A list of all parts of the IEC 61788 series, published under the general title *Superconductivity*, can be found on the IEC website.

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

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#### INTRODUCTION

Copper, Cu/Cu-Ni or aluminium is used as matrix material in Ni-Ti and Nb<sub>3</sub>Sn composite superconductors and works as an electrical shunt when the superconductivity is interrupted. It also contributes to recovery of the superconductivity by conducting heat generated in the superconductor to the surrounding coolant. The cryogenic-temperature resistivity of copper is an important quantity, which influences the stability and AC losses of the superconductor. The residual resistance ratio is defined as a ratio of the resistance of the superconductor at room temperature to that just above the superconducting transition.

the sup. This document specifies the test method for residual resistance ratio of Nb-Ti and Nb<sub>3</sub>Sn composite superconductors. The curve method is employed for the measurement of the resistance just above the superconducting transition. Other methods are described in Clause A.3.