

# **SLOVENSKI STANDARD**

## **SIST EN 61788-14:2010**

**01-oktober-2010**

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**Superprevodnost - 14. del: Močnostne naprave s superprevodniki - Splošne zahteve za značilne preskuse tokovnih vodnikov, načrtovanih za močnostne superprevodnike (IEC 61788-14:2010)**

Superconductivity - Part 14: Superconducting power devices - General requirements for characteristic tests of current leads designed for powering superconducting devices (IEC 61788-14:2010)

Supraleitfähigkeit – Teil 14: Supraleitende Betriebsmittel – Allgemeine Anforderungen an charakteristische Prüfverfahren für Stromzuführungen für die Versorgung supraleitender Geräte (IEC 61788-14:2010)

[SIST EN 61788-14:2010](https://standards.iteh.ai/catalog/standards/sist/7497eaea-5d3f-42a5-8722-225225000000/sist-en-61788-14-2010)

Supraconductivité – Partie 14 : Dispositifs de puissance supraconducteurs - Exigences générales concernant les essais caractéristiques des broches de courant conçus pour l'alimentation des dispositifs supraconducteurs (CEI 61788-14:2010)

**Ta slovenski standard je istoveten z: EN 61788-14:2010**

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**ICS:**

29.050	Superprevodnost in prevodni materiali	Superconductivity and conducting materials
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**SIST EN 61788-14:2010**

**en**

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EUROPEAN STANDARD  
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**EN 61788-14**

July 2010

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English version

**Superconductivity -  
Part 14: Superconducting power devices -  
General requirements for characteristic tests of current leads designed  
for powering superconducting devices  
(IEC 61788-14:2010)**

Supraconductivité –  
Partie 14 : Dispositifs de puissance  
supraconducteurs -  
Exigences générales concernant  
les essais caractéristiques des broches  
de courant conçus pour l'alimentation  
des dispositifs supraconducteurs  
(CEI 61788-14:2010)

Supraleitfähigkeit –  
Teil 14: Supraleitende Betriebsmittel –  
Allgemeine Anforderungen  
an charakteristische Prüfverfahren  
für Stromzuführungen für die Versorgung  
supraleitender Geräte  
(IEC 61788-14:2010)

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# CENELEC

European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**Management Centre: Avenue Marnix 17, B - 1000 Brussels**

## Foreword

The text of document 90/244/FDIS, future edition 1 of IEC 61788-14, prepared by IEC TC 90, Superconductivity, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61788-14 on 2010-07-01.

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

The following dates were fixed:

- latest date by which the EN has to be implemented  
at national level by publication of an identical  
national standard or by endorsement (dop) 2011-04-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 2013-07-01

Annex ZA has been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 61788-14:2010 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

- |                   |      |                                                |
|-------------------|------|------------------------------------------------|
| IEC 61788-3:2006  | NOTE | Harmonized as EN 61788-3:2006 (not modified).  |
| IEC 61788-10:2006 | NOTE | Harmonized as EN 61788-10:2006 (not modified). |

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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 When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-815	2000	International Electrotechnical Vocabulary (IEV) - Part 815: Superconductivity	-	-
IEC 60071-1	-	Insulation co-ordination - Part 1: Definitions, principles and rules	EN 60071-1	-
IEC 60137	-	Insulated bushings for alternating voltages above 1 000 V	EN 60137	-

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IEC 61788-14

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# INTERNATIONAL STANDARD

**Superconductivity –**  
**Part 14: Superconducting power devices – General requirements for**  
**characteristic tests of current leads designed for powering superconducting**  
**devices**

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SUPERCONDUCTIVITY –****Part 14: Superconducting power devices –  
General requirements for characteristic tests of current  
leads designed for powering superconducting devices**

## FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. 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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International Standard IEC 61788-14 has been prepared by IEC technical committee 90: Superconductivity.

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

FDIS	Report on voting
90/244/FDIS	90/250/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 web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

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

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## INTRODUCTION

Current leads are indispensable components of superconducting devices in practical uses such as MRI diagnostic equipment, NMR spectrometers, single crystal growth devices, SMES, particle accelerators such as Tevatron, HERA, RHIC and LHC, experimental test instruments for nuclear fusion reactors, such as ToreSupra, TRIAM, LHD, EAST, KSTAR, W7-X, JT-60SA and ITER, etc., and of advanced superconducting devices in the near future in practical uses such as magnetic levitated trains, superconducting fault current limiters, superconducting transformers, etc.

The major functions of current leads are to power high currents into superconducting devices and to minimize the overall heat load, including heat leakage from room temperature to cryogenic temperature and Joule heating through current leads. For this purpose, current leads are dramatically effective for lowering the overall heat load to use the high temperature superconducting component as a part of the current leads.

On the other hand, the current lead technologies applied to superconducting devices depend on each application, as well as on the manufacturer's experience and accumulated know-how. Due to their use as component parts, it is difficult to judge the compatibility, flexibility between devices, convenience, overall economical efficiency, etc of current leads. This may impede progress in the growth and development of superconducting equipment technology and its application to commercial activities, which is a cause for concern.

Consequently, it is judged industrially effective to clarify the definition of current leads to be applied to superconducting devices and to standardize the common characteristic test methods in a series of general rules.

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## SUPERCONDUCTIVITY –

### Part 14: Superconducting power devices – General requirements for characteristic tests of current leads designed for powering superconducting devices

#### 1 Scope

This part of IEC 61788 provides general requirements for characteristic tests of conventional as well as superconducting current leads to be used for powering superconducting equipment.

#### 2 Normative references

The following referenced documents are indispensable for the application 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 60050-815:2000, *International Electrotechnical Vocabulary (IEV) – Part 815: Superconductivity*

IEC 60071-1, *Insulation coordination – Part 1: Definitions, principles and rules*

IEC 60137, *Insulated bushings for alternating voltages above 1 000 V*

<https://standards.iteh.ai/catalog/standards/sist/7497eaea-5d3f-42a5-8722-1b0a55b26bb0/sist-en-61788-14-2010>

#### 3 Terms and definitions

For the purposes of this document, the terms and definitions contained in IEC 60050-815:2000 as well as the following terms and definitions apply:

##### 3.1

##### **current lead**

power lead

conductor to introduce electric current into a device with an insulation and a cooling channel especially when leading from room temperature to cryogenic temperature

[IEV 815-06-47]

##### 3.2

##### **normal conducting current lead**

conventional current lead

current lead made only of a normal conducting section

##### 3.3

##### **superconducting current lead**

current lead containing a superconducting section

NOTE A superconducting current lead consists of a normal conducting section from room temperature to intermediate temperature and a superconducting section from intermediate temperature to cryogenic temperature. In this standard, the superconducting section is mostly made by a high temperature superconductor (HTS).

##### 3.4

##### **non-gas cooled type current lead**

current lead cooled by conduction cooling method