



# DRAFT INTERNATIONAL STANDARD ISO/DIS 17657-5

ISO/TC 44/SC 6

Secretariat: DIN

Voting begins on  
2002-04-18

Voting terminates on  
2002-09-18

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

## Resistance welding — Welding current measurement for resistance welding —

### Part 5:

### Verification of welding current measuring system

*Soudage par résistance — Mesurage des courants en soudage par résistance —*

*Partie 5: Vérification des systèmes de mesurage de courant de soudage*

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

ICS 25.160.10

[ISO/DIS 17657-5](#)

<https://standards.iteh.ai/catalog/standards/sist/9297e2df-b4c0-46ae-b027-4ce8aa5cfe53/iso-dis-17657-5>

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

### Copyright notice

This ISO document is a Draft International Standard and is copyright-protected by ISO. Except as permitted under the applicable laws of the user's country, neither this ISO draft nor any extract from it may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, photocopying, recording or otherwise, without prior written permission being secured.

Requests for permission to reproduce should be addressed to ISO at the address below or ISO's member body in the country of the requester.

*Copyright Manager  
ISO Central Secretariat  
1 rue de Varembé  
1211 Geneva 20 Switzerland  
tel. + 41 22 749 0111  
fax + 41 22 749 0947  
internet: [iso@iso.ch](mailto:iso@iso.ch)*

Reproduction may be subject to royalty payments or a licensing agreement.

Violators may be prosecuted.

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[ISO/DIS 17657-5](https://standards.iteh.ai/catalog/standards/sist/9297e2df-b4c0-46ae-b027-4ce8aa5cfe53/iso-dis-17657-5)

<https://standards.iteh.ai/catalog/standards/sist/9297e2df-b4c0-46ae-b027-4ce8aa5cfe53/iso-dis-17657-5>

## Contents

Page

Foreword .....	iv
1 Scope .....	1
2 Normative references .....	1
3 Terms and definitions .....	1
4 Test set-up .....	2
5 Physical environment and operating conditions .....	2
6 Verification requirements .....	3
6.1 Master welding current measuring system .....	3
6.2 Master (current sensing) coil .....	3
6.3 Welding machine used for verification .....	3
7 Test report .....	3
8 Test procedure .....	4
Annex A (informative) Items to be recorded or filed as reference documentation for verification .....	5
A.1 Master welding current meter .....	5
A.2 Master current sensing coil .....	5
Annex B (informative) Test report for verification of a welding current measuring system .....	6

ISO/DIS 17657-5

<https://standards.iteh.ai/catalog/standards/sist/9297e2df-b4c0-46ae-b027-4ce8aa5cfe53/iso-dis-17657-5>

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 17657 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 17657-5 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 6, *Resistance welding*.

ISO 17657 consists of the following parts, under the general title *Resistance welding — Welding current measurement for resistance welding*:

- *Part 1: Guideline for measurement;*
- *Part 2: Welding current meter with current sensing coil;*
- *Part 3: Current sensing coil;*
- *Part 4: Calibration system;*
- *Part 5: Verification of welding current measuring system.*

# Resistance welding — Welding current measurement for resistance welding —

## Part 5:

## Verification of welding current measuring system

### 1 Scope

This International Standard specifies a verification procedure for welding current meters and monitoring devices with its current sensing coil, which are applied for measurements of welding current in resistance welding with alternating current of 50 Hz or 60 Hz, or with dc.

This verification procedure is applicable for a current range between 0,5 kA and 25 kA.

### 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 17657. 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 ISO 17657 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

<https://standards.iteh.ai/catalog/standards/sist/9297e2df-b4c0-46ae-b027-46e5f660101c/iso-dis-17657-5>

ISO 669, *Resistance welding — Resistance welding equipment — Mechanical and electrical requirements.*

ISO/DIS 17657-3:2001, *Resistance welding — Welding current measurement for resistance welding — Part 3: Current sensing coil.*

ISO/DIS 17657-4:2001, *Resistance welding — Welding current measurement for resistance welding — Part 4: Calibration system.*

### 3 Terms and definitions

For the purposes of this part of ISO 17657, the terms and definitions given in ISO 669 and the following apply:

#### 3.1

##### **test (current sensing) coil**

a current sensor to be verified

#### 3.2

##### **master (current sensing) coil**

a current sensor of so-called Rogowsky coil type, calibrated against a reference current sensor

#### 3.3

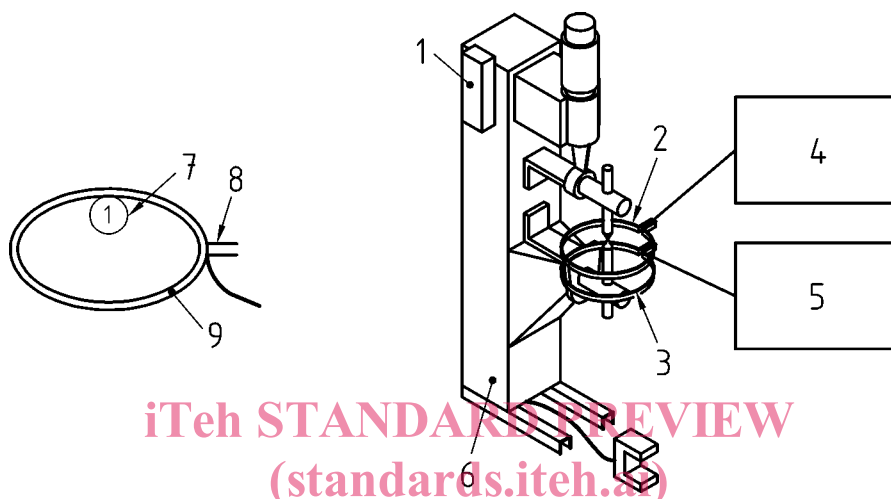
##### **test welding current meter**

a welding current meter to be verified

**3.4 master welding current meter**  
 a welding current meter of the portable type that has been calibrated against a reference welding current meter

## 4 Test set-up

Test set-up for verification consists of a resistance welding machine, a master welding current meter with its coil, and a test welding current measuring system or monitoring device with its coil to be tested. A typical test set-up is shown in figure 1.



### Key

- |   |                              |   |                            |
|---|------------------------------|---|----------------------------|
| 1 | Welding controller           | 6 | Resistance welding machine |
| 2 | Master coil                  | 7 | Electrode                  |
| 3 | Test coil                    | 8 | Connecting metal           |
| 4 | Master welding current meter | 9 | Coil                       |
| 5 | Test welding current meter   |   |                            |

**Figure 1 — A typical set-up for verification of a welding current meter**

## 5 Physical environment and operating conditions

Unless otherwise specified, the verification systems shall be capable of operating under the following conditions without any adverse effect on its accuracy.

- At an ambient air temperature between + 5 °C and + 40 °C;
- In relative humidity up to 95 %;
- At altitudes up to 1 000 m above mean sea level;
- Where gas, fine dust, oil mist, spatters, etc. are included in the air such as those caused by ordinary arc or spot welding work.

## 6 Verification requirements

### 6.1 Master welding current measuring system

One master current measuring system shall be available in each factory or organization.

The master welding current measuring system shall be calibrated by using a reference welding current measuring system at least every year according to the procedure stipulated in 8.2 of ISO/DIS 17657-4:2001. The accuracy of master welding current measuring system shall be higher than the accuracy of the measuring system to be tested.

The master welding current measuring system shall be classified as shown in table 1, and shall be selected depending on the required measuring accuracy.

**Table 1 — Classification of master welding current measuring system by accuracy**

Classification	Measuring accuracy	Explanation
High accurate class	$\pm 1.0\%$ of full scale	For checking of accurate class or ordinary class
Accurate class	$\pm 2.0\%$ of full scale	For checking of ordinary class
Ordinary class	$\pm 5.0\%$ of full scale	Not to be used for checking

The specification, name of certifying body and relevant date for the master welding current meter, and master current sensing coil shall be recorded on all documents, see in annex A.

### 6.2 Master (current sensing) coil

Sensor position error of master current sensing coil should be within 0,5 %, or the sensor/coil position should be set at the same position that it was calibrated. If the master coil requires a fixed position to guarantee the accuracy, the calibrated position shall be marked on the master coil.

NOTE The master coil should be set at the same position that it was calibrated. Position ① as illustrated in figure 1 is recommended as the setting position of master coil in order to keep the accuracy of master coil after multi-repeat setting and detaching.

### 6.3 Welding machine used for verification

Resistance spot, projection and seam welding machines as defined in ISO 669 can be used as the power sources, and should be able of delivering a current within the range of test welding current measuring system.

## 7 Test report

The following shall be recorded during verification of a welding current measuring system including monitoring devices for measuring welding current:

- Model and type of master welding current meter and current sensing coil, the full scale or the measuring range, and the measuring accuracy;
- sensor position of master coil to guarantee the measuring accuracy;
- model and type of test welding current meter, and the rated class;
- measuring range of the test meter to be tested;
- setting positions of master and test coils (see figure 1 in ISO/DIS 17657-3:2001);

- type and frequency of power source used for the test (ac 50 Hz or 60 Hz, dc);
- current flow time for the test;
- room temperature;

also each measurement:

- read-out of the master welding current meter expressed as a R.M.S. value (kA);
- read-out of the test welding current meter expressed as a R.M.S. value (kA);
- deviation from the reference value defined as the ratio between both read outs and full scale reading of the test meter at the setting range;
- the weld time displayed on the master current meter;
- the weld time displayed on the test welding current meter;

for information:

- evaluation results of the measuring accuracy and read out of weld time (approved or not approved);
- test date, name and signature of the testing or examining person.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

## 8 Test procedure

The measuring range of the master current meter shall be adapted to the required current level to improve the measuring accuracy. Measurements for each test sequence shall be recorded as shown in annex B.

The master welding current measuring system shall have been calibrated and certified in a laboratory or by a test body before using.

The test coil shall be checked for any damage before verification. Any deviation of read-out displayed on the test welding current meter relatively to the master meter shall be measured. The deviation should be expressed as a %, which shall be calculated as a ratio of full scale of test current meter at the setting range.

The verification shall be carried out by using a resistance welding machine in short circuit condition. The test shall be carried out at a measurement of three current levels including near full scale and a medium current level conditions of the test current meter. Current flow time for the test should be longer than 0,1 s.

If the maximum deviation of read-out values is larger than the required measuring accuracy, the test welding current meter and the coil shall be adjusted or repaired before further use.



## Annex A (informative)

### Items to be recorded or filed as reference documentation for verification

Following items should be recorded and filed as the reference documents:

#### A.1 Master welding current meter

- 1) Model;
  - 2) Type;
  - 3) Type of measuring current (ac or ac/dc);
  - 4) Maximum measuring current (kA or A);
  - 5) Maximum measuring time (cycle or ms);
  - 6) Measuring accuracy (%);
  - 7) Setting requirements to guarantee the accuracy;
  - 8) Allowable temperature range (°C);
  - 9) Manufacturer's name and name of certifying test body.
- iTech STANDARD PREVIEW  
(standards.iteh.ai)  
ISO/DIS 17657-5  
<https://standards.iteh.ai/catalog/standards/sist/9297e2df-b4c0-46ae-b027-4ce8aa5cfe53/iso-dis-17657-5>

#### A.2 Master current sensing coil

- 1) Model;
- 2) Type;
- 3) Rated conversion coefficient, and the frequency (mV/kA in \_\_Hz);
- 4) Measuring accuracy (%);
- 5) Frequency response (kHz);
- 6) Pre-connected output load of current sensor ( $\Omega$ );
- 7) Required input impedance of integrator ( $k\Omega$ );
- 8) Setting requirements to guarantee the accuracy;
- 9) Allowable temperature range (°C);
- 10) Manufacturer's name and name of certifying test body.