# SLOVENSKI STANDARD
# SIST EN ISO 17657-4:2007

**01-september-2007**

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**Uporovno varjenje - Merjenje jakosti varilnega toka pri uporovnem varjenju - 4. del: Sistem umerjanja (ISO 17657-4:2005)**

Resistance welding - Welding current measurement for resistance welding - Part 4: Calibration system (ISO 17657-4:2005)

Widerstandsschweißen - Schweißstrommessung für das Widerstandsschweißen - Teil 4: Kalibriersystem (ISO 17657-4:2005)



Soudage par résistance - Mesurage des courants en soudage par résistance - Partie 4: Systeme d'étalonnage (ISO 17657-4:2005)



**Ta slovenski standard je istoveten z:** **EN ISO 17657-4:2007**

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**ICS:**

25.160.10 Varilni postopki in varjenje Welding processes

**SIST EN ISO 17657-4:2007** **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN ISO 17657-4

June 2007

ICS 25.160.10

English Version

# Resistance welding - Welding current measurement for resistance welding - Part 4: Calibration system (ISO 17657-4:2005)

Soudage par résistance - Mesurage des courants en soudage par résistance - Partie 4: Système d'étalonnage (ISO 17657-4:2005)

Widerstandsschweißen - Schweißstrommessung für das Widerstandsschweißen - Teil 4: Kalibriersystem (ISO 17657-4:2005)

This European Standard was approved by CEN on 19 May 2007.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.



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## Foreword

The text of ISO 17657-4:2005 has been prepared by Technical Committee ISO/TC 44 "Welding and allied processes" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 17657-4:2007 by Technical Committee CEN/TC 121 "Welding", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2007, and conflicting national standards shall be withdrawn at the latest by December 2007.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

**Endorsement notice**

The text of ISO 17657-4:2005 has been approved by CEN as a EN ISO 17657-4:2007 without any modification.

INTERNATIONAL STANDARD

**ISO 17657-4**

First edition
2005-09-15

# Resistance welding — Welding current measurement for resistance welding —

## Part 4: Calibration system

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

*Partie 4: Système d'étalonnage*



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# Contents

Page

## 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 2.

The main task of technical committees is to prepare International Standards. 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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 17657-4 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: Guidelines 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*

## Introduction

Requests for official interpretations of any aspect of this part of ISO 17657 should be directed to the Secretariat of ISO/TC 44/SC 6 via your national standards body. A complete listing of these bodies can be found at http://www.iso.org.

# Resistance welding — Welding current measurement for resistance welding —

# Part 4: Calibration system

## 1 Scope

This part of ISO 17657 specifies calibration systems and calibration procedures for welding current measuring systems, current sensors, welding current meters and monitoring devices with current sensor used for measuring welding current in resistance welding with alternating current of 50 Hz or 60 Hz, or with direct current.

The procedures are applicable for a current range between 0,5 kA and 25 kA.



## 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.



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

ISO 17657-2, *Resistance welding — Welding current measurement for resistance welding — Part 2: Welding current meter with current sensing coil*

ISO 17657-3:2005, *Resistance welding — Welding current measurement for resistance welding — Part 3: Current sensing coil*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 669 and the following apply.

**3.1**
**test (current) sensor**
current sensor to be calibrated

**3.2**
**reference (current) sensor**
current sensor calibrated in highly accurate condition, used for calibration of current sensors

**3.3**
**test welding current meter**
welding current meter to be calibrated

**3.4**
**non-inductive shunt**
high precision and low value resistance with a very low inductive component

**3.5**
**analog-to-digital converter**
**ADC**
device to convert analog input signals into digital signals

**3.6**
**data acquisition device**
instrument or device used to acquire analog data, which tracks changes in physical variables such as voltage, current and temperature

**3.7**
**measuring accuracy of reference welding current measuring system**
sum of measuring accuracy values of each component calibrated by a certified reference equipment (e.g. reference sensor, integrator, ADC etc.)

## 4 Construction of calibration system

### 4.1 Reference welding current measuring system

Components of a reference welding current measuring system shall be calibrated by certified reference equipment in accordance with Clause 6. The reference welding current measuring system consists of a calibrated current sensor, a data acquisition system and a display unit or a recorder.



### 4.2 Test set-up



The test set-up consists of a test stage or an appropriate circuit for conducting high current, and a power source with a current control unit for supplying a test current.

All signal cables shall be twisted and shielded. The cable resistance shall be very small and negligible compared to the impedance of the current sensor. Typical examples of the test set-up are shown in Annex A.

NOTE A resistance welding machine/transformer can be used as a test set-up.

### 4.3 Basic feature for calibration of welding current measuring system

A welding current meter with a current sensor should be calibrated in a set consisting of the meter and the sensor. Calibration systems for a welding current meter with its sensor consist of a test set-up, a reference welding current measuring system and the welding current measuring system to be tested. The function of a reference welding current meter can be replaced with a calibrated data acquisition device. Figure 1 shows the basic features required for calibration of welding current measuring system.