INTERNATIONAL STANDARD

ISO 17657-2

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Resistance welding — Welding current measurement for resistance welding —

Part 2: Welding current meter with current sensing coil

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

Partie 2: Ampèremètre avec tore de mesure de courant

Reference number
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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 17657-2 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 2:
Welding current meter with current sensing coil

1 Scope

This part of ISO 17657 specifies a welding current meter with a current sensing coil to measure the weld time and the r.m.s. value of the welding current during a certain interval using single-phase alternating current of frequency of 50 Hz or 60 Hz, or direct current.

This part of ISO 17657 is applicable for a welding current measuring system, with a display or calibrated output port, which may be connected to a welding controller.

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 17657-1:2005, *Resistance welding — Welding current measurement for resistance welding — Part 1: Guidelines for measurement*

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

ISO 17657-4:2005, *Resistance welding — Welding current measurement for resistance welding — Part 4: Calibration system*

3 Terms and definitions

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

3.1
minimum measuring time
minimum settable value of the measuring time

See Figure A.1.

3.2
maximum measuring time
maximum settable value of the measuring time, which will depend on the types of component making up the welding current meter

See Figure A.1.

3.3
indicated measuring time
duration of measuring time, from start time to finish time, while the welding current is flowing

NOTE Normally the start and finish times for measuring current flow are automatically set. If the start time is set at zero or at a value greater than zero, and the finish time is set at a smaller value than the weld time, as shown in Figure A.1, then the welding current is calculated for the measuring duration between the start time and the finish time.

3.4
automatic zero level correction
device that allows removal of the effect of zero drift of output when direct welding current measurement is incorporated

3.5
drift
amount of shift in the zero position

3.6
measuring accuracy
scatter limit of indicated or output values permissible, which is indicated against the full scale value

4 Physical environment and operating conditions

Unless otherwise specified, the welding current meter shall be capable of operating under the following conditions without any adverse effect on its accuracy:

— at an ambient air temperature between of +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.

When the operating conditions deviate from those specified above, an agreement shall be made between the manufacturer and the purchaser.

5 Classification of welding current meters with their current sensing coil, and designation of product

5.1 Classes of welding current meter with current sensing coil

Welding current meters with their current sensing coil are classified as in Table 1 depending on the measuring accuracy.

Table 1 — Classification of welding current meters with current sensing coil by measuring accuracy

Classification	Measuring accuracy	Application
Highly accurate class	± 1,0 % of full scale	Laboratory use
Accurate class	± 2,0 % of full scale	Routine use for highly accurate systems
Ordinary class	± 5,0 % of full scale	Routine use for ordinary systems

5.2 Designation of product

The following shall be indicated:

— current type that can be measured i.e. alternating current and/or direct current;

— maximum current measurable;

— specified accuracy as a welding current meter.

EXAMPLE 1 Only single-phase alternating current measurable, ordinary class, and maximum measuring current value of 15 kA.

15 kA ac class 5.0

EXAMPLE 2 Single-phase alternating current and direct current measurable, accurate class, and maximum measuring current value of 20 kA.

20 kA ac/dc class 2.0

6 Requirements for welding current meter with current sensing coil

6.1 Welding current meter

The welding current meter shall consist of a data processing unit, and a display of the welding current and weld time. An example of the construction is illustrated in Annex B.

The welding current shall be indicated as at least the true r.m.s. (root-mean-square) value. The weld time should be counted on a cycle basis or the length indicated in milliseconds, calculated as the product of the length of 1 cycle and the number of cycles.

Welding current meters alone (without the current sensing coil) are classified as in Table 2 depending on the measuring accuracy.

Table 2 — Requirements for measuring accuracy of welding current meters

Classification	Measuring accuracy	Application
Highly accurate class	± 0,5 % of full scale	Laboratory use
Accurate class	± 1,0 % of full scale	Routine use for highly accurate systems
Ordinary class	± 2,0 % of full scale	Routine use for ordinary systems

The scatter shall be checked against the rated value of the test welding current meter in accordance with the test procedures specified in ISO 17657-4.

6.2 Current sensing coil

The current sensing coil shall conform to requirements described in ISO 17657-3. The conversion coefficient of the current sensing coil should coincide with requirements of the integrator built into the welding current meter, and the value of the low-inductive output resistor shall meet the requirement specified by the supplier for the current sensing coil itself.