Resistance welding - Resistance welding equipment - Mechanical and electrical requirements (ISO 669:2016)

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 669:2016 sisaldab Euroopa standardi EN ISO 669:2016 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 669:2016 consists of the English text of the European standard EN ISO 669:2016.
Standard on jõustunud sellekohase teate 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 Euroopa standardi rahvuslikele liikmetele kättesaadavaks 16.03.2016.	Date of Availability of the European standard is 16.03.2016.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 25.160.30

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 669

March 2016

ICS 25.160.30

English Version

Resistance welding - Resistance welding equipment - Mechanical and electrical requirements (ISO 669:2016)

Soudage par résistance - Matériel de soudage par résistance - Exigences mécaniques et électriques (ISO 669:2016)

Widerstandsschweißen - Widerstandsschweißeinrichtungen - Mechanische und elektrische Anforderungen (ISO 669:2016)

This European Standard was approved by CEN on 2 January 2016.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN ISO 669:2016 E

European foreword

This document (EN ISO 669:2016) has been prepared by Technical Committee ISO/TC 44 “Welding and allied processes” in collaboration with Technical Committee CEN/TC 121 “Welding and allied processes” 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 September 2016, and conflicting national standards shall be withdrawn at the latest by September 2016.

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

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, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 669:2016 has been approved by CEN as EN ISO 669:2016 without any modification.

Contents

Page

Foreword ... **v**

1 Scope ... **1**

2 Normative references ... **1**

3 Terms and definitions ... **2**
3.1 Mechanical parts of spot, projection, and seam welding equipment ... 2
3.2 Mechanical parts of upset and flash welding equipment ... 8
3.3 Static mechanical characteristics ... 11
3.4 Electrical and thermal characteristics ... 14
3.5 Pneumatic and hydraulic characteristics ... 16

4 Symbols and abbreviated terms ... **16**

5 Physical environment and operating conditions ... **18**
5.1 General ... 18
5.2 Ambient air temperature ... 18
5.3 Liquid cooling medium ... 18
5.4 Humidity ... 18
5.5 Altitude ... 19
5.6 Transportation and storage ... 19

6 Test conditions ... **19**
6.1 General ... 19
6.2 Environmental conditions ... 19
6.3 Measuring instruments ... 19

7 Rated no load voltage at the output ... **20**
7.1 General ... 20
7.2 a.c. no load voltage (U_{20}) ... 20
7.3 d.c. no load voltage (U_{2d}) ... 20

8 Maximum short circuit current ... **20**
8.1 General ... 20
8.2 Spot and seam welding equipment ... 21
8.3 Projection welding equipment ... 21
8.4 Upset and flash welding equipment ... 22

9 Thermal rating ... **23**
9.1 General ... 23
9.2 Thermal test ... 23

10 Cooling liquid circuit (liquid cooled welding equipment) ... **23**

11 Static mechanical characteristics ... **24**
11.1 General ... 24
11.2 Spot and projection welding equipment ... 24
11.2.1 General ... 24
11.2.2 Eccentricity ... 25
11.2.3 Angular deflection ... 26
11.2.4 Radial deflection ... 26
11.2.5 Axial deflection ... 27
11.2.6 Machine stiffness ... 27
11.2.7 Parallelism of top and bottom platen ... 27
11.2.8 Perpendicularity in platen movement, δ_4 ... 28
11.3 Seam welding equipment ... 29
11.3.1 General ... 29
11.3.2 Eccentricity ... 29
11.3.3 Angular deflection ... 30
11.4 Upset welding equipment ... 30

11.4.1 General 30
11.4.2 Angular deflection 31
12 Rating plate 31
12.1 General 31
12.2 Description 32
12.3 Tolerances 34
13 Instruction manual 34
Annex A (informative) **Examples of rating plates 36**
Bibliography 38

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 44, *Welding and allied processes*, Subcommittee SC 6, *Resistance welding and allied mechanical joining*.

This third edition cancels and replaces the second edition (ISO 669:2000), which has been technically revised.

Resistance welding — Resistance welding equipment — Mechanical and electrical requirements

1 Scope

This International Standard defines and specifies certain identified electrical and mechanical characteristics of equipment used for

— resistance spot welding,

— projection welding,

— resistance seam welding,

— upset welding[1)], and

— flash welding[2)].

This International Standard specifies the information to be given in equipment specifications and the test methods to be used for measuring those characteristics.

Not all requirements apply to all types of equipment.

The following types of power sources are included:

— single phase with alternating welding current;

— single phase with rectified welding current by rectification of the output of the welding transformer;

— single phase with inverter welding transformer;

— three phase with rectified welding current by rectification of the output of the welding transformer;

— three phase with a current rectification in the input of the welding transformer (sometimes called frequency convertor);

— three phase with inverter welding transformers.

This International Standard does not apply to welding transformers that are separate from the equipment.

NOTE Safety requirements for resistance welding equipment are covered by IEC 62135–1.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 5826:2014, *Resistance welding equipment — Transformers — General specifications applicable to all transformers*

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

1) Often referred to by the non-preferred term, butt welding.

2) Often referred to by the non-preferred term, flash butt welding.

ISO 17657-5, *Resistance welding — Welding current measurement for resistance welding — Part 5: Verification of welding current measuring system*

ISO 17677-1, *Resistance welding — Vocabulary — Part 1: Spot, projection and seam welding*

IEC 62135-1, *Resistance welding equipment — Part 1: Safety requirements for design, manufacture and installation*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 17677-1 and the following apply.

3.1 Mechanical parts of spot, projection, and seam welding equipment

3.1.1
arm
device for transmitting the *electrode force* (3.1.16) which can also conduct the welding current or support a separate conductor

Note 1 to entry: See Figure 1 and Figure 3.

3.1.2
welding head
device comprising the force generation and guiding system carrying an *electrode holder* (3.1.3), *platen* (3.1.5), or *seam welding head* (3.1.6) mounted to the upper arm or directly to the machine body

Note 1 to entry: See Figure 1.

3.1.3
electrode holder
device holding a *spot welding electrode* (3.1.4) or an electrode adaptor

[SOURCE: ISO 8430-1, ISO 8430-2, and ISO 8430-3]

Note 1 to entry: See Figure 1.