

Resistance welding - Spot welding of aluminium and aluminium alloys - Weldability, welding and testing

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EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN ISO 18595:2007 sisaldab Euroopa standardi EN ISO 18595:2007 ingliskeelset teksti. Käesolev dokument on jõustatud 22.11.2007 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN ISO 18595:2007 consists of the English text of the European standard EN ISO 18595:2007. This document is endorsed on 22.11.2007 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.
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Käsitlusala: This International Standard specifies requirements for resistance spot welding in the fabrication of assemblies of aluminium sheet, extrusions (both work- and age-hardening alloys) and/or cast material comprising two or three thicknesses of metal, where the maximum single (sheet) thickness of components to be welded is within the range 0,6 mm to 6 mm. This International Standard is applicable to the welding of sheets or plates of dissimilar thickness where the thickness ratio is less than or equal to 3:1. It applies to the welding of three thicknesses where the total thickness is less than or equal to 9 mm. Welding with the following types of machines is within the scope of this International Standard:- pedestal welding machines;- gun welders;- automatic welding equipment where the components are fed by robots or automatic feeding equipment;- multi-welders;- robotic welders.	Scope: This International Standard specifies requirements for resistance spot welding in the fabrication of assemblies of aluminium sheet, extrusions (both work- and age-hardening alloys) and/or cast material comprising two or three thicknesses of metal, where the maximum single (sheet) thickness of components to be welded is within the range 0,6 mm to 6 mm. This International Standard is applicable to the welding of sheets or plates of dissimilar thickness where the thickness ratio is less than or equal to 3:1. It applies to the welding of three thicknesses where the total thickness is less than or equal to 9 mm. Welding with the following types of machines is within the scope of this International Standard:- pedestal welding machines;- gun welders;- automatic welding equipment where the components are fed by robots or automatic feeding equipment;- multi-welders;- robotic welders.
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English Version

Resistance welding - Spot welding of aluminium and aluminium alloys - Weldability, welding and testing (ISO 18595:2007)

Soudage par résistance - Soudage par points de l'aluminium et des alliages d'aluminium - Soudabilité, soudage et essais (ISO 18595:2007)

Widerstandsschweißen - Punktschweißen von Aluminium und Aluminiumlegierungen - Schweißbeignung, Schweißen und Prüfungen (ISO 18595:2007)

This European Standard was approved by CEN on 8 August 2007.

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Foreword

This document (EN ISO 18595:2007) has been prepared by Technical Committee ISO/TC 44 "Welding and allied processes" in collaboration with 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 March 2008, and conflicting national standards shall be withdrawn at the latest by March 2008.

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 the United Kingdom.

Endorsement notice

The text of ISO 18595:2007 has been approved by CEN as a EN ISO 18595:2007 without any modification.

**Resistance welding — Spot welding of
aluminium and aluminium alloys —
Weldability, welding and testing**

*Soudage par résistance — Soudage par points de l'aluminium et des
alliages d'aluminium — Soudabilité, soudage et essais*



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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 18595 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 6, *Resistance welding*.

Requests for official interpretations of any aspect of this International Standard should be directed to the Secretariat of ISO/TC 44/SC 6 via your national standards body, a complete listing of which can be found at www.iso.org.

Resistance welding — Spot welding of aluminium and aluminium alloys — Weldability, welding and testing

1 Scope

This International Standard specifies requirements for resistance spot welding in the fabrication of assemblies of aluminium sheet, extrusions (both work- and age-hardening alloys) and/or cast material comprising two or three thicknesses of metal, where the maximum single (sheet) thickness of components to be welded is within the range 0,6 mm to 6 mm.

This International Standard is applicable to the welding of sheets or plates of dissimilar thickness where the thickness ratio is less than or equal to 3:1. It applies to the welding of three thicknesses where the total thickness is less than or equal to 9 mm.

Welding with the following types of machines is within the scope of this International Standard:

- pedestal welding machines;
- gun welders;
- automatic welding equipment where the components are fed by robots or automatic feeding equipment;
- multi-welders;
- robotic welders.

Information on appropriate welding equipment is given in Annex A and on spot welding conditions in Annex B. The latter are for guidance only and may require modification depending on service conditions of the fabrication, type of welding equipment, characteristics of the secondary circuit, electrode material and geometry.

The welding of coated material, e.g. zinc-coated or anodised material, is not within the scope of this International Standard.

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 669:2000, *Resistance welding — Resistance welding equipment — Mechanical and electrical requirements*

ISO 5182, *Welding — Materials for resistance welding electrodes and ancillary equipment*

ISO 5184, *Straight resistance spot welding electrodes*

ISO 5821, *Resistance spot welding electrode caps*

ISO 5830, *Resistance spot welding — Male electrode caps*

ISO 10447, *Resistance welding — Peel and chisel testing of resistance spot and projection welds*

ISO 14329:2003, *Resistance welding — Destructive tests of welds — Failure types and geometric measurements for resistance spot, seam, and projection welds*

ISO 15614-12, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 12: Spot, seam and projection welding*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 669:2000 and ISO 14329:2003 and the following apply.

3.1

corona bond zone

zone outside the weld nugget in which solid phase bonding has occurred

NOTE 1 See Figure 1.

NOTE 2 This zone can contribute towards the strength of the joints but may not be considered for design purposes.

3.2

corona bond diameter

d_c
outer diameter of the corona bond zone

NOTE See Figure 1.

3.3

cross-tension test

test to determine the load-carrying behaviour of a spot-welded joint subjected to cross-tension loading

3.4

interface failure

fracture through the weld nugget between the sheets in the plane of the interface

NOTE See Figure 1.

3.5

nugget diameter

d_n
mean of the maximum and minimum diameters of the fused nugget in the plane of the interface between the pieces joined, measured on a metallographic section taken transversely through the centre of the nugget

NOTE See Figure 1. The nugget diameter is the parameter on which the mechanical behaviour of a structure is based. Other parameters such as the plug or weld diameter can be influenced by the type of destructive test.

3.6

plug failure

slug/button failure
fracture in the base metal, the heat-affected zone, or the nugget leaving attached metal pulled through thickness from the opposing sheet

NOTE See Figure 2.