



SLOVENSKI STANDARD
kSIST FprEN ISO 14555:2014
01-januar-2014

Varjenje - Obločno varjenje čepov iz kovinskih materialov (ISO/FDIS 14555:2013)

Welding - Arc stud welding of metallic materials (ISO/FDIS 14555:2013)

Schweißen - Lichtbogenbolzenschweißen von metallischen Werkstoffen (ISO/FDIS 14555:2013)

Soudage - Soudage à l'arc des goujons sur les matériaux métalliques (ISO/FDIS 14555:2013)

Ta slovenski standard je istoveten z: FprEN ISO 14555 rev

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| 25.160.10 | Varilni postopki in varjenje | Welding processes |

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Welding — Arc stud welding of metallic materials

Soudage — Soudage à l'arc des goujons sur les matériaux métalliques

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Please see the administrative notes on page iii

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ISO/CEN PARALLEL PROCESSING

This final draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO-lead** mode of collaboration as defined in the Vienna Agreement. The final draft was established on the basis of comments received during a parallel enquiry on the draft.

This final draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel two-month approval vote in ISO and formal vote in CEN.

Positive votes shall not be accompanied by comments.

Negative votes shall be accompanied by the relevant technical reasons.

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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.

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 10, *Unification of requirements in the field of metal welding*.

This third edition cancels and replaces the second edition (ISO 14555:2006), which has been technically revised.

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ISO/FDIS 14555:2013(E)**Introduction**

The purpose of arc stud welding is to weld predominantly pin-shaped metal parts to metal workpieces. In this International Standard it is referred to simply as stud welding. Amongst other things, stud welding is used in bridge building (especially in composite structures), steel structures, shipbuilding, facade-wall fabrication, vehicle manufacture, equipment design, steam-boiler construction, and the manufacture of household appliances.

The quality of a stud weld depends not only on strict compliance with the welding procedure specification but also on the correct function of the actuating mechanism (e.g. welding guns), and on the condition of the components, of the accessories and of the power supply.

This International Standard does not invalidate former specifications, providing the technical requirements are equivalent and satisfied.

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Welding — Arc stud welding of metallic materials

1 Scope

This International Standard covers arc stud welding of metallic materials subject to static and fatigue loading. It specifies requirements that are particular to stud welding, in relation to welding knowledge, quality requirements, welding procedure specification, welding procedure qualification, qualification testing of operators and testing of production welds.

This International Standard is appropriate where it is necessary to demonstrate the capability of a manufacturer to produce welded construction of a specified quality.

NOTE General quality requirements for fusion welding of metallic materials are given in ISO 3834-1, ISO 3834-2, ISO 3834-3, ISO 3834-4 and ISO 3834-5.

This International Standard has been prepared in a comprehensive manner, with a view to its being used as a reference in contracts. The requirements contained within it can be adopted in full, or partially, if certain requirements are not relevant to a particular construction (see Annex B).

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 857-1, *Welding and allied processes — Vocabulary — Part 1: Metal welding processes*

ISO 3834-1, *Quality requirements for fusion welding of metallic materials — Part 1: Criteria for the selection of the appropriate level of quality requirements*

ISO 3834-2, *Quality requirements for fusion welding of metallic materials — Part 2: Comprehensive quality requirements*

ISO 3834-3, *Quality requirements for fusion welding of metallic materials — Part 3: Standard quality requirements*

ISO 3834-4, *Quality requirements for fusion welding of metallic materials — Part 4: Elementary quality requirements*

ISO 4063, *Welding and allied processes — Nomenclature of processes and reference numbers*

ISO 6947, *Welding and allied processes — Welding positions*

ISO 9606-1, *Approval testing of welders — Fusion welding — Part 1: Steels*

ISO 9606-2, *Qualification test of welders — Fusion welding — Part 2: Aluminium and aluminium alloys*

ISO 13918:2008, *Welding — Studs and ceramic ferrules for arc stud welding*

ISO 14175, *Welding consumables — Shielding gases for arc welding and cutting*

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ISO 14731, *Welding coordination — Tasks and responsibilities*

ISO 14732:1998, *Welding personnel — Approval testing of welding operators for fusion welding and of resistance weld setters for fully mechanized and automatic welding of metallic materials*

ISO 15607:2003, *Specification and qualification of welding procedures for metallic materials — General rules*

ISO/TR 15608, *Welding — Guidelines for a metallic materials grouping system*

ISO 15611, *Specification and qualification of welding procedures for metallic materials — Qualification based on previous welding experience*

ISO 15613, *Specification and qualification of welding procedures for metallic materials — Qualification based on pre-production welding test*

ISO 15614-1:2004, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys*

ISO 15614-2, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 2: Arc welding of aluminium and its alloys*

ISO 17636-1, *Non-destructive testing of welds — Radiographic testing — X- and gamma-ray techniques with film*

ISO 17636-2, *Non-destructive testing of welds — Radiographic testing — X- and gamma-ray techniques with digital detectors*

ISO 17662, *Welding — Calibration, verification and validation of equipment used for welding, including ancillary activities*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 857-1, ISO 3834-1, ISO 4063, ISO 14731, ISO 14732 and ISO 15607 and the following apply.

3.1 stud <https://standards.iteh.ai/catalog/standards/sist/bc2ff1c4-858c-466b-9b6b-5fb80923c083/sist-en-iso-14555-2014>

fastener to be attached by stud welding

3.2 auxiliaries

ceramic ferrules and shielding gases

3.3 stud-welding operator

operating personnel for stud-welding equipment

Note to entry In special cases (e.g. mass production at the manufacturer's factory) the welding can be carried out by suitable auxiliary personnel, appropriately trained and supervised.

3.4 stud diameter

d
stud nominal diameter

Note 1 to entry See ISO 13918.

3.5**welding diameter** d_w

diameter at the weld base

3.6**weld zone**

welded area underneath the welding diameter

3.7**current intensity**

root-mean-square (RMS) value of the welding current in the steady state during the burning time of the arc

Note to entry Current intensity is not applicable to capacitor discharge.

3.8**welding time**

time difference between the ignition and the final extinction of the main arc

3.9**lift** L

distance between the stud tip and the work piece surface with the stud-lifting mechanism in position and activated

Note 1 to entry For tip ignition, this definition applies to the ignition gap.

Note 2 to entry See Figure A.1.

3.10**plunge**

axial movement of the stud towards the surface of the work piece

3.11**protrusion** P

(unregulated lifting mechanism) distance between the tip of the stud and the face of the support device in their initial positions, where the support device faces the work piece

Note 1 to entry A spring-loaded lifting mechanism is an unregulated lifting mechanism.

Note 2 to entry See Figure A.1.

3.12**arc blow**

magnetic deflection of the arc from the axial direction of the stud

3.13**flux**

aluminium additive on the weld end of the stud, which improves the ignition and de-oxidizes the weld pool

3.14**dual-material stud**

two-material stud composed of a material at the weld tip, similar to that of the parent material, and a dissimilar material outside the weld tip, which are joined by a friction weld, thus avoiding a mixed structure in the weld zone when stud welding

3.15**structure subjected to fatigue loading**

structure subject to a set of typical load events described by the positions or movements of loads, their variation in intensity and their frequency and sequence of occurrence

ISO/FDIS 14555:2013(E)**3.16****through-deck stud-welding**

application where shear connectors are welded to a steel structure through thin steel sheet with a thickness of less than 3 mm

4 Symbols and abbreviated terms**4.1 Symbols**

For the purposes of this International Standard, the following symbols apply.

| | |
|----------------------|--|
| <i>C</i> | capacitance (expressed in mF) |
| <i>d</i> | stud diameter (expressed in mm) |
| <i>d_w</i> | welding diameter (expressed in mm) |
| <i>h</i> | length of the threaded part of the nut |
| <i>I</i> | current intensity (expressed in A) |
| <i>L</i> | lift |
| <i>P</i> | protrusion |
| <i>t</i> | thickness of plate |
| <i>t_w</i> | welding time (expressed in ms or s) |
| <i>T</i> | torque (expressed in Nm) |
| <i>U</i> | charging voltage (expressed in V) |
| <i>E</i> | charging energy (expressed in Ws) |
| <i>a</i> | bending angle (expressed in °) |

4.2 Abbreviated terms

For the purposes of this International Standard, the following abbreviated terms apply.

| | |
|------|---|
| CF | ceramic ferrule |
| HAZ | heat-affected zone |
| NP | no protection |
| PA | flat welding position |
| PC | horizontal welding position |
| PE | overhead welding position |
| pWPS | preliminary welding procedure specification |
| SG | shielding gas |
| WPS | welding procedure specification |
| WPQR | welding procedure qualification record |