



SLOVENSKI STANDARD
oSIST prEN ISO 13918:2016
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Varjenje - Čepi in keramični obroči za obločno varjenje čepov (ISO/DIS 13918:2016)

Welding - Studs and ceramic ferrules for arc stud welding

Schweißen - Bolzen und Keramikringe für das Lichtbogenbolzenschweißen (ISO 13918:xxxx)

Soudage -- Goujons et bagues céramiques pour le soudage à l'arc des goujons

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Welding — Studs and ceramic ferrules for arc stud welding

Soudage — Goujons et bagues céramiques pour le soudage à l'arc des goujons

ICS: 21.060.10; 25.160.10

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ISO/CEN PARALLEL PROCESSING



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Contents

Page

Foreword	iv
Introduction	vi
1 Scope	1
2 Normative references	2
3 Symbols and abbreviated terms	3
4 Requirements	3
4.1 Ordering information	3
4.2 Dangerous substances	3
4.3 Product requirements	4
4.3.1 Dimensions and tolerances on dimensions, form and position	4
4.3.2 Coating	4
4.3.3 Materials and mechanical characteristics	4
4.3.4 Weldability	6
4.4 Durability	6
5 Dimensions of studs	6
5.1 General	6
5.2 Fully threaded stud (FD)	7
5.3 Virtually fully threaded stud (MD)	8
5.4 Partially threaded stud (PD)	9
5.5 Threaded stud with reduced shaft (RD)	11
5.6 Unthreaded stud (UD)	12
5.7 Insulation pin/nail (ND)	13
5.8 Stud with internal thread (ID)	14
5.9 Shear connector (SD)	15
5.10 Threaded stud with flange (PS)	16
5.11 Unthreaded stud (US)	18
5.12 Stud with internal thread (IS)	19
5.13 Threaded stud (PT)	21
5.14 Unthreaded stud (UT)	22
5.15 Stud with internal thread (IT)	23
6 Dimensions of ceramic ferrules	24
7 Manufacture and finish	25
7.1 Threaded studs (PD), unthreaded studs (UD), threaded studs with reduced shaft (RD)	25
7.2 Shear connectors (SD)	25
8 Inspection	26
8.1 General	26
8.2 Chemical analysis	26
8.3 Mechanical tests	26
8.4 Sample size	26
9 Marking	27
9.1 Traceability	27
9.2 Studs	27
9.3 Ceramic ferrules	27
10 Designation	28
10.1 Studs	28
10.2 Ceramic ferrules	28
Bibliography	29

ISO/DIS 13918:2016(E)**Foreword**

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*.

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).

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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 second edition cancels and replaces the first which has been technically revised:

- a) everything according conformity evaluation is deleted from the standard;
- b) the clause terms and definitions is deleted from the standard;
- c) fully threaded stud (FD), virtually fully threaded stud (MD) and insulation pin/nail (ND) introduced;
- d) threaded stud renamed to partially threaded stud (PD);
- e) abbreviation *P* for pitch introduced;
- f) in 5.3.3.1 introduced, that a stud may consist of two different materials combined by friction welding;
- g) in Table 2 "Materials and mechanical characteristics of finished studs" for SD1 changed value for CEV ($CEV \leq 0,38$);
- h) in Table 2 "Materials and mechanical characteristics of finished studs" for SD3 materials according ISO 15510 introduced;

- i) in Table 2 "Materials and mechanical characteristics of finished studs" for PT, UT and IT materials according ISO/TR 15608 introduced;
- j) in Table 5 "Dimensions of partially threaded studs (PD)" in column l_2 " y_{\min} " is changed to " $y + 2P$ ";
- k) in Table 6 "Dimensions of threaded studs with reduced shaft (RD)" in column d_1 " $y_{\min} + 1$ " is changed to " $y + 2P$ ";
- l) in Table 6 "Dimensions of threaded studs with reduced shaft (RD)" in column d_1 " $\alpha \pm 2,5^\circ$ " is changed to " $\alpha \pm 7^\circ$ ";
- m) in Table 9 "Dimensions of studs with internal thread (ID)" in column D_6 " $\alpha \pm 2,5^\circ$ " is changed to " $\alpha \pm 7^\circ$ ";
- n) in Table 9 "Dimensions of studs with internal thread (ID)" in column D_6 " b " is changed to " $b + 2P$ " and values for M 5 and M 8 are changed to 7,5 mm and 12 mm;
- o) in Table 10 "Dimensions of shear connectors (SD) with l_2 according to Table A.4" the column header " $d_1 - 0,4$ " is changed to " $d_1 \pm 0,4$ ";
- p) in Table 10 "Dimensions of shear connectors (SD) with l_2 according to Table A.4" " $\alpha \pm 2,5$ " is changed to " $\alpha \pm 7$ ";
- q) in Table 13 "Dimensions of studs with internal thread (IS)" the column header " b_{\min} " is changed to " $b + 1$ ";
- r) in Table 16 "Dimensions of studs with internal thread (IT)" the column header " b " is changed to " $b + 2P$ ";
- s) in Table 16 "Dimensions of studs with internal thread (IT)" a nominal diameter ($d_1 \pm 0,1$) of 8 mm introduced with an internal thread diameter (D_6) of M5 and M6; 8
- t) in all tables for the dimensions of ceramic ferrules the values for the nominal diameter (D_7) and the grip diameter (d_8) deleted;
- u) Table 17 "List of ceramic ferrules" introduced;
- v) 9.1 "Traceability" introduced;
- w) Annex A "Mass of studs" deleted;
- x) figures, normative references and layout editorially revised.

Introduction

The range of types of studs specified in this International Standard represents customary applications.

This International Standard can be used in all fields of the metal-working industry.

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Welding — Studs and ceramic ferrules for arc stud welding

1 Scope

This International Standard specifies:

- requirements for studs and ceramic ferrules for arc stud welding;
- dimensions, materials and mechanical properties.

Table 1 shows types of studs and the symbols for studs and ceramic ferrules that are covered by this document.

Table 1 — Types of studs and symbols for studs and ceramic ferrules

Welding technique	Type of stud ^a	Symbol for studs	Symbol for ceramic ferrules
Drawn arc stud welding with ceramic ferrule or shielding gas	fully threaded stud	FD	UF
	virtually fully threaded stud ^b	MD	MF
	partially threaded stud	PD	PF
	threaded stud with reduced shaft	RD	RF
	unthreaded stud	UD	UF
	Insulation pin/nail	ND	UF
	stud with internal thread	ID	UF
	shear connector	SD	UF/DF
Short-cycle drawn arc stud welding	threaded stud with flange (pitch)	PS	—
	unthreaded stud	US	—
	stud with internal thread	IS	—
Stud welding with tip ignition	threaded stud (pitch)	PT	—
	unthreaded stud	UT	—
	stud with internal thread	IT	—
^a Further types of stud and ceramic ferrules can be specified as required for special applications. ^b also called MPF – stud with a nearly full thread and a minimum length of the unthreaded part			

ISO/DIS 13918:2016(E)**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 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs*

ISO 3506-1, *Mechanical properties of corrosion-resistant stainless-steel fasteners — Part 1: Bolts, screws and studs*

ISO 4042, *Fasteners — Electroplated coatings*

ISO 4759-1, *Tolerances for fasteners — Part 1: Bolts, screws, studs and nuts — Product grades A, B and C*

ISO 6947, *Welds — Working positions — Definitions of angles of slope and rotation*

ISO 15510, *Stainless steels — Chemical composition*

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

ISO 16120-2, *Non-alloy steel wire rod for conversion to wire — Part 2: Specific requirements for general-purpose wire rod*

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3 Symbols and abbreviated terms

b	length of the thread
c_d	depth of the crack in the head
d_1	nominal diameter
d_2	diameter at the weld area
d_3	diameter of the weld collar
d_4	diameter of the tip
d_5	head diameter of headed studs
D_6	internal thread diameter
D_7	nominal diameter of the ceramic ferrule
d_8	grip diameter
d_9	base diameter of the ceramic ferrule
h_1	height of the flange
h_2	height of the ceramic ferrule
h_3	height of the head on headed stud
h_4	height of the weld collar
h_5	height of the unthreaded part of stud types PS and PT
l_1	overall length of the stud (excluding aluminium ball or welding tip)
l_2	nominal length of the stud
l_3	length of the welding tip
P	pitch
y	length of the unthreaded part
α	face angle

4 Requirements

4.1 Ordering information

At the time of order the manufacturer shall obtain the following information:

- a) reference to this International Standard if the purchaser demands compliance;
- b) quantities to be delivered;
- c) complete product designation;
- d) other requirements as agreed with the purchaser (e.g. low-temperature requirements).

4.2 Dangerous substances

Materials used in products shall not release any dangerous substances in excess of the maximum levels permitted in the relevant regulations of the state of destination.

ISO/DIS 13918:2016(E)

4.3 Product requirements

4.3.1 Dimensions and tolerances on dimensions, form and position

Dimensions and tolerances on dimensions, form and position shall be in accordance with the requirements given in [Clause 5](#).

For coated threaded studs the tolerances shall apply before coating.

4.3.2 Coating

Unless otherwise specified, studs PS, US, IS, PT, UT, IT of property class 4.8 shall be supplied with electroplated copper coating (C1E).

4.3.3 Materials and mechanical characteristics

4.3.3.1 General

The materials listed in [Table 2](#) shall be used, under the provisions of [4.3.4](#).

The mechanical characteristics of the studs shall comply with the specifications in [Table 2](#).

Studs may consist of two different materials combined by friction welding (dual-material stud).

NOTE The welding part corresponds to the parent metal to avoid problems with dissimilar materials in fusion welding, the rest generally consists of high alloy steel for enhanced corrosion resistance.

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