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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

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.

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).

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For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 10, *Quality management in the field of welding.*

This third edition cancels and replaces the second edition (ISO 13918:2008), which has been technically revised.

The main changes compared to the previous edition are as follows:

a) everything according conformity evaluation has been deleted from this document;

b) fully-threaded stud (FD), virtually fully-threaded stud (MD) and insulation pin/nail (ND) have been introduced;

c) threaded stud has been renamed to partially threaded stud (PD);

d) abbreviation *P* for pitch has been introduced;

e) that a stud may consist of two different materials combined by friction welding has been introduced in 5.3.3.1;

f) value for CEV (CEV ≤ 0,38) in Table 2 has been changed;

g) SD3 materials according ISO 15510 have been introduced in Table 2;

h) PT, UT and IT materials according ISO/TR 15608 have been introduced in Table 2;

i) where applicable, the dimensions d_3 and h_4 are now for guidance only.

j) "y_{min}" has been changed to "$y + 2P$" in Table 5, column l_2;

k) "$y_{min} + 1$" has been changed to "$y + 2P$ in Table 6, column d_1";

l) "$\alpha \pm 2{,}5°$" has been changed to "$\alpha \pm 7°$" in Table 6,column d_1;

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m) "α ± 2,5°" has been changed to "α ± 7°" in Table 9, column D_6;

n) "b" has been changed to "$b + 2P$" and values for M 5 and M 8 have been changed to 7,5 mm and 12 mm in Table 9, column D_6;

o) the column header "$d_1 - 0{,}4$" has been changed to "$d_1 \pm 0{,}4$" in Table 10;

p) "α ± 2,5"has been changed to "α ± 7" in Table 10;

q) the column header "b_{min}" has been changed to "$b_{min} + 2P$" in Table 13;

r) the column header "b" has been changed to "$b_{min} + 2P$" in Table 16;

s) a nominal diameter ($d_1 \pm 0{,}1$) of 8 mm has been introduced with an internal thread diameter (D_6) of M5 and M6 in Table 16;

t) in all tables for the dimensions of ceramic ferrules, the values for the nominal diameter (D_7), the grip diameter (d_8), the base diameter (d_9) and the height (h_2) have been deleted;

u) Table 17 has been introduced;

v) a note that stud and ceramic ferrule are generally a coordinated system from the same manufacturer has been introduced in Clause 7;

w) 10.1 has been introduced;

x) Annex A has been deleted;

y) figures, normative references and layout have been editorially revised.

Requests for official interpretations of any aspect of this document should be directed to the Secretariat of ISO/TC 44 via your national standards body. A complete listing of these bodies can be found at www.iso.org.

This corrected version of ISO 13918:2017 incorporates the following correction:

— footnote [b] in Table 11 has been modified.

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Introduction

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

This document 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 document specifies the following:

— 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	PS	—
	Unthreaded stud	US	—
	Stud with internal thread	IS	—
Stud welding with tip ignition	Threaded stud	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.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 with specified property classes — Coarse thread and fine pitch thread*

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, *Welding and allied processes — Welding positions*

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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*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 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 ignition tip
d_5	head diameter of shear connector
D_6	internal thread diameter
h_1	height of the flange
h_3	height of the head on shear connector
h_4	height of the weld collar
h_5	height of the thread run-out part of stud types PS and PT
l_1	overall length of the stud (excluding aluminium ball or ignition tip)
l_2	nominal length of the stud
l_3	length of the ignition tip
P	pitch
y	length of the unthreaded part
α	face angle

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