

# SVENSK STANDARD

## SS-EN ISO 10675-2:2018

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### **Oförstörande provning av svetsar – Acceptansnivåer för radiografisk provning – Del 2: Aluminium och dess legeringar (ISO 10675-2:2017)**

### **Non-destructive testing of welds – Acceptance levels for radiographic testing – Part 2: Aluminium and its alloys (ISO 10675-2:2017)**



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Denna standard ersätter SS-EN ISO 10675-2:2013, utgåva 1.

The European Standard EN ISO 10675-2:2017 has the status of a Swedish Standard. This document contains the official version of EN ISO 10675-2:2017.

This standard supersedes the Swedish Standard SS-EN ISO 10675-2:2013, edition 1.

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EUROPEAN STANDARD

EN ISO 10675-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2017

ICS 25.160.40

Supersedes EN ISO 10675-2:2013

English Version

## Non-destructive testing of welds - Acceptance levels for radiographic testing - Part 2: Aluminium and its alloys (ISO 10675-2:2017)

Essais non destructifs des assemblages soudés -  
Niveaux d'acceptation pour l'évaluation par  
radiographie - Partie 2: Aluminium et ses alliages (ISO  
10675-2:2017)

Zerstörungsfreie Prüfung von Schweißverbindungen -  
Zulässigkeitsgrenzen für die Durchstrahlungsprüfung -  
Teil 2: Aluminium und seine Legierungen (ISO 10675-  
2:2017)

This European Standard was approved by CEN on 31 October 2017.

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.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
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**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

**SS-EN ISO 10675-2:2018 (E)**

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## European foreword

This document (EN ISO 10675-2:2017) 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 May 2018, and conflicting national standards shall be withdrawn at the latest by May 2018.

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

This document supersedes EN ISO 10675-2:2013.

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

### Endorsement notice

The text of ISO 10675-2:2017 has been approved by CEN as EN ISO 10675-2:2017 without any modification.





# Non-destructive testing of welds — Acceptance levels for radiographic testing —

## Part 2: Aluminium and its alloys

### 1 Scope

This document specifies acceptance levels for indications from imperfections in aluminium butt welds detected by radiographic testing. If agreed, the acceptance levels can be applied to other types of welds or materials.

The acceptance levels can be related to welding standards, application standards, specifications or codes. This document assumes that the radiographic testing has been carried out in accordance with ISO 17636-1 for RT-F (F = film) or ISO 17636-2 for RT-S (S = radioscopy) and RT-D (D = digital detectors).

When assessing whether a weld meets the requirements specified for a weld quality level, the sizes of imperfections permitted by standards are compared with the dimensions of indications revealed by a radiograph made of the weld.

### 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 6520-1, *Welding and allied processes — Classification of geometric imperfections in metallic materials — Part 1: Fusion welding*

ISO 10042, *Welding — Arc-welded joints in aluminium and its alloys — Quality levels for imperfections*

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

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

### 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 <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

### 4 Radiographic technique

Depending on the weld quality level, radiographic technique A or B in accordance with ISO 17636-1 shall be used for RT-F as shown in [Table 1](#) and radiographic technique A or B in accordance with ISO 17636-2 shall be used for RT-S or RT-D as shown in [Table 2](#).

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Table 1 — Radiographic testing for RT-F

Quality levels in accordance with ISO 10042	Testing techniques and classes in accordance with ISO 17636-1 for RT-F <sup>a</sup>	Acceptance levels in accordance with this document
B	B	1
C	B <sup>a,b</sup>	2
D	A	3

<sup>a</sup> RT-F = Radiographic testing with film

<sup>b</sup> However, the minimum number of exposure for circumferential weld testing may correspond to the requirements of class A of ISO 17636-1.

Table 2 — Radiographic testing for RT-S and RT-D

Quality levels in accordance with ISO 10042	Testing techniques and classes in accordance with ISO 17636-2 for RT-S <sup>a</sup> and RT-D <sup>b</sup>	Acceptance levels in accordance with this document
B	B	1
C	B <sup>c</sup>	2
D	A	3

<sup>a</sup> RT-S = Radioscopic testing

<sup>b</sup> RT-D = Radiographic testing with digital detectors

<sup>c</sup> However, the minimum number of exposure for circumferential weld testing may correspond to the requirements of class A of ISO 17636-2.

## 5 General

Welded joints should be visually tested in accordance with ISO 17637 and evaluated before radiographic testing.

The acceptance levels in this document are basically valid for evaluation of imperfections which cannot be detected and evaluated by visual testing (see [Table 3](#)). Surface imperfections (see [Table 4](#); such as undercut and excessive penetration, surface damage, weld spatter, etc.) which due to object geometry cannot be evaluated, but where the interpreter suspects the ISO 10042 quality levels are not fulfilled, shall be subject to more specific testing.

When quantification of undercut and/or excessive penetration by radiographic testing is required, specific procedures using test exposures may be applied in order to establish a basis for approximate quantification in accordance with the requirements of ISO 10042. This shall be specified.

## 6 Acceptance levels

The acceptance levels for indications are shown in [Table 3](#) and [Table 4](#). The types of imperfections are selected from ISO 10042 and defined in ISO 6520-1.

The symbols used in [Table 3](#) and [Table 4](#) are the following:

- A* is the sum of projected areas of indications related to  $L \times w_p$  in %;
- b* is the width of excess penetration of weld, in millimetres;
- d* is the diameter of pore, in millimetres;
- d<sub>A</sub>* is the diameter of area surrounding a cluster, in millimetres;

- $h$  is the width of indication, the width or height of surface or cross surface imperfection, in millimetres;
- $l$  is the length of indication, in millimetres;
- $L$  any 100 mm testing length, in millimetres;
- $s$  is the nominal butt weld thickness, in millimetres;
- $t$  is the material thickness, in millimetres;
- $w_p$  is the width of the weld, in millimetres;
- $\sum l$  is the summary length of imperfections within  $L$ .

Any two adjacent imperfections separated by a distance smaller than the major dimension of the smaller imperfection shall be considered as a single imperfection.

Indications shall not be divided into different ranges  $L$ .

**Table 3 — Acceptance levels for indications in butt welds**

No.	Type of internal imperfections in accordance with ISO 6520-1	Acceptance level 3 <sup>a</sup>	Acceptance level 2 <sup>a</sup>	Acceptance level 1
1	Cracks (100)	Not permitted	Not permitted	Not permitted
2a	Gas pores (2011)	$d \leq 0,4s$ , max. 6 mm	$d \leq 0,3s$ , max. 5 mm	$d \leq 0,2s$ , max. 4 mm
2b	Porosity (2012) material thickness 0,5 mm to 3 mm	$A \leq 6\%$ $L = 100$ mm	$A \leq 2\%$ $L = 100$ mm	$A \leq 1\%$ $L = 100$ mm
2c	Porosity (2012) material thickness >3 mm to 12 mm	$A \leq 10\%$ $L = 100$ mm	$A \leq 4\%$ $L = 100$ mm	$A \leq 2\%$ $L = 100$ mm
2d	Porosity (2012) material thickness >12 mm to 30 mm	$A \leq 15\%$ $L = 100$ mm	$A \leq 6\%$ $L = 100$ mm	$A \leq 3\%$ $L = 100$ mm
2e	Porosity (2012) material thickness >30 mm	$A \leq 20\%$ $L = 100$ mm	$A \leq 8\%$ $L = 100$ mm	$A \leq 4\%$ $L = 100$ mm
3b	Clustered (localized) porosity (2013)	$d_A \leq 25$ mm or $d_{A,max} \leq w_p$	$d_A \leq 20$ mm or $d_{A,max} \leq w_p$	$d_A \leq 15$ mm or $d_{A,max} \leq w_p/2$
4c	Linear porosity (2014)	$l \leq 25$ mm $L = 100$ mm	Not permitted	Not permitted
5 <sup>d</sup>	Elongated cavities (2015) and wormholes (2016)	$l \leq 0,4s$ , max. 6 mm	$l < 0,3s$ , max. 4 mm	$l < 0,2s$ , max. 3 mm
6	Oxide inclusion (303)	$l < s$ , max. 10 mm	$l < 0,5s$ , max. 5 mm	$l < 0,2s$ , max. 3 mm
a	Acceptance levels 3 and 2 may be specified with suffix X which denotes that all indications over 25 mm are unacceptable.			
b	See <a href="#">Figure C.1</a> and <a href="#">Figure C.2</a> (normative).			
c	See <a href="#">Figure C.3</a> and <a href="#">Figure C.4</a> (normative).			
d	See <a href="#">Figure C.5</a> and <a href="#">Figure C.6</a> (normative).			
e	If the length of the weld is below 100 mm, the maximum length of indications shall not exceed 25 % of that weld.			