



SLOVENSKI STANDARD
SIST EN 287-2:1996/A1:2001
01-december-2001

Preskušanje za odobritev varilcev - Talilno varjenje - 2. del: Aluminij in aluminijeve zlitine - Dopnilo 1

Approval testing of welders - Fusion welding - Part 2: Aluminium and aluminium alloys

Prüfung von Schweißern - Schmelzschweißen - Teil 2: Aluminium und Aluminiumlegierungen

Qualification des soudeurs - Soudage par fusion - Partie 2: Aluminium et ses alliages

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Ta slovenski standard je istoveten z: EN 287-2:1992/A1:1997

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ICS:

03.100.30	Vodenje ljudi	Management of human resources
25.160.10	Varilni postopki in varjenje	Welding processes
77.120.10	Aluminij in aluminijeve zlitine	Aluminium and aluminium alloys

SIST EN 287-2:1996/A1:2001 **en**

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EUROPEAN STANDARD

EN 287-2:1992/A1

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 1997

ICS 25.160.10

Descriptors: welding, fusion welding, gas shielded welding, aluminium, aluminium alloys, welders (personnel), qualification, specifications, inspection, tests, acceptability, quality certificate

English version

Approval testing of welders - Fusion welding - Part 2: Aluminium and aluminium alloys

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This amendment 1 modifies the European Standard EN 287-2:1992. This amendment was approved by CEN on 1996-12-11. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment 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 Central Secretariat or to any CEN member.

The European Standards exist 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Foreword

This Amendment EN 287-2:1992/A1:1997 to EN 287-2:1992 has been prepared by Technical Committee CEN/TC 121 "Welding", the secretariat of which is held by DS.

This Amendment to the European Standard EN 287-2:1992 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 1997, and conflicting national standards shall be withdrawn at the latest by November 1997.

This Amendment to the European Standard EN 287-2:1992 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s)

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

- Delete the 5th paragraph and replace by the following:

The welding processes referred to in this standard include those fusion welding processes which are designated as manual or partly mechanized welding. This standard does not cover fully mechanized and automatic welding processes (see 5.2).

- Delete the 7th paragraph and replace by the following:

The certificate of approval testing is issued under the sole responsibility of the examiner or examining body.

2 Normative references

- Delete the following references:

EN ...,	Welded butt joints in metallic materials – Bend tests ¹⁾
ISO 2437:1972	Recommended practice for the X-ray inspection of fusion welded butt joints for aluminium and its alloys and magnesium and its alloys 5 to 50 mm thick
ISO 3452:1984	Non-destructive testing - Penetrant inspection - General principles
ISO/DIS 10 042.2	Arc-welded joints in aluminium and its weldable alloys - Guidance on quality levels for imperfections.

- Add the following references:

EN 571-1	Non-destructive testing – Penetrant inspection – Part 1: General principles for the examination
EN 910	Welded butt joints in metallic materials – Bend tests
EN 1320	Welded joints in metallic materials – Fracture tests
EN 1321	Destructive examination of welds – Macroscopic and microscopic examination of welds
prEN 1435	Non-destructive examination of welds – Radiographic examination of welded joints
EN 30 042	Arc-welded joints in aluminium and its weldable alloys - Guidance on quality levels for imperfections (ISO 10042:1992)

- Delete footnote 1.

3 Definitions

- Delete 3.1 and 3.2. Consequently, change sequence of clause 3.2.1 and 3.2.2 and amend title as follows:

3.1 Welder

..... ((Text unchanged))

3.2 Welding operator

..... ((Text unchanged))

3.3 Examiner or test body

- Amend title to "Examiner or examining body"
- Delete 3.3 and replace by the following:

A person or organization who verifies compliance with the applicable standard. The examiner/examining body shall be acceptable to any of the contracting parties.

4.4 Miscellaneous

- Delete line 3 "gb welding with gas backing".

5.4.2.1 Group W 21: Pure aluminium

- Delete 5.4.2.1 and replace by the following:

Pure aluminium and aluminium-manganese-alloys with $\leq 1,5$ % impurities or alloy content, e.g.

EN AW-Al 99,8 (A)

EN AW-Al 99,5

EN AW-Al Mn 1

5.4.2.2 Group W 22: Non-heat treatable alloys

- Delete 5.4.2.2 and replace by the following:

Non-heat treatable alloys (Aluminium-magnesium-alloys), e.g.

EN AW-Al Mg 1,5 (C)

EN AW-Al Mg 5

EN AW-Al Mg 3 Mn

EN AW-Al Mg 4,5 Mn 0,7

EN AW-Al Si alloys

5.4.2.3 Group W 23: Heat treatable alloys

- Delete 5.4.2.3 and replace by the following:

Heat treatable alloys, e.g.

EN AW-Al Mg 1 SiCu

EN AW-Al Si 1 MgMn

EN AC-Al SiMg (castings)

EN AC-Al SiCu (castings)

EN AW-Al Zn 4,5 Mg 1

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5.5 Filler metal and shielding gas (standards.iteh.ai)

- Amend the title to "Consumables".

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5.6 Dimensions

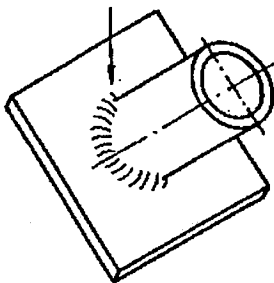
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Figure 1

- Delete "PC Horizontal vertical" and replace by "PC Horizontal".

Figure 2

- Delete "PC Horizontal vertical" and replace by "PC Horizontal".
- Add the following drawing:



- PA Pipe: rotating
Axis: inclined
Weld: flat.

6.2 Welding process

– Delete items a) and b) and replace by the following:

- a) successful completion of an approval test simulating the multi-process joint, i.e. the root run welded by TIG (141) without backing, subsequent runs or layers welded by MIG (131) within the limits of the range of approval for each welding process;
- b) successful completion of separate relevant approval tests one for TIG (141) without backing for the root run and a separate test for the fill by MIG (131) with backing or welded from both sides with or without gouging.

6.3 Joint types

– Delete item b) and replace by the following:

- b) approval for butt welds in plates in all relevant positions covers butt welds on pipes having an outside diameter ≥ 500 mm, except item c also applies;

6.5 Filler metal and shielding gas

– Amend the title to "Welding consumables".

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Table 6

– Add one row and one column indicated below:

Table 6: Range of approval according to welding position

Welding position of approval test piece		Range of approval																			
		Plates										Pipes									
		Butt welds					Fillet welds					Butt welds				Fillet welds					
		Pipe-axis and -angle																			
		rotating		fixed			rotating		1)		fixed										
0°		90°	45°	45°	0°		90°														
PA	PC	PG	PF	PE	PA	PB	PG	PF	PD	PA	PG	PF	PC	H-L045	PA	PB	PG	PF	PD ²⁾		
Plates	Butt welds	PA	★	-	-	-	x	x	-	-	x	-	-	-	x	x	-	-	-		
		PC	x	★	-	-	x	x	-	-	x	-	-	x	-	x	x	-	-	-	
		PG	-	-	★	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	
		PF	x	-	-	★	x	x	-	x	x	-	-	-	-	x	x	-	x	-	
		PE	x	x	-	x	★	x	x	-	x	x	-	-	-	x	x	-	x	x	
	Fillet welds	PA	-	-	-	-	★	-	-	-	-	-	-	-	-	x	-	-	-	-	
		PB	-	-	-	-	x	★	-	-	-	-	-	-	-	x	x	-	-	-	
		PG	-	-	-	-	-	-	★	-	-	-	-	-	-	-	-	-	-	-	
		PF	-	-	-	-	x	x	-	x	★	-	-	-	-	x	x	-	-	-	
		PD	-	-	-	-	x	x	-	x	★	-	-	-	-	x	x	-	-	x	
Pipes	rotating	0°	PA	x	-	-	-	x	x	-	-	-	-	-	★	-	-	-	-	-	
			PG	-	-	x	-	-	-	-	-	-	-	-	-	★	-	-	-	-	
			PF	x	-	-	x	x	x	x	x	x	-	-	-	★	-	-	-	-	-
		fixed	90°	PC	x	x	-	-	x	x	-	-	-	x	-	-	★	-	-	-	-
			45°	H-L045	x	x	-	x	x	x	x	-	x	x	x	★	x	x	-	x	x
	rotating	45°	PA	-	-	-	-	x	-	-	-	-	-	-	-	★	-	-	-	-	
			1)	PB	-	-	-	-	x	x	-	-	-	-	-	-	x	★	-	-	-
		fixed	0°	PG	-	-	-	-	-	x	-	-	-	-	-	-	-	-	★	-	-
			0°	PF	-	-	-	-	x	x	-	x	x	-	-	-	x	x	-	★	x

1) PB for pipes may be welded in two versions
(1) pipe: rotating; axis: horizontal; weld: horizontal vertical
(2) pipe: fixed; axis: vertical; weld: horizontal vertical

2) This is an approved position and is covered by the other related tests.

Key
★ indicates the welding position for which the welder is approved in the approval test
x indicates those welding positions for which the welder is also approved
- indicates those welding positions for which the welder is not approved

7.1 Supervision

– Delete the first sentence and replace by the following:

The welding and testing of test pieces shall be witnessed by an examiner or examining body.

7.3 Welding conditions

- Replace "WPS" by "WPS or pWPS" in the first and second sentence and items k) and l).
- Delete items e) and g) and align the sequence of the following items accordingly.
- Replace the last part of item c by "; cleaning and degreasing is necessary".

7.4 Test methods

- Delete the first paragraph and replace by the following:

Each completed weld shall be examined visually in the as-welded condition. When required (see table 7), visual examination can be supplemented by penetrant (see EN 571-1) or other test methods, and macro tests (see EN 1321) on butt welds.

- Delete the note after table 7.

Table 7

- Delete table 7 and replace by the following:

Table 7: Test methods

Test method	Butt weld plate	Butt weld pipe	Fillet weld
Visual	★	★	★
Radiography	★ ¹⁾	★ ¹⁾	+
Bend or tensile	★ ²⁾	★ ²⁾	+
Fracture	★ ¹⁾	★ ¹⁾	★ ³⁾⁴⁾
Macro (without polishing)	+	+	+ ⁴⁾
Penetrant	+	+	+

1) Radiography or fracture test shall be used, but not both.

2) Tensile test may be used instead of bend test, e. g. for heat treated alloys which receive no post-weld heat treatment. Bend or tensile shall be used additionally to radiography for MIG-welding (131) only.

3) The fracture test should be supported by macro examination and penetrant testing when required by the examiner or examining body.

4) The fracture test may be replaced by a macro examination of at least 4 sections, one of which will be taken from the stop/start location.

Key
★ indicates that the test method is mandatory
+ indicates that the test method is not mandatory

7.5.2 Butt welds in plate

- Delete 7.5.2 and replace by the following:

When radiography is used, the inspection length (see figure 7a) of the weld in the test piece shall be radiographed in the as-welded condition in accordance with EN 1435 using class B technique.

When fracture testing according to EN 1320 is used, the full test piece inspection length shall be tested and to do this, the test piece shall be cut into several test specimens (see figure 7a). The length of any fracture test specimen shall be ≈ 50 mm. If necessary, the excess weld metal of the test specimen may be removed and additionally the weld edges may be notched to a depth of ≈ 5 mm to facilitate fracture in the weld metal (see figure 7b). In the case of single-sided welding (ss) without backing (nb), half of the inspection length shall be tested against the face side and the other half against the root side (see figures 7c and 7d).

When transverse bend testing according to EN 910 is used, 2 root bend test specimens and 2 face bend test specimens shall be tested in accordance with EN 288-4.

During testing, the test specimens shall not reveal any one single flaw > 3 mm in any direction. Flaws appearing at the corners of a test specimen during testing shall be ignored in the evaluation.

For plate thickness ≥ 12 mm the transverse bend tests may be substituted by 4 side bend tests.

Figure 7 b)

- Replace ≈ 40 by ≈ 50 .