

# **SLOVENSKI STANDARD**

## **SIST EN 287-1:1996/A1:2001**

**01-december-2001**

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**Preskušanje za odobritev varilcev - Talilno varjenje - 1. del: Jekla - Dopolnilo 1**

Approval testing of welders - Fusion welding - Part 1: Steels

Prüfung von Schweißern - Schmelzschweißen - Teil 1: Stähle

Qualification des soudeurs - Soudage par fusion - Partie 1: Aciers

**Ta slovenski standard je istoveten z: EN 287-1:1992/A1:1997**

[SIST EN 287-1:1996/A1:2001](https://standards.iteh.ai/catalog/standards/sist/a0eefdb5-11d1-4c8c-91df-ca41fbb77ac9/sist-en-287-1-1996-a1-2001)

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**ICS:**

25.160.10      Varilni postopki in varjenje      Welding processes

**SIST EN 287-1:1996/A1:2001**

**en**

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EUROPEAN STANDARD

EN 287-1:1992/A1

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 1997

ICS 25.160.10

Descriptors: welding, fusion welding, steels, welders (personnel), qualification, specifications, inspection, tests, acceptability, quality certificate

English version

## Approval testing of welders - Fusion welding - Part 1: Steels

Qualification des soudeurs - Soudage par fusion  
- Partie 1: Aciers

Prüfung von Schweißern - Schmelzschiessen -  
Teil 1: Stähle

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This amendment 1 modifies the European Standard EN 287-1:1992. This amendment was approved by CEN on 1997-01-11. 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, 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 287-1:1992/A1:1997 to EN 287-1:1992 has been prepared by Technical Committee CEN/TC 121 "Welding", the secretariat of which is held by DS.

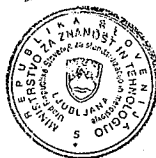
This Amendment to the European Standard EN 287-1:1992 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 1997, and conflicting national standards shall be withdrawn at the latest by October 1997.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this Amendment: Austria, Belgium, 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 <sup>1)</sup>
ISO 1106-1 :1984	Recommended practice for radiographic examination of fusion welded joints – Part 1: Fusion welded butt joints in steel plates up to 50 mm thick
ISO 1106-2 :1985	Recommended practice for radiographic examination of fusion welded joints – Part 2: Fusion welded butt joints in steel plates thicker than 50 mm and up to and including 200 mm in thickness
ISO 1106-3 :1984	Recommended practice for radiographic examination of fusion welded joints – Part 3: Fusion welded circumferential joints in steel pipes up to 50 mm wall thickness
ISO 5817 : 1992	Arc-welded joints in steel – Fusion welding – 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	Destructive tests on welds in metallic materials – Bend tests
prEN 1290	Non destructive examination of welds – Magnetic particles testing of welds – Method
EN 1320	Destructive tests on welds in metallic materials – Fracture tests
EN 1321	Destructive tests on welds in metallic materials – Macroscopic and microscopic examination of welds
prEN 1435	Non destructive examination of welds – Radiographic examination of welded joints
EN 25817	Arc-welded joints in steel – Fusion welding – Guidance on quality levels for imperfections

- 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 related to "Manual welder"))

### 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 contracting party.

#### 4.4 Miscellaneous

- Delete line 2 "gb welding with gas backing".

#### 5.2 Welding processes

- Delete "12 submerged arc welding" and replace by the following:

121 submerged arc welding with wire electrode;

- Add the following:

137 flux-cored wire metal-arc welding with inert gas shield.

##### 5.4.2.2 Group W 01

- Delete the second sentence and replace by the following:

This group also includes fine-grained structural steel with a yield strength,  $R_{eH} \leq 360 \text{ N/mm}^2$ .

##### 5.4.2.4 Group W 03

- Delete 5.4.2.4 and replace by the following:

Fine-grained structural steels normalized, quenched and tempered as well as thermomechanically treated steels with a yield strength,  $R_{eH} > 360 \text{ N/mm}^2$  as well as similarly weldable nickel steels, with a nickel content of 2% to 5%.

#### 5.5 Filler metal, shielding gas and flux

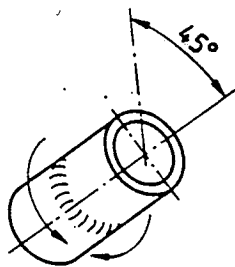
- Amend the title to "Consumables".

Figure 1

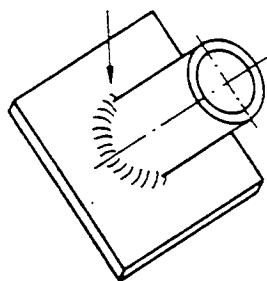
- Delete "PC Horizontal vertical" and replace by "PC Horizontal"

Figure 2

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

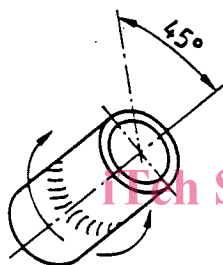


- J-L045 Pipe: fixed  
Axis: inclined  
Weld: vertical downwards;



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

- Change the drawing for H-L045 in accordance with J-L045:



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## 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 metal-arc welding with covered electrode (111) 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 metal-arc welding with covered electrode (111) 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  $\geq 500$  mm, except item c also applies;

## 6.6 Shielding gas and flux

- Amend the title to "Consumables"
- Delete the second sentence.

Table 7

– Add two rows and two columns indicated below:

Table 7: 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°			
PA		PC	PG	PF	PE	PA	PB	PG	PF	PD	PA	PG	PF	PC	H-L045	J-L045	PA	PB	PG	PF	PD <sup>2)</sup>			
Plates	Butt welds	PA		★	-	-	-	-	x	x	-	-	-	x	-	-	-	-	-	x	x	-	-	-
		PC		x	★	-	-	-	x	x	-	-	-	x	-	-	x	-	-	x	-	-	-	
		PG		-	-	★	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	
		PF		x	-	-	★	-	x	x	-	x	-	x	-	-	-	-	-	x	-	x	-	
		PE		x	-	-	x	★	x	x	-	x	x	x	-	-	-	-	-	x	x	-	x	
	Fillet welds	PA		-	-	-	-	-	★	-	-	-	-	-	-	-	-	-	-	x	-	-	-	
		PB		-	-	-	-	-	x	★	-	-	-	-	-	-	-	-	-	x	-	-	-	
		PG		-	-	-	-	-	-	-	★	-	-	-	-	-	-	-	-	-	-	-	-	
		PF		-	-	-	-	-	x	x	-	★	-	-	-	-	-	-	-	x	x	-	-	
		PD		-	-	-	-	-	x	x	-	x	★	-	-	-	-	-	-	x	x	-	x	
Pipes	Butt welds	Pipe-axis and angle	rotating	0°	PA	x	-	-	x	x	-	-	-	★	-	-	-	-	-	x	x	-	-	
				PG	-	-	x	-	-	-	x	★	-	-	-	-	-	-	-	-	x	-	-	
				PF	x	-	-	x	x	x	x	-	x	x	x	-	★	-	-	-	x	x	-	x
			fixed	90°	PC	x	x	-	-	-	x	x	-	x	-	-	-	★	-	-	x	-	-	-
				45°	H-L045	x	x	-	-	x	x	-	x	x	x	x	x	★	-	-	x	-	x	x
	Fillet welds	Pipe-axis and angle	rotating	45°	J-L045	-	-	x	-	-	-	x	-	-	-	-	-	★	-	-	x	-	-	
				PA	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	★	-	-	-	
				1)	PB	-	-	-	-	-	x	x	-	-	-	-	-	-	-	-	x	★	-	-
			fixed	0°	PG	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	★	-	-
				PF	-	-	-	-	-	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																								

- 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 in items k) and l).
- Delete items e) and g) and align the sequence of the following items accordingly.

### 7.4 Test methods

- Delete first paragraph and replace by the following:

Each completed weld shall be examined visually in the as-welded condition. When required (see table 8), visual examination can be supplemented by magnetic particle (see EN 1290), penetrant (see EN 571-1) or other test methods, and macro tests (see EN 1321) on butt welds.

Table 8

- Delete table 8 and replace by the following:

Table 8: Test methods

Test method	Butt weld plate	Butt weld pipe	Fillet weld
Visual	★	★	★
Radiography	★ <sup>1)5)</sup>	★ <sup>1)5)</sup>	+
Bend	★ <sup>2)</sup>	★ <sup>2)</sup>	+
Fracture	★ <sup>1)</sup>	★ <sup>1)</sup>	★ <sup>3)4)</sup>
Macro (without polishing)	+	+	+ <sup>4)</sup>
Magnetic particle/penetrant	+	+	+

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

2) When radiography is used, then bend tests are mandatory for the processes 131, 135 and 311.

3) The fracture test should be supported by magnetic particle/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.

5) The radiographic test may be replaced by an ultrasonic test for thickness  $\geq 8$  mm on ferritic steels only.

**Key**

★ indicates that the test method is mandatory

+ indicates that the test method is not mandatory

#### 7.5.2 Butt weld 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 pieces 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  $\approx 50$  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  $\approx 5$  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 is used, 2 root bend test specimens and 2 face bend test specimens shall be tested in accordance with EN 910. The diameter of the former or the inner roller shall be  $4t$  and the bending angle at least  $120^\circ$  unless the low ductility of the parent metal or filler metal imposes other limitations.