



# SLOVENSKI STANDARD

## SIST EN 13067:2003

01-julij-2003

---

### Osebjje za varjenje plastike - Preskušanje usposobljenosti varilcev – Varjenje plastomerov

Plastics welding personnel - Qualification testing of welders - Thermoplastics welded assemblies

Kunststoffschweißpersonal - Anerkennungsprüfung von Schweißern - Thermoplastische Schweißverbindungen

Personnel en soudage des plastiques - Epreuve de qualification des soudeurs - Assemblages soudés thermoplastiques

**iTeh STANDARD PREVIEW**  
(standards.iteh.ai)  
SIST EN 13067:2003  
<https://standards.iteh.ai/catalog/standards/sist/6a4b576e-7dfb-4e34-985f-48e1ecf0438e/sist-en-13067-2003>

**Ta slovenski standard je istoveten z: EN 13067:2003**

---

#### **ICS:**

03.100.30	Vodenje ljudi	Management of human resources
25.160.01	Varjenje, trdo in mehko spajkanje na splošno	Welding, brazing and soldering in general

**SIST EN 13067:2003**

**en**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN 13067:2003](#)

<https://standards.iteh.ai/catalog/standards/sist/6a4b576e-7dfb-4e34-985f-48e1ecf0438e/sist-en-13067-2003>

EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 13067**

April 2003

ICS 25.160.10

English version

## Plastics welding personnel - Qualification testing of welders - Thermoplastics welded assemblies

Personnel en soudage des plastiques - Epreuve de  
qualification des soudeurs - Assemblages soudés  
thermoplastiques

Kunststoffschweißpersonal - Anerkennungsprüfung von  
Schweißern - Thermoplastische Schweißverbindungen

This European Standard was approved by CEN on 9 September 2002.

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 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 Management Centre 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, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

[SIST EN 13067:2003](https://standards.iteh.ai/catalog/standards/sist/6a4b576e-7dfb-4e34-985f-48e1ecf0438e/sist-en-13067-2003)

<https://standards.iteh.ai/catalog/standards/sist/6a4b576e-7dfb-4e34-985f-48e1ecf0438e/sist-en-13067-2003>



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

## Contents

	page
Foreword.....	3
Introduction .....	4
1 Scope .....	4
2 Normative references .....	5
3 Terms and definitions.....	5
4 Admission to the test .....	7
5 Testing of skill and knowledge.....	7
5.1 General.....	7
5.2 Practical test.....	7
5.3 Theoretical test.....	7
6 Duty of Plastics Welding Examiner.....	14
7 Range of qualification .....	14
8 Welding of test piece .....	14
8.1 Test piece.....	14
8.2 Inspection requirements .....	14
8.3 Difficulties and corrections whilst welding the test piece.....	14
9 Test piece and test specimens, shapes and dimensions.....	15
10 Evaluation and acceptance criteria of test piece(s) and test specimens .....	20
10.1 General.....	20
10.2 Visual examination .....	21
10.3 Destructive tests .....	21
11 Test result and qualification test certificate.....	22
11.1 Practical test.....	22
11.2 Theoretical test.....	22
11.3 Overall assessment .....	22
11.4 Qualification test certificate.....	23
12 Failed test .....	23
13 Period of validity .....	23
13.1 Initial qualification .....	23
13.2 Prolongation .....	24
14 Qualification test certificate renewal .....	24
Annex A (informative) Welding recording sheet .....	25
Annex B (informative) Welder's test certificate format.....	26
Annex C (informative) PWE evaluation sheet for practical test.....	27

## Foreword

This document (EN 13067:2003) has been prepared by Technical Committee CEN/TC 249 "Plastics", the secretariat of which is held by IBN.

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 October 2003, and conflicting national standards shall be withdrawn at the latest by October 2003.

Annexes A, B and C are informative.

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, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 13067:2003](https://standards.iteh.ai/catalog/standards/sist/6a4b576e-7dfb-4e34-985f-48e1ecf0438e/sist-en-13067-2003)

<https://standards.iteh.ai/catalog/standards/sist/6a4b576e-7dfb-4e34-985f-48e1ecf0438e/sist-en-13067-2003>

**EN 13067:2003 (E)****Introduction**

This standard covers the principles to be observed in the qualification testing of welder performance for the welding of thermoplastic materials.

The ability of the welder to follow verbal or written instructions and testing of his skill are important factors in ensuring the quality of the welded product.

This standard is intended to provide the basis for the mutual recognition by examining bodies for qualification relating to welders competence in the various fields of application.

**1 Scope**

This standard specifies the method of testing the knowledge and skill of a welder who is required to carry out welds on thermoplastics in new constructions and repair work.

The skill examination of a welder is an essential condition for the assurance of the quality of the welding work. The application of this standard guarantees that the examination is carried out according to a uniform test procedure.

The standard applies when the contractor or the authorities responsible for the application require it. Gas and water utility network industries with alternative qualification programmes are excluded from this standard.

This standard applies to the following welding processes:

- hot gas welding: round nozzle, high speed nozzle, wedge;
- extrusion welding;
- heated tool welding: butt, saddle, socket, wedge;
- electrofusion welding: socket, saddle.

This standard applies to the welding of the following products:

- sheet;
- pipe;
- fittings;
- lining membrane.

This standard covers the welding of the following groups of materials:

- for sheets, pipes and fittings:
  - group 1: PVC (it includes all kinds of PVC-U and ABS and PC);
  - group 2: PP (it includes all kinds of PP);
  - group 3: PE (it includes all kinds of PE, PB);
  - group 4: PVDF;

- group 5: ECTFE or PFA or FEP.
- for lining membranes:
  - group 6: PVC-P;
  - group 7: PE (it includes all kinds of PE);
  - group 8: ECB.

## 2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 12814-1, *Testing of welded joints of thermoplastics semi-finished products - Part 1: Bend test.*

EN 12814-2:2000, *Testing of welded joints of thermoplastics semi-finished products - Part 2: Tensile test.*

EN 12814-4, *Testing of welded joints of thermoplastics semi-finished products - Part 4: Peel test.*

EN 12814-8, *Testing of welded joints of thermoplastics semi-finished products - Part 8: Requirements.*

EN 13100-1, *Non destructive testing of welded joints of thermoplastics semi-finished products - Part 1: Visual examination.*

[SIST EN 13067:2003](https://standards.iteh.ai/catalog/standards/sist/6a4b576e-7dfb-4e34-985f-48e1ecf0438e/sist-en-13067-2003)

<https://standards.iteh.ai/catalog/standards/sist/6a4b576e-7dfb-4e34-985f-48e1ecf0438e/sist-en-13067-2003>

## 3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply:

### 3.1

#### welding process

##### 3.1.1

##### general

technique characterized by the method of softening to obtain permanent assembly

##### 3.1.2

##### hot gas welding

welding process in which the materials to be unified are softened by hot air or inert gas and are pressed together

##### 3.1.2.1

##### round nozzle

welding process in which the pressure is applied via the welding material or a suitable attachment such as a pressure roller

##### 3.1.2.2

##### high-speed nozzle

welding process in which the welding material is suitably guided and pre-heated, the nozzle tip is provided with a profiled area to apply the welding pressure

##### 3.1.3

##### extrusion welding

welding process in which an extruder unit with a melting chamber gives the extruded material required by the thickness and shape of the joint. Hot air or inert gas heats simultaneously the base material

**EN 13067:2003 (E)****3.1.4****heated tool welding**

welding process in which the joint surfaces are adequately heated by exposure, through contact or non-contact, to heated elements and are welded under pressure

**3.1.5****electrofusion welding**

welding process concerning a joint between a socket or saddle electrofusion fitting and pipe or fitting with spigotted ends. The electrofusion fittings are heated by the Joule effect of the heating element incorporated at their jointing surfaces, causing the material to melt and the pipe and fitting surfaces to weld

**3.1.6****heated wedge**

welding process in which the lining membrane welded is gripped by rollers which guide and propel the welding machine which uses either hot gas to heat the lining membrane and the wedge to effect the weld or electrically heated wedge to heat the lining membrane in the area being welded

**3.2****Welding Procedure Specification (WPS)**

document providing in detail the required variables for a specific application to assure repeatability

**3.3****welding record sheet**

document providing in detail the variables used during the practical test

**3.4****welder**

person making a welded assembly by any process, whose manual skill and knowledge are two of the determining factors influencing the quality of the welded joint, or person performing a welding operation by means of mechanical or automatic equipment

**iTeh STANDARD PREVIEW**

(standards.iteh.ai)

[SIST EN 13067:2003](https://standards.iteh.ai/catalog/standards/sist/6a4b576e-7dfb-4e34-985f-48e1ecf0438e/sist-en-13067-2003)

<https://standards.iteh.ai/catalog/standards/sist/6a4b576e-7dfb-4e34-985f-48e1ecf0438e/sist-en-13067-2003>

**3.5****plastics fabricator**

person whose manual skill and knowledge in producing assemblies including marking out, developing complex shapes and forms, requires welding as an essential part

**3.6****Plastics Welding Examiner (PWE)**

qualified person acceptable to the contracting parties who verifies the compliance with this standard

**3.7****manufacturer**

company, contractor or organization who is responsible for the welding

**3.8****range of qualification**

welding processes, types of joint, materials, thicknesses and diameters for which a welder is qualified

**3.9****qualification test**

theoretical and practical tests in order to verify the knowledge and the skill of the welder

**3.10****test piece**

welded assembly which is used in the test

**3.11****test specimen**

part or portion cut from the test piece for the test specified



### 3.12

#### training centre

educational establishment for training plastics welding personnel and/or Plastics Welding Examiner

### 3.13

#### test house

establishment having all relevant test equipment to carry out the required tests

## 4 Admission to the test

Only welders whose training and/or for whose previous activities show that they are likely to pass the planned test may be admitted. As a rule this is the case if one of the following conditions is met:

- completed apprenticeship as plastics fabricator;
- at least two years experience as a plastics welder (company's certificate);
- completion of a technical and practical training course in preparation for the plastic welders qualification test.

## 5 Testing of skill and knowledge

### 5.1 General

During the test, the welder shall demonstrate his practical skill according to 5.2 and his theoretical knowledge according to 5.3.

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

### 5.2 Practical test

SIST EN 13067:2003

[https://standards.iteh.ai/catalog/standards/sist/6a4b576e-7dfb-4e34-985f-](https://standards.iteh.ai/catalog/standards/sist/6a4b576e-7dfb-4e34-985f-48a1eef7438a/sist-en-13067-2003)

The welder shall complete the test piece specified by the required sub-group in Table 1 or Table 2 in accordance with the relevant WPS.

All welding equipments, materials and documents necessary to complete the test piece shall be available to the welder.

The time taken by the welder to complete the test piece shall correspond to that taken under production conditions.

### 5.3 Theoretical test

The welder's knowledge of the practical working rules for skilful and safe working shall be established in the theoretical test.

This test is carried out under the supervision of the PWE. The welder shall answer a minimum of 20 questions relevant to the qualification testing. These questions shall be presented to the candidate in a written form. A multiple-choice questions form is appropriate for this test.

Completion of the theoretical test shall not exceed one hour, be continuous without access to teaching aids.

The questions shall cover the following subjects, as appropriate:

- designation and rules for welding of thermoplastics to which the test is designed to apply, meaning of the welding signs and symbols of the range of work;
- operation and monitoring of the welding equipment;
- welding processes;

**EN 13067:2003 (E)**

- knowledge concerning on-site welding;
- correct preparation of the work pieces for welding;
- familiarity of the characteristics of thermoplastics within the sub-groups;
- preventing and correcting faults when making welds;
- knowledge concerning the types of imperfections for the applied welding process(es);
- knowledge of the WPS and welding record sheet;
- awareness of the consequences of misapplying welding parameters and/or procedures;
- knowledge of non-destructive examinations and destructive tests necessary for the applied welding process(es);
- awareness of health and safety requirements for the above work.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN 13067:2003](https://standards.iteh.ai/catalog/standards/sist/6a4b576e-7dfb-4e34-985f-48e1ecf0438e/sist-en-13067-2003)

<https://standards.iteh.ai/catalog/standards/sist/6a4b576e-7dfb-4e34-985f-48e1ecf0438e/sist-en-13067-2003>

Table 1 — Sheets, pipes and fitting details of tests

Dimensions in millimetres

Group of material	Sub-groups	Type of product S = sheet P = pipe $e_n$ = nominal wall thickness $d_n$ = nominal pipe outside diameter		Welding process	Weld form	Position	Examination and testing Type of test  (See NOTE 1)	Test piece according to Figure	Range of qualification		
		SDR = $d_n / e_n$							Dimensions	Type of joint	Position
1 PVC	1.1	S	$e_n = 5$	Hot gas round nozzle	V	Flat	V/B f + r	1	All $e_n$	V, <u>V</u> , X, $\perp$	All
	1.2	S	$e_n = 5$	Hot gas high speed nozzle	V	Flat	V/B f + r	1	All $e_n$	V, <u>V</u> , X, $\perp$	All
	1.3	S	$e_n = 5$	Heated tool	]]	Machine	V/B	1	$e_n \geq 3$	]]	Machine
2 PP	2.1	S	$e_n = 10$	Hot gas high speed nozzle	X	Flat	V/B f + r	1	All $e_n$	V, <u>V</u> , X, $\perp$	All
	2.2	S	$e_n = 10$	Extrusion continuous	<u>V</u>	Flat	V/B f + r	1	$e_n \geq 3$	<u>V</u> , X, $\perp$	All
	2.3	S	$e_n = 10$	Heated tool	]]	Machine	V/B	1	$e_n \geq 3$	]]	Machine
	2.4	P	$d_n = 110$ SDR = 17,6	Heated tool	]]	Machine	V/B r	2	$e_n \geq 3$ $d_n \leq 315$	]]	Machine
	2.5	P	$d_n \geq 400$ SDR $\leq 17,6$	Heated tool	]]	Machine	V/B s	2	$d_n > 315$	]]	Machine
	2.6	P	$d_n = 63$ SDR = 11	Heated tool	Socket	Machine	V/Pc	4	All $d_n$	Socket	Machine
	2.7	P	$d_n = 63$ SDR = 11	Electrofusion	Socket	Machine	V/Pc	4	All $d_n$	Socket	Machine

(continued)

Table 1 (continued)

Dimensions in millimetres

Group of material	Sub-groups	Type of product S = sheet P = pipe $e_n$ = nominal wall thickness $d_n$ = nominal pipe outside diameter $SDR = d_n / e_n$		Welding process	Weld form	Position	Examination and testing Type of test (See NOTE 1)	Test piece according to Figure	Range of qualification		
		Dimensions	Type of joint						Position		
3 PE	3.1	S	$e_n = 10$	Hot gas high speed nozzle	X	Flat	V/B f + r	1	All $e_n$	X, V, $\underline{V}$ , $\perp$	All
	3.2	S	$e_n = 10$	Extrusion continuous	$\underline{V}$	Flat	V/B f + r	1	$e_n \geq 3$	$\underline{V}$ , X, $\perp$	All
	3.3	S	$e_n = 10$	Heated tool	][	Machine	V/B	1	$e_n \geq 3$	][	Machine
	3.4	P	$d_n = 110$ or $d_n = 180$ SDR = 11 or SDR = 17,6	Heated tool	][	Machine	V/T	2	$d_n \leq 315$	][	Machine
	3.5	P	$d_n \geq 400$ SDR $\leq 17,6$	Heated tool	][	Machine	V/T	2	$d_n > 315$	][	Machine
	3.6	P	$d_n = 90$ SDR = 11	Electrofusion	Socket	Machine	V/Pd	4	$d_n \leq 225$	All socket	Machine
	3.7	P	$d_n = 315$ SDR = 17,6	Electrofusion	Socket	Machine	V/Pd	4	$d_n > 180$	All socket	Machine
	3.8	P	$d_n = 32$ on $d_n = 90$ SDR = 11	Electrofusion	Saddle	Machine	V/Pd	5	All $d_n$	All saddle	Machine
	3.9	P	$d_n = 63$ SDR = 11	Heated tool	Socket	Machine	V/Pc	4	All $d_n$	All socket	Machine
	3.10	P	$d_n = 32$ on $d_n = 90$ SDR = 11	Heated tool	Saddle	Machine	V/Pc	5	All $d_n$	All saddle	Machine

(continued)