SLOVENSKI STANDARD
SIST EN 13067:2014

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Nadomešča:
SIST EN 13067:2003

Osebje za varjenje polimerov - 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 - Épreuve de qualification des soudeurs - Assemblages soudés thermoplastiques

Ta slovenski standard je istoveten z: **EN 13067:2012**

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
83.080.20	Plastomeri	Thermoplastic materials

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EUROPEAN STANDARD

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English Version

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

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

Kunststoffschweißpersonal - Anerkennungsprüfung von Schweißern - Thermoplastische Schweißverbindungen

This European Standard was approved by CEN on 22 September 2012.

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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 13067:2012) has been prepared by Technical Committee CEN/TC 249 “Plastics”, the secretariat of which is held by NBN.

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of an identical text or by endorsement, at the latest by May 2013, and conflicting national standards shall be withdrawn at the latest by May 2013.

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

This document supersedes EN 13067:2003.

In this revision, the scope of this standards includes solvent welding: socket and covers the welding of the polypropylene (PP) lining membranes (group 9: PP).

According to the CEN/CENELEC Internal Regulations, the national standards organisations 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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 European 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.

This European 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 European 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;

— solvent welding: socket.

This European Standard applies to the welding of the following products:

— sheet;

— pipe;

— fittings;

— lining membrane.

This European Standard covers the welding of the following groups of materials:

a) for sheets, pipes and fittings:

   1) group 1: PVC (including all kinds of PVC-U, PVC-C), ABS;

   2) group 2: PP (including all kinds of PP);

   3) group 3: PE (including all kinds of PE);

   4) group 4: PVDF;

   5) group 5: ECTFE or PFA or FEP;

b) for lining membranes:

   1) group 6: PVC-P;

2) group 7: PE (including all kinds of PE);

3) group 8: ECB;

4) group 9: PP.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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*

EN 14728, *Imperfections in thermoplastic welds — Classification*

EN ISO/IEC 17024:2003, *Conformity assessment — General requirements for bodies operating certification of persons (ISO/IEC 17024:2003)*

EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025)*

3 Terms and definitions

For the purposes of this document, the terms and definitions from EN ISO/IEC 17024:2003 and the following apply.

3.1
AD-WLD break
failure mode in an extrusion welded membrane peel test specimen where the failure is through the weld material

3.2
certificate issuing authority
establishment responsible for approving the PWE and or the Invigilator

3.3
invigilator
qualified person approved by Certificate Issuing Authority (CIA) who can supervise the practical and theoretical tests

Note 1 to entry: 3.3 and 3.5 can be the same person.

3.4
manufacturer
company, contractor or organisation who is responsible for the welding

3.5
Plastics Welding Examiner
PWE
qualified person approved by Certificate Issuing Authority (CIA) who verifies the compliance with this standard

3.6
qualification test
theoretical and practical tests in order to verify the knowledge and the skill of the welder

3.7
range of qualification
welding processes, types of joint, materials, thicknesses and diameters for which a welder is qualified

3.8
test piece
assembly which is welded during the practical test

3.9
test specimen
part or portion cut from the test piece for the test specified

3.10
test house
establishment having all relevant test equipment to carry out the required tests and working in compliance with EN ISO/IEC 17025

3.11
training centre
educational establishment for training plastics welding personnel and/or Plastics Welding Examiner, approved by CIA

3.12
welding process
technique characterized by the method of softening to obtain permanent assembly

3.12.1
electrofusion welding
softening of fitting and pipe surfaces to be welded is obtained by means of a heating element embedded in the fitting which remain between welded joints

3.12.2
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 parent material

3.12.3
heated tool welding
welding process in which the joint surfaces are adequately heated by exposure, through direct contact with heated elements and are welded under pressure, which includes butt fusion welding (also called hot plate welding, platen welding or mirror welding) and socket fusion welding

3.12.4
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

3.12.5
high-speed nozzle
welding process in which the welding rod is suitably guided and pre-heated and the nozzle tip is provided with a profiled area to apply the welding pressure

3.12.6
hot gas welding
welding process in which the materials to be unified are softened by hot air or inert gas and are pressed together

3.12.7
round nozzle
welding process in which the pressure is applied via the welding rod or a suitable attachment such as a pressure roller

3.12.8
solvent welding
softening of fitting and pipe surfaces, by means of a solvent contained in the cement

Note 1 to entry: After suitable cure time, the solvent dries leaving the parent material in the interface between welded joints.

3.13
welding Procedure Specification
WPS
document providing in detail the required variables for a specific application to assure repeatability

3.14
welding record sheet
document recording in detail the variables used during the practical test

3.15
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

4 Admission to the qualification tests

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 confirmed by manufacturer's declaration;

— completion of both a technical and practical training course in preparation for the plastic welders qualification test.

An example of a suitable training course is defined in Entry [1] in the Bibliography or may be identified in national standards.

5 Testing of skill and knowledge

5.1 General

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

5.2 Practical test

This test is carried out under the supervision of the PWE or Invigilator.

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 equipment, materials and documents necessary to complete the test piece shall be available to the welder.

All welding shall be performed in a horizontal position.

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

5.3 Theoretical test

This test is carried out under the supervision of the PWE or Invigilator.

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

The welder shall answer a minimum of 20 multiple-choice questions relevant to the qualification testing.

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:

— 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 control of the welding equipment;

— welding processes;

— knowledge concerning on-site welding;

— correct preparation of the work pieces for welding;

— knowledge concerning the characteristics of thermoplastics within the sub-groups;

— knowledge concerning the characteristics of solvents / cements within the relevant sub-group;

— preventing and correcting faults when making welds;

— knowledge concerning the types of imperfections for the applied welding process(es);

— knowledge concerning the WPS and welding record sheet;

— awareness of the consequences of misapplying welding parameters and/or procedures;

— knowledge concerning non-destructive examinations and destructive tests necessary for the applied welding process(es);

— awareness of health and safety requirements for the above work.

Table 1 — Sheets, pipes and fitting details of tests *(1 of 3)*

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[b]	Examination and testing Type of test [a]	Test piece according to Figure	Range of qualification	
								Dimensions	Type of joint [b]
1 PVC	1.1	S	e_n=5	Hot gas round nozzle	$\underline{V}$	V/ B f+r	1	All e_n	$\underline{V}$,X,⊥
	1.2	S	e_n=5	Hot gas high speed nozzle	$\underline{V}$	V/ B f+r	1	All e_n	$\underline{V}$,X,⊥
	1.3	S	e_n=5	Heated tool	][	V/ B	1	$e_n \geq 3$	][
	1.4	P	d_n=40 and d_n=110 SDR≤21	Solvent Welding	I	V/ VIs	4	d_n< 160	I
	1.5	P	d_n≥160 SDR≤21	Solvent Welding	I	V/ VIs	4	d_n≥160	I
2 PP	2.1	S	e_n=9 or 10	Hot gas high speed nozzle	X	V/ B f+r	1	All e_n	$\underline{V}$,X,⊥
	2.2	S	e_n=9 or 10	Extrusion continuous	$\underline{V}$	V/ B f+r	1	$e_n \geq 3$	$\underline{V}$,X,⊥
	2.3	S	e_n=9 or 10	Heated tool	][	V/ B	1	$e_n \geq 3$	][
	2.4	P	d_n=110 SDR≤17,6	Heated tool	][	V/ B	2	$e_n \geq 3$ $d_n \leq 315$	][
	2.5	P	d_n≥400 SDR≤17,6	Heated tool	][	V/ B s	2	d_n> 315	][
	2.6	P	d_n=63 SDR≤17,6	Heated tool [c]	I	V/ Pc	4	All d_n	I
	2.7	P	d_n=63 SDR≤17,6	Electrofusion	I	V/ Pc	4	All d_n	I