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Platics welding personnel - Qualfication of welders - Thermoplastics welded assemblies

Kunststoffschweißpersonal - Anerkennungsprüfung von Schweißern - Thermoplastische Schweißverbindungen

iTeh STANDARD PREVIEW

Personnel en soudage des plastiques - Qualification des soudeurs - Assemblages soudés thermoplastiques

SIST EN 13067:2020

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EUROPEAN STANDARD

EN 13067

NORME EUROPÉENNE

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Supersedes EN 13067:2012

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Plastics welding personnel - Qualification of welders - Thermoplastics welded assemblies

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

Kunststoffschweißpersonal - Qualifizierung von
Schweißern - Thermoplastische Schweißverbindungen

This European Standard was approved by CEN on 26 July 2020.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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EN 13067:2020 (E)**European foreword**

This document (EN 13067:2020) 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of an identical text or by endorsement, at the latest by March 2021, and conflicting national standards shall be withdrawn at the latest by March 2021.

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 13067:2012.

In comparison with the previous edition EN 13067:2012, the following technical modifications have been made:

- in Clause 1 Scope for the different group of materials in a) for sheets, pipes and fittings, group 1 includes also ABS; b) is for lining membranes and flooring. In c) for pipes and fittings, the group 10 is for PA-U 11 or PA-U 12;
- subclause 5.3 has been redrafted with subclause 5.3.1 General, making reference to Table 3 - Welding processes for the theoretical test and Table 4 - Minimum number of questions for the theoretical test, and with subclause 5.3.2 Questions;
- in Table 1, the group of material 10 PA-U has been added;
- in Table 2 for the group of material 6 PVC-P the range of e_n has been modified from $e_n = 2$ to $1 \leq e_n \leq 3$ and the sub-groups 6.5, 6.6 have been added; for the group of material 7 PE, the sub-groups 7.6, 7.7 and 7.8, have been added and the range of the nominal wall thickness is: $0,75 \leq e_n \leq 1$;
- Figure 9 — Test piece for lining membranes – Butt weld with V preparation, has been added and the numbering of the other ones has been changed;
- in 10.3.4 indications have been added for the tensile test of test specimens of PE pipes with wall thicknesses greater than 30 mm;
- subclause 10.4 Non-destructive tests on the high voltage test, has been added;
- Clause 11 is only for test result, there is no more reference to qualification test certificate.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This document 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 document 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.

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EN 13067:2020 (E)**1 Scope**

This document 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 document guarantees that the examination is carried out according to a uniform test procedure.

This document 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 document.

This document applies to the following welding processes:

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

This document applies to the welding of the following products:

- sheet;
- pipe (unreinforced, solid wall only);
- fittings (unreinforced only);
- lining membrane.

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

- a) for sheets, pipes and fittings:
 - group 1: PVC (including all kinds of PVC-U, PVC-C) or ABS;
 - group 2: PP (including all kinds of PP);
 - group 3: PE (including all kinds of PE);
 - group 4: PVDF;
 - group 5: ECTFE or PFA or FEP;
- b) for lining membranes and flooring:
 - group 6: PVC-P;
 - group 7: PE (including all kinds of PE);

- group 8: ECB;
 - group 9: PP;
- c) for pipes and fittings only:
- group 10: PA-U 11 or PA-U 12.

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.

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 13100-4, *Non destructive testing of welded joints of thermoplastics semifinished products - Part 4: High voltage testing*

EN 14728, *Imperfections in thermoplastic welds - Classification*

EN ISO 6947, *Welding and allied processes - Welding positions (ISO 6947)*

CEN/TS 16892, *Plastics - Welding of thermoplastics - Specification of welding procedures*

ISO 13955, *Plastics pipes and fittings - Crushing decohesion test for polyethylene (PE) electrofusion assemblies*

3 Terms and definitions

For the purposes of this document, the following term and definition apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1

AD-WLD break

failure mode in an extrusion welded membrane peel test specimen where the failure is through the weld material

EN 13067:2020 (E)**3.2****applicant**

person who has submitted an application to be admitted into the qualification process

3.3**assessment**

process that evaluates a person's fulfilment of the requirements of the qualification scheme

3.4**candidate**

applicant who has fulfilled specified prerequisites and has been admitted to the qualification process

3.5**qualification body**

independent entity that administers qualifications of plastics welders and approves the PWE and/or the invigilator

3.6**invigilator**

qualified person, approved by the qualification body who can oversee the practical and theoretical tests

3.7**manufacturer**

company, contractor or organization who is responsible for the welding

3.8**Plastics Welding Examiner**

PWE

qualified person approved by the qualification body, who verifies the compliance with this document

3.9**qualification test**

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

3.10**range of qualification**

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

3.11**test piece**

assembly which is welded during the practical test

3.12**test specimen**

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

3.13**test house**

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

3.14**training centre**

educational establishment for training plastics welding personnel and/or Plastics Welding Examiner approved by the qualification body

3.15**welding process**

technique characterized by the method of softening to obtain permanent assembly

3.15.1**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

3.15.2**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

Note 1 to entry: Hot air or inert gas heats simultaneously the parent material.

3.15.3**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

3.15.4**heated wedge welding**

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

3.15.5**hot gas speed welding**

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

3.15.6**hot gas welding**

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

3.15.7**hot gas round nozzle welding**

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

3.15.8**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.

EN 13067:2020 (E)**3.16****welding procedure specification****WPS**

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

3.17**welding record sheet**

document recording in detail the variables used during the practical test

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

- completed apprenticeship as plastics fabricator;
- at least two years of 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 candidate shall demonstrate his practical skill according to 5.2 and his theoretical knowledge according to 5.3.

5.2 Practical test

This part of the qualification test is carried out under the supervision of the PWE or invigilator.

The candidate 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 candidate.

All welding shall be performed in the flat position (PA), according to EN ISO 6947.

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

5.3 Theoretical test

5.3.1 General

This part of the qualification test is carried out under the supervision of the PWE or invigilator.

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

The candidate shall answer 20 multiple-choice questions for one welding process. If the candidate is being tested in more than one welding process, the number of multiple-choice questions shall be increased by five per welding process up to a maximum of 45. The different welding processes are defined in Table 3.

The minimum number of general and welding process specific questions are given in Table 4.

Completion of the 20 questions theoretical test shall not exceed one hour and be continuous without access to teaching aids. For any extra question a maximum time of 3 min shall be added to the previous hour.

The questions shall cover the subjects in 5.3.2 as appropriate.

5.3.2 Questions

The questions shall cover the following general and welding process specific subjects.

General subjects:

- 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;
- knowledge concerning on-site welding;
- knowledge concerning the characteristics of thermoplastics within the sub-groups;
- knowledge concerning WPSs and welding record sheets;
- 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.

Subjects specific to each welding process:

- operation and control of the welding equipment;
- welding processes (for solvent welding, this includes the characteristics of solvents / cements within the relevant sub-group);
- correct preparation of the work pieces for welding;
- preventing and correcting faults when making welds;
- knowledge concerning the types of imperfections for the applied welding process(es);
- awareness of the consequences of misapplying welding parameters and/or procedures.