



SLOVENSKI STANDARD
SIST-TS CEN/TS 16892:2016
01-marec-2016

Polimerni materiali - Varjenje plastomerov - Specifikacija varilnih postopkov

Plastics - Welding of thermoplastics - Specification of welding procedures

Kunststoffe - Schweißen von thermoplastischen Kunststoffen - Anforderung von Schweißverfahren

Plastiques - Soudage des matériaux thermoplastiques - Spécification de modes opératoires de soudage

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Ta slovenski standard je istoveten z: **CEN/TS 16892:2015**

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TECHNICAL SPECIFICATION
SPÉCIFICATION TECHNIQUE
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ICS 25.160.10

English Version

**Plastics - Welding of thermoplastics - Specification of
welding procedures**

Plastiques - Soudage des matériaux thermoplastiques -
Spécification de modes opératoires de soudage

Kunststoffe - Schweißen von thermoplastischen
Kunststoffen - Anforderung von Schweißverfahren

This Technical Specification (CEN/TS) was approved by CEN on 13 November 2015 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European foreword

This document (CEN/TS 16892:2015) has been prepared by Technical Committee CEN/TC 249 “Plastics”, the secretariat of which is held by NBN.

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CEN/TS 16892:2015 (E)**1 Scope**

This Technical Specification provides guidance for the minimum content of welding procedure specifications for the following welding processes:

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

This Technical Specification applies to the welding of the following products and semi-finished products made of thermoplastic materials:

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

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1**welding procedure**

specified course of action to be followed in making a weld, including the welding process(es), reference to materials, welding consumables, preparation, preheating (if necessary), method and control of welding and necessary equipment to be used

3.2**welding process**

technique characterized by the method of softening to obtain permanent assembly

3.3**welding procedure specification****WPS**

document that has been qualified and provides the required variables of the welding procedure to ensure repeatability during production welding

3.4**work instruction**

simplified welding procedure specification (WPS), suitable for direct application

3.5**welding procedure qualification record****WPQR**

record comprising all necessary data needed for qualification of a welding procedure specification

3.6**welding consumable**

materials consumed in the making of a weld, including filler material

3.7**essential variable**

welding condition that influences the quality of the welded joint and requires qualification

3.8**non essential variable**

welding condition addressed in the WPS, but not requiring qualification

3.9**parent material**

parts to be joined by welding

3.10**welding organization**

organization responsible for the welding production

4 Technical content of welding procedure specification (WPS)**4.1 General**

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A Welding Procedure Specification (WPS) shall provide all the necessary information required to make a weld.

The minimum information required in a WPS is given in 4.2 to 4.5.

Welding procedure specifications cover a certain range for each essential / non-essential variable.

A work instruction can be prepared for each specific job as part of detailed production planning.

Examples of the WPS format are shown in Annexes A, B, C, D, E, F, G, H, I.

The procedure for measuring each variable should be according to agreed specifications.

4.2 Related to the welding organization

- Identification of the welding organization;
- WPS number;
- Welding Procedure Qualification Record (WPQR) number, if applicable;
- signature of the person responsible for approval, appointed by the welding organization.

4.3 Related to the parent material(s)**4.3.1 Parent material(s) type**

- Designation of the material(s) and reference standard(s), if any.

An alternative identification shall be used if a reference standard does not exist.

CEN/TS 16892:2015 (E)**4.3.2 Parent material(s) dimensions**

- Thicknesses (Standard Dimension Ratio (SDR) for pipes and spigot fittings);
- nominal diameters (for pipes and fittings).

4.4 Common to all welding procedures**4.4.1 Joint preparation**

- Cutting and surface preparation method (e.g. machining or scraping);
- initial cleaning (chemical or mechanical);
- jiggling, fixtures, clamping.

4.4.2 Welding process**4.4.3 Joint design**

- Joint and weld type;
- a sketch of the joint design/configuration and dimensions or reference to standards which provide such information.

4.4.4 Welding position

- Welding positions (in accordance with EN ISO 6947, where applicable).

4.4.5 Ambient temperature

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4.5 Specific to a welding process**4.5.1 Hot gas round nozzle and high speed nozzle welding**

- Initial joint geometry;
- weld rod/wire [cross-section geometry, e.g. round, triangular, designation of the material(s) and reference standard(s), dimensions (size)];
- welding speed;
- gas type;
- backing (method and type of backing, backing material and dimensions);
- nozzle diameter;
- gas flow rate;
- gas temperature;
- torch angle;
- rod/wire angle;
- distance between gas nozzle and workpiece (round nozzle welding only);

- interpass cleaning;
- back gouging (method to be used, depth and shape);
- weld run sequence.

4.5.2 Heated tool butt welding

- Heater plate temperature;
- initial bead-up (or alignment) interfacial pressure;
- initial bead size at end of bead-up (or alignment) time;
- heat soak (or heating up) interfacial pressure;
- heat soak (or heating up) time;
- heater plate removal (dwell or change-over) time;
- time to achieve interfacial fusion jointing pressure (or joining pressure build-up time);
- fusion jointing (or joining) interfacial pressure;
- minimum cooling time in the machine under pressure;
- minimum cooling time out of the machine without pressure.

NOTE The pressure on the welding machine needs to be calculated from the **interfacial** pressures and the surface areas of the parts to be welded.

4.5.3 Extrusion welding

- Initial joint geometry;
- welding shoe design;
- hot gas temperature;
- extrudate temperature;
- extrudate output;
- gas type;
- backing (method and type of backing, backing material and dimensions);
- gas flow rate;
- welding speed;
- cooling time;
- filler material (material designation, wire or pellet, wire diameter);
- interpass cleaning;

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- welding equipment maximum output;
- weld run sequence.

4.5.4 Solvent socket welding

- Socket fitting material designation and standard;
- cement (production date, expiry date, standard reference, method and type of application, application, curing time);
- primer (type, production date, method and time of application);
- pipe chamfering angle and depth;
- pipe insertion depth;
- pipe and fitting insertion method (manual / mechanical, manufacturer and type for mechanical devices).

4.5.5 Heated tool wedge welding

- Overlap length;
- heated wedge temperature;
- welding speed;
- welding force;
- heated wedge type;
- nip roller type.

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4.5.6 Hot gas wedge welding

- Overlap length;
- hot gas temperature;
- welding speed;
- welding force;
- nip roller type.

4.5.7 Socket fusion

- Heated tool temperature;
- pipe chamfering angle and depth;
- pipe insertion depth;
- heating time;
- changeover time;

- cooling time (fixed pipes);
- cooling time (before joint can be loaded);
- pipe and fitting insertion method (manual / machine).

4.5.8 Electrofusion socket

- Manual or automatic data input;
- fitting manufacturer;
- minimum external diameter of the unscrapped element (e.g. for electrofusion socket welding, measured at pipe end);
- insertion depth;
- voltage;
- current type (AC/DC);
- preheating voltage and time (if applicable);
- single or multiple coil fitting;
- heating time;
- minimum cooling time (before removing clamps);
- minimum cooling time out of clamps (before joint can be loaded).

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4.5.9 Electrofusion saddle

- Manual or automatic data input;
- fitting manufacturer;
- minimum external diameter of the unscrapped pipe measured at the point of assembly;
- voltage;
- current type (AC/DC);
- single or multiple coil fitting;
- heating time;
- cooling time;
- assembling load method.