# SLOVENSKI STANDARD
# oSIST prEN ISO 472-3:2026

**01-december-2026**

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**Polimerni materiali - Slovar - 3. del: Varjenje in toplotno spajanje plastike (ISO/DIS 472-3:2026)**

Plastics - Vocabulary - Part 3: Welding and thermal staking of plastics (ISO/DIS 472-3:2026)

Kunststoffe - Fachwörterverzeichnis - Teil 3: Thermisches Fügen von Kunststoffen (ISO/DIS 472-3:2026)

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|---|---|---|
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# DRAFT International Standard

# ISO/DIS 472-3

# Plastics — Vocabulary —

## Part 3: Welding and thermal staking of plastics

*Plastiques — Vocabulaire —*

*Partie 3: Soudage et collage thermique des plastiques*

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This document was prepared by Technical Committee ISO/TC 61, *[Plastics]*, Subcommittee SC 11, *[Products] in collaboration with Commission VI, Terminology, of the International Institute of Welding (IIW)*.

A list of all parts in the ISO 472 series can be found on the ISO website.

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# Introduction

The following information is included for each term in each of the three languages currently available (English, French and German):

— term ID – unique for each term;

— term;

— definition;

— note (where applicable).

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# Plastics — Vocabulary —

# Part 3: Welding and thermal staking of plastics

## 1 Scope

The ISO 472 series defines terms used in the plastics industry, including terms and definitions appearing in the plastics standards of ISO/TC 61 and general terms and definitions of polymer science used in all aspects of plastics technology.

This document defines terms used in the plastics standards of ISO TC61/SC11 Plastics Products and relevant terms applied in the area of welding (including solvent welding) and thermal staking.

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

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When a term has one or more synonyms, they follow the preferred term. The synonyms are listed in alphabetical order. Deprecated terms are indicated by “DEPRECATED”.

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Some definitions in this International Standard begin with information in angled brackets. This has been added to indicate limitation of the definition to a particular field.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

### 3.1 Terms related to welding processes

#### 3.1.1 General terms

**3.1.1.1**
**joining**, noun
assembling, noun
DEPRECATED: jointing
process of connecting materials

Note 1 to entry: Includes *welding* (3.1.1.9), adhesive bonding and mechanical joining.

**3.1.1.2**
**manual welding**, noun
*welding* (3.1.1.9) in which the welding device is manipulated by hand

[SOURCE: ISO/TR 25901-1:2016 [1] , 2.1.1.8, modified - “electrode holder, gun, torch or blowpipe” in the definition has been replaced by “welding device”.]

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**3.1.1.3**
**semi-automatic welding**, noun
process performed manually with equipment controlling one or more of the process parameters

[SOURCE: AWS A3.0M/A3.0:2020 [2] , modified - “An operation” in the definition for semiautomatic process has been replaced by “process” and “conditions” has been replaced by “parameters”.]

**3.1.1.4**
**staking**, noun
process of melting and reforming a plastic stud to mechanically lock a dissimilar material in place

Note 1 to entry: Includes heat staking - hot air, heat staking - electrical, heat staking – infrared, ultrasonic staking.

[SOURCE: AWS G1.1M/G1.1:2006 [3] , modified - Note 1 to entry has been added.]

**3.1.1.5**
**swaging**, noun
process of capturing another part of an assembly by melting and reforming a ridge of plastic

[SOURCE: AWS G1.1M/G1.1:2006 [3]]

**3.1.1.6**
**thermal joining**, noun
processes in which the thermoplastic parts to be joined are melted by the application of heat and, after *joining (3.1.1.1) and cooling, form a solid joint*

**3.1.1.7**
**weld**, noun
result of *welding* (3.1.1.9)

[SOURCE: ISO/TR 25901-1:2016 [1] , 2.1.1.3, modified - Note 1 to entry has been removed.]

**3.1.1.8**
**welder**, noun
person making a welded assembly by any *manual welding* (3.1.1.2) process

Note 1 to entry: The manual skill and knowledge of the welder are two of the determining factors influencing the quality of the welded joint.

[SOURCE: EN 13067:2020 [4] , 3.18, modified - “or person performing a welding operation by means of mechanical or automatic equipment” in the definition has been removed and “any process” has been replaced by “any manual welding process”.]

**3.1.1.9**
**welding**, noun
process of uniting softened surfaces of materials, generally with the aid of heat

[SOURCE: ISO 472:2013/Amd 1:2018 [5] , 2.1252, modified – Note 1 to entry deleted.]

**3.1.1.10**
**welding process**, noun
technique characterized by the method of softening to obtain permanent assembly

[SOURCE: EN 13067:2020 [4] , 3.15]

### 3.1.2 Welding processes

**3.1.2.1**
**angular vibration welding**, noun
angular welding, noun
*vibration welding* (3.1.2.53) process which uses reciprocating rotational movements to create heating and melting at surfaces in contact under pressure

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**3.1.2.2**
**contour laser welding**, noun
*transmission laser welding* (3.1.2.47) process where the laser beam is guided sequentially along a predetermined *weld* (3.1.1.7) path and the laser beam moves along the path just once

**3.1.2.3**
**diffusion welding**, noun
DEPRECATED: diffusion bonding
*welding process* (3.1.1.10) whereby the workpieces are kept in contact under specified continual pressure and are heated in their entirety at a defined temperature over a controlled time

Note 1 to entry: The molecules from two polymer surfaces under pressure intermingle over time with no, or very little, deformation.

Note 2 to entry: *Welding* (3.1.1.9) is carried out at a temperature below the melting point of semi-crystalline polymers or below the glass transition temperature of amorphous polymers.

[SOURCE: ISO/TR 25901-3:2016 [6] , 2.2.1.8.1, modified - "welding with pressure" in the definition has been replaced by "welding process" and Notes to entry have been replaced.]

**3.1.2.4**
**direct drive spin welding**, noun
**servo-drive spin welding**, noun
*spin welding* (3.1.2.46) using constant speed rotation

[SOURCE: ISO/TR 25901-3:2016 [6] , 2.2.1.6.4, modified - "friction" in the definition for "direct drive friction welding" has been replaced by "spin".]

**3.1.2.5**
**direct laser welding**, noun
laser welding process where both parts are opaque to the laser energy and heating is from the laser contact surface(s)

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**3.1.2.6**
**electrofusion saddle welding**, noun
*electrofusion welding* (3.1.2.8) process between an *electrofusion saddle fitting* (3.1.8.4) and a pipe

**3.1.2.7**
**electrofusion socket welding**, noun
*electrofusion welding* (3.1.2.8) process between an *electrofusion socket fitting* (3.1.8.5) and a pipe or fitting with spigotted ends

**3.1.2.8**
**electrofusion welding**, noun
**EF welding**, noun
*resistive implant welding* (3.1.2.39) process for *joining* (3.1.1.1) thermoplastic pipes, in which softening of fitting and pipe surfaces to be welded is obtained by means of a heating element embedded in the fitting, which remains in the joint

Note 1 to entry: Includes *electrofusion socket welding* (3.1.2.7) and *electrofusion saddle welding* (3.1.2.6).

[SOURCE: EN 13067:2020 [4] , 3.15.1, modified - "resistive implant welding process for joining thermoplastic pipes, in which" has been added to the definition and "which remain between welded joint" has been replaced by "which remains in the joint".]

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**3.1.2.9**
**extrusion welding**, noun
hot gas extrusion welding, noun
*hot gas welding* (3.1.2.24) process in which a molten *extrudate* (3.1.8.6) is extruded into a preheated *weld* (3.1.1.7) groove

[SOURCE: AWS A3.0M/A3.0:2020 [2] , modified - "A welding process" in the definition has been replaced by "hot gas welding process".]

**3.1.2.10**
**flash-free welding**, noun
*welding* (3.1.1.9) techniques for pipes, sheets and rods that do not generate any *flash* (3.1.3.1) and the melt is fully constrained within the *weld* (3.1.1.7)

[SOURCE: [7]]

**3.1.2.11**
**flow fusion welding**, noun
beadless welding, noun
*flash-free welding* (3.1.2.10) process for *joining* (3.1.1.1) butting ends of workpieces using a band(s) placed across the joint to heat the constrained *weld* (3.1.1.7) zone

[SOURCE: AWS A3.0M/A3.0:2020 [2] , modified - "A welding process" in the definition has been replaced by "flash-free welding process".]

**3.1.2.12**
**FSW**, noun
**friction stir welding**, noun
*friction welding* (3.1.2.13) process producing a *weld* (3.1.1.7) by the frictional heating and mixing of material in the molten or plastic state caused by a rotating tool or vibrating blade that traverses along the *weld* (3.1.1.7)

Note 1 to entry: Includes *viblade welding* (3.1.2.52).

[SOURCE: ISO/TR 25901-3:2016 [6] , 2.2.1.6.9, modified - "joining" in the definition has been replaced by "friction welding", "plastic state" has been replaced by "molten or plastic state", "rotating tool" has been replaced by "rotating tool or vibrating blade" and Note 1 to entry has been replaced.]

**3.1.2.13**
**friction welding**, noun
*welding processes* (3.1.1.10) in which the surfaces to be united are softened by heat generated by friction

Note 1 to entry: Includes *spin welding* (3.1.2.46), *ultrasonic welding* (3.1.2.51), *vibration welding* (3.1.2.53), *orbital welding* (3.1.2.35), *angular vibration welding* (3.1.2.1) and *friction stir welding* (3.1.2.12).

[SOURCE: ISO 472:2013/Amd 1:2018 [5] , 2.421, modified – "spin welding" has been deleted as an admitted term, "pressure-welding process" in the definition has been replaced by "welding processes" and Note 1 to entry has been added.]

**3.1.2.14**
**heated tool welding**, noun
*welding processes* (3.1.1.10) in which the joint surfaces are adequately heated by exposure, through direct contact with heated elements and are welded under pressure

Note 1 to entry: Includes *hot plate welding* (3.1.2.25), *socket fusion welding* (3.1.2.43), *saddle fusion welding* (3.1.2.40) and *heated wedge welding* (3.1.2.15).

[SOURCE: EN 13067:2020 [4] , 3.15.3, modified - "which includes butt fusion welding (also called hot plate welding, platen welding or mirror welding) and socket fusion welding" in the definition has been replaced by Note 1 to entry.]

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**3.1.2.15**
**heated wedge welding**, noun
hot wedge welding, noun
hot wedge seaming, noun
heated tool wedge welding, noun
hot shoe welding, noun
DEPRECATED: fusion welding
*heated tool welding* (3.1.2.14) process in which the lining membrane welded is gripped by rollers which guide and propel the *welding* (3.1.1.9) machine which uses either hot gas to heat the lining membrane and the wedge to effect the *weld* (3.1.1.7) or electrically heated wedge to heat the lining membrane in the area being welded

[SOURCE: EN 13067:2020 [4] , 3.15.4]

**3.1.2.16**
**heat sealing**, noun
*welding processes* (3.1.1.10) for *joining* (3.1.1.1) two or more thin layers of material, at least one of which is a thermoplastic film, by the simultaneous application of heat and pressure to the areas to be joined

Note 1 to entry: Includes *hot bar welding* (3.1.2.18), *impulse welding* (3.1.2.27) and *hot air seam welding* (3.1.2.17).

[SOURCE: ISO 472:2013/Amd 1:2018 [5] , 2.458, modified - “process of bonding” in the definition has been replaced by “welding processes”, “heating areas in contact with each other to the temperature at which fusion of the thermoplastic film(s) occurs, the bonding usually being completed by the application of pressure” has been replaced by “the simultaneous application of heat and pressure to the areas to be joined” and Note 1 to entry has been added.]

**3.1.2.17**
**hot air seam welding**, noun
hot air seaming, noun
*heat sealing* (3.1.2.16) process where high temperature air or gas is introduced between two films or sheets to facilitate localized surface melting

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Note 1 to entry: Pressure is applied to the top or bottom sheet, forcing together the two surfaces to form a continuous *weld* (3.1.1.7).

[SOURCE: GRI-GM19:2002 [8] , modified – definition has been revised.]

**3.1.2.18**
**hot bar welding**, noun
hot bar sealing, noun
*heat sealing* (3.1.2.16) process where a heated metal bar is pressed against the films to be welded

[SOURCE: [7] , modified - “method for joining thermoplastic films and thin sheets” in the definition has been replaced by “heat sealing process”.]

**3.1.2.19**
**hot gas convection welding**, noun
*hot gas welding* (3.1.2.24) process where the parts to be joined are heated using either a hot inert gas or exhaust gases from combustion of natural gas

**3.1.2.20**
**hot gas manual welding without welding rod**, noun
*hot gas welding* (3.1.2.24) process where a *hot gas torch* (3.3.21) fitted with a *fish-tail nozzle* (3.3.15) is used to *weld* (3.1.1.7) lining membranes by blowing hot air between the parts and applying a pressure using a hand-held roller

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**3.1.2.21**
**hot gas round nozzle welding**, noun
round nozzle welding, noun
hot gas hand welding, noun
hot gas pendulum welding, noun
fan welding, noun
freehand welding, noun
*hot gas welding* (3.1.2.24) process where the *weld rod* (3.1.8.14) is fed into the joint without the aid of a *nozzle* (3.3.25); the pressure is applied directly to the *weld rod* (3.1.8.14) by the *welder* (3.1.1.8)

[SOURCE: AWS G1.10M:2016 [9] , modified - “method” in the definition has been replaced by “process”, “welding nozzle” has been replaced by “nozzle” and “welding rod” has been replaced by “weld rod”.]

**3.1.2.22**
**hot gas speed welding**, noun
speed welding, noun
hot gas high-speed welding, noun
high-speed nozzle welding, noun
*hot gas welding* (3.1.2.24) process in which the *weld rod* (3.1.8.14) is suitably guided and pre-heated and the *nozzle* (3.3.25) tip is provided with a profiled area to apply the welding pressure

[SOURCE: EN 13067:2020 [4] , 3.15.5 modified - “welding process” in the definition has been replaced by “hot gas welding process” and “welding rod” has been replaced by “weld rod”.]

**3.1.2.23**
**hot gas wedge welding**, noun
hot air wedge welding, noun
*welding process* (3.1.1.10) for lining membranes in an overlap configuration where a wedge positioned between the two membranes is heated by hot gas

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Note 1 to entry: The lining membranes are gripped by rollers, which provide the welding pressure and also propel the *welding* (3.1.1.9) machine along the joint.

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**3.1.2.24**
**hot gas welding**, noun
hot air welding, noun
DEPRECATED: hot-gas welding
*welding processes* (3.1.1.10) in which the materials to be welded are softened by hot air or inert gas and are pressed together

Note 1 to entry: Includes *hot gas round nozzle welding* (3.1.2.21), *hot gas speed welding* (3.1.2.22), *hot air seam welding* (3.1.2.17), *hot gas manual welding without welding rod* (3.1.2.20).

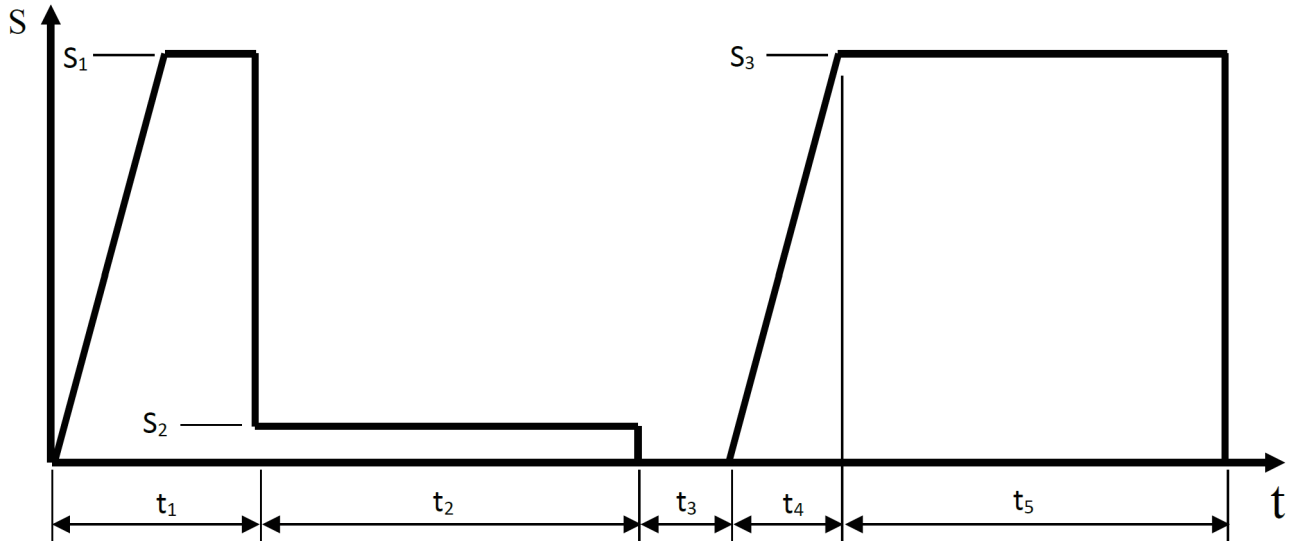
[SOURCE: EN 13067:2020 [4] , 3.15.6, modified - “welding process” in the definition has been replaced by “welding processes”, “unified” has been replaced by “welded”, and Note 1 to entry has been added.]

**3.1.2.25**
**hot plate welding**, noun
butt fusion welding, noun
mirror welding, noun
platen welding, noun
heated tool butt welding, noun
*heated tool welding* (3.1.2.14) process where the parts to be joined are heated through direct contact with a hot plate

Note 1 to entry: The hot plate welding cycle is shown in Figure 1 .

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**Key**

| | |
|---|---|
| S | interface stress |
| $S_1$ | interface bead-up stress |
| $S_2$ | interface heat-soak stress |
| $S_3$ | interface fusion/cooling stress |
| t | time |
| $t_1$ | bead-up time |
| $t_2$ | heat soak time |
| $t_3$ | changeover time |
| $t_4$ | joining pressure build-up time |
| $t_5$ | fusion/cooling time |

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**Figure 1 — Hot plate welding cycle**

**3.1.2.26**
**implant welding**, noun
*welding processes* (3.1.1.10) that require a consumable material at the *joint interface* (3.1.3.5) that is different from the parent material as the heat source

Note 1 to entry: Includes *resistive implant welding* (3.1.2.39), *induction welding* (3.1.2.28) and *microwave welding* (3.1.2.33).

**3.1.2.27**
**impulse welding**, noun
impulse sealing, noun
thermal-impulse sealing, noun
*heat sealing* (3.1.2.16) process in which films are subjected to non-continuous rapid heating under pressure, pressure being maintained after heating

[SOURCE: ISO 472:2013/Amd 1:2018 [5] , 2.483, modified - “bonding process” in the definition for “impulse sealing” has been replaced by “heat sealing process” and “the surfaces to be united” has been replaced by “films”.]

**3.1.2.28**
**induction welding**, noun
*welding process* (3.1.1.10) where high frequency electromagnetic energy is used to excite molecules of a ferromagnetic material placed at the *joint interface* (3.1.3.5)

Note 1 to entry: The heat generated melts the surrounding thermoplastic material, *welding* (3.1.1.9) the two together.

[SOURCE: [7]]

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