
**Welding and allied processes —
Vocabulary —**

**Part 1:
General terms**

Soudage et techniques connexes - Vocabulaire —

Partie 1: Termes généraux

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: [Foreword — Supplementary information](#).

The committee responsible for this document is ISO/TC 44, *Welding and allied processes*, Subcommittee SC 7, *Representation and terms*, in collaboration with Commission VI, *Terminology*, of the *International Institute of Welding (IIW)*.

This first edition of ISO/TR 25901—1, together with the other parts of ISO/TR 25901, cancels and replaces ISO 857—1:1998 and ISO/TR 25901:2007, of which it constitutes a revision.

ISO/TR 25901 consists of the following parts, under the general title *Welding and allied processes — Vocabulary*:

- *Part 1: General terms* [Technical Report]
- *Part 3: Welding processes* [Technical Report]
- *Part 4: Arc welding* [Technical Report]

The following parts are under preparation:

- *Part 2: Safety and health* [Technical Report]

Friction welding is to form the subject of a future part 5.

Requests for official interpretations of any aspect of this International Standard should be directed to the Secretariat of ISO/TC 44/SC 7 via your national standards body. A complete listing of these bodies can be found at www.iso.org.

Welding and allied processes — Vocabulary —

Part 1: General terms

1 Scope

This part of ISO/TR 25901 contains general terms and definitions applicable to welding and allied processes.

It does not contain terms and definitions related to specific processes or particular aspects of welding and allied processes that are covered in other parts of this Technical Report (see Foreword) or in other ISO standards.

In the main body of this part of ISO/TR 25901, terms are arranged in a systematic order. [Annex A](#) provides an index in which all terms are listed alphabetically with reference to the appropriate subclause. In addition, it provides French translations, covering two of the three official ISO languages (English, French and Russian). German translations are also provided; these are published under the responsibility of the member body for Germany (DIN), and are given for information only.

NOTE 1 Only the terms given in the official languages (English, French and Russian) are to be considered as ISO terms and definitions.

2 Terms and definitions

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

2.1 Terms related to welding and allied processes

2.1.1 General terms

2.1.1.1 welding

joining process in which two or more parts are united producing a continuity in the nature of the workpiece material(s) by means of heat or pressure or both, and with or without the use of *filler material* ([2.1.10.4](#))

Note 1 to entry: Welding processes may be used also for *surfacing* ([2.1.9.1](#)) and remelting.

2.1.1.2 fusion welding

welding ([2.1.1.1](#)) involving localized melting without the application of external force in which the fusion surface(s) has (have) to be melted with or without addition of *filler material* ([2.1.10.4](#))

2.1.1.3 weld

result of *welding* ([2.1.1.1](#))

Note 1 to entry: The weld includes the *weld metal* ([2.1.2.1](#)) and the *heat-affected zone* ([2.1.2.2](#)).

2.1.1.4 weldment

assembly incorporating one or more *welded joint(s)* ([2.1.4.2](#))

2.1.1.5

parent material

base material

material to be joined, or surfaced, by *welding* (2.1.1.1), braze welding or brazing

2.1.1.6

parent material thickness

material thickness

nominal thickness (2.1.7.7) of the materials to be welded

2.1.1.7

parent metal

base metal

metallic *parent material* (2.1.1.5)

2.1.1.8

manual welding

welding (2.1.1.1) in which the *electrode* (2.3.8) holder, gun, *torch* (2.3.9) or blowpipe is manipulated by hand

2.1.1.9

partly mechanized welding

semiautomatic welding

manual welding (2.1.1.8) where wire feed is mechanized

2.1.1.10

mechanized welding

fully mechanized welding

welding (2.1.1.1) where the required *welding parameters* (2.4.1) are maintained by mechanical or electronic means

Note 1 to entry: Manual adjustment of *welding parameters* by the *welding operator* (2.5.25) during welding is possible.

2.1.1.11

automatic welding

welding (2.1.1.1) in which all operations are performed without *welding operator* (2.5.25) intervention during the process

Note 1 to entry: Manual adjustment of *welding parameters* (2.4.1) by the welding operator during welding is not possible.

2.1.1.12

robotic welding

welding (2.1.1.1) that is performed and controlled by robotic equipment

2.1.1.13

gouging

thermal cutting process variation that forms a groove by melting or burning

2.1.1.14

arc gouging

gouging (2.1.1.13) using an arc cutting process variation

2.1.1.15

air-arc gouging

gouging (2.1.1.13) using a carbon *electrode* (2.3.8) and compressed air

2.1.2 Characterization of welds

2.1.2.1

weld metal

all metal melted during *welding* (2.1.1.1) and retained in the *weld* (2.1.1.3)

2.1.2.2

heat-affected zone

HAZ

portion of non-melted *parent metal* (2.1.1.7) whose microstructure has been affected

2.1.2.3

weld zone

zone containing the *weld metal* (2.1.2.1) and the *heat-affected zones* (2.1.2.2)

2.1.2.4

deposited metal

filler metal that has been added during *welding* (2.1.1.1)

2.1.2.5

fusion line

interface between the *weld metal* (2.1.2.1) and the non-melted *parent metal* (2.1.1.7) as determined on the cross section of a *weld* (2.1.1.3)

2.1.2.6

fusion zone

in the *weld metal* (2.1.2.1), part of the *parent metal* (2.1.1.7) that has been melted, as determined on the cross section of a *weld* (2.1.1.3)

2.1.2.7

all-weld metal

weld metal (2.1.2.1) consisting of *deposited metal* (2.1.2.4) without *dilution* (2.1.2.12)

2.1.2.8

weld pool

molten pool

pool of liquid metal formed during *fusion welding* (2.1.1.2)

Note 1 to entry: In electroslag welding, the term includes the slag bath.

2.1.2.9

as welded

condition of the *weld* (2.1.1.3) after *welding* (2.1.1.1), prior to any subsequent thermal, mechanical, or chemical treatments

Note 1 to entry: For alloys that may undergo natural ageing (e.g. some aluminium alloys), the as welded condition lasts only for a limited period of time.

2.1.2.10

ferrite number

FN

arbitrary standardized value designating the ferrite content of nominally austenitic or austenitic-ferritic (duplex) type stainless steel *weld metal* (2.1.2.1) based on its magnetic properties

2.1.2.11

metallurgical deviation

<*welding*> changes in the mechanical properties and/or metallurgical structure of the *weld metal* (2.1.2.1) or *heat-affected zone* (2.1.2.2) compared to the properties of the *parent metal* (2.1.1.7)

2.1.2.12

dilution

mixing of melted *parent metal* (2.1.1.7) and *deposited metal* (2.1.2.4) expressed as a ratio of the melted parent metal to the total melted mass

2.1.2.13

dilution rate

dilution (2.1.2.12) expressed as a percentage

2.1.2.14

residual welding stress

stress remaining in a metal part or structure as a result of *welding* (2.1.1.1)

2.1.2.15

strength weld

weld (2.1.1.3) designed to withstand stress

2.1.2.16

joint efficiency

ratio of strength of a *joint* (2.1.4.1) to the strength of the *parent metal* (2.1.1.7), expressed as a percentage

2.1.3 Imperfections

2.1.3.1

imperfection

discontinuity in the *weld* (2.1.1.3) or a deviation from the intended geometry

Note 1 to entry: Imperfections are cracks, lack of penetration, porosity, *slag* (2.1.10.9) inclusions.

2.1.3.2

internal imperfection

imperfection (2.1.3.1) that is not open to a surface or not directly accessible

2.1.3.3

systematic imperfection

imperfections (2.1.3.1) that are repeatedly distributed in the *weld* (2.1.1.3) over the weld lengths to be examined

2.1.3.4

projected area

area where *imperfections* (2.1.3.1) distributed along the volume of the *weld* (2.1.1.3) under consideration are imaged two-dimensionally

2.1.3.5

hot crack(s)

material separations occurring at high temperatures along the grain boundaries (dendrite boundaries) when the level of strain and the strain rate exceed a certain level

Note 1 to entry: Small cracks visible only at magnifications greater than 50×, are often described as microcracks.

2.1.3.6

solidification crack

hot crack (2.1.3.5) formed during solidification from the liquid phase of *weld metals* (2.1.2.1)

Note 1 to entry: It usually extends up to the surface of the weld metal, but sometimes can be subsurface.

2.1.3.7

liquation crack

hot crack (2.1.3.5) formed by liquation in the *heat-affected zone* (2.1.2.2) of the *parent material* (2.1.1.5) or in multirun welds where *weld metal* (2.1.2.1) is reheated by subsequent *runs* (2.1.8.4)

2.1.3.8**ductility dip crack**

hot crack (2.1.3.5) formed during *welding* (2.1.1.1) by a reduction in hot ductility

Note 1 to entry: As with a *liquation crack* (2.1.3.7), it can occur in the *heat-affected zone* (2.1.2.2) of the *parent material* (2.1.1.5) or in multirun welds.

2.1.3.9**cold crack(s)**

local rupture (intergranular or transgranular) appearing in a *weld* (2.1.1.3) as a result of a critical combination of microstructure, stress and hydrogen content

2.1.4 Type of joints**2.1.4.1****joint**

junction of workpieces or the edges of workpieces that are to be joined or have been joined

2.1.4.2**welded joint**

assembly that is produced by *welding* (2.1.1.1) together two or more parts

2.1.4.3**multiple joint**

type of *joint* (2.1.4.1) where three or more parts meet at any required angles to each other

2.1.4.4**parallel joint**

type of *joint* (2.1.4.1) where the parts lie parallel to each other

Note 1 to entry: In explosive cladding.

2.1.4.5**butt joint**

type of *joint* (2.1.4.1) where the parts lie in the same plane and against one another at an angle of 135° to 180°

2.1.4.6**T-joint**

angle joint (2.1.4.8) where the parts meet each other forming a T-shape

2.1.4.7**lap joint**

type of *joint* (2.1.4.1) where the parts lie parallel to each other (0° to 5°) and overlap each other

2.1.4.8**angle joint**

type of *joint* (2.1.4.1) where one part meets the other at an acute angle greater than 5° but not more than 90°

Note 1 to entry: For a *fillet weld* (2.1.6.11), the angle is over 5° and less than 45°.

Note 2 to entry: For a *butt weld* (2.1.6.3), the angle is between 45° to 90° inclusive.

2.1.4.9**corner joint**

type of *joint* (2.1.4.1) where two parts meet at their edges at an angle between 30° and 135° to each other

2.1.4.10**edge joint**

type of *joint* (2.1.4.1) where two parts meet at their edges at an angle of 0° to 30°

2.1.4.11

cross joint

type of *joint* (2.1.4.1) where two parts lie crossing over each other

Note 1 to entry: Wires that cross over each other.

2.1.4.12

cruciform joint

type of *joint* (2.1.4.1) where two parts lying in the same plane each meet, at right angles, a third part lying between them

2.1.4.13

homogeneous joint

welded joint (2.1.4.2) in which the *weld metal* (2.1.2.1) and *parent material* (2.1.1.5) have no significant differences in mechanical properties and/or chemical composition

Note 1 to entry: A welded joint made of similar parent materials without filler metal is considered homogeneous.

2.1.4.14

heterogeneous joint

welded joint (2.1.4.2) in which the *weld metal* (2.1.2.1) and *parent material* (2.1.1.5) have significant differences in mechanical properties and/or chemical composition

2.1.4.15

dissimilar material joint

welded joint (2.1.4.2) in which the *parent materials* (2.1.1.5) have significant differences in mechanical properties and/or chemical composition

2.1.5 Joint preparations

2.1.5.1

edge preparation

surface prepared on the edges of a part to be welded

2.1.5.2

joint preparation

weld preparation

configuration of the workpieces to be joined after each individual part has been suitably prepared and assembled

2.1.5.3

fusion face

surface of the *parent metal* (2.1.1.7) to be melted during *welding* (2.1.1.1)

2.1.5.4

feather edge

complete absence of a *root face* (2.1.5.10)

2.1.5.5

gap

air gap

distance at any cross section between edges, ends or surfaces to be joined

2.1.5.6

edge distance

distance between the centre of a *weld* (2.1.1.3) and the nearest edge of the workpiece

2.1.5.7

root

DEPRECATED: root of weld

zone on the opposite side from where the *welding* (2.1.1.1) was performed

2.1.5.8**root gap**

gap (2.1.5.5) between the *root faces* (2.1.5.10)

2.1.5.9**root radius**

radius of the curved portion of the *fusion face* (2.1.5.3) in a part prepared for a single-J, single-U, double-J or double-U weld

2.1.5.10**root face**

portion of a *fusion face* (2.1.5.3) that is not beveled or grooved

2.1.5.11**land**

part of a *fusion face* (2.1.5.3) that supports the *weld pool* (2.1.2.8)

Note 1 to entry: An example is the horizontal area between the *root face* (2.1.5.10) and the curved part of a J or U preparation.

2.1.5.12**bevel angle**

angle between the bevel of a *joint* (2.1.4.1) member and a plane perpendicular to the surface of the member

2.1.5.13**included angle****groove angle**

angle between the planes of the *fusion faces* (2.1.5.3) of parts to be welded

2.1.6 Types of welds**2.1.6.1****full penetration weld**

weld (2.1.1.3) with a complete *fusion penetration* (2.1.7.3)

2.1.6.2**partial penetration weld**

weld (2.1.1.3) in which the *fusion penetration* (2.1.7.3) is intentionally less than full penetration

2.1.6.3**butt weld****groove weld**

weld (2.1.1.3) other than a *fillet weld* (2.1.6.11) made in a groove or in a square preparation

2.1.6.4**single-J butt weld**

butt weld (2.1.6.3) in a single-J preparation

2.1.6.5**double-J butt weld**

butt weld (2.1.6.3) in a double-J preparation

2.1.6.6**single-U butt weld**

butt weld (2.1.6.3) in a single-U preparation

2.1.6.7**double-U butt weld**

butt weld (2.1.6.3) in a double-U preparation

2.1.6.8

single-V butt weld

butt weld (2.1.6.3) in a single-V preparation

2.1.6.9

double-V butt weld

butt weld (2.1.6.3) in a double-V preparation

2.1.6.10

square butt weld

butt weld (2.1.6.3) in a square preparation

2.1.6.11

fillet weld

triangular *weld* (2.1.1.3) between two or more parts for joining a *T-joint* (2.1.4.6), *corner joint* (2.1.4.9) or *lap joint* (2.1.4.7)

2.1.6.12

plug weld

weld (2.1.1.3) made by filling a circular or elongated hole in one part of a workpiece with filler metal so as to join it to the surface of an overlapping part exposed through the hole

2.1.6.13

seal weld

weld (2.1.1.3) intended primarily to provide tightness against leakage of gas or fluid

2.1.6.14

slot weld

weld (2.1.1.3) between two overlapping parts made by depositing a *fillet weld* (2.1.6.11) round the periphery of a hole in one part so as to join it to the surface of the other part exposed through the hole

2.1.6.15

intermittent weld

series of weld elements made at intervals along a *joint* (2.1.4.1)

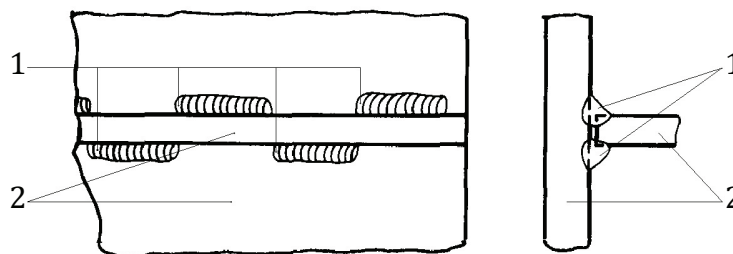
2.1.6.16

staggered intermittent weld

intermittent weld (2.1.6.15) on each side of a *joint* (2.1.4.1) arranged so that the welds on one side lie opposite to the spaces on the other side along the joint

Note 1 to entry: These are usually *fillet welds* (2.1.6.11) in *T-joints* (2.1.4.8) and *lap joints* (2.1.4.7).

Note 2 to entry: A staggered intermittent weld is illustrated in [Figure 1](#).



Key

- 1 weld
- 2 workpiece

Figure 1 — Staggered intermittent weld