

# Glossary of Welding Terms

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## A

### **AC or alternating current**

Is that kind of electricity which reverses its direction periodically. For 60 cycle current, the current goes in one direction and then in the other direction 60 times in the same second, so that the current changes its direction 120 times in one second.

### **arc blow**

The deflection of an electric arc from its normal path because of magnetic forces.

### **arc length**

The distance from the end of the electrode to the point where the arc makes contact with work surface.

### **arc voltage**

The voltage across the welding arc.

### **as-welded**

The condition of weld metal welded joints, and weldments after welding but prior to any subsequent thermal, mechanical, or chemical treatments.

### **automatic welding**

Welding with equipment which performs the welding operation without adjustment of the controls by a welding operator. The equipment may or may not perform the loading and unloading of the work.

## B

### **backing**

A material or device placed against the back side of the joint, or at both sides of a weld in electroslag and electrogas welding, to support and retain molten weld metal. The material may be partially fused or remain unfused during welding and may be either metal or nonmetal.

### **backstep sequence**

A longitudinal sequence in which weld passes are made in the direction opposite to the progress of welding.

### **bare electrode**

A filler metal electrode consisting of a single metal or alloy that has been produced into a wire, strip, or bar form and that has had no coating or covering applied to it other than that which was incidental to its manufacture or preservation.

### **base metal (material)**

The metal (material) to be welded, brazed, soldered, or cut.

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## **butt joint**

A joint between two members aligned approximately in the same plane.

## **C**

### **concavity**

The maximum distance from the face of a concave fillet weld perpendicular to a line joining the weld toes.

### **convexity**

The maximum distance from the face of a convex fillet weld perpendicular to a line joining the weld toes.

### **covered electrode**

A composite filler metal electrode consisting of a core of a bare electrode or metal cored electrode to which a covering sufficient to provide a slag layer on the weld metal has been applied. The covering may contain materials providing such functions as shielding from the atmosphere, deoxidation, and arc stabilization and can serve as a source of metallic additions to the weld.

### **crater**

In arc welding, a depression at the termination of a weld bead or in the molten weld pool.

## **D**

### **depth of fusion**

The distance that fusion extends into the base metal or previous pass from the surface melted during welding.

### **DC or direct current**

Electric current which flows only in one direction. In welding, an arc welding process wherein the power supply at the arc is direct current.

## **E**

No terms under 'E'

## **F**

### **fillet weld**

A weld of approximately triangular cross section joining two surfaces approximately at right angles to each other in a lap joint, T-joint or corner joint.

### **fillet weld leg**

Source: As defined in the Hobart Institute of Welding Technology "Pocket Welding Guide", 26th edition

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The distance from the joint root to the toe of the fillet weld.

## **flat position**

The welding position used to weld from the upper side of the joint; the face of the weld is approximately horizontal.

## **flux**

Material used to prevent, dissolve, or facilitate removal of oxides and other undesirable surface substances.

## **flux cored arc welding**

(FCAW) An arc welding process that produces coalescence of metals by heating them with an arc between a continuous filler metal (consumable) electrode and the work. Shielding is provided by a flux contained within the tubular electrode. Additional shielding may or may not be obtained from an externally supplied gas or gas mixture.

## **G**

### **gas metal arc welding**

(GMAW) An arc welding process that produces coalescence of metals by heating them with an arc between a continuous filler metal (consumable) electrode and the work. Shielding is obtained entirely from an externally supplied gas or gas mixture.

### **gas tungsten arc welding**

(GTAW) An arc welding process that produces coalescence of metals by heating them with an arc between a tungsten (non-consumable) electrode and the work. Shielding is obtained from a gas or gas mixture. Pressure may or may not be used and filler metal may or may not be used. (This process has sometimes been called TIG welding, a non-preferred term.)

### **groove weld**

A weld made in the groove between the work pieces.

## **H**

### **heat-affected zone**

That portion of the base metal that has not been melted, but whose mechanical properties or microstructure have been altered by the heat or welding, brazing, soldering, or cutting.

### **horizontal position**

(a) fillet weld - The position in which welding is performed on the upper side of an approximately horizontal surface and against an approximately vertical surface.

(b) groove weld - The position of welding in which the weld axis lies in an approximately horizontal plane and the weld face lies in an approximately vertical plane.

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## I

No terms under 'I'

## J

### **joint penetration**

The depth a weld extends from its face into a joint, exclusive of reinforcement.

## K

No terms under 'K'

## L

### **lap joint**

A joint between two overlapping members in parallel planes.

## M

### **machine welding**

Welding with equipment that performs the welding operation under the constant observation and control of a welding operator. The equipment may or may not load and unload the workpieces.

### **manual welding**

A welding operation performed and controlled completely by hand.

### **melting rate**

The weight or length of electrode melted in a unit of time.

## N

No terms under 'N'

## O

### **open circuit voltage**

The voltage between the output terminals of the welding machine when no current is flowing in the welding circuit.

### **overhead position**

The position in which welding is performed from the underside of the joint.

### **overlap**

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The protrusion of weld metal beyond the weld toe or weld root.

## P

### **peening**

The mechanical working of metals using impact blows.

### **porosity**

Cavity type discontinuities formed by gas entrapment during solidification.

### **post heating**

The application of heat to an assembly after welding, brazing, soldering, thermal spraying or cutting operation.

### **pre heating**

The application of heat to the base metal immediately before welding, brazing, soldering, thermal spraying, or cutting.

## Q

No terms under 'Q'

## R

### **radiography**

The use of radiant energy in the form of Xrays or gamma rays for the non-destructive examination of metals.

### **reverse polarity**

A nonstandard term for direct current electrode positive.

### **root opening**

A separation at the joint root between the workpieces.

### **root penetration**

The depth that a weld extends into the joint root.

## S

### **seal weld**

Threaded joint sealed, without thread compound, by backwelding.

### **semiautomatic arc welding**

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Arc welding with equipment that controls only the filler metal feed. The advance of the welding is manually controlled.

## **shielded metal arc welding**

(SMAW) An arc welding process that produces coalescence of metals by heating them with an arc between a covered metal electrode and the workpieces. Shielding is obtained from decomposition of the electrode covering. Pressure is not used and filler metal is obtained from the electrode.

## **slag inclusion**

Non metallic solid material entrapped in weld metal or between weld metal and base metal.

## **spatter**

The metal particles expelled during fusion welding which do not form a part of the weld.

## **straight polarity**

A nonstandard term for direct current electrode negative.

## **stress relief heat treatment**

Uniform heating of a structure or a portion thereof to a sufficient temperature to relieve the major portion of the residual stresses, followed by uniform cooling.

## **stringer bead**

A type of weld bead made without appreciable weaving motion.

## **T**

### **tack weld**

A weld made to hold parts of a weldment in proper alignment until the final welds are made.

### **throat of a fillet weld**

(a) theoretical throat - The distance from the beginning of the joint root perpendicular to the hypotenuse of the largest right triangle that can be inscribed within the cross section of a fillet weld. This dimension is based on the assumption that the root opening is equal to zero.

(b) actual throat - The shortest distance between the weld root and the face of a fillet weld.

(c) effective throat - The minimum distance minus any convexity between the weld root and the face of a fillet weld.

### **tungsten electrode**

A non-filler metal electrode used in arc welding or cutting made principally of tungsten.

## **U**

### **underbead crack**

A crack in the heat-affected zone generally not extending to the surface of the base metal.

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**undercut**

A groove melted into the base metal adjacent to the weld toe or weld root and left unfilled by weld metal.

**V****vertical position**

The position of welding in which the weld axis is approximately vertical.

**W****weave bead**

A type of weld bead made with transverse oscillation.

**weld**

A localized coalescence of metals or non-metals produced either by heating the materials to welding temperature, with or without the application of pressure, or by the application of pressure alone, and with or without the use of filler material.

**weld face**

The exposed surface of a weld on the side from which welding was done.

**weld metal**

That portion of a weld which has been melted during welding.

**weld pass**

A single progression of welding or surfacing along a joint or substrate. The result of a pass is a weld bead, layer, or spray deposit.

**weld pool**

The localized volume of molten metal in a weld prior to its solidification as weld metal.

weld root: The points, as shown in cross section, at which the back of the weld intersects the base metal surfaces.

**weld size**

(a) groove weld size - The joint penetration of a groove weld.

(b) fillet weld size - For equal leg fillet welds, the leg lengths of the largest isosceles right triangle which can be inscribed within the fillet weld cross section. For unequal leg fillet welds, the leg lengths of the largest right triangle that can be inscribed within the fillet weld cross section.

**weld toe**

The junction of the weld face and the base metal.

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**welding procedure**

The detailed methods and practices involved in the production of a weldment.

**welding rod**

A form of welding filler metal, normally packaged in straight lengths, that does not conduct electrical current.

**weldment**

An assembly whose component parts are joined by welding.

**W, Y, Z**

No terms under 'X,Y,Z'