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A

Acetylene: A gas composed of two parts of carbon and two parts of hydrogen. When burned in the atmosphere of oxygen, it produces one of the highest flame temperatures obtainable.

Acetylene Cylinder: Acetylene is a versatile industrial fuel gas used in cutting, heating, welding, brazing, soldering, flame hardening, metallizing, and stress relieving applications. It is produced when calcium carbide is submerged in water or from petrochemical processes. The acetylene gas produced is then compressed into cylinders or fed into piping systems. Acetylene becomes unstable when compressed in its gaseous state above 15 PSIG (103 kPa). Therefore, it cannot be stored in a “hollow” cylinder under high pressure the way oxygen, for example, is stored. Acetylene cylinders are filled with a porous material (calcium silicate) creating, in effect, a “solid” as opposed to a “hollow” cylinder. The porous filling is then saturated with liquid acetone. When acetylene is pumped into the cylinder, it is absorbed by the liquid acetone throughout the porous filling. It is held in a stable condition (see Figure Below). Filling acetylene cylinders is a delicate process requiring special equipment and training. Acetylene cylinders must, therefore, be refilled only by authorized gas distributors. Acetylene cylinders MUST NEVER be transfilled.

Porous filler: (calcium-silicate) 8% - 10%

The filler, which completely occupies the steel shell, is 90% - 92% composed of millions of interconnected pores.

ACETONE: 42%

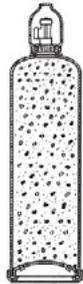
Acetone is equal to 42% of the internal volume, and is dispersed throughout the filler.

ACETYLENE GAS: 36%

The acetylene gas is uniformly absorbed by the acetone. The resulting mixture occupies 78% of the internal volume.

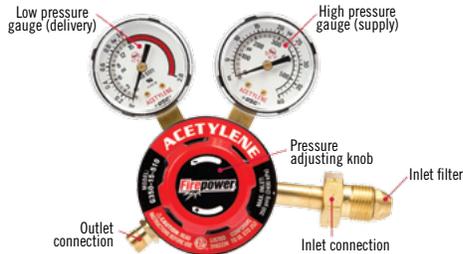
RESERVE VOLUME AT 70°F: 10% - 12%

Since acetone and acetylene gas will expand as temperature rises, a safety reserve must be present even at 150°F.



ACETYLENE CYLINDER INTERIOR

Acetylene Regulator: A device used to reduce cylinder pressure to torch pressure and to keep the pressure constant. They are never to be used as oxygen regulators. (See Figure Below)



ACETYLENE REGULATOR FEATURES

Air Carbon Arc Cutting (CAC-A): A carbon arc cutting process that removes molten metal with a jet of air. Also referred to as air carbon arc gouging.

Alloy: A substance with metallic properties and composed of two or more chemical elements of which at least one is a metal.

Annealing: Softening metals by heat treating. This most commonly consists of heating the metals up to a critical temperature and then cooling them slowly.

ANSI: Abbreviation for “American National Standards Institute”.

Arc Length: The distance from the tip of the welding electrode to the adjacent surface of the weld pool.

Arc Voltage: The electrical potential between the electrode and work piece.

Arc Welding: A group of welding processes that produces fusion of work pieces by heating them with an arc. The processes are used with or without the application of pressure and with or without filler metal.

Arc Welding (MIG) Gun: A device used to transfer current to a continuously fed consumable electrode, guide the electrode, and direct the shielding gas.

Arc Welding (TIG) Torch: A device used to transfer current to a fixed welding electrode, position the electrode and direct the shielding gas.

Autogenous Weld: A fusion weld made without filler metal.

Automatic Welding: Welding with equipment that requires only occasional or no observation of the welding, and no manual adjustment of the equipment controls.

AWS: Abbreviation for “American Welding Society”.

Axis Of Weld: (See Weld Axis)

B

Back Gouging: The removal of weld metal and base metal from the weld root side of a welded joint to facilitate complete fusion and complete joint penetration upon subsequent welding from that side.

Backhand Welding: A welding technique in which the welding torch or gun is directed opposite to the progress of welding.



BACKHAND WELDING

Backing Gas: Backing in the form of a shielding gas employed primarily to provide a protective atmosphere.

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

Base Metal: The metal or alloy that is welded, brazed, soldered, or cut.

Bead: A type of weld composed of one or more string or weave beads deposited on an unbroken surface.

Bevel: An angular edge preparation. For successful welding, the edges of the parts to be joined with a butt joint often require a beveled edge to allow adequate deposition and penetration of the weld. While the strength requirements of the joint dictate the actual joint

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design required, butt welding of material 3/8" (9.5mm) or thicker often requires some sort of edge preparation before welding.

Blowpipe: Another term used for cutting torch. (See Cutting Torch)

Bond: To join (metals) by applying heat, sometimes with pressure and sometimes with an intermediate or filler metal having a high melting point.

Braze Welding: a welding process variation in which a filler metal, having a liquidus above 840°F (450°C) and below the solidus of the base metal, is used. Unlike brazing, in braze welding the filler metal is not distributed in the joint by capillary action.

Brazing: a group of welding processes that produces coalescence of materials by heating them to the brazing temperature in the presence of a filler metal having a liquidus above 840°F (450°C) and below the solidus of the base metal. The filler metal is distributed between the closely fitted surfaces of the joint by capillary action.

Buildup: A surfacing variation in which surfacing metal is deposited to achieve the required dimensions.

Burned Metal: Term occasionally applied to the metal which has been combined with oxygen so that some of the carbon changed into carbon dioxide and some of the iron into iron oxide.

Burning: A non-standard term for oxygen cutting.

Butane: A fuel gas which is a member of the paraffin family. A hydrocarbon molecule comprised of four carbon atoms and ten hydrogen atoms, C₄H₁₀.

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

C

Cap: A non-standard term for the final layer of a groove weld.

Capillary Action: A phenomenon in which a liquid's surface rises, falls, or becomes distorted in shape where it is in contact with a solid. It is caused by the difference between the relative attraction of the molecules of the liquid for each other and for those of the solid.

Carbon: An element which, when combined with iron, forms various kinds of steel. In steel, it is the changing carbon content which changes the physical properties of the steel. Carbon is also used in a solid form as an electrode for arc welding and as a mold to hold metal.

Carbon Electrode: A non-filler metal electrode used in arc welding and cutting, consisting of a carbon or graphite rod, which may be coated with copper or other materials.

Carbonizing Flame: An oxy-acetylene flame in which there is an excess of acetylene. Also a non-standard term for Reducing Flame.

Case Hardening: Adding of carbon to the surface of a mild steel object and heat treating to produce a hard surface.

Castings: Metallic forms that are produced by pouring molten metal into a shaped container (mold).

CGA: Abbreviation for "compressed gas association".

Coalescence: The growing together or growth into one

body of the materials being joined. (See Fusion)

Cold Crack: A crack which develops after solidification.

Cold Lap: A non-standard term. A joint with incomplete coalescence (fusion) caused by insufficient application of heat to the base metal.

Collet: A mechanical clamping device used to hold the electrode in position within the welding, cutting or spraying torch.

Combustion: The process of burning a fuel with oxygen in which the products are energy, in the form of light and heat, and by products such as water and carbon dioxide.

Concave Fillet Weld: A weld that has a concave face (may result in cracking).

Cone: The conical part of an oxy-fuel flame next to the orifice of the tip.

Constant Current (CC) Power Source: An arc welding power source with a volt-ampere relationship yielding a small welding current change from a large arc voltage change.

Constant Voltage (CV) Power Source: An arc welding power source with a volt-ampere relationship yielding a large welding current change from a small arc voltage change.

Contact Tip: A component of a MIG gun that delivers welding current to, and guides, a continuous electrode.

Continuous Weld: A weld that extends continuously from one end of the joint to the other. Where the joint is essentially circular, it extends completely around the joint.

Convex Fillet Weld: A fillet welds having a convex face (a good weld with no undercutting).

Corner Joint: A joint between two members located approximately at right angles to each other to form an "I".

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.

Crack: A fracture type discontinuity characterized by a sharp tip and high ratio of length and width to opening displacement.

Cracking: Action of opening a valve slightly and then closing the valve immediately.

Crater: A depression in the weld face at the termination of the weld bead.

Crater Fill Time: The time interval following weld time but prior to melt back time during which arc voltage or current reach a preset value greater or less than welding values. Weld travel may or may not stop at this point.

Crown: Curve or convex surface of finished weld face.

Cutting Torch: A device used in gas cutting for controlling the gases used for preheating and the oxygen used for cutting the material.

Cylinder: (see Gas Cylinder)

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D

Defect: A discontinuity or discontinuities that by nature or accumulated effect render a part or product unable to meet minimum applicable acceptance standards or specifications. The term designates rejectability. See also discontinuity and flaw.

Deposition Rate: The weight of material deposited in a unit of time.

Direct Current Electrode Negative (DCEN): The arrangement of direct current arc welding leads in which the electrode is the negative pole and work piece is the positive pole of the welding arc.

Direct Current Electrode Positive (DCEP): The arrangement of direct current arc welding leads in which the electrode is the positive pole and the work piece is the negative pole of the welding arc.

Discontinuity: An interruption of the typical structure of a material, such as a lack of homogeneity in its mechanical, metallurgical or physical characteristics. A discontinuity is not necessarily a defect.

DOT: Abbreviation for "Department of Transportation".

Downslope Time: The time during which the current is changed continuously from final taper current or welding current to final current.

Drag Angle: The travel angle when the electrode is pointing in a direction opposite to the progression of welding. This angle can also be used to partially define the position of guns, torches, rods, and beams.

Dross: The remaining solidified oxidized metallic material adhering to the work piece adjacent to the cut surface.

Duty Cycle: The percentage of time during a specified test period that a power source or its accessories can be operated at rated output without overheating.

E

Edge Joint: A joint between the edges of two or more parallel or nearly parallel members.

Electrode: A component of the electrical circuit that terminates at the arc, molten conductive slag or base metal.

Electrode Extension (See Also Stickout): The length of electrode extending beyond the end of the contact tip.

Elongation: Percentage increase in the length of a specimen when stressed to its yield strength.

Erosion: A condition caused by dissolution of the base metal by molten filler metal resulting in a reduction in the thickness of the base metal.

F

Face Of Weld: (See Weld Face)

Fill Pass: A non-standard term when used for intermediate weld pass.

Filler Material: The material to be added in making a brazed, soldered or welded joint.

Filler Wire: A non-standard term for welding wire.

Fillet: Weld metal in the internal vertex, or corner, of the angle formed by two pieces of metal, giving the joint additional strength to withstand unusual stress.

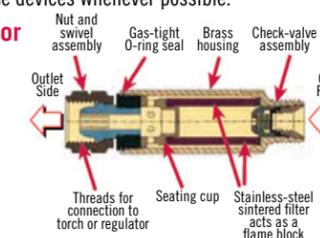
Fillet Weld: A weld of approximately triangular cross section joining two surfaces approximately at right angles to each other in a lap joint, T-joint or corner joint.

Filter Lens: A colored glass used in goggles, helmets, and shields to exclude harmful light rays.

Flashback Arrestor: A device commonly used in oxy-fueled welding and cutting to stop the flame from burning back up into the equipment and causing damages or explosion. Firepower recommends the use of these devices whenever possible.

The Flashback Arrestor

Prevents flashback



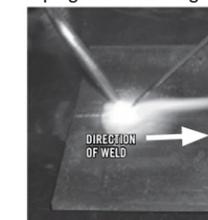
Flat Position: The welding position used to weld from the upper side of the joint; the face of the weld is approximately horizontal.

Flux: A material used to hinder or prevent the formation of oxides and other undesirable substances in molten metal and on solid metal surfaces, and to dissolve or otherwise facilitate the removal of such substances.

Flux Cored Arc Welding (FCAW): An arc welding process that uses an arc between a continuous filler metal electrode and the weld pool. The process is used with shielding gas from a flux contained within the tubular electrode, with or without additional shielding from an externally supplied gas and without the application of pressure.

Flux Cored Electrode: A composite tubular filler metal electrode consisting of a metal sheath and a core of various powdered materials, producing an extensive slag cover on the face of a weld bead.

Forehand Welding (Non-Standard Term: Push Technique): A welding technique in which the welding torch or gun is directed toward the progress of welding.



Forging: Metallic shapes being derived by either hammering or squeezing the original piece of metal into the desired shapes or thicknesses.

Full Penetration: A non-standard term for complete joint penetration.

Fusion: The melting together of filler metal and base metal, or of base metal only, to produce a weld.

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G

Gas: The state of matter in which molecules move freely, so allowing it to expand completely to fill any space that it occupies.

Gas Cylinder: A portable container used for transportation and storage of compressed gas.

Gas Lens: One or more fine mesh screens located in the gas nozzle to produce a stable stream of shielding gas. This device is primarily used for gas tungsten arc welding.

Gas Metal Arc Welding (GMAW): An arc welding process that uses an arc between a continuous filler metal electrode and the weld pool. The process is used with shielding from an externally supplied gas and without the application of pressure.

Gas Nozzle: A device at the exit end of the torch or gun that directs shielding gas.

Gas Pockets: Cavities in weld metal caused by entrapping gas (porosity).

Gas Regulator: A device for controlling the delivery of gas at some substantially constant pressure.

Gas Shielded Arc Welding: A group of processes including, flux cored arc welding, gas metal arc welding, gas tungsten arc welding and plasma arc welding.

Gas Shielded Flux Cored Arc Welding (FCAW-G): A flux cored arc welding process variation in which shielding gas is supplied through the gas nozzle, in addition to that obtained from the flux within the electrode.

Gas Tungsten Arc Welding (GTAW): An arc welding process that uses an arc between a tungsten electrode (non-consumable) and the weld pool. The process is used with shielding gas and without the application of pressure.

Globular Transfer, Gas Metal Arc Welding: The transfer of molten metal in large drops from a consumable electrode across the arc. See also short circuiting transfer and spray transfer.

Gouging: A thermal cutting process variation that removes metal by melting or burning the entire removed portion, to form a bevel or groove. For more information on gouging techniques, see Gouging Techniques for Specific Materials.

Groove Angle: The included angle between the groove faces of a weld groove.

Groove Weld: A weld in a weld groove on a work piece surface, between work piece edges, between work piece surfaces, or between work piece edges and surfaces.

Ground Clamp: A non-standard and incorrect term for work piece connection.

Ground Connection: An electrical connection of the welding machine frame to the earth for safety.

Ground Lead: A non-standard and incorrect term for work piece lead.

H

Hardfacing (Non-Standard Term: Hard Surfacing): A surfacing variation in which surfacing material is deposited to reduce wear.

Heat Conductivity: Speed and efficiency of heat energy movement through a substance.

Heat Input: The energy supplied by the welding arc to the work piece. That portion of the base metal that has not been melted, but whose mechanical properties of microstructure have been altered by the heat of welding, cutting, or heating.

Heat-Affected Zone (HAZ): The portion of base metal whose mechanical properties or microstructure have been altered by the heat of welding, brazing, soldering or thermal cutting.

Heating: A process of heating various metals with direct application of single or multi-flames to a desired elevated temperature in order to perform the following metal fabrication processes: straightening or bending, stress relieving, flame hardening or flame shrinking.

Horizontal Position: The position in which welding is performed on the upper side and approximately horizontal surface and against an approximately vertical surface.

Hose: Flexible medium used to carry gases from the regulator to the torch. Constructed of continuous layers of rubber or neoprene material over a braided inner section.

Hot Pass: A non-standard term when used in pipe welding for the weld pass subsequent to the root pass.

Hot Start Current: A very brief current pulse at arc initiation to stabilize the arc quickly.

Hydrogen: A gas formed of the single element hydrogen. It is considered one of the most active gases. When combined with oxygen, it forms a very clean flame.

I

Ignition: The action of firing an explosive mixture of gases or vapors by means of a flame, electric spark, heating of sudden pressure change.

Included Angle: The angle of the groove between the two work pieces that are welded together. A non-standard term when used for groove angle.

Inclusion: Entrapped foreign solid material in a weld, such as slag.

Incomplete Fusion: A weld discontinuity in which fusion did not occur between weld metal and fusion faces or adjoining weld beads.

Inert Gas: A gas that normally does not combine chemically with materials (Argon and Helium are inert gases).

Inside Corner Weld: Two metals fused together; one metal is held 90° to the other. The fusion is performed inside the vertex of the angle.

Intermediate Weld Pass: A single progression of welding along a joint subsequent to the root pass(es) and prior to the cover pass(es).

Intermittent Weld: A weld which the continuity is broken by recurring unweld spaces.

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Interpass Temperature: In a multi-pass weld, the temperature of the weld area between weld passes.

J

Joining: Connecting two pieces of base metal (e.g. copper tubing) with a capillary fitting, sealing those pieces with a filler that is melted by heating the base metal with a torch.

Joint: The junction of members, or the edges of members, which are to be joined or have been joined.

Joint Clearance: The distance between the faying surfaces of a joint.

Joint Efficiency: The ratio of strength of a joint to the strength of the base metal, expressed in percent.

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

Joint Type: A weld joint classification based on the relative orientation of the members being joined. The five basic joint types are: butt, corner, edge, lap and T-joint.

K

Kerf: The gap produced by a cutting process.

Keyhole Welding: A technique in which a concentrated heat source penetrates partially or completely through a work piece, forming a hole (keyhole) at the leading edge of the weld pool. As the heat source progresses, the molten fills in behind the hole to form the weld bead.

Kindling Temperature: The temperature at which a substance will catch on fire and continue to burn, also referred to as the "ignition point".

Knee: The supporting structure of the lower arm in a resistance welding machine.

Knurling: A method of surface roughening in which the surface is upset with a knurling tool.

L

Land: A non-standard term for root face.

Lap Joint: A joint between two overlapping members in parallel planes.

Layer: A certain weld metal thickness made of one or more passes.

Lens: (See Filter Lens)

Liquefied Gas: A substance which is gaseous at ambient temperature and atmospheric pressure but has been transformed into liquid by changing its temperature and/or pressure. If the critical temperature for the substance is above the ambient temperature it can be liquefied by either lowering the temperature or increasing the pressure. If its critical temperature is below ambient it cannot be liquefied by applying pressure alone, it must also be cooled.

M

Liquidus: The liquidus temperature is the higher temperature at which the filler metal is completely melted. This is minimum temperature at which brazing will take place.

Manual Welding: Welding with the torch, gun, or electrode holder held and manipulated by hand (SMAW and GTAW are common manual processes).

Mechanized Welding: Welding with equipment that requires manual adjustment of the equipment controls in response to visual observation of the welding, with the torch, gun, or electrode holder held by a mechanical device.

Melting Range: The difference between solidus and liquidus temperatures is how the melting range is determined. This is the working range for the filler metal and the speed with which the filler metal will become solid after brazing. Filler metals with narrow ranges, with or without silver, solidify more quickly and therefore require careful heat application.

Metal Cored Electrode: A composite tubular filler metal electrode consisting of a metal sheath and a core of various powdered materials, producing no more than slag islands on the face of a weld bead.

Metal Electrode: A filler or non-filler metal electrode used in arc welding and cutting that consists of a metal wire or rod that has been manufactured by any method and that is either bare or covered.

Mig Welding: A non-standard term for flux cored arc welding or gas metal arc welding. It stands for metal inert gas.

Mixing Chamber: That part of the welding torch or cutting torch in which the fuel gas and oxygen are mixed.

N

Neutral Flame: An Oxy-fuel gas flame in which the portion used is neither oxidizing nor reducing.

NFPA: Abbreviation for "national fire protection association". Fuel gas flame in which the portion used is neither oxidizing nor reducing.

Nondestructive Examination (NDE): The act of determining the suitability of some material or component for its intended purpose using techniques that do not affect its serviceability.

Nozzle: A device at the exit end of the gun that directs the atomizing air or other gas.

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O

Open Circuit Voltage (OCV): The voltage between the output terminals of the power source when no current is flowing to the torch or gun.

Open Root Joint: An unwelded joint without backing or consumable insert.

Orifice: Opening through which gas flows. It is usually the final opening controlled by a valve.

OSHA: Abbreviation for "Occupational Safety and Health Administration".

Outside Corner Weld: Fusing two pieces of metal together with the fusion taking place on the under part of the seam.

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

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

Oxidizing: Combining oxygen with any other substance. For example, a metal is oxidized when the metal is burned, i.e., oxygen is combined with all the metal or parts of it.

Oxidizing Flame: An Oxy-fuel gas flame having an oxidizing effect due to excess oxygen.

Oxy-Acetylene Cutting: An Oxy-fuel gas flame having an oxidizing effect due to excess oxygen.

Oxy-Acetylene Welding: An Oxy-fuel gas cutting process used to burn metals by means of the reaction oxygen with the base metal at elevated temperatures. The necessary temperature is maintained by gas flames resulting from the combustion of acetylene with oxygen.

Oxy-Fuel Cutting: The process used to sever metals by means of the reaction of oxygen with the base metal at elevated temperatures. The necessary temperature is maintained by gas flames resulting from the combustion of fuel with oxygen. An Oxy-fuel gas welding process that produces fused metals by heating them with a gas flame or flames obtained from the combustion of acetylene with oxygen. The process may be used with or without the application of pressure and with or without the use of a filler metal.

Oxy-Fuel Cutting Torch: A device used for directing the preheating flame produced by the controlled combustion of fuel gases and to direct and control the cutting oxygen.

Oxygen: A gas formed of the element oxygen. When oxygen very actively supports combustion it is called burning; when oxygen is slowly combined with a substance it is called oxidation.

Oxygen Cutting: A process of cutting ferrous metals by means of the chemical action of oxygen on elements in the base metal at elevated temperatures.

Oxygen Cylinder: (See Gas Cylinder)

Oxygen Hose: (See Hose)

Oxygen Hydrogen Flame: The chemical combining of oxygen with the fuel gas hydrogen.

Oxygen L.P. Gas Flame: Chemical combining of oxygen with the fuel gas L.P. (liquefied petroleum).

Oxygen Regulator: A device used to reduce cylinder pressure to torch pressure and to keep the pressure constant. They are never to be used as fuel gas regulators.

P

Pass: (See weld pass)

Penetration: A non-standard term for joint penetration.

Pilot Arc: A low current arc between the electrode and the constricting nozzle of the plasma arc torch to ionize the gas and facilitate the start of the welding or plasma cutting arc.

Plasma Arc Cutting (PAC): An arc cutting process that uses a constricted arc and removes the molten metal with a high-velocity jet of ionized gas issuing from the constricting orifice.

Plug Weld: A weld made in a circular hole in one member of a joint fusing that member to another member.

Polarity: See direct current electrode negative and direct current electrode positive.

Porosity: Cavity type discontinuities formed by gas entrapment during solidification.

Porosity: Cavity Type discontinuities formed by gas entrapment during solidification or in a thermal spray deposit.

Postflow Time: The time interval from current shut off to either shielding gas or cooling water shut off.

Postheating: The application of heat to an assembly after welding, cutting, or heating.

Pounds Per Square Inch (PSI): A measurement equal to a mass or weight applied to one square inch of surface area.

Power Source: An apparatus for supplying current and voltage suitable for welding, thermal cutting or thermal spraying.

Precoating: Coating the base metal in the joint prior to soldering or brazing.

Preflow Time: The time interval between start of shielding gas flow and arc starting.

Preheat Temperature: The temperature of the base metal in the volume surrounding the point of welding immediately before welding is started. In a multi-pass weld, it is also the temperature immediately before the second and subsequent passes are started.

Preheating: The application of heat to the base metal immediately before welding or cutting.

Propane: A fuel gas. A member of the paraffin family. A hydrocarbon molecule comprising three carbon atoms and eight hydrogen atoms, C₃H₈.

Propylene: A fuel gas. A member of the olefin family. A hydrocarbon molecule comprising three carbon atoms and six hydrogen atoms, C₃H₆. Two of the carbon atoms form a double covalent bond in which two pairs of electrons are shared.

Puddle: A non-standard term for weld pool.

Pulsed Gas Metal Arc Welding (GMAW-P): A gas metal arc welding process variation in which the current is pulsed.

Pulsed Gas Tungsten Arc Welding (GTAW-P): A gas tungsten arc welding process variation in which the current is pulsed.

Push Angle: The travel angle when the electrode is pointing in the direction of weld progression. This angle can also be used to

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partially define the position of guns, torches, rods and beams.

PWG Weld: A weld in a circular hole in one member of a joint fusing that member to another member.

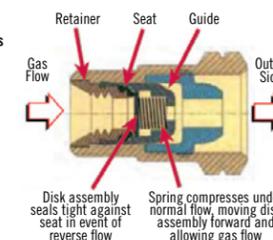
R

Reducing Flame: A flame having a reducing effect due to excess fuel gas.

Reinforcement Weld: (See Weld Reinforcement)

Reverse Flow Check Valves: Helps to prevent the reverse flow of gases from traveling past the check valve. Firepower recommends the use of these devices whenever possible.

The Check Valve
Prevents the reverse flow of gases



Root Bead: A weld bead that extends into or includes part or the entire joint root.

Root Of Weld: (See Weld Root)

Rosebud: Term used for multi-flame heating nozzle.

S

Self-Shielded Flux Cored Arc Welding (FCAW-S): A flux cored arc welding process variation in which shielding gas is obtained exclusively from the flux within the electrode.

Semi-Automatic Welding: Manual welding with equipment that automatically controls one or more of the welding conditions.

Shielded Metal Arc Welding (SMAW): An arc welding process with an arc between a covered electrode and the weld pool. The process is used with shielding from the decomposition of the electrode covering, without the application of pressure and with filler metal from the electrode.

Shielding Gas: Protective gas used to prevent or reduce atmospheric contamination.

Short Circuiting Transfer, Gas Metal Arc Welding: Metal transfer in which molten metal from a consumable electrode is deposited during repeated short circuits.

Slag: A non-metallic product resulting from the mutual dissolution of flux and non-metallic impurities in some welding and brazing processes.

Slag Inclusion: Non-metallic solid material entrapped in the weld metal or between weld metal and base metal.

Soldering: A group of welding processes, soldering uses metal to join

two pieces of metal. However, the metal added during the process has a melting point lower than that of the work piece, so only the added metal is melted, not the work piece. Soldering uses metals with a melting point below 800°F (427°C). The filler metal is distributed between the closely fitted surfaces of the joint capillary action.

Solidus: The highest temperature at which a metal or an alloy is completely solid.

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

Spot Weld: A weld made between or upon overlapping members in which coalescence may start and occur on the faying surfaces or may proceed from the outer surface of one member.

Spray Transfer, Gas Metal Arc Welding: Metal transfer in which molten metal from a consumable electrode is propelled axially across the arc in small droplets.

Standard Cubic Feet Per Hour (SCFH): USC unit for volumetric flow rate of air or gas (same as free air or free gas) at a temperature of 15.6°C (60°F) and an absolute pressure of 101,3 KPA (14,7 psi), expressed in cubic feet per hour.

Stickout, Gas Metal Arc Welding And Gas: Shielded flux cored arc welding: the length of unmelted electrode extending beyond the end of the gas nozzle.

Stickout, Gas Tungsten Arc Welding: The length of tungsten electrode extending beyond the end of the gas nozzle.

Stinger: Term used for stick electrode holder.

Strain: Reaction of an object to a stress.

Stress: Load imposed on an object.

Stress Relieving: Even heating of a structure to a temperature below the critical temperature followed by a slow, even cooling.

T

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

Tensile Strength: Maximum pull strength which a specimen is capable of withstanding.

Throat Of A Fillet Weld: Distance from the weld root to the weld face.

TIG Welding: A non-standard term for gas tungsten arc welding. It stands for tungsten inert gas.

Tinning: A non-standard term for precoating.

Tip: The end of the torch where the gas burns and creates a high temperature flame, it regulates and directs the flame.

Toe Of Weld: (See Weld Toe) Joint formed by placing one metal against another at an angle of 90°. The edge of one metal contacts the surface of the other metal.

Torch: (See Cutting Torch or Welding Torch)

Tungsten Electrode: A non-filler metal electrode used in arc welding, arc cutting, and plasma spraying, made principally of tungsten.

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Tungsten Inclusion: A discontinuity consisting of tungsten entrapped in weld metal.

U

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

Weld Axis: A line through the length of the weld, perpendicular to and at the geometric center of its cross section.

Weld Bead: A weld deposit resulting from a pass.

Weld Face: The exposed surface of the weld on the side from which welding was done.

Weld Metal: Metal in a fusion weld consisting of that portion of the base metal and filler metal 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 or layer.

Weld Pool: The localized volume of molten metal as a weld prior to its solidification as weld metal.

Weld Reinforcement: Weld metal in excess of the quantity required to fill a joint.

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

Weld Toe: The junction of the weld face and the base metal.

Welding: A joining process that produces coalescence of materials by heating them to the welding temperature, with or without the application of pressure or by the application of pressure alone, and with or without the use of filler metal.

Welding Arc: Controlled electrical discharge between the electrode and the work piece that is formed and sustained by the establishment of gaseous conductive medium, called arc plasma.

Welding Electrode: A component of the welding circuit through which current is conducted and that terminates at the arc, molten conductive slag, or base metal.

Welding Helmet: A device equipped with a filter plate designed to be worn on the head to protect eyes, face, and neck from arc radiation, radiated heat, spatter or other harmful matter expelled during some welding and cutting processes.

Welding Leads: The work piece lead and electrode

lead of an arc welding circuit.

Welding Power Source: An apparatus for supplying current and voltage suitable for welding.

Welding Procedure Specification (WPS): A document providing the required welding variables for a specific application to assure repeatability by properly trained welders and welding operators.

Welding Rod: Filler metal in wire or rod form, used in gas welding and brazing processes and in those arc welding processes in which the electrode does not provide the filler metal.

Welding Sequence: The order of making welds in a weldment.

Welding Torch: A device used in gas cutting for controlling the gases used for preheating and the oxygen used for cutting the metal.

Welding Wire: Metal wire that is melted and added to the welding puddle to produce the necessary increase in bead thickness.

Weldment: Assembly of component parts joined together by welding.

Whipping: A manual welding technique in which the arc or flame is oscillated backwards and forwards in the direction of travel as it progresses along the weld path.

Wire Feed Speed: The rate at which wire is consumed in arc welding.

Wire Stick Out: The distance from the contact tip of a MIG gun to end of the welding electrode protruding from it.

Work Lead: A non-standard term for work piece lead.

Workpiece: The part that is welded, brazed, soldered, thermal cut or thermal sprayed.

Workpiece Connection: The connection of the work piece lead to the work piece.

Workpiece Lead: The electrical conductor between the arc welding current source and work piece connection.

Y

Yield Strength: Stress at which a specimen assumes a permanent set.