

WARNINGS

Cyanide and cyanide fumes are dangerous poisons. The cyaniding method of case hardening requires expert supervision and adequate ventilation.

Oil or grease in the presence of oxygen will ignite violently, especially in an enclosed pressurized area.

Do not substitute oxygen for compressed air in pneumatic tools. Do not use oxygen to blow out pipe lines, test radiators, purge tanks or containers, or to "dust" clothing.

Welding machine Model 301, AC/DC, Heliarc with inert gas attachment, NSN 3431-00-235-4728, may cause electrical shock if not properly grounded. If one is being used, contact Castolin Institute, 4462 York St., Denver, Colorado 80216 ATTN: Mr. Lent.

The vapors from some chlorinated solvents (e.g. carbon tetrachloride, trichloroethylene, and perchloroethylene) break down under the ultra-violet radiation of an electric arc and form a toxic gas. Avoid welding where such vapors are present. These solvents vaporize easily and prolonged inhalation of the vapor can be hazardous. These organic vapors should be removed from the work area before welding is begun.

Do not assume that a container that has held combustibles is clean and safe until proven so by proper tests. Do not weld in places where dust or other combustible particles are suspended in air or where explosive vapors are present. Removal of flammable material from vessels/containers may be done either by steaming out or boiling.

The automotive exhaust method of cleaning should be conducted only in well ventilated areas to ensure levels of toxic gases are kept below hazardous levels.

Welding polyurethane foam-filled parts can produce toxic gases. Welding should not be attempted on parts filled with polyurethane foam. If repair of such parts by welding is necessary, the foam must be removed from the heat affected area, including the residue, prior to welding.

Do not stand facing cylinder valve outlets of oxygen, acetylene, or other compressed gases when opening them.

If it is necessary to blow out the acetylene hose, do it in a well ventilated place, free of sparks, flame, or other sources of ignition.

WARNINGS (cont)

Purge both acetylene and oxygen lines (hoses) prior to igniting torch. Failure to do this can cause serious injury to personnel and damage to the equipment.

Regulators with gas leakage between the regulator seat and the nozzle should be repaired immediately to avoid damage to other parts of the regulator or injury to personnel. With acetylene regulators, this leakage is particularly dangerous. Acetylene at high pressure in the hose is an explosion hazard.

Defects in oxyacetylene welding torches which are sources of gas leaks must be corrected immediately, as they may result in flashbacks, or backfires, with resultant injury to the operator and/or damage to the welding apparatus.

Damaged inlet connection threads may cause fires by ignition of the leaking gas, resulting in injury to the welding operator and/or damage to the equipment.

Dry cleaning solvent and mineral spirits paint thinner are highly flammable. Do not clean parts near an open flame or in a smoking area. Dry cleaning solvent and mineral spirits paint thinner evaporate quickly and have a defatting effect on the skin. When used without protective gloves, these chemicals may cause irritation or cracking of the skin. Cleaning operations should be performed only in well ventilated areas.

The acid solutions used to remove aluminum welding and brazing fluxes after welding or brazing are toxic and highly corrosive. Goggles, rubber gloves, and rubber aprons should be worn when handling the acids and solutions. Do not inhale fumes. When spilled on the body or clothing, wash immediately with large quantities of cold water.

Never pour water into acid when preparing solutions; instead, pour acid into water. Always mix acid and water slowly. These operations should only be performed in well ventilated areas.

Precleaning and postcleaning acids used in magnesium welding and brazing are highly toxic and corrosive. Goggles, rubber gloves, and rubber aprons should be worn when handling the acids and solutions. Do not inhale fumes and mists. When spilled on the body or clothing, wash immediately with large quantities of cold water, and seek medical attention. Do not pour water into acid when preparing solution; instead, pour acid into water. Always mix acid and water slowly. Cleaning operations should be performed only in well ventilated areas.

If the electrode becomes frozen to the base metal during the process of starting the arc, all work to free the electrode while the current is on must be done with the eyes shielded.

The nitric acid used to preclean titanium for inert gas shielded arc welding is highly toxic and corrosive. Goggles, rubber gloves, and rubber aprons should be worn when handling the acid and the acid solution. Do not inhale gases and mists. When spilled on the body or clothing, wash immediately with large quantities of cold water, and seek medical help. Do not pour water into acid when preparing the solution; instead, pour acid into water. Always mix acid and water slowly. Perform cleaning operations only in well ventilated areas.

The caustic chemicals (including sodium hydride) used to preclean titanium for inert gas shielded arc welding are highly toxic and corrosive. Goggles, rubber gloves, and rubber aprons should be worn when handling these chemicals. Do not inhale gases or mists. When caustics are spilled on the body or clothing, wash immediately with large quantities of cold water, and seek medical help. Special care should be taken at all times to prevent any water from coming in contact with the molten bath or any other large amount of sodium hydride, as this will cause the evolution of highly explosive hydrogen gas.

When using weld backup tape, the weld must be allowed to cool for several minutes before attempting to remove the tape from the workpiece.

Safety precautions must be exercised in underwater cutting and welding. Electrode holder and cable must be insulated, current must be shut off when changing electrodes, and the diver should avoid contact between the electrode and grounded work.

In thermit welding, the mold must be thoroughly dried before the charge in the crucible is ignited. When the charge has been ignited, the operator should stand a safe distance away and should wear goggles. Painful burns may occur from splashing metal, upsetting of the crucible, breaking of the mold, or allowing the molten metal to come in contact with moisture in the mold.

Before welding on equipment painted with CARC paint, remove the paint from an area larger than that which will be heated during welding.

Do not operate welding machines in an enclosed area unless the exhaust gases are piped to the outside. Inhalation of exhaust fumes will result in serious illness or death.

When filling the fuel tank, always provide a metal-to-metal contact between the container and the fuel tank. This will prevent a spark from being generated as fuel flows over the metallic surfaces.

Do not fill the fuel tanks while the engine is running. Fuel spilled on a hot engine may explode and cause injury to personnel.

WARNINGS (cont)

Do not attempt any maintenance on the welding machine while it is in operation. The voltage generated by it can cause injury or death.

Ensure that all welding machines are properly grounded. Failure to properly ground welding machines could result in electrical shock.

Always use ear plugs. Diesel engines exceed a permissible decibel level. Failure to observe this warning could result in a permanent hearing injury.

Always wear arc proof glasses or a welder's helmet when welding to prevent serious eye burns or possible blindness.

Use only approved cleaning solvents to avoid the possibility of fire or poisoning.

Inert gas, metal-arc welding processes produce intense ultra-violet radiation which can be harmful to the eyes and skin. Therefore, certain precautions must be observed to protect the operator from injury.

Skin must be completely covered. Leather gloves are recommended for hand protection. Heavy, dark colored clothing should be worn to prevent the radiation from penetrating to the skin or reflecting onto the neck under the helmet. Lightweight leather clothing is recommended because of its durability and resistance to deterioration from radiation. Cotton clothing will deteriorate rapidly when subjected to ultra-violet radiation.

Adequate ventilation should be provided to remove fumes which are produced by welding processes. American standard Z-49.1 on welding safety covers such ventilation procedures. Highly toxic gases are formed when the vapors from halogenated solvents are subjected to ultra-violet radiation. Therefore, it is recommended that degreasers and other sources of these vapors should be located so that the vapors cannot reach the welding operation.

Under no circumstances should acetylene cylinders be positioned or stored in other than an upright position. Storage of the cylinder in a horizontal or reclining position could create a hazardous condition.

Stand to the side of gas and oxygen cylinders when turning on the pressure release valves. The cylinders contain extreme pressure. Injury could occur if a defective flowmeter or pressure regulator valve ruptures when subjected to these pressures.

Ensure that all gages are removed from gas and oxygen cylinders before transporting. Failure to observe this warning could create a hazardous condition.

Wear head and eye protection, rubber gloves, boots, and aprons when handling steam, hot water, and caustic solutions. When handling dry caustic soda or soda ash, wear approved respiratory protective equipment, long sleeves, and gloves. Wear fire resistant hand pads or gloves to handle hot drums.

Brazing filler metals containing cadmium may form poisonous fumes on heating. Do not breathe fumes. Use only with adequate ventilation, such as fume collectors, exhaust ventilators, or air-supplied respirators. See American National Standards Institute Standard Z49.1-1973. If chest pain, cough, or fever develops after use, call physician immediately.

Acetylene, stored in a free state under pressure greater than 15 psi (103.4 kPa), can break down from heat or shock, and possibly explode. Under pressure of 29.4 psi (203 kPa), acetylene becomes self-explosive, and a slight shock can cause it to explode spontaneously.

Acetylene which may accumulate in a storage room or in a confined space is a fire and explosion hazard. All acetylene cylinders should be checked, using a soap solution, for leakage at the valves and safety fuse plugs.

Do not stand facing cylinder valve outlets of oxygen, acetylene, or other compressed gases when opening them.

Always have suitable fire extinguishing equipment at hand when doing and welding.
