before the helmet is lowered. The lenses shall be No. 1 or No. 3 shade. Inert gas metal-arc

viii. Unless other suitable provisions have been made to prevent cylinders from upsetting during use, they shall be securely tied to a substantial stationary object.

ix. Cylinder valves shall be closed and valve protection caps replaced before cylinders are moved or placed into storage.

x. Special cylinder carts shall be used for moving cylinders.

xi. All cylinders shall be placed in an upright position whether in use or in storage. This prevents fuel gas liquids in LP-Gas or MAPP Gas (Methylacetylene-Propadiene) cylinders or acetone liquid in acetylene cylinders from being discharged through the regulator.

xii. Cylinders shall be used in the order they are received from the supplier. When empty, their valves shall be closed, caps replaced, and the cylinders marked “MT Storage” to

xxvi. Acetylene shall not be used at a pressure >15psi.

b. Hose Lines and Connections

i. Only hose in good condition shall be used. At regular intervals, examine pressurized hose while it is immersed in water to detect leaks.
ii. ii. Only hose designated to be used with a specific gas shall be used. In general, hoses can be identified by their color: red=fuel gas, green=oxygen, and black=inert gas.
iii. Hose shall be protected from damage by trucks, falling objects, sharp edges, sparks, slag, and open flame.
iv. Hose shall be placed so that it will not create a tripping hazard. Excess hose shall be coiled to prevent kinks and tangles.
v. Standard oxygen hose or regulator outlet con

i. Before starting operations, all electrical connections shall be checked to determine that they are securely made and firmly attached to the work.
ii. ii. Work leads shall be kept as short as possible.
iii. Equipment shall be examined frequently to determine that all electrical connections and insulations on holders and cables are in good condition. Loose cable connections may overheat or arc and cause a fire.
iv. Safety devices such as circuit breakers and interlocks shall not be shunted our or disconnected. Power sources or line fuses shall be locked out or removed when equipment is being installed, inspected, or serviced.
v. Report any missing enclosures or defects in the motor or generator to your supervisor.
vi. Terminals of the welding generator shall not contact the frame of the welder. This produces an electrical ground.
vii. Only electrode holders designed to safely handle the maximum rated current required shall be used.
viii. Electrode holders that are not fully insulated shall be replaced. Holders with protruding screws shall not be used.
ix. Electrodes shall be removed from the holder when not in use.
x. An arc shall not be struck on a gas cylinder or any pressure vessel as it may seriously weaken the vessel.
xi. Only welding cables that are completely insulated, flexible, and of proper size for the maximum current requirements of the work shall be used. Cables shall be regularly inspected for cracks, wear, or damage and repair or replace if necessary.
xii. Lengths of cable shall be connected by fully insulated lock-type connectors having a capacity equal to that of the cable.
xiii. Cable lugs shall be soldered to the cable and shall be securely fastened to give full electrical contact.
xiv. The exposed metal parts of lugs shall be completely covered with rubber tape and protected with friction tape. Exposed parts of electrical units shall have insulating covers in place before the power is turned on.
xv. Proper electrical contact shall exist at all joints when a building structure or pipeline is used temporarily as a ground-return circuit.
xvi. When a structure or pipe is continuously used as a ground for the machine, all joints shall be electrically bonded to establish a good ground.
xvii. Pipe containing gases, flammable liquids, or conduits carrying electrical conductors shall not be used as a ground-return circuit.

xxii. When discontinuing work, the power supply switch in the equipment shall be opened and the unit disconnected from the source of power.

xxiii. Welding rods shall be stored in the container on the welding machine; not thrown on floors or staging.

xxiv. Welding shall never take place in damp areas without insulation to protect workers against electrical shock. Dry duckboard or a mat shall be used if necessary.

xxv. Gas or diesel electric generators shall have the exhaust gases vented to the outside to avoid the toxic effects of carbon monoxide and other gaseous byproducts.

Note: The hazards connected with atomic hydrogen and heli-arc welding are essentially the same as described herein for arc welding.

b. Spot Welding

The use of this type of welding presents certain hazards inherent to the nature of spot welding equipment.

i. Prior to spot welding, the material is usually cleaned in a caustic or slightly acid bath. Employees performing these wash operations shall be protected from splashing liquid.

ii. ii. Under no circumstances shall the operator of a spot welding machine adjust the contactors. This shall be done by a trained electrician.

iii. In hand spot welding installations, eye protection shall be required to protect the operator from the spattering metal.

iv. Operators shall exercise extreme care when cleaning the tips of the contactors to prevent having their fingers crushed between tips.

v. Welding of materials such as stainless and high carbon steels causes excessive spattering of metal. Operators shall be cautioned to protect against the possible penetration of the metal into the tips of the fingers.

Filter Lens Shade Numbers for Protection

Against Radiant Energy

Gas Welding Operation	Shade Number
Soldering	2
Torch brazing	3 or 4
Light cutting, up to 1″	3 or 4
Medium cutting, 1″ to 6″	4 or 5
Heavy cutting, over 6″	5 or 6
Gas welding (light), up to 1/8″	4 or 5