

## SECTION 6. WELDING AND BRAZING SAFETY

**4-111. GENERAL.** A number of inherent hazards exist in the use of oxy-fuel welding and cutting apparatus. It is necessary that proper safety and operating procedures are understood. A thorough understanding of the proper safety and operating procedures minimizes the hazards involved and adds to the pleasure and efficiency of your work.

**4-112. FIRE AND EXPLOSION SAFETY.** Fires occur in welding areas because flammables are left where they can be ignited by welding sparks or gas welding flames. Before welding, clear the welding area of all flammables such as rags, paper, wood, paint cans, solvent, and trash containers. Do not weld in areas where flammables are present.

**a. Unless absolutely necessary, never weld** any tank or radiator that has had a flammable in it, including gasoline, av-gas, motor oil, hydraulic fluid, or any other liquid that could ignite if the vapor and temperature reach a flashpoint. Explosions often occur when empty tanks are being welded or cut open with a torch.

**b. If welding** such tanks or radiator coolers is absolutely necessary, the tank must first be washed with a caustic-based, water-soluble liquid, rinsed with plenty of clear water, and then dried. Before welding, the tank or container should be thoroughly purged with argon, or other inert gas, while the welding is in process.

**4-113. WELDING WORK AREA.**

**a. The work area** must have a fireproof floor, concrete floors are recommend.

**b. Use heat-resistant shields** to protect nearby walls or unprotected flooring from sparks and hot metal.

**c. Maintain an adequate suction ventilation system** to prevent the concentration of oxygen/fuel gas, flammable gases, and/or toxic fumes. It is important to remember that oxygen will not burn. The presence of oxygen, however, serves to accelerate combustion, and causes materials to burn with great intensity.

**CAUTION: Oil and grease in the presence of oxygen can ignite and burn violently.**

**d. A completely clean welding shop** area with white walls, ceiling, and floor; and with plenty of light, is better for welding. The better the lighting conditions, the easier it is to see the weld puddle and make excellent aircraft-quality welds.

**e. During oxy-fuel processes** use work benches or tables with fireproof tops. Fire bricks commonly top these surfaces and support the work.

**f. Chain or otherwise secure oxygen** and fuel gas cylinders to a wall, bench, post, cylinder cart, etc. This will protect them from falling and hold them upright.

**4-114. FIRE PROTECTION.** Practice fire prevention techniques whenever oxy-fuel operations are in progress. Simple precautions prevent most fires, and minimize damage in the event a fire does occur. Always practice the following rules and safety procedures.

**a. Inspect oxy-fuel apparatus** for oil, grease, or damaged parts. DO NOT use the oxy-fuel apparatus if oil or grease is present or if damage is evident. Have the oxy-fuel apparatus cleaned and/or repaired by a qualified repair technician before it is used.

**b. Never use oil** or grease on or around any oxy-fuel apparatus. Even a trace of oil or grease can ignite and burn violently in the presence of oxygen.

**c. Keep flames,** heat, and sparks away from cylinders and boxes.

**d. Flying sparks** can travel as much as 35 feet. Move combustibles a safe distance away from areas where oxy-fuel operations are performed.

**e. Use approved** heat-resistant shields to protect nearby walls, floor, and ceiling.

**f. Have a fire extinguisher** of the proper class (ABC) and size in the work area. Inspect it regularly to ensure that it is in proper working order. Know how it is used.

**g. Use oxy-fuel equipment** only with the gases for which it is intended.

**h. DO NOT open** an acetylene cylinder valve more than approximately 1-1/2 turns and preferably no more than 3/4 of a turn. Keep the cylinder wrench, if one is required, on the cylinder valve so, if necessary, the cylinder may be turned off quickly.

**i. On all gases except acetylene,** open the cylinder valve completely to seal the cylinder back-seal packing.

**j. Never test for gas leaks with a flame.** Use an approved leak-detector solution.

**k. When work is complete,** inspect the area for possible fires or smoldering materials.

**l. Special care should be taken** when welding structural tubing that has been coated on the inside with linseed oil. Smoke and fire may be generated by the heat of the torch. Ensure that an observer with a fire extinguisher is close.

#### **4-115. PROTECTIVE APPAREL.**

**a. Protect yourself from sparks,** flying slag, and flame brilliance at all times.

(1) For gas welding and brazing, use number 3 or 4 green-shaded tempered lenses.

(2) When gas welding aluminum, use cobalt-blue tint lenses.

(3) When arc welding, including TIG, MIG, and plasma cutting; use number 9 to 12 green lenses and a full face-and-neck covering helmet.

(4) Electronically darkening lenses provide number 3 to 12 automatic darkening as soon as the arc is ignited.

**b. Wear protective gloves,** sleeves, aprons, and lace-up shoes to protect skin and clothing from sparks and slag.

**CAUTION: Keep all clothing and protective apparel absolutely free of oil or grease.**

**4-116. FIRST-AID KITS.** Always keep a special welder's first-aid kit where it is easily accessible. Burns are the most common welding accidents.

**4-117.—4-128. [RESERVED.]**