



Company Name: \_\_\_\_\_ Job Site Location: \_\_\_\_\_

Date: \_\_\_\_\_ Start Time: \_\_\_\_\_ Finish Time: \_\_\_\_\_ Foreman/Supervisor: \_\_\_\_\_

## Topic 248: Safety for Brazing, Sweating, and Soldering

**Introduction:** “*Brazing*” is a term usually applied to oxygen/acetylene gas welding on non-ferrous (iron) metals. High-pressure copper refrigerant line-sets are generally brazed with a copper alloy rod. “*Sweating*” is a term applied to a type of soldering used in plumbing and other copper pipe work to join fresh-water supply-lines that will sustain substantial fluctuating hydraulic pressures. “*Soldering*” uses melted metal solder as an adhesive to join together material in low stress assemblies (such as sheet metal fabrications). All three of the above operations may be referred to as “hot work”. These safety rules should be followed when performing brazing, sweating, or soldering operations:

- **Adequate ventilation** must always be provided when performing any of these operations. If these operations are performed in confined spaces respirators or self contained breathing apparatus may be required.
- **Burn hazards** are always associated with these operations and proper personal protective equipment (such as safety glasses, or welding, goggles for brazing, heavy welders gloves, sturdy pants or a welding apron, and heavy boots) must be used by all personnel involved.
- **Personnel involved** in brazing, sweating, or soldering (hot work) should always notify co-workers of areas where hot work is being performed. If possible, shield those areas to prevent contact by any co-workers.
- **The danger of explosion** or fire is ever-present due to the fuel gas and oxidizer being used; or by other flammable or combustible materials present in the work-zone. Always keep a properly rated and filled fire extinguisher readily available, and have a fire watch posted when doing hot work in particularly susceptible areas
- **When sweating** in copper pipe for residential wood frame structures, it is a good idea to slightly dampen the area with a spray bottle of clean water to prevent marring, damaging, or igniting the surrounding material.
- **The hazard from smoke**, vapors, and fumes result from: ① burning flux, ② the by-products of combustion (carbon monoxide), ③ from the fuel of the gas torch being used, ④ and from paint or other anti-rust coatings burning off the metal being welded or heated.
- **The acid flux** used in hot work is toxic when ingested or inhaled. Wear gloves and use ventilation when handling flux.
- **Additional hazards** relate to the fabrication and preparation processes such as the grinding and mechanical cutting of the material being used.



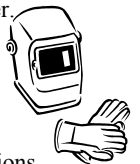
**Lead exposure in brazing, sweating, and soldering:** lead may be encountered in all of these operations in the form of lead solder, lead paint, and lead alloys used in brazing. When absorbed into your body in certain doses lead is a toxic substance. Lead is not absorbed through your skin, except in certain organic compounds. *Ways in which lead may cause contamination:*

- **When lead is scattered** in the air as a dust, fume or mist (such as when old lead paint is burned off metal) it can be inhaled and absorbed through your lungs and upper respiratory tract. Adequate ventilation will prevent unsafe atmospheric levels of lead in the workplace.
- **You can also absorb** lead through your digestive system if lead gets into your mouth and is swallowed. Do not eat food in areas where work with lead takes place. Always wash after working in areas where exposure to lead contaminants may be possible.
- **Only unleaded solder** may be used for work (sweating and soldering) on fresh water supply lines.
- **If you have concerns** that you may have exposure to lead in excess of safe limits, have the air tested in your workplace or have your doctor perform a blood test.



**Safe handling, use, and storage of Compressed Gas Cylinders (CGC):**

- **Valve caps must** be installed and valves must be closed off before a cylinder is moved, when it is empty, and at the completion of each job.
- **Gas cylinders must** be kept far enough away from hot operations and external heat sources so that sparks, flames, or slag will not reach them. If impractical, fire resistant heat shields must be utilized.
- **CGCs must** be legibly marked to clearly identify the gas contained and stored in a manner that prevents hazards of tipping, falling, or rolling.
- **Gas cylinders must** be checked periodically for corrosion, general distortion, cracks, or any other defects anywhere on the cylinder.
- **If a special valve wrench** is needed, it must be left in position on the valve while the cylinder is in use.
- **Regulators, hoses, and torches** must be carefully inspected and removed from service if worn or damaged.
- **Color-coded hoses** must be used: **RED** to identify fuel gas, **GREEN** to identify oxygen, and **BLACK** for inert gas (or air hose).
- **Fuel gas cylinders** and oxygen cylinders must be separated by distance and fire resistant barriers while in storage.



**Conclusion:** Burns are a common injury when doing hot work, and the proper first aid training for burns is a useful asset for these operations.

### Work Site Review

Work-Site Hazards and Safety Suggestions: \_\_\_\_\_

Personnel Safety Violations: \_\_\_\_\_

**Employee Signatures:**

*(My signature attests and verifies my understanding of and agreement to comply with, all company safety policies and regulations, and that I have not suffered, experienced, or sustained any recent job-related injury or illness.)*


**Foreman/Supervisor's Signature:** \_\_\_\_\_

*These guidelines do not supercede local, state, or federal regulations and must not be construed as a substitute for, or legal interpretation of, any OSHA regulations.*