

Using a torch to cut or join metal material is commonly known as **“Hot Work”**.

Torch welding uses high temperatures to heat or melt the metal material to be bonded and uses a similar, compatible material to melt into the joint as filler to make the weld (joint).

The term “Brazing” is generally applied to gas welding on non-ferrous (iron) metals. HVAC high-pressure copper refrigerant line-sets are generally brazed, although sometimes they are sweated (soldered).

“Sweating” is a term applied to a type of soldering used by plumbers to join copper fresh-water supply-lines.

Regular “Soldering” uses melted metal as a form of glue to join low stress assemblies (such as sheet metal pans).

“Gas Torch Cutting” requires the metal (usually ferrous alloys) to be heated to liquid. This process blows molten metal spray in all directions. Safe gas torch cutting skills are only acquired through much practice.

Most of the injuries and illnesses associated with “Gas Welding and Cutting” are due to the extreme temperatures involved.

- 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.
- The hazard from smoke, vapors, and fumes results from burning flux, the combustion

by-products (carbon monoxide) from the fuel gas torch being used, and from paint or other anti-rust coatings burning off the metal being welded or cut.

Guidelines for safe “Gas Welding and Cutting” operations:

- Un-trained or inexperienced persons should never be allowed to do “Hot Work” without supervision.
- All possible Engineering Controls should be implemented prior to beginning the job to ensure **adequate ventilation and exhaust**.
- Personal Protective Equipment (PPE) appropriate to the type of operations being conducted must be worn. **Eye and Face protection** must have the correct filter lenses, **Proper gloves**, **Welding apron** (if needed), **Steel-toed boots** (if working with heavy metal), **Hearing protection** when grinding and machine cutting.
- **Fire Prevention control measures** must be in place prior to starting “Hot Work” such as fire extinguishers, water buckets, and fire watchers. Many times, during rough-in processes, plumbers and HVAC mechanics apply direct flame to wooden frame members and it is

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important to remember to **douse these areas with water** to avoid smoldering embers which could later flare-up and set the job on fire.

- **Compressed Gas Cylinders** (CGCs) must be kept far enough away from hot operations so that sparks, flames, or slag will not reach them. (If that is impractical, fire resistant heat shields must be utilized.)
- Make certain that cylinders containing oxygen, acetylene, or other fuel gases are not taken into confined spaces.
- **Color-coded hoses** must be used: RED to identify fuel gas, GREEN to identify oxygen, and BLACK for inert gas (or air hose).
- Pressure-reducing regulators and manifolds must only be used for the gas and pressures for which they were designed.
- **CGC regulators, hoses, and torches** must be carefully inspected and removed from service if integrity is suspect.

Thoughtful care must be given to all equipment and PPE being used in areas of the “Hot” processes. These operations must be conducted in a safe manner to avoid potential serious injury or possibly setting the jobsite or shop on fire.