

Welding Safety

Highway Department employees have several responsibilities, some of which require welding. The process of welding is when metal pieces or parts are joined together by heating the surfaces to the point of melting, pressing or hammering them together, then allowing them to cool, causing fusion. The common types of welding we see in municipal garages are oxyacetylene gas welding and arc welding. Arc welding includes MIG (metal inert gas) and TIG (tungsten inert gas) welding. Many of our members have oxyacetylene outfits in the garage, along with a portable electric arc welder. This equipment and its operational use have inherent risks which need to be addressed.



Associated Hazards

There are several dangers employers need to protect welders from. These can include smoke, fumes, heat, noise, electrical hazards, and light.

- *Smoke & Fumes:* Welding produces smoke and metal fumes. Many materials used in welding create highly toxic fumes. These gases not only reduce the oxygen in the air but can also cause short and long-term respiratory damage.
- *Heat:* The extreme heat of welding can cause burns to exposed skin. Contact with hot slag and metal chips can produce skin and eye injuries. If combustible or flammable materials are nearby, sparks can cause fires or explosions.
- *Noise:* Welding activities can produce noise levels of over 100 dB(A), damaging hearing and potentially resulting in impairment.
- *Electrical:* For portable welding equipment, there is a danger of electric shock. Electrocution can cause serious injury or death.
- *Light:* The intense light associated with welding can cause 'welder's flash,' also known as a flash burn, and skin burns. A flash burn is the painful inflammation of the cornea, like a sunburn in the eye, due to bright ultraviolet light exposure.

Safety Measures

To protect employees from the many associated hazards, take precautions. Before welding, it is imperative to inspect one's surroundings. In 2019, an auto mechanic was fatally injured when welding too close to a near-empty drum of washer fluid, a flammable material. The drum exploded, covering him with burning fluid, and he died from his injuries a few weeks later.

Safety Measures (cont.)

Always inspect for flammable chemicals, combustibles, equipment containing flammables like gasoline, and other dangers. Move all combustibles a minimum of 35 feet from the welding location. If that is not possible, properly shield combustibles from the operations with flame-resistant materials.

Additional precautions include:

- *Adequate Storage:* Oxyacetylene outfits consist of an oxygen tank and an acetylene tank. These are paired on either a portable cart or in a permanent-use location. This is the only instance where these two tanks can be stored together. All spare oxygen and acetylene tanks must be separated by at least 20 feet when stored inside a building. The storage area should be well protected from contact and in a well-vented, dry area away from highly combustible materials such as oil or excelsior fibers.
- *Proper Ventilation:* ANSI Z49.1-2012 provides guidance on ventilation for natural and mechanical welding. Appropriate ventilation is when airflow sufficiently controls exposure to hazardous airborne contaminants. Ventilation systems depend on various factors, so be sure to reference this standard before beginning welding operations.
- *PPE (Personal Protective Equipment):* OSHA standard 29 CFR 1910.252 includes protections for employees including eye, face, hand, and body protection. Helmets, hand shields, goggles, safety glasses, or a combination of these are acceptable protections in various applications. Helmets and hand shields protect the face, neck, and ears from direct radiant heat from the arc. All filter lenses and plates must meet the test for transmission of radiant energy described in ANSI/ISEA Z87.1-2015.
- *Fire Safety:* Fire extinguishers must be available in or near welding operations. Smoldering embers could cause a major fire, resulting in significant loss and injury. Therefore, a fire watch must be maintained for at least 30 minutes after the welding or cutting operations finish.

Given the risks this operation poses to employees and facilities, it is essential to routinely review the welding process and confirm all necessary safety precautions are being taken. Additionally, newly hired staff must complete safety training on the proper safeguards. This training must be repeated when experienced employees show a failure to comply with the standards.

Please reach out to Robert Blaisdell, Director of Loss Control at rblaisdell@wrightinsurance.com for further information on this subject. Also, view the safety training video on Safety Source Online (<https://midwest-employers-casualty.safetysourceonline.com/>) entitled 'Welding Safety: The Basics SS1103AE.'