



Welding hazards

Welding smoke is a mixture of gases and very fine particles, called fumes. Many of the substances contained in these fumes and gases, such as chromium, nickel, asbestos, silica, cadmium, carbon monoxide, and many others, can be extremely toxic.

Welding fumes and gases generally come from the base material being welded or the filler material that is used, from coatings and paints on the metal, or from chemical reactions which are the result of ultraviolet light from the arc, and heat.

Exposure to welding smoke may have short-term and long-term health effects.

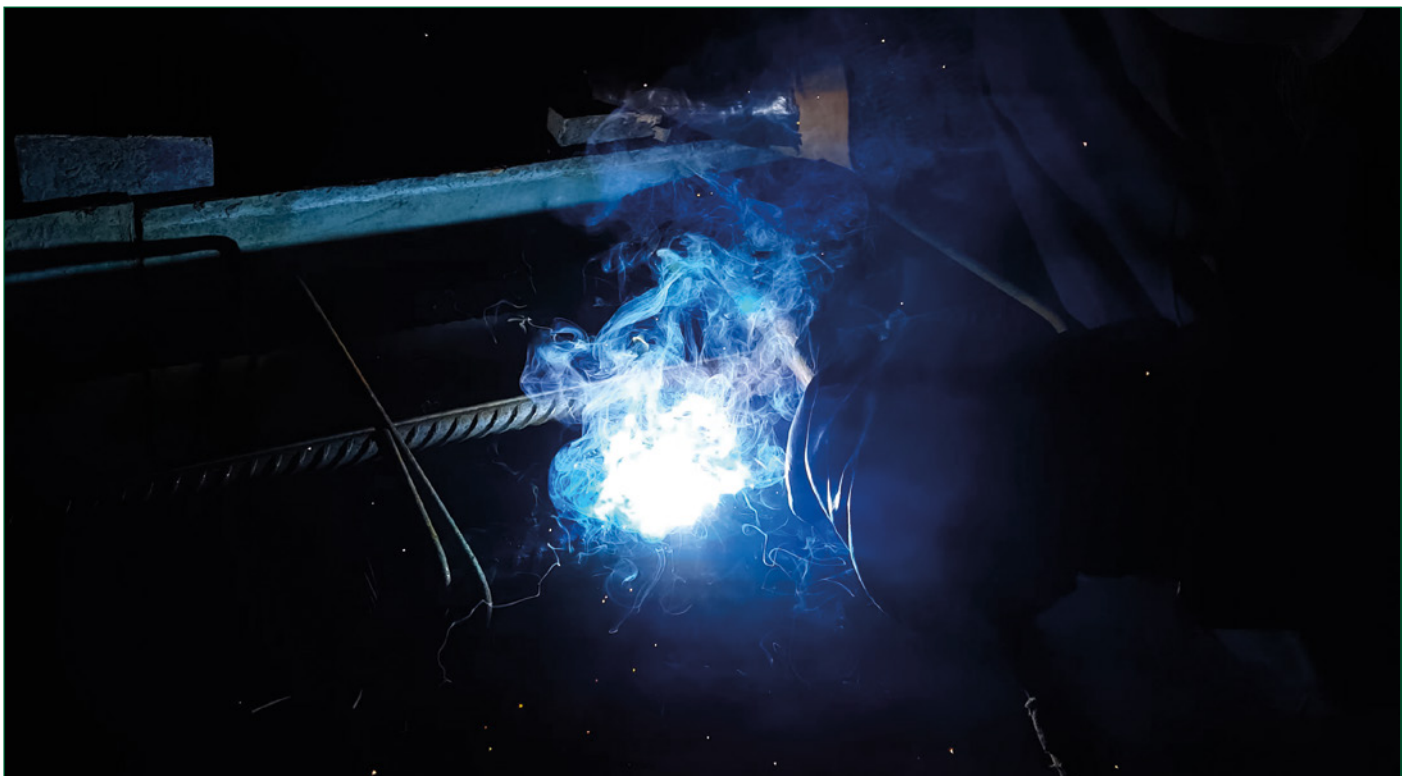
- **Short-term health effects** – Exposure to such metal fumes as zinc, magnesium, copper, and copper oxide can cause metal fume fever. Symptoms of metal fume fever include fever, muscle ache, chest soreness, cough, fatigue, and nausea. Ultraviolet radiation given off by welding reacts with oxygen and nitrogen in the air to form ozone and nitrogen oxides. These gases are deadly at high doses, and can also cause irritation of the throat and serious lung disease.
- **Long-term health effects** – Welders have an increased risk of lung cancer, and possibly cancer of the larynx and urinary tract, owing to the large amount of toxic substances in welding smoke. Welders may also experience a variety of chronic respiratory problems, kidney damage and heart and skin disease. Additionally, the intense heat of welding can cause burns, while eye injuries have resulted from contact with metal chips, sparks, and hot electrodes. Finally, the intense light associated with arc welding can cause damage to the retina of the eye.

How can we reduce the hazards of welding? Before beginning a welding job, it is important to **identify the hazards** for that particular welding operation. The hazards will depend on the type of welding, the materials to be welded and the environmental conditions.

Always ensure you know what you are welding before you start. Then **replace hazardous materials** for less dangerous ones. Ventilation should be used to remove harmful fumes and gases. **Use shielding** to protect other people in the work area from the light of the welding arc, heat, and hot spatter.¹ You can minimise the production of welding fumes by using the lowest acceptable amperage and holding the electrode perpendicular and as close to the work surface as possible.

GLOSSARY

1 small shower





Always wear **personal protective equipment**. Eye protection should be worn for all welding operations to protect the eyes from bright light, heat, ultraviolet light, and flying sparks. Hearing protectors, such as ear plugs or ear muffs, should be used during noisy operations such as air arcing and grinding.

Protective clothing, which should be used during welding, includes fire-resistant gauntlet gloves, headcap, high-top hard-toed shoes, leather apron, flame-retardant coveralls, and leggings or high boots. Protective clothing should be made of wool, which does not ignite easily, or specially-treated cotton fabrics. Sleeves and collars should be kept buttoned.

Adapted from AFSCME Health and Safety Fact Sheet



ACTIVITIES

1 Answer the following questions.

- 1 What do we mean by 'welding fumes'?
- 2 Where do these fumes come from?
- 3 What are the most common short-term health effects of exposure to welding?
- 4 What are the most common long-term health effects of exposure to welding?
- 5 What do welding hazards depend on?
- 6 What are the main precautions to take before starting a welding job?
- 7 How can we minimise the production of welding fumes?
- 8 What kind of protective equipment should be worn by welders?

2 Match each term with its definition.

- | | |
|---------------|---|
| 1 Asbestos | A A membrane at the back of the eyeball sensitive to light |
| 2 Toxic | B Feeling of sickness |
| 3 Ultraviolet | C Boxlike space at the top of the windpipe containing the vocal cords |
| 4 Nausea | D Soft grey mineral substance which can be used as fireproof material |
| 5 Lung | E A wavelength which is beyond the violet end of the visible spectrum |
| 6 Larynx | F Either of the two breathing organs in the chest of man |
| 7 Retina | G Types of cloth |
| 8 Fabrics | H Poisonous |