



TIS 24

Welding Fumes - Safety Alert



**Thousands die each year from
fume related illnesses.**

Don't be one of them.



TECHNICAL INFORMATION SHEET 24

Revision 1: 2013

WELDING FUMES – SAFETY ALERT

1. SCOPE

Metal welding, both arc and gas, and cutting produces a variety of hazards, not only to those directly involved but also in the surrounding area. Obvious dangers exist such as a fire hazard; the handling of compressed, fuel and shielding gases; solvents and material handling. However a significant hazard exists from fumes. This publication aims to highlight the potentially fatal consequences in both the short and long term that these can present.

2. OVERVIEW OF FUMES

The content of fumes may be either asphyxiating or toxic.

Asphyxiating fumes are mainly due to shielding gases and produce their effect by displacing oxygen from the surrounding air, excessive quantities can cause suffocation. They are most commonly argon (Ar), helium (He) and nitrogen (N₂). This risk is well documented and is covered in BCGA Guidance Note 11.

Toxic fumes can be both gaseous and particulate. These fumes can present a serious threat to health and ultimately life in both the short and long term.

Short-term risks:

- Eye irritation.
- Shortness of breath, and irritation to respiratory tract.
- Metal fume fever.
- Poisoning by many metals e.g. zinc, barium, manganese, nickel, lead, copper, chromium, cadmium and aluminium. Fume containing these metals is toxic and can cause immediate risk of injury.
- Ozone, carbon monoxide and oxides of nitrogen are formed in some welding and cutting processes. These cannot be detected by the senses, but are toxic.

NOTE: Short-term risks like these are fairly well known and understood, but failure to take appropriate precautions will still expose workers to risk of injury or even death.

Long-term risks:

There is an increasing understanding that exposure to fume can lead to serious chronic health problems in the long term, perhaps many years later. Smoking is now well-known to cause serious health problems in later life and exposure to fume must be treated as a similar risk. The risks include:

- Chronic Obstructive Pulmonary Disease (COPD). This is caused by many factors, such as exposure to dust, and is now linked to exposure to welding fume.
- Lung cancer. This can be caused by exposure to many substances, including heavy metal fume.

NOTE: The Health and Safety Executive (HSE) have estimated 12,000 people die in the UK each year from long latency health issues, i.e. disease caused over a long period. Of these approximately 4,000 are caused by lung disease with 3,000 attributed to COPD. Many of these will have been at least partly caused by occupational exposure.

BCGA has engaged with the HSE and others via the Welding Fume Team to try to influence attitudes and behaviours with respect to welding fume, particularly in encouraging the use of appropriate Personal Protective Equipment. The Welding Fume Team has produced a website www.badairday.info which explains in detail the safety concerns associated with welding fume and which encourages appropriate safe behaviour.



3. WHAT DOES THE LAW SAY, AND HOW SHOULD STAFF BE PROTECTED?

The Health & Safety at Work etc. Act places general duties on employers and employees.

Employers, including self-employed persons, must ensure the health and safety of their employees so far as is reasonably practicable. To do this they must:

- Conduct a risk assessment of all activities which involve a risk to health and safety. This must be formally recorded.
- Make available to employees information about the risks identified and the control measures put in place to mitigate them.
- Provide protective equipment as necessary.
- Provide training to employees on procedures and safety.

Employees must cooperate with their employer in relation to health and safety issues. This requires that they:

- Follow instructions for safe working.
- Participate in training.
- Use the protective equipment provided.

It is vital that employers and employees recognise these duties, which are enshrined in criminal law.

Protection of staff may require the use of:



Heat resistant gloves, safety boots,
fire-resistant clothing



Eye protection, often with full face visor



Extraction / ventilation system to
ensure clean air supply



Breathing apparatus or respirator

The actual requirement for any job will be defined in the overall risk assessment. Employees must ensure that they follow the instructions to use the protection systems provided.

4. BCGA RELATED PUBLICATIONS

- | | |
|--------------------------------|--|
| Code of Practice 7 | The safe use of oxy-fuel gas equipment (individual portable or mobile cylinder supply). |
| Guidance Note 7 | The safe use of individual portable or mobile cylinder gas supply equipment. |
| Guidance Note 11 | Reduced oxygen atmospheres. The management of risks associated with reduced oxygen atmospheres from the use of gases in the workplace. |
| Guidance Note 23 | Identifying gas safety training requirements in the workplace. |
| Technical Information Sheet 15 | Model risk assessment for the storage and use of oxy-acetylene cylinders. |

Also refer to the “Welding Matters” page on the BCGA website – www.bcgaco.uk.