

	MRAT 028	Electric arc welding fumes	Applicable to: aluminium; mild steel; stainless steels	See also: 027
	Process(es) covered:	The creation of a joint using a filler (welding rod) of similar composition to the metal being joined. The electric arc gives rise to fumes from the electrode coatings, metallic oxides, any paint or surface contaminant and possibly to ozone and nitrogen oxides.		

Control Measures

- All steel welding must be carried out with adequate and suitable extraction or forced ventilation, which must be maintained at all times. This will keep fume levels down as well as removing any ozone.
- Painted surfaces should be chemically stripped (see dichloromethane on sheet 007) before welding in case the paint contains lead.
- See sheet 027 for eye protection requirements.

Immediate Remedial Measures:

Fumes are inhaled	In the event of dizziness occasioned by fume, remove the affected person to the fresh air until recovered.
Burns to the skin	Cool the affected area under a running cold tap for 10 minutes.
Serious burns to the skin	Send for an ambulance. Cool the affected area under a running cold tap for ten minutes. Watch for difficulty in breathing or faintness. Gently remove jewellery or watches that might be difficult to remove later if the limb swells.

Storage	
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Disposal	
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Risk Assessment

Hazards:

Toxic Irritant	Unless a totally inert shielding gas is used, ozone [STEL (15 mins) 0.4 mg m ⁻³] is likely to be present with traces of nitrogen oxides, which are classified as Causes severe skin burns and eye damage [H314]. Fatal if inhaled [H330]. May cause respiratory irritation [H335]. (Nitrogen monoxide: Corrosive to the respiratory tract [EUH071]). Particles of freshly-formed metallic oxides may also be present to give the possibility of 'metal fume fever'. (See <i>Further Information</i> .) Irritation of the respiratory tract, caused by gases or fine particles.
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Risks:

Toxic	All steel welding requires extraction or forced ventilation. Workplace limits for ozone and oxides of nitrogen are not likely to be exceeded if welding is very occasional but, even in MIG welding, the ozone concentration can reach the limit quite quickly. Zinc oxide fumes, commonly emitted when galvanised steel is welded, have no published WEL value. This operation will not be routine in a school workshop but may be required for an occasional repair that can be done outside with extraction. Welding through painted surfaces, particularly those containing lead compounds, also produces hazardous fumes. Cases of 'metal fume fever' are rare.
Irritant	The oxide particles are mainly responsible for this risk.

Further Information:

<ul style="list-style-type: none"> In schools, arc-welding usually involves the simplest technique with coated electrodes but flux-cored electrodes and inert gas shielding welding (MIG and TIG) are now increasingly used and are generally safer. These assessments assume that filler rods containing cadmium are not used in school workshops. Products containing cadmium must not be welded in schools. Should metal fume fever symptoms (similar to influenza) appear, this is usually after a latent period of ten hours. They tend to disappear after a 24-hour rest period.
