



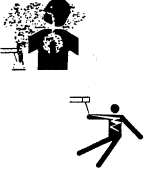







# Welding & Joining Management Group

FORENSIC EXPERTS • METALS TESTING

Hazard	Severity Factors	Precaution Summary
Electric shock can kill 	<ul style="list-style-type: none"> <li>Wetness</li> <li>Welder in or on workpiece</li> <li>Confined space</li> <li>Electrode holder and cable insulation</li> </ul>	<ul style="list-style-type: none"> <li>Insulate welder from workpiece and ground using dry insulation. Rubber mat or dry wood.</li> <li>Wear dry, hole-free gloves. (Change as necessary to keep dry.)</li> <li>Do not touch electrically "hot" parts or electrode with bare skin or wet clothing.</li> <li>If wet area and welder cannot be insulated from workpiece with dry insulation, use a semiautomatic, constant-voltage welder or stick welder with voltage reducing device.</li> <li>Keep electrode holder and cable insulation in good condition. Do not use if insulation damaged or missing.</li> </ul>
Fumes and gases can be dangerous 	<ul style="list-style-type: none"> <li>Confined area</li> <li>Positioning of welder's head</li> <li>Lack of general ventilation</li> <li>Electrode types, i.e., manganese, chromium, etc. See MSDS</li> <li>Base metal coatings, galvanize, paint</li> </ul>	<ul style="list-style-type: none"> <li>Use ventilation or exhaust to keep air breathing zone clear, comfortable.</li> <li>Use helmet and positioning of head to minimize fume in breathing zone.</li> <li>Read warnings on electrode container and material safety data sheet (MSDS) for electrode.</li> <li>Provide additional ventilation/exhaust where special ventilation requirements exist.</li> <li>Use special care when welding in a confined area.</li> <li>Do not weld unless ventilation is adequate.</li> </ul>
Welding sparks can cause fire or explosion 	<ul style="list-style-type: none"> <li>Containers which have held combustibles</li> <li>Flammable materials</li> </ul>	<ul style="list-style-type: none"> <li>Do not weld on containers which have held combustible materials (unless strict AWS F4.1 procedures are followed). Check before welding.</li> <li>Remove flammable materials from welding area or shield from sparks, heat.</li> <li>Keep a fire watch in area during and after welding.</li> <li>Keep a fire extinguisher in the welding area.</li> <li>Wear fire retardant clothing and hat. Use earplugs when welding overhead.</li> </ul>
Arc rays can burn eyes and skin 	<ul style="list-style-type: none"> <li>Process: gas-shielded arc most severe</li> </ul>	<ul style="list-style-type: none"> <li>Select a filter lens which is comfortable for you while welding.</li> <li>Always use helmet when welding.</li> <li>Provide non-flammable shielding to protect others.</li> <li>Wear clothing which protects skin while welding.</li> </ul>
Confined space 	<ul style="list-style-type: none"> <li>Metal enclosure</li> <li>Wetness</li> <li>Restricted entry</li> <li>Heavier than air gas</li> <li>Welder inside or on workpiece</li> </ul>	<ul style="list-style-type: none"> <li>Carefully evaluate adequacy of ventilation especially where electrode requires special ventilation or where gas may displace breathing air.</li> <li>If basic electric shock precautions cannot be followed to insulate welder from work and electrode, use semiautomatic, constant-voltage equipment with cold electrode or stick welder with voltage reducing device.</li> <li>Provide welder helper and method of welder retrieval from outside enclosure.</li> </ul>
General work area hazards   	<ul style="list-style-type: none"> <li>Cluttered area</li> </ul>	<ul style="list-style-type: none"> <li>Keep cables, materials, tools neatly organized.</li> </ul>
	<ul style="list-style-type: none"> <li>Indirect work (welding ground) connection</li> </ul>	<ul style="list-style-type: none"> <li>Connect work cable as close as possible to area where welding is being performed. Do not allow alternate circuits through scaffold cables, hoist chins, ground leads.</li> </ul>
	<ul style="list-style-type: none"> <li>Electrical equipment</li> </ul>	<ul style="list-style-type: none"> <li>Use only double insulated or properly grounded equipment.</li> <li>Always disconnect power to equipment before servicing.</li> </ul>
	<ul style="list-style-type: none"> <li>Engine-driven equipment</li> </ul>	<ul style="list-style-type: none"> <li>Use in only open, well ventilated areas.</li> <li>Keep enclosure complete and guards in place.</li> <li>See Lincoln service shop if guards are missing.</li> <li>Refuel with engine off.</li> <li>If using auxiliary power, OSHA may require GFI protection or assured grounding program (or isolated windings if less than 5KW).</li> </ul>
<ul style="list-style-type: none"> <li>Gas cylinders</li> </ul>	<ul style="list-style-type: none"> <li>Never touch cylinder with the electrode.</li> <li>Never lift a machine with cylinder attached.</li> <li>Keep cylinder upright and chained to support.</li> </ul>	