



JOB SAFETY ANALYSIS		
JSA No. JSABuilder Sample Library - 4 (short)		
<b>Job/Operation Title:</b> Electric Arc Welding		<b>Date:</b>
<b>Department/Division/Section:</b> Facility Maintenance		<b>Analysis Developed By:</b> Name Person 2
<b>Location(s):</b> Welding Shop		<b>Analysis Reviewed By:</b> Name Person 3
<b>Person(s) Performing This Job:</b> Name Person 1 Name Person 2		<b>Supervisor:</b> Name Person 1
<b>Job Start Date:</b>		<b>Duration:</b> 2 hours
Task/Step	Potential Hazards	Recommended Safe Job Procedures
1. Sign in and inspect (Step 1)	<ul style="list-style-type: none"> <li>- Welding/Cutting/Burning Equipment</li> <li>- Wires, cables, hoses</li> </ul>	<ul style="list-style-type: none"> <li>- Before setting up the welding shop, visit the Admin desk to sign in.</li> <li>- Inspect arc welding equipment cables and connections; look for loose connections, frayed insulation on electrode holders and cables (see photo), make sure electrical cables are dry (complete safety checklist).</li> </ul>
Step 1 Image: 		
2. Steps 2 - 6	- x--- NA ---x	Steps 2 - 6 have been removed to keep this sample to a reasonable length.
3. Perform the weld (Step 7)	<ul style="list-style-type: none"> <li>- Arc rays</li> <li>- Combustible materials</li> <li>- Electrical equipment (transformers, switching gear, breakers, high voltage lines)</li> <li>- Ignitable materials and liquids</li> <li>- Infrared (IR)</li> <li>- Light (optical) radiation (i.e.</li> </ul>	<ul style="list-style-type: none"> <li>- User proper PPE (see photo).</li> <li>- Follow manufacturer recommended procedures, lessons learned and experience.</li> <li>- If possible, position shelf so that head is not in fumes while welding.</li> <li>- If possible use sub arc process to minimize light and fumes, and/or minimize the production of welding fumes by using the lowest acceptable amperage and holding the</li> </ul>

	welding operations, etc.). - Repetitive motion or other ergonomic concerns - Rolling or pinching objects - Sharp objects - Slag splatter - Sparks - Ultraviolet (UV) - WELDING FUMES AND GASES - Welding/Cutting/Burning Equipment - Wires, cables, hoses	electrode perpendicular and as close to the work surface and possible. - Keep electrode moving. Tack as appropriate for project and metal type. - Finish the weld.
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Step 3 Image:



4. Steps 8 - 9	- x--- NA ---x	Steps 8 - 9 have been removed to keep this sample to a reasonable length.
5. Remove excess slag from welded material (Step 10)	- Electrical equipment (transformers, switching gear, breakers, high voltage lines) - Hand tools - metal chips - Repetitive motion or other ergonomic concerns - Sharp objects - Sparks - Wires, cables, hoses	When welded material has cooled, use chipping hammer or grinder to remove excess slag from weld (see photo). Secure material to workbench with clamps as necessary, before chipping. <b>FACE SHIELD IS REQUIRED FOR THIS ACTIVITY TO PROTECT FROM FLYING DEBRIS.</b> Be alert to fingers and pinch points and struck-by potential.

Step 5 Image:



6. Steps 11 - 12

- x--- NA ---x

Steps 11 - 12 have been removed to keep this sample to a reasonable length.

**POTENTIAL HAZARDS OF THIS JOB**

Physical Hazards	Consequences
Combustible materials Electrical equipment (transformers, switching gear, breakers, high voltage lines) Hand tools hot electrodes Ignitable materials and liquids Inadequate lighting Light (optical) radiation (i.e. welding operations, etc.). metal chips Poor Housekeeping Repetitive motion or other ergonomic concerns Rolling or pinching objects Sharp objects Slag splatter Sparks Welding/Cutting/Burning Equipment Wires, cables, hoses x--- NA ---x	Awkward or static position Cuts and abrasions Electrocution or shock Excessive lifting, twisting, pushing, pulling, reaching, or bending Exposure (inhaling, swallowing, or absorbing) to harmful levels of gases, vapors, aerosols, liquids, fumes, or dust) Exposure to excessive light (welding) Falling (< 6 feet), tripping, or slipping Injury caused by slip, trip or fall Pinches Slag splatter Sparks Struck by falling or flying object Struck by uncontrolled pressure release Thermal burns
Chemical Hazards	Description/Health Hazards
WELDING FUMES AND GASES ()	Welding smoke is a mixture of very fine particles (fumes) and gases. Many of the substances in welding smoke, such as chromium, nickel, arsenic, asbestos, manganese, silica, beryllium, cadmium, nitrogen oxides, phosgene, acrolein, fluorine compounds, carbon monoxide, cobalt, copper, lead, ozone, selenium, and zinc can be extremely toxic. Generally, welding fumes and gases come from: - base material being welded or the filler material that is used;

	<p>- coatings and paints on the metal being welded, or coatings covering the electrode;</p> <p>- shielding gases supplied from cylinders;</p> <p>The health effects of welding exposures are difficult to list, because the fumes may contain so many different substances that are known to be harmful (depending on the factors listed above). The individual components of welding smoke can affect just about any part of the body, including the lungs, heart, kidneys, and central nervous system. (Welding Hazard Safety Program, TX Dept of Insurance)</p>
Radiological Hazards	Description/Health Hazards
<p>Arc rays</p> <p>Infrared (IR)</p> <p>Ultraviolet (UV)</p> <p>Visible light</p>	<p>Effect on the Eyes - Welder's flash (feeling of sand or grit in eyes, blurred vision, intense pain, burning, and headache)</p> <p>Effects on the Eyes - Cataracts</p> <p>Effects on the Skin - Burns</p> <p>momentary blinding</p>
HAZARD CONTROL MEASURES USED FOR THIS JOB	
<p><b>Administrative Controls:</b></p> <p>Certified operators</p> <p>Competent person</p> <p>Drug and alcohol policy</p> <p>Emergency procedures</p> <p>Equipment maintenance and servicing manual</p> <p>Ergonomic procedure</p> <p>Hot work procedure</p> <p>Housekeeping practices</p> <p>Inspections (ongoing) work areas, equipment, tools, etc.</p> <p>Inspections (pre-job) - work areas, equipment, tools, etc.</p> <p>Material Safety Data Sheets (MSDS)</p> <p>Monitoring (hazardous atmospheres)</p> <p>Operating instructions (equipment)</p> <p>Operating procedures (process)</p> <p>Radiological safety program</p> <p>Safety checklists (use to document inspections)</p>	<p><b>Required Training:</b></p> <p>Ergonomics</p> <p>Fire protection (extinguishers)</p> <p>General Safety</p> <p>Hazard Communication (HAZCOM)</p> <p>Orientation (site or job)</p> <p>Personal protective equipment (PPE)</p> <p>Respiratory protection</p> <p>Welding, cutting, and brazing</p>
<p><b>Engineering Controls:</b></p> <p>Ventilation and exhausting.</p>	<p><b>Required PPE:</b></p> <p>Boots - compatible for OSHA electrical protection requirements</p> <p>Clothing - fire resistant</p> <p>Clothing - long pants</p> <p>Clothing - long sleeve shirt</p> <p>Fire resistant gauntlet glove</p> <p>Safety glasses: see manual for lens shade requirements for welder &amp; spotter</p> <p>Side shield</p> <p>Welding hood</p> <p>Welding jacket &amp; apron</p>
<p><b>Required Permit(s):</b></p> <p>No permit required - verify no LOTO is in progress on chosen equipment</p> <p>Welding shop - space reservation (see Admin desk for list of welding operations &amp; times)</p>	<p><b>Other Information:</b></p> <p>A 2A20B:C fire extinguisher must be readily available and within arm's reach at all times. Fire alarm operability must be confirmed prior to start of work. Follow manufacturer instructions to test fire alarm. Also, follow all manufacturer instructions for operation of the electric arc welder. STOP WORK immediately if an unsafe or potentially unsafe condition exists.</p>

JSABuilder chemical Description/Health Hazards is from the CAMEO database maintained by the U.S. EPA, NOAA, and the U.S. Coast Guard ([www.cameochemicals.noaa.gov](http://www.cameochemicals.noaa.gov)). The creator of this JSA is responsible for any edits to this information.