

International Hazard Datasheets on Occupation



Welder, arc

What is a Hazard Datasheet on Occupation?

This datasheet is one of the International Datasheets on Occupations. It is intended for those professionally concerned with health and safety at work: occupational physicians and nurses, safety engineers, hygienists, education and Information specialists, inspectors, employers' representatives, workers' representatives, safety officers and other competent persons.

This datasheet lists, in a standard format, different hazards to which welder, arcs may be exposed in the course of their normal work. This datasheet is a source of information rather than advice. With the knowledge of what causes injuries and diseases, is easier to design and implement suitable measures towards prevention.

This datasheet consists of four pages:

- Page 1: Information on the most relevant hazards related to the occupation.
- Page 2: A more detailed and systematized presentation on the **different hazards** related to the job with indicators for preventive measures (marked as numbered shields and explained on the third page).
- Page 3: Suggestions for **preventive measures** for selected hazards.
- Page 4: **Specialized information**, relevant primarily to occupational safety and health professionals and including information such as a brief job description, a list of tasks, notes and references.






Who is an arc welder?

A worker who cuts, trims, or scarfs metal objects using arc-cutting equipment.

What is dangerous about this job?

- Arc welders may be injured by flying sparks or particles of hot metal.
- The process of arc cutting produces ultraviolet radiation which may seriously harm the arc welders' health.
- Metal fumes to which arc welders are exposed during their work are hazardous to their health.
- Arc welders must often handle heavy loads and work in uncomfortable postures (e.g., standing for long periods). This may cause trauma and, in the course of time, back, arm, hand, and leg pain.

Hazards related to this job

Accident hazards 	<ul style="list-style-type: none"> Injuries due to sparks or hot metal falling into folds of rolled up sleeves and pant- cuffs or work boots 	1
	<ul style="list-style-type: none"> Electric shock from excess moisture (e.g. perspiration or wet conditions) and contact with metal parts which are "electrically hot" 	
	<ul style="list-style-type: none"> Fire or explosion due to extreme temperatures (up to 10,000F) from welding sparks coming into contact with flammable materials (e.g. coatings of metals, gasoline, oil, paint, thinner, wood, cardboard, paper, acetylene, hydrogen, etc.) 	2
	<ul style="list-style-type: none"> Falls during work on ladders, above ground, and in confined spaces 	3
	<ul style="list-style-type: none"> Eye and face injuries from flying particles, molten metal, liquid chemicals, acids or caustic liquids, or chemical gasses or vapors 	1
Physical hazards 	<ul style="list-style-type: none"> Exposure to high noise levels from arc welding equipment, power sources and processes 	
	<ul style="list-style-type: none"> Exposure to ultraviolet (UV) radiation resulting in skin burns and skin cancer. "Welder's flash" (brief exposure to UV radiation) may result in temporary swelling and fluid excretion of the eye or temporary blindness 	1
	<ul style="list-style-type: none"> Cataracts from chronic exposure to UV radiation 	1
	<ul style="list-style-type: none"> Irritation of lungs due to heat and UV radiation 	
Chemical hazards 	<ul style="list-style-type: none"> Exposure to metal fumes causing metal fume fever (temporary illness similar to flu) from zinc fumes 	1 4
	<ul style="list-style-type: none"> Bronchitis and lung fibrosis due to mineral dusts or fumes 	
	<ul style="list-style-type: none"> Potential exposure to manganese, cadmium, shielding bases (argon, helium and carbon dioxide) chromium, nickel, steel and other metals 	
	<ul style="list-style-type: none"> Pulmonary granulomatous disease due to chronic beryllium exposure 	
Biological hazards 	<ul style="list-style-type: none"> No significant biological exposures expected 	
Ergonomic, psychosocial and organizational factors 	<ul style="list-style-type: none"> Back pain and other musculoskeletal problems resulting from fatigue due to standing for long periods, sprains due to lifting of heavy machinery or metal products and cramping due to working in vertical, horizontal or overhead positions 	5 6
	<ul style="list-style-type: none"> Wrist, elbow or shoulder joint pain due to repetitive motion while feeding material (Repetitive Strain Injury - RSI) 	7

Preventive measures

- 1** Always wear a welding helmet with UV protection. If local exhaust ventilation is impractical, use respiratory protective equipment. Wear an apron to protect body and clothing. Wear fire resistant heavy leather gloves to protect hands
 - 2** Assure the flammable and combustible materials are stored in safe containers well away from the work area
 - 3** Inspect ladder before climbing. Never climb on a shaky ladder or a ladder with slippery rungs
 - 4** Install effective exhaust ventilation to prevent air contamination; add local exhaust ventilation if necessary
 - 5** Learn and use safe lifting and moving techniques for heavy or awkward loads; use mechanical aids to assist in lifting
 - 6** Select safety shoes for maximum comfort, suitable for standing over long standing periods; if possible, have the shoes made-to-measure for each worker. Use floor mats to reduce leg fatigue
 - 7** Take frequent "rest and exercise pauses" if symptoms or RSI manifest themselves; do NOT overexert a wrist, shoulder, or other body part if you feel pain there. Consult an occupational physician or nurse
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Specialized information

Synonyms Arc welder (cutter); arc-air operator; burn-out-scarfing operator

Definitions and/or description Cuts, trims, or scarfs metal objects to dimensions, contour, or bevel specified by blueprints, work order, or layout, using arc-cutting equipment: Positions workpiece onto table or into fixture or with jib or crane. Selects carbon or metal-coated electrode, gas nozzle, electric current, and gas pressure, according to thickness and type of metal, data on charts, or record of previous runs. Inserts electrodes and gas nozzle into holder and connects hose from holder to compressed gas supply. Connects cables from power source to electrode and workpiece or fixture, to obtain desired polarity. Strikes arc and guides electrode along lines to cut (melt) through metal. May cut off chips or sprue and burn out cracks and holes. May use holder having two electrodes. May cut without using gas jet. May use nonconsumable tungsten electrode and gases, such as helium or carbon dioxide, and be designated arc welder- gas-tungsten arc (welding). May use plasma-arc cutting torch and gases, such as nitrogen and carbon dioxide, and be designated arc welder- plasma arc (welding)



Related and specific occupations Workers engaged in various types of welding, cutting, etc.: Gas welding; gas shielded arc welding [metal inert gas (MIG), tungsten inert gas (TIG)]; manual metal arc; open arc welding; atomic hydrogen welding; electron- beam welding; electro-slag welding; flash welding; friction welding; laser welding and drilling; metal spraying; plasma-arc welding; plasma-arc spaying; tungsten-arc cutting; resistance welding (spot, seam, projection or butt welding); spark erosion machining; stud welding; thermit welding

Tasks Adjusting; analyzing (damaged material); assembling; attaching (parts); bonding; brazing; clamping; cleaning (equipment); connecting (hoses); constructing (parts); cutting; examining (cylinders, etc.); feeding (machines); fuses; guiding (electrodes); heating; inserting (electrodes); inspecting; (materials); insulating; joining; maintaining; melting; monitoring (processes); operating; planning (tasks); positioning; regulating (processes); repairing scarfing (metal objects); securing (cylinders, materials); selecting; setting up (equipment); soldering; striking (arc); testing (equipment); trimming; turning (knobs and levers); washing; welding (wiping)

Primary equipment used Stick welders; tig welders; cv welders; engine driven welders; wire feeder/welders; semiautomatic wire feeders; automatic wire feeders; robotics/automation systems; plasma; guns, torches and accessories; environmental systems

Workplaces where the occupation is common Any fabricated metal product industry, air conditioning and heating, aircraft manufacturing, appliance assembly, bridge building, car manufacturing, construction (beams and steel reinforcing rods), conveyor chain production, electronics, industrial machinery and equipment manufacturing, nuclear power plants, pipeline manufacturing, shipbuilding, snow plow manufacturing, spacecraft manufacturing, transportation equipment, trucking (fuel tank production) vibrating bin manufacturing (for powdered, flaked and granular products), welding

References Encyclopaedia of Occupational Health and Safety, 4th Ed., ILO, Geneva, 1998, Vol. 2, p. 49.6, 49.17 (See also information on welding and welders in various chapters).



Adams, R.M.: Occupational Skin Diseases. Saunders Co., Philadelphia, 1990, p. 673 - 675.

This information has been compiled by the Israel Institute for Occupational Safety and Hygiene jointly with the BIA (Germany).
