

5. HEALTH MONITORING

Health monitoring of a person means monitoring the person to identify changes in their health status because of exposure to certain substances. It involves the collection of data in order to evaluate the effects of exposure and to determine whether or not the absorbed dose is within safe levels. This allows decisions to be made about implementing ways to eliminate or minimise the worker's risk of exposure, for example reassigning a worker to other duties that involve less exposure or improving control measures.

Regulation 368

A person conducting a business or undertaking must ensure health monitoring is provided to a worker carrying out work for the business or undertaking if:

- the worker is carrying out ongoing work at a workplace using, handling, generating or storing hazardous chemicals and there is a significant risk to the worker's health because of exposure to a hazardous chemical referred to in Schedule 14, table 14.1, of the WHS Regulations, or
- the person identifies that because of ongoing work carried out by a worker using, handling, generating or storing hazardous chemicals there is a significant risk that the worker will be exposed to a hazardous chemical (other than a hazardous chemical referred to in Schedule 14, table 14.1) and either:
 - valid techniques are available to detect the effect on the worker's health, or
 - a valid way of determining biological exposure to the hazardous chemical is available and it is uncertain, on reasonable grounds, whether the exposure to the hazardous chemical has resulted in the biological exposure standard being exceeded.

Health monitoring, which may include biological monitoring, can assist in:

- establishing whether an identifiable disease or health effect known to be linked to exposure to dust, chemicals or noise has occurred
- determining levels of toxic substances in the body so that informed decisions can be made about the effectiveness of control measures and whether any further action needs to be taken (e.g. eliminating or minimising exposure).

Biological monitoring is a way of assessing exposure to hazardous chemicals that may have been absorbed through the skin, ingested or inhaled, therefore, biological monitoring techniques should also be used. For example, workers exposed to lead may require biological monitoring to measure the level of lead in their blood.

Biological monitoring has the specific advantage of being able to take into account individual responses to particular hazardous chemicals. Individual responses are influenced by factors including size, fitness, personal hygiene, work practices, smoking and nutritional status.

If health monitoring is required a person conducting a business or undertaking must ensure the type of health monitoring referred to in the WHS Regulations is provided, unless:

- an equal or better type of health monitoring is available, and
- the use of that other type of monitoring is recommended by a registered medical practitioner with experience in health monitoring.

Health monitoring is not an alternative to implementing control measures. If the results indicate that a worker is experiencing adverse health effects or signs of exposure to a hazardous chemical, the control measure must be reviewed and if necessary revised.

A person conducting a business or undertaking must:

- inform workers and prospective workers about health monitoring requirements
- ensure health monitoring is carried out by or under the supervision of a registered medical practitioner with experience in health monitoring
- consult workers in relation to the selection of the registered medical practitioner
- pay all expenses relating to health monitoring
- provide certain information about a worker to the registered medical practitioner
- take all reasonable steps to obtain a report from the registered medical practitioner as soon as practicable after the monitoring has been carried out
- provide a copy of the report to the worker and the regulator if the report contains adverse test results or recommendations that remedial measures should be taken. Also provide the report to all other persons conducting a business or undertaking who have a duty to provide health monitoring for the worker
- keep reports as confidential records for at least 30 years after the record is made (40 years for reports relating to asbestos exposure), and
- not disclose the report to anyone without the worker's written consent unless required to under the WHS Regulations.

The WHS Regulations contain specific requirements relating to health monitoring for lead. If a worker is carrying out lead risk work, health monitoring must be provided to a worker before the worker first commences lead risk work and 1 month after the worker first commences lead risk work.

Further information on health monitoring can be found in the [*Health Monitoring for Exposure to Hazardous Chemicals – Guide for Persons Conducting a Business or Undertaking*](#).

APPENDIX A – BY-PRODUCTS OF WELDING

This appendix contains information on types of fumes typically released during welding. Some of these substances have national exposure standards. You should refer to the *Workplace Exposure Standards for Airborne Contaminants* published on the Safe Work Australia website to determine if an exposure standard has been set.

Source and Health Effect of Welding Fumes		
Fume Type	Source	Health Effect
Aluminium	Aluminium component of some alloys, e.g., nickel-chromium, copper, zinc, steel, magnesium, brass and filler materials.	Respiratory irritant.
Beryllium	Hardening agent found in copper, magnesium, aluminium alloys and electrical contacts.	“Metal Fume Fever.” A carcinogen. Other chronic effects include damage to the respiratory tract.
Cadmium Oxides	Stainless steel containing cadmium or plated materials, zinc alloy.	Irritation of respiratory system, sore and dry throat, chest pain and breathing difficulty. Chronic effects include kidney damage and emphysema. Suspected carcinogen.
Chromium	Most stainless-steel and high-alloy materials, welding rods. Also used as plating material.	Increased risk of lung cancer. Some individuals may develop skin irritation. Some forms are carcinogens (hexavalent chromium).
Copper	Alloys such as nickel-copper, brass, bronze. Also some welding rods.	Acute effects include irritation of the eyes, nose and throat, nausea and “Metal Fume Fever.”
Fluorides	Common electrode coating and flux material for both low-and high-alloy steels.	Acute effect is irritation of the eyes, nose and throat. Long-term exposures may result in bone and joint problems. Chronic effects also include excess fluid in the lungs.
Iron Oxides	The major contaminant in all iron or steel welding processes.	Siderosis – a benign form of lung disease caused by particles deposited in the lungs. Acute symptoms include irritation of the nose and lungs. Tends to clear up when exposure stops.
Lead	Solder, brass and bronze alloys, primer/coating on steels.	Chronic effects to nervous system, kidneys, digestive system and mental capacity. Can cause lead poisoning. Ototoxic and therefore risk of hearing loss.
Manganese	Most welding processes, especially high-tensile steels.	“Metal Fume Fever.” Chronic effects may include central nervous system problems. Ototoxic and therefore risk of hearing loss.
Molybdenum	Steel alloys, iron, stainless steel, nickel alloys.	Acute effects are eye, nose and throat irritation, and shortness of breath.
Nickel	Stainless steel, nickel-chromium, nickel-copper and other high-alloy materials, welding rods and plated steel.	Acute effect is irritation of the eyes, nose and throat. Increased cancer risk has been noted in occupations other than welding. Also associated with dermatitis and lung problems.
Vanadium	Some steel alloys, iron, stainless steel, nickel alloys.	Acute effect is irritation of the eyes, skin and respiratory tract. Chronic effects include bronchitis, retinitis, fluid in the lungs and pneumonia.
Zinc Oxides	Galvanized and painted metal.	Metal Fume Fever.

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Source and Health Effect of Welding Gases		
Gas Type	Source	Health Effect
Carbon Monoxide	Formed in the arc.	Absorbed readily into the bloodstream, causing headaches, dizziness or muscular weakness. High concentrations may result in unconsciousness and death. Ototoxic and therefore risk of hearing loss.
Hydrogen Fluoride	Decomposition of rod coatings.	Irritating to the eyes and respiratory tract. Overexposure can cause lung, kidney, bone and liver damage. Chronic exposure can result in chronic irritation of the nose, throat and bronchi.
Nitrogen Oxides	Formed in the arc.	Eye, nose and throat irritation in low concentrations. Abnormal fluid in the lung and other serious effects at higher concentrations. Chronic effects include lung problems such as emphysema.
Oxygen Deficiency	Welding in confined spaces, and air displacement by shielding gas.	Dizziness, mental confusion, asphyxiation and death.
Ozone	Formed in the welding arc during open arc welding processes including Manual Metal Arc Welding (MMAW), Flux Cored Arc Welding (FCAW), especially during plasma-arc, Metal Inert Gas (MIG) and Tungsten Inert Gas (TIG) processes.	Acute effects include fluid in the lungs. Very low concentrations (e.g., one part per million) cause headaches and dryness of the eyes. Chronic effects include significant changes in lung function.
Phosphine	Metal coated with rust inhibitors. Phosphine is formed by reaction of the rust inhibitor with welding radiation.	Irritant to eyes and respiratory system, can damage kidneys and other organs.

Source and Health Effect of Organic Vapours as a result of Welding		
Gas Type	Source	Health Effect
Aldehydes (such as formaldehyde)	Metal coating with binders and pigments. Degreasing solvents	Irritant to eyes and respiratory tract.
Diisocyanates	Metal with polyurethane paint.	Eye, nose and throat irritation. High possibility of sensitization, producing asthmatic or other allergic symptoms, even at very low exposures.
Phosgene	Metal with residual degreasing solvents. Phosgene is formed by reaction of the solvent and welding radiation.	Severe irritant to eyes, nose and respiratory system. Symptoms may be delayed.

LIST OF AMENDMENTS

Date	Page Number	Amendments
22 April 2016	Front Cover	Publication date of July 2012 changed to April 2016.
22 April 2016	3	The bolded wording was removed “Designers, manufacturers, importers and suppliers of plant or substances used in welding must ensure, so far as is reasonably practicable, that the plant or substance they design, manufacture, import or supply is without risks to health and safety. This duty includes carrying out testing and analysis as well as providing specific information about the plant or substance.” was removed from this paragraph. This is consistent with the word version of this Code.
22 April 2016	16	Wording changed from “Flashback arrestors should be fitted at the blow pipe and to the oxygen and fuel gas regulators.” To “Flashback arrestors should be fitted at the blow pipe and regulator end of both the oxygen and fuel gas lines” This is consistent with the word version of this Code.