



Electrical Engineer/Fitter

HAZARDS AND RISKS

Installation, maintenance, and repair of electrical wiring, equipment, and fixtures can involve tasks which generate dusts and fumes which are harmful when inhaled. Activities that might put electricians at risk of such hazardous exposures include soldering and brazing to connect wires to sockets and terminals, and drilling and riveting when assembling parts and installing or examining electrical fixtures and appliances such as fuse boxes and generators and electrical control systems.

Asbestos fibres*

Engineers may come into contact with or disturb a number of asbestos containing materials (ACMs), particularly if working in buildings. Asbestos is classified as a category 1 carcinogen. Inhalation of asbestos fibres can cause mesothelioma, asbestos-related lung cancer, asbestosis, and pleural thickening - all fatal or serious and incurable diseases that take many years to manifest.

Solder fumes

During soldering, the heating of flux containing rosin (or derivatives) produces fume, which if inhaled is one of the most significant causes of occupational asthma, an irreversible condition. The fumes can also act as an irritant to the upper respiratory tract.

Silica dust - respirable crystalline silica (RCS)

Silica is present in large amounts in most rocks, sand and clay, and in products such as bricks, concrete and mortar. Some of the dust created by drilling and riveting into these materials is fine enough to be breathed deeply into the lungs; this is called respirable crystalline silica (RCS) and exposure to RCS over many years or in extremely high doses can lead to serious lung diseases, including fibrosis, silicosis, chronic obstructive pulmonary disease (COPD) and lung cancer. These diseases cause permanent disability and early death: it is estimated that over 230 workers die every year from lung cancer caused by exposure to RCS.

Wood dust

Dust from softwood, hardwood, and wood-based products such as MDF and chipboard can cause asthma which is a serious, debilitating, and sometimes life-limiting condition. Exposure comes from cutting and drilling wood and from settled dust that is later disturbed. Fine dust particles are most likely to damage the lungs. Some wood types are known to cause cancer.

CONTROL OPTIONS

Elimination/prevention

- Asbestos: The aim is to avoid exposure completely. Information on the presence of asbestos should come from the premises' asbestos management plan and asbestos register.
- Removal of asbestos must be conducted by approved licensed asbestos removalists.

Choose methods which eliminate/minimise the use of hazardous materials eg. use rosin-free or rosin reduced solder; use soldering irons at the lowest temperature possible.

Engineering controls

- Use industrial Class H HEPA vacuums for cleaning up ACMs.
- Use on-tool extraction for soldering irons.

Safe working methods

- Minimise dust creation eg. avoid or limit drilling, particularly of silica containing materials if at all possible; wet working: damp down before work and during debris removal and cleaning; use vacuums or wet cleaning, avoid dry sweeping or use of compressed air to remove dust; use hand tools in place of power tools if feasible.
- Ensure good natural ventilation of the work area.

PPE

- Risk assess the tasks and also refer to Australian Standard AS/NZ 1715 for RPE guidance.
- For non-licensed asbestos work, disposable overalls and single-use disposable gloves should be worn and disposed of as asbestos waste. Non-laced boots are preferable to disposable overshoes. Use respiratory protective equipment (RPE) with a minimum protection rating of 50 or more; disposable respirator (eg P2), half mask with P2 filter.

MANAGING THE RISK

Training & communication, supervision, maintenance & testing of controls and air monitoring* are all vital aspects of managing the risk, in addition to health surveillance which can be a requirement in certain circumstances.

See our introductory [Respiratory Health Hazards in Construction Fact Sheet Series: Overview](#) for more information about what things to consider and implement.

Air monitoring*

Air monitoring is a specialist activity. It may be needed as part of a risk assessment, as a periodic check on control effectiveness and to assess compliance with relevant WES, or where there has been a failure in a control (for example if a worker reports respiratory symptoms). A qualified Occupational Hygienist can ensure it is carried out in a way that provides meaningful and helpful results.

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WORKPLACE EXPOSURE STANDARDS (WES) & EXPOSURE LEVELS

Agent or substance	Control/Exposure Limit	Exposure Levels
Asbestos (all types)	0.1 fibres /ml (8 hr TWA)	It is important to know whether the planned work is licensed. High risk from particular pipe ACMs - and tank lagging, sprayed insulation, wall boards and ceiling tiles, loose packing/insulation in heating equipment/loft spaces/under floors. All such work, as well as any at exposures above the control and short-term exposure limits, must be carried out by an approved licensed asbestos contractor.
Silica - RCS	0.1 mg/m ³ (8 hr TWA).	Different types of stone contain different amounts of silica, with sandstone (70-90% silica) and concrete (anything from 25-75% silica) typically containing the most. Granite, slate and brick (around 30% silica), and limestone and marble (about 2% silica) usually contain the least. Levels of dust exposure are affected by the frequency and duration of the work and are likely to be higher in poorly ventilated spaces. Dry working without extraction controls is likely to produce the highest levels of dust. Health risks to electricians are likely to be significant only if exposures are frequent or prolonged.
Wood dust - Soft wood	5 mg/m ³ (8 hr TWA)	
Wood dust - Certain hard woods	1 mg/m ³ (8 hr TWA)	
Rosin (colophony) based solder flux fume	0.15mg/m ³ (15 min TWA) 0.05mg/m ³ (8 hr TWA)	Manual soldering with a hand-held iron poses the greatest risk of fume exposure because the operator's head is likely to be near or actually in the fume which rises vertically.

Further information

- Controlling health risks from rosin based solder fluxes: www.hse.gov.uk/pubns/indg249.pdf
- COSHH Essentials guidance sheet on how to control exposure to hazards in construction: www.hse.gov.uk/pubns/guidance/cnseries.htm
- Construction dust leaflet: www.hse.gov.uk/pubns/cis36.pdf
- Silica dust: www.hse.gov.uk/construction/healthrisks/cancer-and-construction/silica-dust.htm
- Wood dust: www.hse.gov.uk/woodworking/wooddust.htm