

**B. PERFORMANCE STANDARDS**

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**B1. PARTICULATE AND GAS/VAPOUR EXPOSURES**

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**1.0 Scope**

This Standard applies to dust, fibres, mist and fume (ie. particulates), and gas and vapour exposures in the workplace, with emphasis on inhalation as the prime route of exposure. It covers particulate and gas/vapour hazard evaluation, control programme design and control programme evaluation (medical surveillance), to ensure that employees and contractors will not suffer adverse health effects from particulates or gas/vapours, either used or generated by the Business.

**2.0 Programme Design**

- 2.1 Where risk assessment indicates the need, a workplace air monitoring programme must be in place such that:
- (a) It complies with all relevant requirements in the A Standards;
  - (b) The air quality of the workplace with regard to dust, fibre, mist, fume, gas and vapour emissions is adequately described;
  - (c) Workplace particulate and gas/vapour sources that contribute to the exceedance of OELs are identified and adequately characterised; and
  - (d) Control measures are periodically checked that they minimise emissions and protect employees and contractors from adverse exposure.
- 2.2 Where it is likely that the 95 percentile value of a TWA mean concentration for total inhalable dust, respirable dust, respirable crystalline silica, asbestos or non-asbestos fibrous materials exceeds the relevant OEL, the area must be identified and mapped, signposted or otherwise clearly communicated to employees working in the area. Areas where other identifiable particulate hazards (eg. PAH, lead, mercury, etc), or gases (eg. CO, SO<sub>2</sub>, NH<sub>3</sub>, etc), or vapours exceed the relevant OEL, must also be similarly identified and clearly communicated. Signposting, where necessary, must use appropriate wording or symbols on signs to identify the hazard.
- 2.3 These designated areas require a documented respiratory protection programme, regular monitoring of SEGs working in the area and a formal review of the practicality of engineering controls.
- 2.4 Particulate and gas / vapour monitoring must be based on the use of equipment approved by local regulatory authorities, as per documented methods.
- 2.5 There must be a special consideration given to the sampling of hot/volatile/pressurised toxic process streams where they occur.

**3.0 Medical Surveillance**

3.1 Employees and Category 1 contractors must be covered by a medical surveillance programme when:

- (a) Their SEG TWA mean exposure to respirable crystalline silica, total inhalable dust, respirable dust, lead or asbestos dust is greater than 50% of the relevant OEL;
- (b) The medical adviser considers that it is advisable; or
- (c) There is a legal requirement for medical monitoring.

3.2 Where risk assessment indicates a risk of a respiratory condition, assessment programmes must include chest x-rays and/or lung function tests. Where indicated, they must meet the following standards:

- (a) High quality chest x-rays will be taken every 5 years, unless local legislation requires these to be more frequent;
- (b) All chest x-rays will be read to ILO standards by an ILO B reader, wherever possible;
- (c) Any progression of more than one step on the ILO extended scheme to a reading above 1/0 will be reviewed by a physician;
- (d) Any reading suggesting active lung disease will be reviewed by a physician; and
- (e) All spirometry will be by trained staff following the American Thoracic Society guidelines or equivalent.

3.3 All lead monitoring programmes must meet the following standards:

- (a) All testing will be of venous blood according to local standards;
- (b) Only laboratories using an active quality assurance or quality control scheme will be used for testing;
- (c) All male workers with a whole-blood lead above 40µg/dL will be removed from exposure until the level has fallen below 30 µg/dL, and until the physician declares the worker fit for duty; and
- (d) Females of reproductive capacity with a whole-blood lead above 20µg/dL will be removed from exposure until the physician declares the worker fit for duty, and exposure to lead should cease when pregnancy is notified to the Company.

3.4 All monitoring programmes for other substances must be documented.

**4.0 Exposure Controls**

4.1 Elimination or substitution must be considered.

4.2 Where required or practicable, there must be engineering controls in place.

4.3 There must be documented procedures for inspection, assessment and maintenance of the engineering controls to ensure that the equipment continues to operate to design specifications.

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- 4.4 Controls must be of an adequate standard such that surfaces are adequately cleaned to avoid:
- (a) dust generation due to material dislodgment (eg. wind blown), where practicable; and
  - (b) fume generation from accumulated dust during welding/heating or cutting operations.
- 4.5 Employees must not eat or smoke in areas or jobs with potentially harmful exposures. Cigarette smoking must also be prohibited wherever people are likely to be exposed to harmful levels of smoke.
- 4.6 Abrasive blast cleaning must be conducted so as to protect worker health and minimise dust emissions. Substitutes must be used whenever practicable for abrasives containing crystalline silica. However, if such abrasives are used, workers must be aware of the hazards and exposure monitoring conducted. The hazardous properties of alternative materials must be considered before use.
- 4.7 Fixed station monitors and alarms must be installed where appropriate to warn against accidental or periodic releases of toxic gases/vapours (eg. HCN, CO, SO<sub>2</sub>). Such monitors must only be installed after training all affected personnel on the capabilities and limitations of the monitors.
- 4.8 All fixed station monitors / alarms must be identified, listed and included in a periodic schedule of preventive maintenance and testing, including calibration of detectors. Periodic drills with regard to response to sounding of the alarm must be conducted. Periodicity should be based on level of risk.
- 4.9 Where required, there must be a documented respiratory protection device (RPD) programme based on suitable standards, that provides training in the recognition of signs and symptoms of hazardous particulate and gas / vapour exposure, emergency procedures and preventative measures.

### **5.0 Respiratory Protection Devices**

- 5.1 RPDs must be selected with regard to:
- (a) The potential particulate particles size, gas / vapour types, substance toxicity and likely concentrations;
  - (b) Compatibility with the work tasks; and
  - (c) Comfort (as it affects wear-time) and allowance for adequate communication.
- 5.2 Half-face and full-face air-purifying respirators must not be used where:
- (a) The atmosphere is oxygen deficient (< 19.5%);
  - (b) The atmosphere is immediately dangerous to life or health (eg. in areas where CO concentrations are > 1,500 ppm or NH<sub>4</sub> > 300 ppm);
  - (c) Gases and vapours are more than 10 times their OEL or greater than 1000 ppm for half-face respirators, or more than 100 times their OEL for full-face respirators; or

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- (d) Particulates are more than 10 times their OEL for half-face respirators, or more than 100 times their OEL for full-face respirators.
- 5.3 For atmospheres that are oxygen deficient, or contain unknown hazards, or have concentrations of gases and vapours that are unknown, or could potentially exceed immediately dangerous to life or health (IDLH) values, an air-supplied type respirator must be worn.
- 5.4 For effective use of air-purifying respirators (other than powered air-purifying respirators), fit testing must be qualitative and documented as a minimum, although quantitative fit testing is preferred. There must be a policy requiring a clean shaven face when using a negative or neutral pressure RPD for routine tasks, or the use of a positive pressure RPD will be required. A pulmonary function test may be required to determine whether or not an individual is medically fit to wear a respirator.
- 5.5 For air-supplied RPDs, breathing air must be effectively filtered and / or isolated from plant and instrument air, and isolated from sources of nitrogen and carbon monoxide potential exposure. The quality of the breathing air must be checked for conformance with national standards.