

Chapter 10

Exhaust and diesel fumes



What's the hazard?

Cancer Council Australia estimates that one person every three days is diagnosed with lung cancer caused by diesel fumes. The International Agency for Research on Cancer estimates that those regularly exposed to diesel exhaust fumes at work can be up to 40% more likely to develop lung cancer.

Diesel fumes cause lung cancer, chronic bronchitis, heart disease, stroke, respiratory infections and exacerbation of asthma.

Exposure to petrol engine exhaust emissions does not have the same risk of cancer but may contribute to chronic lung disease especially in asthmatics. It may even cause asthma.

Skin contact with cold diesel fuel may cause dermatitis.

Diesel fumes are a mixture of gases, vapours, liquid aerosols and substances made up of particles. They contain the products of combustion including:

- Carbon (soot)
- Nitrogen
- Water
- Carbon monoxide
- Aldehydes
- Nitrogen dioxide
- Sulphur dioxide
- Polycyclic aromatic hydrocarbons.

Most of the contaminants are adsorbed onto the soot. The content of the carbon particle or soot varies depending on the fuel used and the type of engine. Petrol engines produce more carbon monoxide but much less soot than diesel engines.

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The quantity and composition of diesel fumes will vary depending on:

- The quality of diesel fuel used
- The type of engine e.g. standard, turbo or injector
- The state of engine tuning
- The fuel pump setting
- The workload demand on the engine
- The engine temperature
- Regular maintenance of the engine.

Workers particularly at risk include diesel mechanics, vehicle service and repair and those working with diesel operated engines, generators, compressors etc.

As smoke is the product of combustion, its colour can be an indicator that action is needed:

- Blue smoke (mainly oil and unburnt fuel) which indicates a poorly serviced and/or tuned engine
- Black smoke (soot, oil and unburnt fuel) which indicates a mechanical fault with the engine
- White smoke (water droplets and unburnt fuel) which is produced when the engine is started from cold and disappears when the engine warms up. With older engines, the white smoke produced has a sharp smell which may cause irritation to the nose and throat.

The Regulations

There are no specific Regulations for exhaust fumes – including diesel fumes. Guides provide some advice. The AMWU supports an exposure level of 0.05 mg/m³. Currently there is no exposure standard (December 2018).

Beware of enclosed spaces

Any internal combustion engine, i.e. petrol, diesel or LPG must never be used in an enclosed space. It is best not to use these engines indoors. Diesel engines are the most hazardous of vehicle emissions, but LPG engines can produce dangerous levels of carbon monoxide. Carbon monoxide is a deadly, colourless and odourless gas: for example, a 1.8 LPG engine operating in a workplace of 10 metres x 60 metres x 100 metres could just take 30 minutes to get above the standard for carbon monoxide.

To decrease exposures - all engines:

- Use electric powered vehicles in workplaces
- Keep the workplace well ventilated; at least 10 air changes per hour
- Consider wiring the extraction fans with the lighting circuit

- For static running of engines, install tailpipe exhaust scavenge systems that are hard to damage; crushed ducts do not work
- Use filters attached to tailpipes
- Catalytic converters.

Lower the levels of diesel by:

- Start-up diesel fuelled vehicles outside
- Turn off engines when not required
- Keep doors and windows open where practicable
- Install air vents in the walls and ceiling
- Job rotation
- Suitable gloves should be worn when handling hot and cold diesel fuel.

The presence of soot on the walls or on other surfaces is a useful indicator that diesel fumes are not being adequately controlled.

Maintenance, examination and testing

Watch out for dark smoke from diesel engines or unusual acrid smells from LPG fuelled engines. These engines need immediate maintenance.

Static running, e.g. vehicle testing

- Every day look for signs of damage to the scavenge ducts
- At least once a week, check that the scavenging system works properly
- To know if the scavenging system is working properly you need to know the extraction design performance. The equipment supplier's manual should give this information.
- Get a competent ventilation engineer to examine the system thoroughly and test its performance at least once every 14 months.

Moving vehicles, e.g. workplace

- At least once a week, check visually that the fan and roof vents are clearing the fumes properly. Look for signs of damage to the fan and dirt build up on the blades.
- Examine and test the ventilation system - this requires a competent ventilation engineer.
- Test LPG fuelled engines for carbon monoxide emissions regularly.

Other information

- Cancer Council Australia - <http://www.cancer.org.au/news/media-releases/diesel-fumes-at-work-cause-130-lung-cancer-cases-every-year.html>
- Safe Work Australia - <http://www.safeworkaustralia.gov.au/sites/swa/about/publications/pages/guidance-for-managing-the-risks-of-diesel-exhaust>
- UK HSE - Control of diesel engine exhaust emissions in the workplace <http://www.hse.gov.uk/pubns/priced/hsg187.pdf>
- UK HSE - Health and Safety in the motor vehicle repair and associated industries <http://www.hse.gov.uk/pubns/books/hsg261.htm>