

Occupational Cancer Risk Series

Diesel engine exhaust



There may be hazards where you work that increase your risk of developing cancer. This factsheet discusses occupational hazards related to diesel engine exhaust (DEE).

Key messages

- In Australia, it is estimated that 1.2 million workers from many jobs are exposed to diesel engine exhaust (DEE).
- DEE contains airborne chemicals that are known to cause cancer (carcinogens).
- Eliminate or reduce exposure to carcinogens by using recommended controls.
- Refer to Safe Work Australia's [Guidance for Managing the Risks of Diesel Exhaust](#) for more information or contact your [state or territory work health and safety regulator](#).

Diesel engine exhaust and cancer

DEE is created by burning diesel fuels. It contains a mixture of airborne chemicals that can be harmful to people. When breathed in, these chemicals increase your risk of developing long-term health problems. This includes lung cancer and possibly bladder cancer. In Australia, DEE is the second most common carcinogen workers are exposed to, behind solar UV radiation exposure. It is estimated that 1.2 million Australian workers were exposed to DEE in 2011.

Airborne contaminants

DEE contains a mixture of gases and soot, which is also called particulate matter. Other substances, including carcinogens, may stick to the soot. Because soot particles are very small they can easily get deep into the lungs. This is how they cause a range of short-term and long-term health problems, including cancer. Regular exposure to high levels of soot, over a long period of time, increases the risk of getting lung and bladder cancer.

Cancer risk from diesel engine exhaust varies depending upon the:

- location of the operating engine (outside or enclosed space)
- ventilation in the workspace
- number of engines
- type and age of the engine
- size of engines
- fuel pump setting
- engine temperature

- fuel used (e.g. low-sulphur diesel)
- use of emission control system/s
- state of engine tuning and maintenance
- pattern of use (load and acceleration)
- length of time the worker is exposed

Effective controls

All Australian workplaces must follow work health and safety laws; however these vary slightly between states and territories, but the duty of care for employers and responsibilities of workers across Australia is similar:

- Employers are required to ensure the health and safety of their workers at their workplace.
- Employers are required to ensure the health and safety other people due to the work carried out.
- Employers have a duty to control the risks associated with work.
- Workers must take reasonable care of their own health and safety.
- Workers must not negatively affect the health and safety of other people.
- Workers must follow any reasonable instruction and workplace health and safety policies, of which they have been notified.

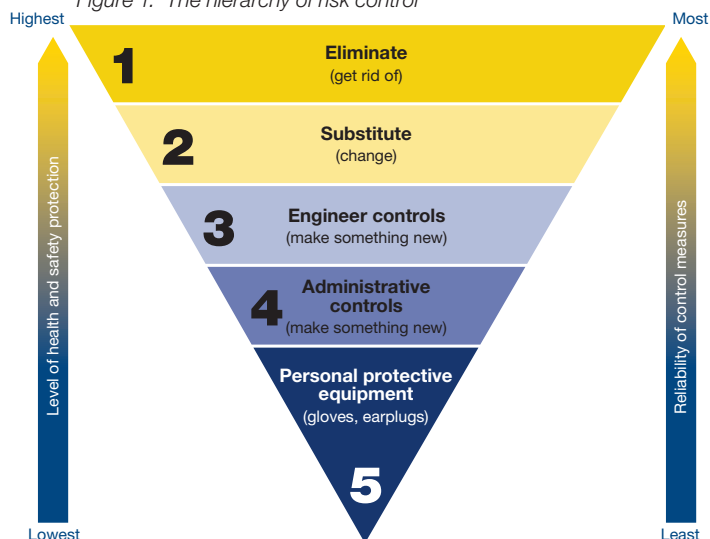
For specific information regarding the laws or regulations in your state or territory please use the links supplied on the landing page under 'useful resources'.

Workers should always be involved in the risk management process to correctly identify hazards and use control measures that suit the workplace.

The Safe Work Australia [Guidance for Managing the Risks of Diesel Exhaust](#) has information on how you can control DEE hazards in your workplace. A combination of the recommended controls should be used (Table 1 - on the next page) to minimise DEE exposure. You should choose the control measures that best suit your workplace.

Diesel engine exhaust

Figure 1. The hierarchy of risk control



Eliminate or reduce exposure to hazards

Use the hierarchy of control (Figure 1) and put in place a [risk management process](#). If suitable control measures are not in place, anyone working with or around diesel-powered engines could be at an increased risk of developing cancer.

Recommended workplace exposure limits in the [Australian Institute of Occupational Hygienists: Diesel Particulate Matter and Occupational Health Issues – Position Paper](#) help to reduce the irritant effect of DEE and secondarily aid in minimising the potential risk for lung cancer caused by work.

Workplace air monitoring can be used to check if exposure to particulate matter in DEE is being effectively reduced by the controls you are using. An occupational hygienist can assist with air monitoring.

For any concerns related to control measures at your workplace, or for more information on the control of air quality contact:

- your workplace supervisor or management (if you're an employee)
- your workplace health and safety representative or union representative
- [state and territory work health and safety regulators](#)
- [Safe Work Australia](#).

How do I detect cancer early and reduce my cancer risk?

Speak to your doctor if you have had a cough for more than three weeks or have blood in your urine. To find out what you can do to create a workplace that supports healthy choices to help reduce cancer risk, contact Cancer Council on 13 11 20 or visit [cancer.org.au](#).

Table 1. Summary of control measures for DEE.

ACTIVITY	CONTROL
Engine selection	Replace diesel powered engines with other energy sources (i.e. electric, gas) or choose low emission engines. Use purchasing guidelines for supply of engines that meet US Tier 4 or Euro 6 standards.
Fuel selection	Use ultra-low sulphur and other low-emission diesel fuels, fuel additives and low sulphur lubricants where possible. Avoid contaminating diesel fuel and lubricating oils.
Engine refurbishment	Refurbish engines to use low-sulphur fuel and to improve fuel efficiency.
Emission control devices	Install devices that reduce emissions (e.g. particulate filters, catalytic converters, scrubbers, acoustic agglomeration, cyclones).
Enclosed equipment	Design and maintain air-conditioned cabs where possible (positive pressure, HEPA filtered air supply, leak tested).
Ventilation	Use both local exhaust and forced dilution ventilation. Natural ventilation should not be used as a control method. Use connecting extraction pipes for vehicle exhausts in workshops. Cold engine starts should occur in spaces with good ventilation.
Maintenance and repairs	Have a maintenance schedule for all engines and emission control equipment. Carry out emissions-based maintenance on engines (initial baseline testing and raw exhaust monitoring).
Testing of exhaust components	Use raw exhaust tests to measure how well exhaust treatments are working. Test in normal working conditions (e.g. engines under load, in low gear with hot engine and hydraulics, engine revving at 70-80%). High and low idle tests are not enough.
Engine operation	Operate engines to optimise combustion (e.g. drive to usual conditions, limit idling and over-revving). Turn off engines when not in use.
Worker education and training	Educate workers on hazards and the policies and procedures used to manage them. This is a work health and safety requirement. Report any changes in engine emissions or visible changes in the workplace (i.e. visible white, blue or black smoke, walls or surfaces covered in soot or smoky looking haze when diesel engines are in use).
Share activities	Rotate job tasks between your workers to reduce amount of time exposed to DEE.
PPE	Wear air supplied or air purifying respiratory protection that filters particulates. They should be fitted to each worker.

For more information visit the 'useful websites' listed on [www.cancer.org.au/preventing-cancer/workplace-cancer/diesel-engine-exhaust.html](#)