



Diesel Engine Exhaust Emissions

Diesel engine exhaust emissions have the potential to cause a range of health problems. This leaflet is a short guide for employees to the hazards posed by the emissions, and describes the precautions that employers and individuals can take.

WHAT ARE DIESEL ENGINE EXHAUST EMISSIONS?

Diesel engine exhaust emissions (commonly known as '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.

The carbon particle or soot content varies from 60% to 80% depending on the fuel used and the type of engine. Most of the contaminants are adsorbed onto the soot. Petrol engines produce more carbon monoxide but much less soot than diesel engines.

WHAT FACTORS AFFECT THE COMPOSITION OF DIESEL FUMES?

The quantity and composition of diesel fumes in your workplace may vary depending on:

- the quality of diesel fuel used;
- the type of engine, eg standard, turbo or injector;
- the state of engine tuning;
- the fuel pump setting;
- the workload demand on the engine;
- the engine temperature;
- whether the engine has been regularly maintained.

WHAT DOES THE COLOUR OF THE SMOKE PRODUCED INDICATE?

Smoke is the product of combustion. Vehicles at your workplace may produce three kinds of smoke, two of which indicate engine problems. The three types are:

- 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 your upper respiratory system.

You should tell your employer if workplace vehicles are producing blue or black smoke so that prompt action can be taken to correct any problem.

WHERE ARE DIESEL FUMES LIKELY TO BE FOUND IN THE WORKPLACE?

You may be exposed to diesel fumes if you work where diesel operated heavy vehicles are being used, or where motor vehicles are generating diesel fumes such as when coming into and out of car parks or when passing toll booths.

You may also be exposed to diesel fumes if you are working in tunnels or on construction sites where diesel operated stationary power sources are being used.

DIESEL FUMES AND YOUR HEALTH

Breathing in diesel fumes can affect your health, and exposure to the fumes can cause irritation of your eyes or respiratory tract. These effects are generally short term and should disappear when you are away from the source of exposure.

However, prolonged exposure to diesel fumes, in particular to any blue or black smoke, could lead to coughing, chestiness and breathlessness.

In the long term, there is some evidence that repeated exposure to diesel fumes over a period of about 20 years may increase the risk of lung cancer. Exposure to petrol engine exhaust emissions does not have the same risk.

Skin contact with cold diesel fuel may cause dermatitis.

If you think that your health is being affected by exposure to diesel fumes, you should tell your employer (eg supervisor) and/or safety representative, and consult your doctor.

WHAT SHOULD MY EMPLOYER DO TO PROTECT MY HEALTH?

Under the Control of Substances Hazardous to Health Regulations 1994 (COSHH), your employer should make a suitable and sufficient assessment of the risks to your health if you are exposed to diesel fumes. They should then take the necessary steps to **prevent** or **adequately control your exposure** in the workplace.

Where exposure cannot be prevented, your employer will need to consider the use of a combination of specific control measures including:

- workplace air extraction fans;
- tailpipe exhaust extraction systems;
- the use of filters attached to tailpipes;
- catalytic converters; and more general control measures such as:
- turning off engines when not required;
- keeping doors and windows open where practicable;

- installing air vents in the walls and ceiling;
- job rotation;
- providing suitable personal protective equipment (suitable gloves should be worn when handling hot and cold diesel fuel).

Your employer should only provide respiratory protective equipment as a last resort when other means of control are not suitable.

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

In addition to the control measures described in the preceding paragraphs, your employer should also ensure that:

- any engineering controls used are properly maintained and checked regularly;
- where necessary, your exposure to diesel fumes is monitored (see HSG publication Control of diesel engine exhaust emissions in the workplace - full details at end of text);
- you are provided with the necessary information on the risks of exposure to diesel fumes;
- you are provided with instruction and training on the safe use of the control measures and any personal protective equipment that you are using.

WHAT CAN I DO TO PROTECT MY OWN HEALTH?

You can do a number of things to protect your health from exposure to diesel fumes. These include:

- **ask** your employer for information on the hazards associated with diesel fumes, read it, make sure you understand it and if not, seek clarification;
- **avoid** exposure where possible;
- **make** full use of any controls provided;
- **know** how to use the controls provided and be able to detect any faults;
- **report** any faults in the controls to your employer, eg poor extraction fans;
- **keep** doors and windows open to remove any diesel fumes where possible;
- **turn** off engines when not required;
- **know** how to correctly wear any respiratory protective equipment or personal protective equipment your employer provides;
- **keep** it clean and serviced, and store in a clean area provided by your employer.

In addition to these controls, there are a number of personal hygiene measures you can take:

- **do not** eat or smoke in areas where there is likely to be exposure;
- **wash** your hands and face before drinking, eating or leaving work;
- **avoid** skin contact with cold diesel fuel and hot fuel or oil.

Remember, you have a duty not only to protect your own health and safety but also to ensure that your actions do not put others around you at risk.

FURTHER ACTION

If you have any concerns or problems about exposure to diesel fumes, ask your supervisor and/or safety representative to discuss them with your employer. If this is not possible, you may contact HSE's InfoLine (Tel: 08701 545500).

In addition, HSE has produced more detailed guidance, aimed at employers and self-employed people, on how to control exposure to diesel engine exhaust emissions. The publication is available from HSE Books, and is titled *Control of diesel engine exhaust emissions in the workplace*, HSG187 ISBN 0 7176 1662 2.

HSE priced and free publications are available by mail order from:

HSE Books,
PO Box 1999,
Sudbury,
Suffolk CO10 6FS

Tel: 01787 881165
Fax: 01787 313995

HSE priced publications are also available from good booksellers.

For other enquiries ring HSE's InfoLine Tel: 08701 545500, or write to HSE's Information Centre, Broad Lane, Sheffield S3 7HQ

This leaflet contains notes on good practice which are not compulsory but which you may find helpful in considering what you may need to do.

This leaflet is available in priced packs of 15 from HSE Books, ISBN 0 7176 1671 1. Single free copies are also available from HSE Books.

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