

Working safely with metalworking fluids

A guide for employees



Introduction

This leaflet aims to help employees who work with metalworking fluids understand the main risks to their health. It contains general advice on the precautions which you and your employer can take to avoid these risks.

What are metalworking fluids?

Metalworking fluids - sometimes referred to as suds, coolants, slurry or soap - are used during the machining of metals to provide lubrication and cooling, and to help carry away debris such as swarf and fine metal particles. They can also help to improve machining performance and prolong the life of the cutting tool, as well as provide corrosion protection for the surfaces of workpieces.

How can metalworking fluids affect you?

Metalworking fluids are mostly applied by continuous jet, spray, or hand dispenser. They can affect you:

- **if you inhale** the mist, aerosol or vapour generated during machining operations. Your exposure will depend on the type of machining you are doing and how well the machine is enclosed and ventilated. Exposure is likely to be highest:
 - near the metalworking machine;
 - in operations involving high-speed tools or deep cuts;
 - at machines where the process is not enclosed;
 - where there are inadequate ventilation arrangements.
- **through contact with the skin**, particularly hands and forearms, if appropriate precautions (eg the use of gloves, overalls or face shields) are not taken. Skin contact can occur during the preparation or draining of fluids, handling of workpieces, changing and setting of tools, and during maintenance and cleaning operations. Fluids can also splash onto you during machining, eg if there are no splashguards or if they are inadequate;
- **by entering your body through cuts and abrasions** or other broken skin; or
- **by entering your body through the mouth** if you eat or drink in work areas, or do not wash your hands before eating or smoking.



Dermatitis usually affects the hands or forearms - the parts of your body most likely to be in contact with metalworking fluids. It can be very painful but with care most cases can be prevented.

How can metalworking fluids affect your health ?

Skin disorders

All types of metalworking fluids can cause irritation of the skin or dermatitis.

Neat oils in regular and prolonged contact with the skin can cause irritation of the hair roots. Also, fine microscopic metal particles, which are generated during machining, can damage the skin and make any existing irritation worse.

Dermatitis can be caused:

- by bacteria and their toxic by-products when these are present in the sump;
- through contact with sensitising agents such as chromium, nickel and cobalt, which can leach out from cutting tools and grinding wheels into metalworking fluids; and
- by chemicals which are added to metalworking fluids, particularly for killing bacteria (biocides) and preventing corrosion.

Respiratory ill health

Workers exposed to metalworking fluid mist and vapour have an increased risk of developing work-related asthma, bronchitis, irritation of the respiratory tract and breathing difficulties. It can also cause extrinsic allergic alveolitis, which can cause increasingly severe breathing difficulties in recurrent episodes, following repeated exposure. Exposure may also cause irritation to the eyes, nose and throat.

Under suitable conditions, bacteria and fungi can grow well in metalworking fluids. Inhalation of these bacteria, fungi or toxic by-products can cause irritation of the respiratory tract or flu-like symptoms, as well as making existing asthma symptoms worse.

Cancer

In the past, the use of unrefined mineral oils led to skin cancer affecting the exposed skin, often hands and forearms. Also, oil-soaked clothing and oily rags kept in overalls caused cancer of the scrotum. Today, the use of highly refined oils and the substitution of cancer-causing chemicals in metalworking fluids, as well as changes in work practices and improved personal hygiene, have reduced the risk of cancer.

What precautions should you take?

The more you know about the hazards associated with metalworking fluids and the precautions you should take, the safer you will be.

General

- Follow the instructions and training given by your employer on safe systems of work when working with metalworking fluids.
- Use splash guards, where provided, to control splashing and misting.
- Minimise the production of mist and vapour by controlling the volume and rate of delivery of the fluid to the cutting edge of the tool.
- Use any enclosures or ventilation provided to remove or control any mist or vapour produced.
- Allow a time delay before opening the doors on machine enclosures to ensure that all mist and vapour have been removed by the ventilation.
- Report any damaged or defective splash guards, ventilation hoods or other control equipment.
- Open workroom doors and windows to improve natural ventilation.
- Don't use compressed air to remove excess metalworking fluids from machined parts or plant or equipment.

Skin protection

- Reduce your contact with wet workpieces and surfaces.
- Don't put your bare hands into fluid sumps or use oily rags to wipe them clean.
- Wear suitable gloves, overalls, aprons, goggles or face shields if needed (NB: Gloves can be hazardous if worn near rotating machinery or parts).
- Take care not to contaminate the inside of your gloves with metalworking fluids when putting them on or taking them off.
- You should ensure your hands are kept clean and in good condition. Using pre-work creams may help to make removing contaminants easier. They do not provide an effective barrier, and are not a substitute for gloves. After-work creams are particularly beneficial because they help restore the natural moisture content of the skin after washing hands. See the HSE publication HSG262 for further information.
- Cover any cuts and abrasions with a waterproof dressing.
- Wash regularly with soap and water to remove metalworking fluids from your skin. Avoid using abrasive or powerful solvent cleaners.
- Wash your hands thoroughly before eating, drinking or smoking. Pay particular attention to washing skin under rings and watch straps.

Sump fluid control

- Do not discard unwanted food, drink or any other debris into the sump.
- Tell your supervisor if you see any layers of scum or large amounts of tramp oil on top of the sump fluid, or if the sump fluid is dirty or smelly.
- Follow good working practices when mixing fluids, cleaning and topping up sumps etc.

Other precautions

- Store personal protective equipment in the changing facilities provided or another clean storage area.
- Change dirty overalls regularly and keep oily rags out of your pockets.
- Avoid taking dirty overalls home, eg for washing.
- Avoid eating or drinking in areas where metalworking fluids are used.

What about health checks?

If exposure to metalworking fluids cannot be prevented, your employer will need to have a programme of regular skin inspections by a responsible person, usually about once a month. If exposure to mist cannot be prevented your employer should get you to complete a questionnaire about your breathing every year.

It is also important that you:

- check your own skin regularly for lasting changes, eg inflammation or dry, cracking patches, and for ulcers and warts, especially if you have worked with neat oils in the past;
- don't ignore health problems caused by metalworking fluids, as these could become disabling and permanent, sometimes requiring a change in occupation.

What should you do if you think your health might be affected?

If you think your health is being affected by working with metalworking fluids, or if you are concerned that adequate precautions are not being taken, you should tell your supervisor, safety representative or doctor, as appropriate. Show them this leaflet.

Report skin and chest complaints to the work's doctor or nurse, if there is one. If not, tell another responsible person at work and see your GP, who may refer you to a doctor with a knowledge of occupational skin problems or lung disease if the problem persists.

What are the legal requirements?

Both you and your employer have responsibilities to make sure the risks to your health from metalworking fluids are properly controlled.

Your employer must:

- assess the risks to your health and decide what precautions are needed;
- tell you about the risks and precautions necessary to protect your health;
- prevent your exposure to substances hazardous to health or, where this is not reasonably practicable, ensure that your exposure is adequately controlled;
- ensure that exposure control measures are followed at all times, and regularly checked and maintained, and that safety procedures are observed;
- monitor your exposure and carry out appropriate health surveillance, where the assessment has shown this is necessary;
- train you in the use of control measures and any personal protective equipment which is required.

You must:

- co-operate with your employer;
- make full use of any control measures, use personal protective equipment and report any defective equipment;
- attend and participate in health surveillance programmes at your workplace, where appropriate.

Wash fluids and washing machines

Water-mix wash fluids used to clean components after metalworking may also pose a risk to health, from skin contact with the wash fluids themselves, and from breathing in mist from washing machines.

When handling wash fluids, Instructions For Use should always be followed.

If you breathe in mist from washing machines, you may suffer the same sorts of symptoms and diseases as you would experience from breathing in mist from metalworking machines.

The same principles of risk assessment, prevention and control applied to metalworking fluids should be applied to water-mix wash fluids. Mist from washing machines should normally be kept within the machines or ventilated to a safe place. Visible mist from washing machines should be reported to your supervisor.

What other guidance is available?

There is more guidance on metalworking and wash fluids at HSE's website at www.hse.gov.uk/metalworking.

Further information

For information about health and safety, or to report inconsistencies or inaccuracies in this guidance, visit www.hse.gov.uk/. You can view HSE guidance online and order priced publications from the website. HSE priced publications are also available from bookshops.

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

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