

MW5

COSHH essentials for
machining with metalworking
fluids

The Control of Substances Hazardous to Health Regulations 2002 (COSHH) require employers to ensure that exposure is prevented or, where this is not reasonably practicable, adequately controlled. This guidance gives practical advice on how this can be achieved by applying the principles of good practice for the control of exposure to substances hazardous to health, as required by COSHH.

It is aimed at people whose responsibilities include the management of substances hazardous to health at work (eg. occupational health specialists, anyone undertaking COSHH assessments and supervisors). It is also useful for trade union and employee safety representatives. It will help you carry out COSHH assessments, review existing assessments, deliver training and supervise activities involving substances hazardous to health.

This guidance is issued by the Health and Safety Executive. Following the guidance is not compulsory, unless specifically stated, and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance.

See Essential information near the end of the sheet.

Managing fluid quality

Control approach 4 Special

What this sheet covers

This sheet describes good practice to manage fluid quality of water-mix metalworking fluids (MWF).

It is important to follow all the points, or use equally effective measures.

Hazards

- ✓ MWF stays in the machine and deteriorates over time.
- ✓ Systems that contain water-mix MWF can become contaminated with harmful bacteria.
- ✓ The maintenance of fluid quality is key to controlling risk.
- ✓ Inhalation of MWF mist can cause lung diseases, such as occupational asthma and occupational hypersensitivity pneumonitis.
- ✓ Skin exposure to MWF can cause dermatitis.

Access to work area

- ✓ Allow access to authorised and appropriately trained people only.

Equipment and procedures

- ✓ Cover sumps to keep them free from contamination eg. food, tea-bags and urine.
- ✓ Minimise leaks of tramp oil (hydraulic, lubricating or gearbox oil) into the sump. Remove tramp oil by mechanical skimmers, mobile oil coalescers or vacuum systems.
- ✓ Remove fines using centrifuges, filtration systems or magnetic separators (for ferrous materials).
- ✓ Remove swarf from the sump with suitable tools eg. brushes and shovels. Wear gloves which provide protection from chemical and mechanical hazards, but only when machinery is switched off.
- ✓ Mix fresh water-mix fluids to the supplier's recommended concentration. In use, water-mix fluids evaporate and become more concentrated. Therefore top up only with fluid below recommended concentration.
- ✓ Maintain and clean the machine and MWF system in accordance with the supplier's instructions.
- ✓ When commissioning or modifying a MWF supply system, avoid points of low or no flow (stagnation). For example, these include bottlenecks, dead-ends (a length of pipe sealed at one end preventing continuous flow) and dead-legs (fittings through which MWF only passes infrequently).
- ✓ Prevent fluid stagnation in sumps and pipes, which allows biofilm (microbial) growth by keeping the fluid circulating with pumps.
- ✓ Remove dead-ends, and where reasonably practicable dead-legs. Otherwise minimise risk by regular (eg. weekly) flushing.
- ✓ Check all strainers/filters regularly for blockages.

Monitoring Fluid Quality

- ✓ Check input water quality for hardness, pH and bacteria. Consult your MWF supplier about suitable water quality requirements.
- ✓ If using stored water rather than direct mains, carry out weekly inspections of water storage tanks and water filtration equipment to ensure they are kept clean.
- ✓ Check your MWF for bacteria using dipslide testing (see below).
- ✓ Check the fluid appearance every day. Any unusual odour and/or biofilm deposits on the inside surfaces of the sump?
- ✓ Check weekly that tramp oil is kept to a minimum (recommended below 2%). Get advice from your fluid supplier on a suitable measurement method.
- ✓ Measure the fluid concentration (with a refractometer) and pH every week. Follow your supplier's recommended levels for fluid concentration and pH.
- ✓ Measure the sump fluid temperature weekly.
- ✓ Consider cooling the fluid if its temperature rises significantly above the workroom temperature.

Dipslides

- ✓ Monitoring should be used to confirm the effectiveness of your controls, as well as indicating increased levels of bacteria at an early stage.
- ✓ Stir the sump before testing, to avoid tramp oil coating the slide.
- ✓ Use a dipslide incubator to keep the temperature for developing slides the same for every test.
- ✓ Follow the dipslide supplier's instructions for incubation. This will tell you the correct temperature and how long the slides should spend inside the incubator.
- ✓ Take dipslides once a week.
- ✓ To reduce this frequency you need to demonstrate that your fluid quality management is effective, eg. dipslide, fluid concentration and pH test records.
- ✓ Consult a 'competent person' who can advise on new recommended testing intervals, eg. priority being given to more vulnerable systems.

Dipslide Results

- ✓ Dipslide results at or above 10^4 cfu/ml indicate microbial growth.
- ✓ Do not add biocide until all good practice measures to maintain the fluid have been followed (concentration, pH, tramp oil content, metal contamination, operating temperature, agitation and flow).
- ✓ If bacterial growth continues despite these adjustments, add biocide. Only use biocides at the doses recommended by your supplier.
- ✓ Use a dispensing system to add biocide where practicable and decide whether personal protective equipment (PPE) is required. Choose a point of high turbulence to ensure complete mixing eg. the sump.
- ✓ Dipslide results showing heavy contamination with bacteria at or above 10^6 cfu/ml indicate poor control. **Act immediately.** This normally means draining and cleaning the system or taking other measures which are equally effective.

Records

- ✓ If a third party undertakes the checks make sure you review the results and remedial actions taken.
- ✓ Keep records of all tests for at least five years.
- ✓ Keep records in a table/graph (see included example) to make it easy to spot trends and act on the results to maintain fluid quality.

Training and supervision

- ✓ Train those carrying out fluid quality checks on the equipment to be used, the correct procedure, how to record and interpret the results and the remedial actions to take.

Essential information

MW0 Advice for managers

MW1 CNC machining

MW2 Control of skin risks during machining

MW3 Sump cleaning: water-mix fluids

MW4 Sump cleaning: neat oils

Further information

Good practice guide for safe handling and disposal of metalworking fluids UKLA 2020 www.ukla.org.uk/wp-content/uploads/UKLA-HSE-Good-Practice-Guide-for-Safe-Handling-and-Disposal-of-Metalworking-Fluids.pdf

Working safely with metalworking fluids: A guide for employees INDG365 HSE 2011 www.hse.gov.uk/pubns/indg365.pdf

See www.hse.gov.uk/metalworking/index.htm

Managing skin exposure risks at work HSG262 HSE 2015 www.hse.gov.uk/pubns/books/hsg262.htm

See www.hse.gov.uk/health-surveillance/index.htm

You can find the full COSHH essentials series at www.hse.gov.uk/coshh/essentials/

British Occupational Hygiene Society (BOHS) <https://www.bohs.org/information-guidance/guidance-for-employers/>

Occupational Safety and Health Consultants Register www.oshcr.org/

For information about health and safety visit <https://books.hse.gov.uk> or <http://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.

To report inconsistencies or inaccuracies in this guidance email: commissioning@wlt.com.

Employee checklist

- If you notice an usual odour or appearance to the MWF inform your supervisor.
- Use, maintain and store your PPE in accordance with instructions.
- Remember that gloves increase the risk of entanglement at moving machinery.
- Always follow the standard operating procedure.
- Make sure you know what to do if there is a fluid spill.
- If you find any problems tell your supervisor. Don't just carry on working.
- Wash your hands before eating, drinking, smoking or using the toilet.
- Use skin creams provided as instructed.
- Check your skin regularly for dryness or soreness – tell your supervisor if these symptoms appear.
- Co-operate with health surveillance.

Location	Product										Sump capacity
Machine	Operating concentration range %										MWF refractometer correction factor
Asset Ref	Operating pH range										
Tramp Oil	Day										
	Month										
	Heavy										
	Moderate										
	Light										
System specific check MWF temperature °C	None										
	38										
	36										
	34										
	32										
	30										
	28										
	26										
Visual Inspection*	24										
	22										
	20										
	Biofilm/ slime										
	Mould										
	Smell										
	Colour										
Primary contact:	Rust										
	Agitation										
	Excessive cuttings										
	* Biofilm accumulation, strong smells and accumulation of metal fines are signs that the MWF supply system should be cleaned and fresh MWF added.										