



BEST PRACTICE FOR WATER- SOLUBLE METALWORKING FLUIDS

MIXING SOLUBLE METALWORKING FLUIDS

- Ensure the sump is sterilised by using a dedicated system cleaner before introducing fresh emulsion.
- Use a good quality water source that has not been left stagnant for a period of time. Use tap water where possible and avoid very cold water.
- Always add the metalworking fluid concentrate to water with agitation, to avoid gelling or splitting of the emulsion.
- Use a dosing unit or mixer to ensure constant concentration for optimum fluid performance.

Part code	Product	Description
8113	Quakerclean 8700	Formaldehyde and boron free high-power system cleaner with good bio resistance and high solvency to loosen and dissolve dirt.
5561	Millercare SC	Formaldehyde-free aqueous solutions system cleaner with detergency package and good bio resistance.
75677	Dostatron Mixer	The Dosatron system accurately and consistently doses metalworking fluid into water without electric power and is not affected by fluctuations in water pressure. Flow rate of 10 - 3,000 L/hr. Dose rates of 1 - 10%.
75707	A-900 Venturi Emulsion Mixer	The Venturi emulsion mixer ensures a correct and uniform blending of metalworking fluids with water, powered by water-pressure. Flow rate of up to 2,000 L/hr. Mixing ratio from 0 to approx. 16%.

CLEAN OUTS

- Use a system cleaner with good detergency and bio resistance, and check compatibility with the metalworking fluid.
- Add the system cleaner to the sump at the recommended dosage and circulate through the system for at least 8 hours prior to draining. Machining can continue during this period, but some foaming may occur.
- Rinse the system thoroughly with water or diluted fresh fluid, before introducing fresh emulsion at the recommended dilution.

STORAGE

- Store product indoors.
- Avoid extreme temperatures – recommended temperature is usually between 5°C and 35°C.
- Keep barrel bungs in place when not in use.

HANDLING

- Keep contact with metalworking fluids to a minimum – reduce contact with wet workpieces and surfaces, and avoid putting bare hands into fluid sumps.
- Wear suitable PPE – gloves, overalls, aprons, goggles, or face shields if needed, and take care not to contaminate the inside of gloves with metalworking fluid when taking them on and off.
- Wash hands regularly with soap and water, especially before eating and drinking.
- Use after-work creams to help restore the skin's natural moisture.
- Cover any cuts or abrasions with water-proof dressings.

CONDITION MONITORING AND MAINTENANCE OF THE FLUID

- Use a coolant management chart on each machine, detailing the product and required concentration/ refractometer range and pH limits to track the condition of the fluid at regular intervals.
- Check the concentration of the fluid regularly, for best practice at the start of each shift, using a refractometer. A low concentration will reduce the performance of the product, and could result in corrosion, microbial growth and emulsion splitting. A high concentration increases the chance of foaming, and can also reduce cutting performance.
- Check the pH using pH paper or a pH meter regularly, preferable every week. A drop in pH can signify an increase in bacteria levels. A rise in pH could mean contamination from cleaning products.
- Frequently remove any tramp oil from the surface of the fluid using a belt skimmer or vacuum, ideally at the start of each shift if the emulsion has been stood overnight. Tramp oil can promote bacterial growth and cause smoking/ misting and splitting of the emulsion.
- At the start of each shift, ensure that all pumps are submerged by the fluid.
- Always top up with mixed emulsion, not water, to ensure emulsion stability. To increase concentration, use a high concentration mix. To reduce concentration, use a more dilute mix.
- If microbial growth is suspected (from pH drop, visual inspection or unpleasant odours), dip slides can be used to monitor levels of fungus and bacteria. Problems can often be resolved by ensuring concentration is kept at the correct level, however system treatments may need to be used as a last resort preventative measure.
- Check for any changes in water hardness each month, as this can affect product performance and emulsion stability.

Part code	Product	Description
75704	Refractometer	Measures metalworking fluid concentration from 0-18% with accuracy of +/- 0.2% and automatic temperature compensation.
75281	pH Papers	100 pc. Scale of pH 4.5 - 10.
75893	Water hardness test Strips	100pc. Clear colour changes from green to red ensure accurate determination of water hardness.
75705	2450M Oil Skimmer Magnet Stand	Removes approximately 5L/hr of tramp oil (hydraulic oil, spindle oil, etc.) from the surface of the metalworking fluid sumps. Convenient size allows 2450M Oil Skimmer to be mounted in most CNC machines. Supplied ready to use with 600mm belt.
75723	202502 SB-600 Skimmer Belt	49mm x 600mm skimmer belt for use with the 2450M Oil Skimmer Magnet Stand.

TROUBLESHOOTING GUIDE

Short fluid life?

This could be caused by a number of factors including contamination and poor concentration control.

By putting a coolant monitoring programme in place, the condition of the fluid can be tracked and preventative maintenance (e.g. concentration adjustments) can be carried out to extend the life of the fluid.

Our Millers-Xtra technicians are able to advise you or carry out preventative maintenance.

Bad smell?

Foul odours are typically caused by high levels of bacteria which also reduce fluid life and increase risks of respiratory problems. Keeping the concentration at the correct level prevents bacterial growth. Depending on the level of bacteria, the system may require clean-out and filling with fresh product.

Corrosion to machine tool or components?

Corrosion can be caused by using incorrect product, poor quality water, low concentration or contamination. Millers Oils can analyse samples of the fluid and water to understand the root cause of corrosion and advise a solution that fits your business.

Foaming?

Foaming is often caused by soft water (<100 ppm), air entrainment due to pump cavitation or high concentration.

Make sure you're using the correct product for your application and water type. Water hardness test kits are available from Millers Oils, and water type is included on technical datasheets.

Use a coolant monitoring programme and make necessary adjustments to the fluid to keep the concentration at the correct level to prevent foaming.


Poor tool life?

Some metalworking operations are more arduous and require a high level of lubricity. Make sure you're using the correct product for the application by checking the technical datasheet or contacting Millers Oils Technical Help Desk.

If the concentration of the fluid drops this means that there is a lower lubricity additive content in the fluid, so always monitor the fluid and make necessary adjustments to maintain the correct concentration.

Skin irritation?

High concentration, bacteria, and too much contact with the metalworking fluid can all contribute to skin irritation. Keep direct contact with the fluid to a minimum, wash hands regularly and wear appropriate PPE.



For further information regarding safe use of metalworking fluids, visit the HSE website
<http://www.hse.gov.uk/metalworking/index.htm>

Millers Oils Technical Help Desk

T: 01484 475 060

E: technical@millersoils.co.uk



“ Millers Oils’ technical knowledge and experience means we have full confidence in their recommendations, and the training and condition monitoring provided has helped us to both extend coolant life and prevent unplanned down-time. The Millers-Xtra team has been particularly supportive during the transition to formaldehyde-free product, providing a flexible changeover programme so clean-outs are scheduled with minimal impact on our business. All in all an invaluable service for the metalworking industry.”

Maintenance Manager - Fives Landis

“ We have been using Millers Oils for over ten years now and have always found them to be a very reliable and cooperative supplier. They are very helpful with any technical problems we may have and always do their best to assist us in any way they can.”

John Crabtree – Bowers Metrology

Millers Oils is a leading independent blender of oils and lubricants, operating since 1887 in Brighouse, West Yorkshire. We pride ourselves on our award-winning innovation and our independence which allows maximum flexibility to meet our customers’ needs.

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