Machine Shop Checklist #2A: Waterless Metalworking Fluid Management

DEPARTMENT OF ECOLOGY
State of Washington

Oil and other waterless petroleum or synthetic metalworking fluids (MWFs) eventually go bad and must be replaced because:

- Metal particulates build up from machined iron, brass, aluminum, copper, or other metals.
- Water contaminates the metalworking fluid.
- Heat degrades the active ingredients.
- Volatile active ingredients evaporate.
- Tramp oils and dirt contaminate the fluid (for example, machine lube oils, oil-coated parts, dirt on parts and from the air).
- Active ingredients are removed by parts and chips.

Know when to replace your fluid

For small sumps, it's not cost-effective to test metalworking fluid through a laboratory. Instead, track and record the condition of your MWF. Consider using the following methods to know when it's time to replace your fluid:

Mason jar sample

- Once per month, collect a sample from the nozzle in a clear glass mason jar.
- Compare the sample to the unused product (under good lighting).
- Save the sample jars, compare them from month to month, and decide when to replace.

White paper sample

- Put some sump MWF on a clean piece of white paper.
- Compare this month's paper sample with last month's sample. Note the presence of dirt, metal fines, or tramp oil water on the paper. Is it time to replace?
- Can you tell what is shortening the life of the MWF? Could you treat it to prolong its life?

Remove and replace

Set up the replacement MWF for a long life by cleaning the sump and lines.

- Pump the spent fluid. Remove chips and trash. Properly dispose of the used fluid.
- Wipe the sump and lines. Follow manufacturer's recommended sump cleaning procedures.

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Treat and extend the life of your metalworking fluid

Increase process control and improve the finish quality, output of your shop, and tool life by treating your metalworking fluid. Some shops use treatment carts to treat multiple sumps that use the same metalworking fluid. Consider using the following methods:

Reduce metals buildup

Use full flow polyester 30 µm filters (followed by as small as 1 µm filters if practical, or paper filtration). Use gravity settling and magnetic filtering of iron or steel.

Water removal drain valve

Decant off tank bottom or low point in storage system.

Heat removal/chiller

Waterless MWFs overheat more readily than water-based fluids. Cooling straight oil can reduce ingredient volatilization and prolong fluid life.

Volatile additive replenishment

Straight oils and other waterless MWFs lose some of their active ingredients and need replenishment. Ask the MWF manufacturer for details.

Tramp oil buildup

Ask the MWF manufacturer if your shop's machine lube oils and MWF are compatible. If not, consider switching to compatible lube oils. If possible, fix machine leaks. Skim and filter tramp oil.

Fluid management plan clipboard

Track the last fluid dump replacement and ongoing fluid adds, sump cart filtrations, and paper and mason jar tests observations. You'll end up having to replace MWF less often and eliminate a source of production headaches.

Contact Information

Central Region: (509) 575-2490
Eastern Region: (509) 329-3400
Northwest Region: (206) 594-0000
Southwest Region: (360) 407-6300
Webpage: ecology.wa.gov/P2

ADA Accessibility

To request an ADA accommodation, email HWTRPubs@ecy.wa.gov, call (360) 407-6700, or dial 711 for relay services. Visit ecology.wa.gov/ADA for more information.

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