



Machining

Recycling MWFs Can Help Reduce Machine Coolant Disposal

Holly Martin | Nov 20, 2018

Whether for cost-savings or to reduce the volume of waste product, metalworking manufacturers are reaping the benefits of recycling coolants and fluids on their own. We talk to fluid and filtration system makers to better understand what you need to know.

Given all the attention lean manufacturing practices receive in today's manufacturing, it's not surprising to see companies employ methods to improve processes and save dollars at the same time. Coolant use and *machine coolant disposal* are no different. Many manufacturers are finding value in recycling metalworking fluids, reducing disposal costs, which can be hefty, and extending the life of MWFs.

Coolant vendors and recycling system vendors alike are developing new solutions that can save manufacturers production time and money and keep the environment safer and cleaner while allowing high-quality cutting operations.

"If you recycle your coolant, it stays functioning properly much longer, so you have less waste to haul off," says John Treese, director of global training at Master Fluid Solutions. "You're buying less coolant, which can be anywhere from about 25 percent to 50 percent cost-savings, and you're keeping your coolant healthier and in peak operating performance so you get a more consistent cut."

Keeping Machine Coolant Clean for Recycling

Recycling helps avoid many of the problems that are common in coolant, including rancidity caused by bacteria from the sump water, metal parts and a worker's hands.

"In any manufacturing plant that uses cutting fluids, water-based biological growth is usually your biggest fear because it can have harmful effects on workers," says Brent Morgan, an applications engineer at Castrol Industrial. "In a machine shop when workers are handling parts with coolant on them, a guy might cut himself, and then you don't want any biological contaminants to get into his skin, so it is a big concern."

Rancid coolant also has an awful odor. The coolant is probably being broken down by bacteria—what the industry calls "splitting," according to Treese.

"The good oils and chemicals in the coolant are being forced out, making it unhealthy and inefficient,"

says Treese.

Need more advice on coolant maintenance and disposal? Read "4 Tips to Optimize Machine Fluid Maintenance and Coolant Disposal."

The Importance of Machine Coolant Filtration

"Coolant manufacturers often get blamed for failing, when it's the environment, not their product," says Keith Urban, president of JK Industries. "You could put a premium fluid in your machine, but if you have no reasonable filtration it's going to go bad, and you're not going to get the results you want."

Urban believes 70 percent or more of the fluids out there would all do a great job if they were in a sustainable environment. Urban also believes the energy cost of pumping dirty coolant to a central recycler is prohibitive.

"Our vision of how to manage fluids and keep them sustainable is to greatly improve the filtration at each machine, and then take a slipstream off the clean side of your system back to a central reservoir where you can turn it over continuously and do all your chemistry adjustments at one location," he says.

A manufacturer that has a lot of machines doing a lot of cutting has many variables it can't control, including evaporation rate, chip carry off and part carry off, Urban explains. But tying them all together and turning them over continuously with a central mixed system makes for a homogeneous representation at every *sump*.

"This makes it much more effective for the customer to really dial in the fluid chemistry to the target concentration," says Urban.

MWF Recycling System Considerations

What kind of equipment does it take to effectively recycle coolant back to a healthy condition? And what coolant qualities should be considered when setting up a recycling system?

"One thing that I try to make clear is that recycling coolant keeps good coolant in great condition for a long, long time, but it doesn't magically fix bad coolant," says Treese. "If the coolant has been allowed to break down from lack of maintenance and control, running it through a recycler is not a magic fix."

Treese outlines two basic types of recycling systems: separation, or coalescing, cyclers and centrifuge cyclers.

"The separator is a big tank that skims the free tramp oil off of the top and allows fines and solids to settle to the bottom for 24 to 48 hours—this separates out the easy, or loose, oils from the coolant so it can be reused," Treese explains. "Then there is the centrifuge recycler, which spins the coolant at over 10,000 rpm to mechanically separate out the solids and oils—so the fines get thrown one way, the tramp oil goes another [way] and cleaned coolant comes out the middle."

The spinning action forces out most of the tramp oil that is dissolved in the coolant, but not all coolants can go through a centrifuge, because it may spin the good ingredients out with the bad, according to Treese.

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What Makes a Good Recycling Coolant?

According to Morgan, MWFs made for recycling need the following three qualities: Stability, separation and removal.

“We try to make all of our newer fluids biologically resistant, or stable, so that you don’t get any bacteria and fungus growing in them,” says Morgan. “Typically they will destroy the cutting fluid by breaking down the emulsifiers and corrosion inhibitors so it’s no longer good and it doesn’t recycle well.”

The fluid should reject tramp oils, including rust inhibitors from parts being machined, hydraulic oils that leak or way oils that are used in machines, Morgan explains.

“The right coolant formula will cause those to separate out so that they can be skimmed off or filtered out,” he says. “Then the third requirement is to formulate it so that the metals you are machining can be readily removed from the fluid,” Morgan says. “For instance, if you’re machining a cast iron, you want a lower oil content in your fluid, so the cast iron fines will settle out fast.”

In addition, coolant manufacturers add esters to provide better surface finishes and better tool life, according to Morgan.

“Old-type esters used to have a problem with hydrolysis, so over a long period of time, they’d fall out of solution,” he says. “A lot of the newer esters are resistant to hydrolysis so that they’ll stay in the formulas and work for long periods of time—those are much better at recycling and staying in the fluids.”

Machine shops working with mixed steel and aluminum parts must make sure that the coolant they select can be recycled with both, according to Morgan.

Generally, smaller to midsize shops are not going to want to put two different recycling units in, so they’ll want the fluid to drop the fines out of both aluminums and steels but give good corrosion resistance to both and resist stains to the aluminum. Luckily, fluid technology has caught up to this over the last 10 years.

How is your shop recycling coolant and metalworking fluids? Share with your peers.