Technical Bulletin

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Tramp Oil Removal Device - Coalescers

With the movement in the market place to fluids with lower surface tensions (wet better and faster) and tighter more complex emulsions they also become more reluctant to “give up” the tramp oils that they pick up. Because of this and other reasons, including increased machine up time, higher volume, higher pressure pumps, and smaller sumps; tramp oil has become increasingly difficult to get out of the coolant. On the cleaners front, the movement from solvent based systems to ones based on water all have increased the industries interest in and reliance on the coalescer as the tool of choice for tramp oil removal.

At its most basic, a coalescer is a very large (relative to the flow rate) tank where the free and mechanically dispersed oil contained in the fluid is allowed to raise to the surface and be removed. In addition to the settling tank, better coalescers have a series of baffles and/or collection media on which the tramp oil can coalesce. As the fluid containing the tramp oil passes through the unit, the droplets of tramp oil come in contact with the surfaces of the tank or the media. A percentage of that oil sticks. The oil that has stuck to the media then asserts even a stronger attraction for other oil in the fluid. This process continues until the oil droplet is large enough to have sufficient buoyancy (difference in density between the oil droplet and the surrounding fluid) to overcome the interfacial surface tension and the attraction of the oil for the media. Once the droplet begins to move towards the surface it comes into contact with other droplets. These droplets combine and the process continues until the droplets reach the surface. The cleaner fluid is then returned to the sump and the tramp oil that has be collected on the surface is decanted.

When evaluating coalescers it is important to consider metalworking fluids data only. One of the major uses of the coalescer technology is the removal of crude oil from fresh or sea water and in these situations both the oils and the media that they are being separated from are very different than what is found in the metalworking fluids business.

The following thoughts about using coalescers in the metalworking fluids market are based on extensive field experience with a wide variety of different units:

1. It is critical that the fluid pick-up nozzle be located in such a manner that it gets the surface oil and as few chips as possible.
2. The longer the fluid is retained in the coalescer the better the separation will be. However some flow needs to be maintained.
3. Whenever possible, the coalescer should be

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allowed to run continually (have its own supply pump). If the unit is to be shut down, make sure that a “working” anti-siphon device is in place.

4. Periodically cleaning the coalescer is critical to long-term success. Tramp oil tends to collect bacteria and many of the residues associated with metalworking fluids are tramp oil based or at least contain substantial quantities of tramp oil and therefore tend to collect on the surfaces of the coalescer providing “homes” for bacterial growth and reducing the efficiency of the coalescer media.
5. The efficiency of any of the tramp oil removal devices are very much a function of the kind of fluids that are in use and the type of oil that represents the contamination. Try to select hydraulic and lubricating oils that are rejected by the fluid in use.

The big advantage that the coalescer offers over a skimmer is that it can function whether the machine is running or not, while skimmers are only effective when the tank is quiescent. Additionally, the addition of a coalescer to a machine tool increases the sump size by the volume of the coalescer tank.