FOAM IN METALWORKING FLUIDS

THE CONCERN WITH FOAM

Foam is never a welcome sight when it comes to metalworking fluids. The air in the fluid does not cool nor does it lubricate which leads to poor performance of the coolant. In addition, large amounts of foam can also be a safety issue as foam can cause the coolant to spill out of its reservoir and onto the floor causing slippery surfaces. It also results in increased costs from loss of coolant.

CAUSE OF FOAM

Foam may have physical causes and/or chemical causes. Potential physical causes include high pressures, low fluid levels in the reservoir, and areas of high agitation such as high fluid velocities, sharp corners in return flumes, and excessive waterfalls. Leaks in piping where air can be introduced into the fluid can also be a physical cause. Chemical causes can be high concentration, low water hardness, and contamination.

CORRECTIVE ACTIONS

The first step in troubleshooting foam is a simple handshake test. Prior to treatment with any defoamer, fill a 4 or 8 oz. bottle about ¾ full of the coolant. Cap the bottle and shake vigorously for about 20 seconds. Once done, quickly open the bottle and observe the foam break.

If the foam breaks within 10 to 15 seconds, there may be a physical cause of the foam. An inspection of the system for some of the causes listed above may identify the cause and simple repairs can help mitigate the foam.

If the foam takes longer than 20 seconds to break, the cause may be chemical in nature. Check the concentration to confirm it is not too high. If you are able, check the hardness with either a hardness test strip or Hach kit to determine if soft water (<3 grains per gallon) may be an issue. If contamination is suspected, try to identify the source and eliminate it. Cleaner contamination and tramp oils can both increase the foam in a system.

If unable to find any factors contributing to the foam, a tank side defoamer is likely necessary. Siloxane defoamers can be very effective in controlling foam in synthetic, semi-synthetic, and soluble oil coolants. A fatty acid type defoamer can also be effective in semisynthetic and soluble oil coolants but should not be added to a synthetic coolant. Please note that some water hardness is required to make these defoamers effective. If soft water is determined to be an issue, hardening the water with calcium compounds can help control foam. Please note that the defoaming effect may be short term and future additions may be necessary.
If the foam continues to be an issue, a partial to full dump and recharge may be necessary.

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