

LUBE

TECHNI-GRAM



FROM:

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PROPER PREPARATION AND MAINTENANCE OF METALWORKING FLUIDS

Whether an operation calls for a soluble oil, semi-synthetic or 100% synthetic, high speed/high production machining operations have made metalworking fluids their products of choice over traditional straight cutting fluids. Speed of machining, quality of the machined parts, operator health, shop cleanliness and safety are all important concerns which are impacted by the choice of coolants.

The key to improved productivity and enhanced profits in these operations is the proper preparation and maintenance of the emulsions and solutions of metalworking fluids such as SWEPCO's 910 Soluble Oil, 920 Semi-Synthetic Coolant and 930 Synthetic Coolant.

How are MWF's used?

In addition to the initial charge, the fluids in metalworking systems must be maintained on a daily basis through testing and the addition of booster product applications. The initial charge, even with booster applications, has a finite life as the protective additive chemistry is depleted or contaminants build up to unacceptable levels...this is called "Sump Life." At the end of the sump life, the system must be drained, cleaned and recharged. A *proactive* approach to properly maintaining metalworking emulsions/solutions is a key to greatly extending the product's performance and sump life.

Preparation of MWF Emulsions/Solutions

The key to the preparation of satisfactory emulsions/solutions is *mixing*. Different types of MWF may vary in the ease with which they can be emulsified or mixed in solution, but the preferred technique is to always add the MWF product slowly to water while mixing. For best results, both MWF and the water used in preparing the emulsions/solution should be near room temperature, although most modern MWF's are compounded to allow a considerable amount of leeway in mixing temperature. Emulsions/solutions should never be made by adding water to the MWF. This could result in the formation of thick paste or curds rather than the desired emulsions/solution.



... to keep it running

Operating pH and Emulsion Strength

Emulsion strength

**Check concentration daily and maintain proper concentration!*

Emulsion strength checks should be made regularly to ensure that the proper ratio of oil to water is maintained. A small, hand-held refractometer provides a quick method of checking emulsion strength.

Too high a concentration can lead to high pH and skin irritation; while low concentrations, however temporary, can lead to inadequate rust protection, poorer work finish, and microbial deterioration.

When initially mixed, the emulsion strength is carefully controlled. With time it tends to become weaker because oil may be preferentially absorbed onto the work surface and the swarf. On the other hand, water may be lost by evaporation or by the heat generated during the cutting operation. A hand-held refractometer provides a quick method of checking emulsion strength.

Operating pH

The hydrogen ion concentration of pH value is a measure of the acidity or alkalinity of a solution.

pH 0 represents extreme acidity

pH 7 represents neutrality

pH 14 represents extreme alkalinity

The pH for a soluble oil emulsion is normally between 8.5 and 9.5. If the pH value is allowed to fall below 8.5, both the rusting process and the rate of microbial attack accelerate.

Keeping Emulsions Clean

A clean and stable emulsion is degraded if the fluid is transferred to machines with dirty sumps. Machines should be cleaned regularly and the emulsion should be totally cleared of swarf (particles), metal dust, rust, sludge, and scale. Pockets in castings and pump wells should also be inspected and cleaned. Maintenance operations may appear expensive in terms of labor and downtime; however, the effort is fully justified. Oil films that appear on the surfaces of emulsions/solutions are not always the result of emulsion breakdown. The oil film may indicate contamination from a leaking gearbox, bearing, or hydraulic system. If an oily film is detected on a soluble oil emulsion/solution, the machine should be examined for leaks.

If a machine coolant system is affected by bacteria or fungi, the machine should be thoroughly cleaned with SWEPCO's 990 Machine & Sump Cleaner...a powerful "in process" cleaning concentrate. Pockets of microbes left anywhere will multiply rapidly and destroy an emulsion/solution. The presence of bacteria is recognized by a foul smell and discoloration of the emulsion/solution.