

METALWORKING FLUIDS

TROUBLE SHOOTING

To ensure proper performance of your metalworking fluids, several factors must be considered. In use, metalworking fluid systems are dynamic. Contamination can come from a number of sources, including tramp oils, dirt, metal fines, and hard water minerals. Tramp oils can cause issues with bacterial growth, residues and product stability. Dirt and metal fines create a haven for microbiological activity. Build-up of hard water minerals and chlorides can cause deposits, corrosion and stability issues.

With all these potential challenges to metalworking fluids, problems can occur. Understanding how to correct or compensate for these changes will help maximize performance and extend the life of the coolant. Common problems which must be addressed include:

- ▷ Poor tool life
- ▷ Rust and corrosion
- ▷ Rancidity or objectionable odors
- ▷ Residues
- ▷ Dirt accumulation
- ▷ Foam
- ▷ Skin irritation
- ▷ Poor surface finish on parts
- ▷ Low tool or grinding wheel life

The first step in troubleshooting metalworking fluid problems is to understand the situation. Obtain all pertinent information directly from the people reporting the problem. This should include machine operators, maintenance personnel and supervisors and observe how the problem impacts their specific operation. Machine operators and maintenance personnel often are sensitive to changes in metalworking fluid conditions and can provide critical insight into their operation. Depending on the nature of the complaint, a sample should be collected and analyzed for the following:

- ▷ Product Concentration (should be done on site)
- ▷ pH and conductivity
- ▷ Bacterial or fungal growth
- ▷ Tramp oil level
- ▷ Dissolved minerals or other contaminants

Many problems can be eliminated by adjustments to product concentration or improved maintenance practices. Condition monitoring of the fluid provides critical insight into the health of the system. Regular testing and monitoring, along with proactive maintenance will ensure consistent product performance.

To help streamline your troubleshooting capabilities, we have provided a checklist which we hope you will find helpful in solving the more common problems.



TROUBLE SHOOTING CHECKLIST

RUST AND CORROSION

| CONDITION TO REVIEW | RESULT |
|--|--------|
| Type of rust | |
| Fluid concentration | |
| Fluid pH | |
| Fluid contamination levels (fines, anti-foams, etc.) | |
| Fluid biological activity | |
| Fluid make up water (CL, SO4) | |
| Storage area temperature | |
| Storage area humidity | |
| Storage area ventilation | |
| Length of time parts in storage before rust occurs | |
| Parts handling techniques | |

RANCIDITY OR OBJECTIONABLE ODORS

| CONDITION TO REVIEW | RESULT |
|--|--------|
| Fluid concentration | |
| Fluid pH | |
| Fluid contamination levels (tramp oils, chips, etc.) | |
| Fluid make up water (SO4) | |
| Fluid usage area for extraneous chemicals or debris | |

OBJECTIONABLE RESIDUE

| CONDITION TO REVIEW | RESULT |
|--------------------------------------|--------|
| Fluid concentration | |
| Fluid contamination levels | |
| Fluid misting tendency | |
| Fluid make up water (hardness) | |
| Lubricant leakage from machine tools | |

TROUBLE SHOOTING CHECKLIST

EYE, NOSE, THROAT IRRITATION

| CONDITION TO REVIEW | RESULT |
|--|--------|
| Affected individual | |
| Plant medical authority | |
| Fluid system for abnormal odor levels (ammonia, sulfur oxides, etc.) | |
| Fluid alkalinity/pH | |
| Fluid concentration | |
| Fluid misting tendencies | |
| Local plant environment for extraneous fumes/vapors | |
| Plant ventilation/air movement systems (fans, forced air, etc.) | |

POOR SURFACE FINISH ON PARTS

| CONDITION TO REVIEW | RESULT |
|--|--------|
| Fluid concentration | |
| Fluid biological activity | |
| Fluid alkalinity/pH | |
| Fluid make up water (hardness) | |
| Direction and flow of fluid nozzles | |
| Functionality of clarification equipment (filters, separators, etc.) | |
| Suitability of grinding wheel or tool for operation | |
| Part metallurgy (changes) | |
| Treatment of reground tools (re-hardening, deviations, etc.) | |

UNSATISFACTORY TOOL OR GRINDING WHEEL LIFE

| CONDITION TO REVIEW | RESULT |
|--|--------|
| Fluid concentration | |
| Fluid biological activity | |
| Fluid alkalinity/pH | |
| Fluid make up water (hardness) | |
| Direction and flow of fluid nozzles | |
| Functionality of clarification equipment (filters, separators, etc.) | |
| Suitability of grinding wheel or tool for operation | |
| Part metallurgy (changes) | |
| Treatment of reground tools (re-hardening, deviations, etc.) | |

TROUBLE SHOOTING CHECKLIST

▶ DIRT ACCUMULATION

| CONDITION TO REVIEW | RESULT |
|--|--------|
| Fluid concentration | |
| Fluid flow over parts and machine | |
| Fluid make up water (hardness) | |
| Functionality of clarification equipment (filters, separators, etc.) | |
| Lubricant leakage from machine tools | |
| Machine maintenance schedules (wash, downs, etc.) | |

▶ FOAM

| CONDITION TO REVIEW | RESULT |
|--|--------|
| Fluid concentration | |
| Fluid make up water (softness) | |
| Fluid contamination (cleaner, surfactant, etc.) | |
| Fluid pressure at nozzles and flumes | |
| Fluid return lines and drop points | |
| Fluid pumping equipment (housing, cracks, loose unions, low reservoir) | |
| Fluid filtering mechanism, if used (porosity, vacuum, etc.) | |

▶ SKIN IRRITATION

| CONDITION TO REVIEW | RESULT |
|---|--------|
| Affected individual | |
| Plant medical authority | |
| Fluid alkalinity/pH | |
| Fluid concentration | |
| Fluid contamination (excessive cleaner, biocide, fines, etc.) | |
| Use of gloves or creams | |
| Possible external contact of individual with irritating chemicals | |
| Past sensitivity of person to skin irritation | |