Kouper Lubricants Private Limited

KOUPER Products are derived with innovative formulations and technology with the re-defined tribological solution to all industrial applications.

Coolant Management Mar - 24


METAL WORKING FLUIDS


NEAT CUTTING OILS


GEAR OIL


HYDRAULIC OIL


RUST PREVENTION OIL


SPINDLE OIL


LUBE OIL


KNITTING OIL


CLEANERS


EDM OIL


DRAWING OIL

Your ideal product collaborator.

Continuous monitoring of coolants is crucial to uphold their performance and quality. This practice not only extends machine and fluid lifespan but also enhances manufacturing efficiency, maximizes profitability, and contributes to improved safety. Despite these benefits, fluid condition monitoring doesn't have to be complex or costly.

Multiple monitoring techniques are available to measure a range of factors affecting coolants. While some tests may require laboratory analysis, others are relatively simple and cost-effective to conduct. This concise guide offers insights into establishing and implementing efficient condition-based analysis techniques for coolants.

Kouper lubricants come up with knowledge transfer magazines to improve our product partners to enhances their manufacturing efficiency, maximizes profitability, and contributes to improved safety.

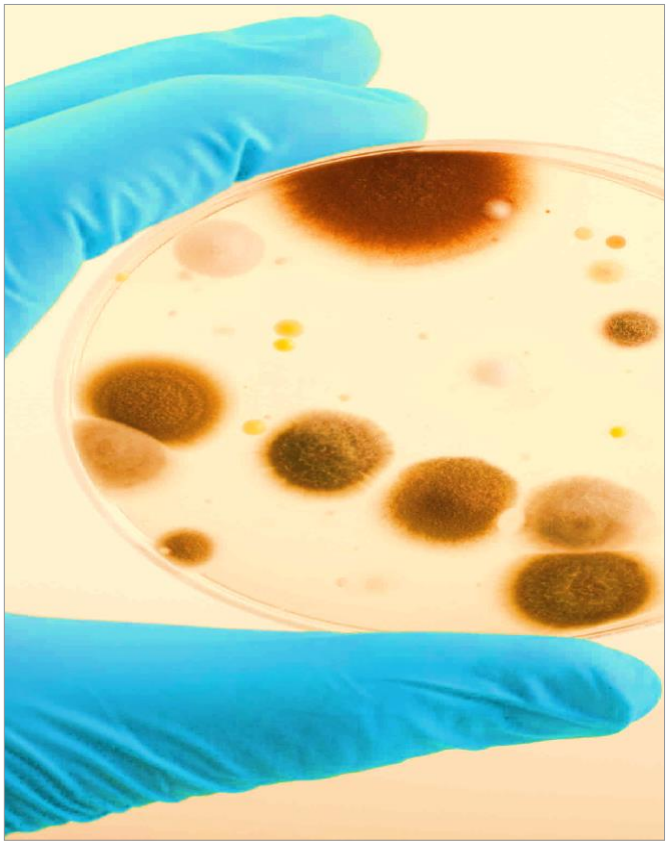
Technical Support Excellence

Benefit from our unparalleled expertise in lubrication and chemical processes at KOUPER. We offer unmatched products and services with focused engineering, administrative, and technical support. Our comprehensive business support solutions encompass customer service team, customer account managers, and a team of experienced technical engineers and product specialists.

Every lubrication recommendation schedule and review are customized to the unique needs of your operation. Our goal is to extend service life and optimize operational efficiency. At KOUPER, we are committed to providing exceptional support for your technical requirements.

COOLANT
MANAGEMENT

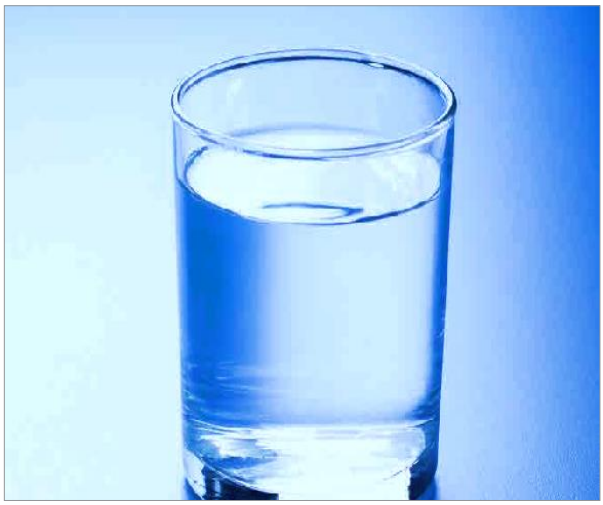
Compared to other types of lubricants, coolants need extra care and attention to ensure they're kept in good condition. Dirt and contaminants can have a detrimental effect on the effectiveness of the coolant, therefore good housekeeping practices, effective coolant management and high standards of hygiene are essential



Controlling Microbial Contamination in Water-Based Coolants

Microbial contamination stands as a significant factor leading to diminished fluid quality and lifespan. Water-based coolants, in particular, provide an abundant water supply that supports microbial growth if not well maintained and controlled. Microorganisms can infiltrate coolant systems through various avenues, including tramp oil, organic matter (e.g., food), water used in emulsion mixing, and metal fines.
The presence of bacteria can significantly degrade the technical performance of water-miscible cutting fluids. Bacterial activity can create an acidic environment, leading to coolant separation and a reduction in lubricity. Signs of bacterially spoiled emulsions include emulsion instability or splitting, offensive odors after machine shutdown, increased corrosion or rusting, changes in coolant color, a drop in pH levels, or the presence of scum clogging lines or filters.
Solution: While it's challenging to prevent bacteria from entering the coolant system, their levels can be managed effectively. To minimize the impact of bacteria, implement good coolant management practices. This includes maintaining the correct fluid concentration, removing tramp oil, and ensuring cleanliness by removing swarf. Regular cleanouts, as needed, are crucial to limiting bacteria growth and extending service life. By adopting these measures, you can effectively control microbial contamination and ensure the longevity and efficiency of water-based coolants.

Optimizing Water Quality for Soluble Emulsions



Soluble emulsions typically consist of 85-98% water, making the quality of water a critical factor in fluid performance. The higher the water quality, the longer the coolant's lifespan. Water hardness, ranging from very soft (0-20 ppm) to very hard (400 ppm and above), can impact foaming, mixing, and the stability of the fluid
Solution: In cases of generally poor water quality, employing water softeners, de-ionization, and reverse osmosis systems can significantly improve water quality. These technologies help mitigate issues associated with water hardness, ensuring better emulsion stability. Additionally, water quality is a key factor in preventing microbial contamination. For optimal results, prioritize the use of fresh drinking water when available, as it reduces the risk of impurities that could compromise the fluid's performance. By addressing water quality concerns, you enhance the overall effectiveness and longevity of soluble emulsions.

Managing Tramp Oil in Coolant Systems

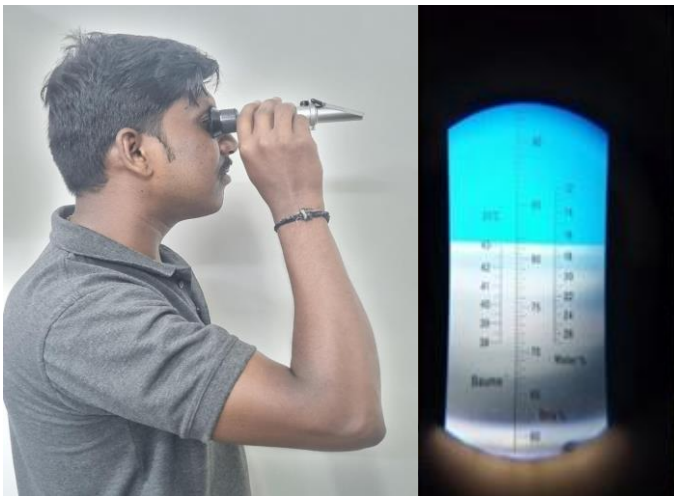
Tramp oil, an undesired lubricating oil that infiltrates the coolant system, stands as a predominant contamination challenge. It tends to float on top of water-based emulsions due to its lower specific gravity than water. This creates a sealing effect on the sump's surface, leading to oxygen deprivation and the degradation of the system. In such conditions, anaerobic bacteria, not reliant on oxygen for survival, proliferate, releasing foul-smelling Hydrogen Sulphide. If left untreated, tramp oil can expedite fluid degradation, intensify corrosion, destabilize emulsions, and pose health hazards to workers.

Solution: Regular fluid circulation is crucial to prevent the formation of tramp oil and bacterial growth. Skimmers, tramp oil separators, or centrifuges can effectively separate and remove any tramp oil present. One of the easiest methods is to use any paper or newspaper can placed on the tramp oil, paper will observe the tramp oil, it can be thrown to dustbin. To eliminate mineral oil leakages into the coolant system, ensure machines are routinely cleaned, maintained, and monitored for any hose or seal leakages or defective parts that need replacement.
A well-managed system should ideally have less than 2% tramp oil to ensure optimal performance and safety.

Managing Swarf in Coolant Systems

Regular removal of swarf fines from the sump is essential to mitigate the risk of corrosion and to increase the available capacity for the coolant. Clearing away swarf also helps reduce the static zone, minimizing the potential for contamination. Effective coolant filtration is crucial to maintain a superior surface finish, enhance cutting performance, and safeguard machines from damage. Moreover, the removal of fines contributes to a reduction in the abrasive nature of sharp particulates on the skin.
Solution: To address excess swarf, employ filtration units or vacuums to separate and remove fines from the fluid as frequently as possible. It is advisable to perform this task before the machine tool is shut down for extended periods, such as between shifts, overnight, or before weekends. Well-managed coolant samples typically contain less than 100 ppm/mg per liter of fines, ensuring optimal performance and longevity.

COOLANT
MONITORING

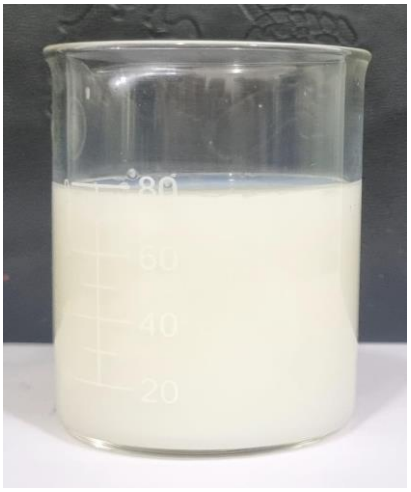


MONITORING COOLANT CONCENTRATION

- Maintaining the correct concentration in metalworking fluids is crucial, and it is highly advised to adhere to the recommended dilution rates.
- When the proper concentration is maintained, end users can realize significant cost savings, potentially up to 50% on coolant costs. Moreover, maintaining the correct concentration helps in reducing bacteria populations and mitigating skin-related issues.
- The concentration recommended by the manufacturer for any water-miscible metalworking fluid is set at a level that ensures maximum performance. For example, a 5% concentration indicates that 5 parts of water-miscible metalworking fluid concentrate should be mixed with 95 parts of water.
- Regular checks of a coolant's strength are essential, and daily monitoring is recommended. Shop floor personnel can easily conduct concentration checks using a refractometer.
- This simple yet effective tool allows for quick and accurate assessments of the fluid concentration, ensuring optimal performance and cost-effectiveness.

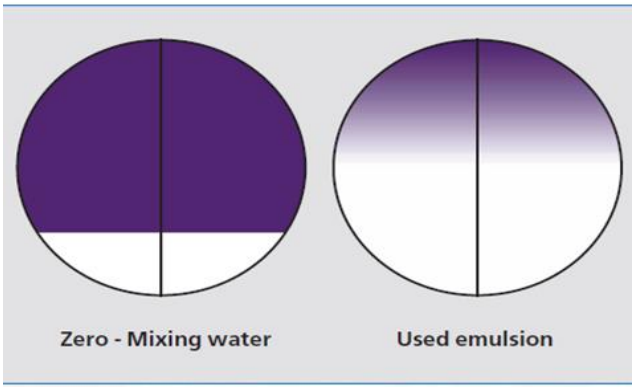
MIXING OF WATER MISCIBLE METALWORKING FLUIDS

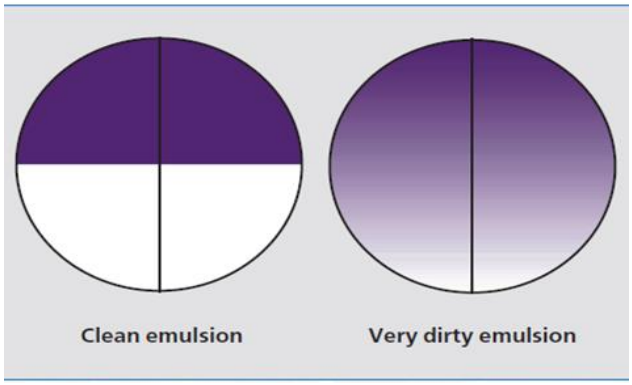
- **Clean Mixing System:** Use a dedicated mixing system with a clean container for preparing water-miscible coolants. Avoid contamination by ensuring the system is free from residues of other substances.
- **Avoid Sump Mixing:** Refrain from mixing fluids directly in the sump of the machine tool. Choose a separate mixing system to maintain precision and prevent potential contamination.
- **Automatic Mixing Systems**: Consider using automatic mixing systems. These systems offer precision and efficiency, allowing for accurate dosing of the desired mix strength. They contribute to consistency and reduce the margin for error.
- **Set-Up Accuracy:** When using automatic mixing systems, ensure they are set up accurately to deliver the desired coolant concentration to the machine tool. Regularly check and calibrate these systems for optimal performance.
- **Contamination Prevention:** Implement measures to prevent contamination during the mixing process. Clean containers, tools, and equipment are essential to maintaining the purity of the coolant.



REFRACTOMETER

A refractometer is an instrument designed to assess the 'refractive index' of a solution, providing information about the proportions of oil and water within the coolant mixture. In essence, it quantifies the volume relationship between these components in the coolant composition. Refractometers offer a swift and user-friendly method for keeping tabs on coolant concentration.
Always ensure the refractometer is thoroughly cleaned between testing different emulsions.





CALIBERATION

- **Clean the Prism:** Lift the Perspex flap and wipe the glass prism clean.
- **Apply Clean Water:** Place several drops of clean water onto the glass surface and close the cover.
- **Focus Adjustment:** Look into the refractometer and use the focus ring to create a clear image, ensuring that the scale comes into focus in the eyepiece.
- **Calibration:** Adjust the small screw on the top of the refractometer until the line between the white and blue areas meets at 0 on the scale. This action effectively 'zeroes' the refractometer.
- **Zeroed State:** Confirm that the refractometer is now 'zeroed' for accurate readings.
- **Prism Cleaning:** Wipe the water off the prism to prepare it for the next measurement.

Following these precise steps ensures that the refractometer is properly calibrated and ready for accurate coolant concentration readings

REFRACTOMETER MEASUREMENT

- **Apply Coolant**: Place several drops of coolant on the glass surface and close the cover. It's recommended to use coolant from the delivery jets. Carefully exclude any floating oil, as this can impact the instrument reading positively.
- **Read the Scale**: Look into the refractometer and note the reading on the scale. The reading is taken where the line between the blue and white areas intersects the scale.
- **Factor in Concentration:** Calculate the actual concentration of the emulsion by multiplying the scale reading by the correction factor for the specific coolant in use.
- **Use Correction Factor:** Each coolant product has its unique refractometer correction factor. Always refer to the correction factor provided in the product's data sheets for accurate concentration calculations.
- **Calculation Formula**: To calculate concentration: Refractometer Reading x Correction Factor = Actual Concentration.

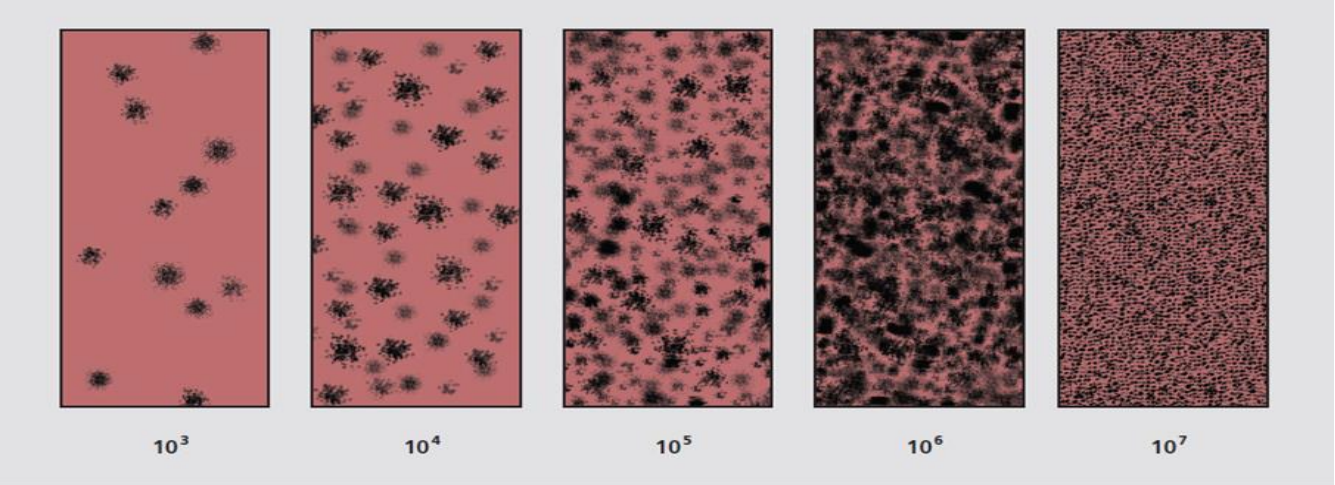
REFRACTOMETER READINGS

Maintaining the clarity and accuracy of refractometer readings is essential for reliable results:

- **Clean Coolant for Clear Reading:** Fresh or thoroughly clean coolant will provide a crisp and clear reading initially.
- **Changes Over Time**: As coolant is used over time, the reading may become more obscure, showing a diffused area of color.
- **Dirty Coolant Challenges**: In cases of very dirty coolant with a high tramp oil content, obtaining a reading can be challenging or impossible.
- **Potential Causes of Obscured Reading**: Even with good coolant, an obscured reading may indicate contamination of the glass slide and Perspex cover with oil, dirt, or grease.
- **Essential Cleaning:** To ensure reliable and repeatable results, regular cleaning of the glass slide and Perspex cover is imperative. Use soft, non-scratching materials for cleaning to prevent damage to the refractometer components.
  By adhering to proper cleaning practices, you enhance the longevity and accuracy of your refractometer readings, providing dependable results over time.

MONITORING BACTERIA LEVELS

Routine monitoring of bacterial contamination is crucial to sustaining optimal conditions in soluble oil emulsions. The substantial presence of bacteria poses a dual threat by degrading the technical performance properties of the emulsions and elevating the risk of health problems. Through regular checks, you not only confirm the effectiveness of your bacterial control standards but also gain early insights into potential increases in bacterial levels. Measurement techniques, such as using dip slides, offer a swift and cost-effective means to uphold low bacterial levels, enabling timely interventions if necessary. This proactive approach ensures both the technical efficiency of the emulsions and a safer working environment.



DIP SLIDES

- A dip slide is a testing device comprising a plastic carrier coated with a sterile culture medium. This slide is immersed into the liquid under examination.
- Afterward, it undergoes incubation to foster microbial growth. The ensuing colonies are assessed by referring to a chart that compares the density of the colonies. This comparative analysis indicates the degree of bacterial contamination.
- The outcomes are typically expressed in Colony-Forming Units per Milliliter of fluid (CFU/ml).

USING A DIP SLIDE

Follow these steps for proper handling of dip slides:

- **Prepare for Sampling**: Loosen the cap on the tube and carefully remove the dip slide from the container, ensuring not to touch the surface.
- **Immerse in Emulsion:** Immerse the dip slide into the emulsion under test. It's crucial to guarantee that both sides of the slide come into contact with the emulsion.
- **Record Information:** Enter the machine ID and emulsion ID on the container for proper identification
- **Send for Laboratory Analysis:** Send the dip slide to a laboratory for incubation, typically at 30ºC for 48 hours, and subsequent interpretation.
- **Avoid Contamination:** Exercise care during dip slide sampling to avoid tramp oil contamination, ensuring the accuracy of results.
- **Safe Disposal:** Dispose of used dip slides safely, adhering to the instructions provided by the dip slide manufacturer.

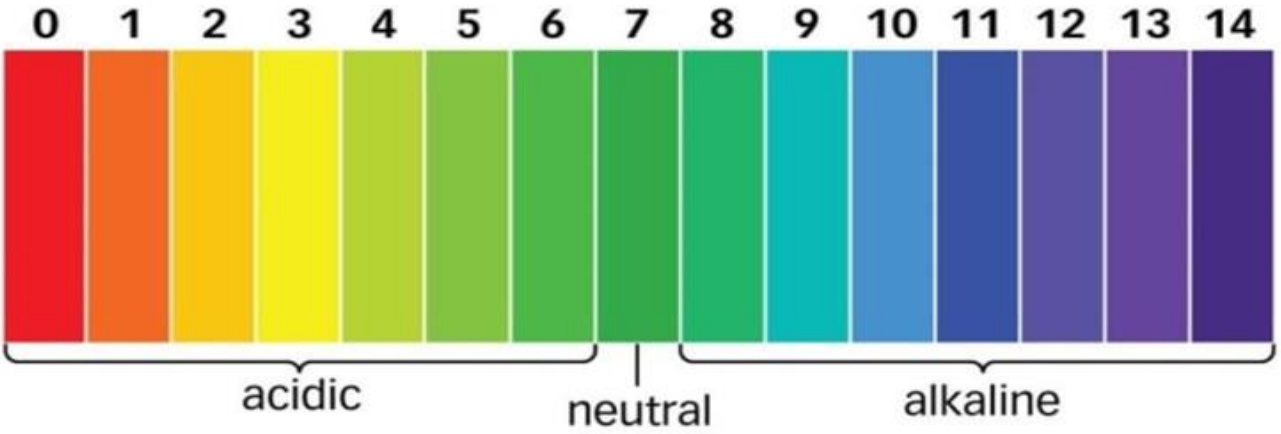
EFFECTIVE MONITORING

BACTERIA LEVEL GUIDELINES

- **Good Level = <10^3 CFU/ml**
  Bacteria are being maintained at low levels. No further action is required.
- **Reasonable Level = 103 to 106 CFU/ml** Review control measures to ensure levels of bacteria remain manageable. Risk assessment should specify action to be taken. Biocides and or cleaning may be indicated. If biocides are used, expert advice should be obtained, and the concentration of biocides should be monitored.
- **Poor Level = > 106 CFU/ml**
  Immediate action should be taken in line with the risk assessment. Normally at very high levels, draining and cleaning should take place.

THE pH SCALE

- **pH Measurement:** The pH scale gauges the acidity or alkalinity of a solution.
- **Scale Range:** The scale spans from one to fourteen, with 7 marking neutrality (e.g., distilled water).
- **Higher pH (Alkali) Implications:** Elevated pH values suggest potential issues like incorrect materials in the machine tool sump, excessive biocide or machine cleaner, or a high coolant concentration. Consequences may include skin irritation and corrosion.
- **Lower pH (Acid) Implications:** Lower pH values indicate heightened bacterial activity. Consequences may include emulsion instability and the formation of gummy deposits.



MONITORING pH LEVELS

- **Frequency of pH Checks:** pH levels should undergo checking at least weekly.
- **Importance of Regular Checks:** Regular checks are crucial because a shift in the coolant's pH value signals internal changes in the coolant.
- **Measurement Methods:** Various methods exist for pH measurement, but the simplest on-site approach is employing pH strips

USING pH STRIPS

- **Dip the Strip:** Submerge the pH strip into the emulsion sample.
- **Wait Period:** Allow the strip to remain in the sample for 30 seconds.
- **Color Comparison:** After the wait period, compare the colors on the strip with those on the scale provided on the box.
- **pH Value Indication:** The comparison will indicate the pH value of the emulsion.

MONITORING ESSENTIALS

- **Strategic Planning:** Develop a comprehensive strategy outlining what needs to be tested, testing frequencies, and methods.
- **Regular Monitoring:** Ensure that monitoring is conducted on a consistent and regular basis.
- **Visual Monitoring Importance:** Emphasize the importance of visual monitoring. Staff should be vigilant for signs of contamination and changes in fluid appearance and odor.
- **Fines Debris Counts:** Routinely monitor fines debris counts at specified sample points.
- **Specialized Sample Analysis:** Collect and analyze samples from machines not on routine oil analysis, specifically for fines debris and bacteria.
- **Equipment Cleanliness:** Ensure that all equipment used for capturing and containing samples is impeccably clean.
- **Prevent Cross-Contamination:** Take precautions to avoid cross-contamination when taking multiple samples from different systems.
- **Safety Precautions:** Always ensure fluid systems are not under pressure when collecting samples.
- **Record Keeping with Charts:** Use charts to record results, facilitating easy interpretation into graphs for quick trend and change analysis.
- **Long-Term Record Keeping:** Maintain records of all tests for several years to establish benchmarks for monitoring.
- **Actionable Results:** Ensure that results are acted upon promptly.
- Follow-Up on Recommendations: Follow up on any recommendations and record their effects.
- **Fungal Growth Checks:** Regularly inspect coolant systems for evidence of fungal growth, especially in head spaces and above the coolant level in tanks. Seek technical support for advice on removal and treatment if fungal presence is suspected.
- **Contact for Help:** For further assistance and advice, contact KOUPER. By adhering to these best practices, you establish a robust and proactive approach to monitoring that ensures the longevity and optimal performance of your systems.

COOLANTS AND YOUR HEALTH

MONITORING COOLANT CONCENTRATION

- Coolants comprise a complex blend of various chemicals, including emulsifiers, stabilizers, corrosion inhibitors, biocides, fragrances, and extreme pressure additives. The presence of these substances can contribute to health risks. The Health and Safety Executive (HSE) has emphasized the heightened risk of health issues associated with contaminated fluid that hasn't been adequately maintained and controlled.
- Manufacturers should be cognizant of their legal duty of care, particularly in safeguarding the workforce from health risks associated with the utilization of metalworking fluids.

EMPLOYERS SHOULD:

- Conduct a comprehensive risk assessment of health hazards for workers and determine necessary precautions.
- Implement measures to prevent or control exposure to metalworking fluids; if prevention is not feasible, ensure exposure is effectively managed and minimized.
- Regularly monitor exposure levels and conduct necessary health surveillance.
- Refer any individual suspected of a work-related illness to an occupational health professional.
- Regularly inspect and maintain safety and control measures, ensuring adherence to all established procedures.
- Furnish workers with ample information, training, and instructions on using control measures and the required personal protective equipment (PPE).

EMPLOYESS SHOULD:

- Collaborate with employers and adhere to all provided training and instructions.
- Utilize control measures and personal protective equipment (PPE) to the fullest extent.
- Promptly report any defective equipment to ensure timely repairs or replacements.
- Consistently follow fluid management procedures and contamination control measures.
- Measures to prevent or control exposure to metalworking fluids; if prevention is not feasible, ensure exposure is effectively managed and minimized.
- Regularly monitor exposure levels and conduct necessary health surveillance.
- Refer any individual suspected of a work-related illness to an occupational health professional.
- Regularly inspect and maintain safety and control measures, ensuring adherence to all established procedures.
- Furnish workers with ample information, training, and instructions on using control measures and the required personal protective equipment (PPE).
- Attend and actively participate in health surveillance programs as required.

REDUCING
INHALATION

The generation of oil mists and vapors occurs when high-speed machinery vaporizes coolant into the atmosphere. These substances are pervasive and can linger in the air for extended periods before settling on surfaces, walls, and floors. Mist, vapors, smoke, and fumes may contain respiratory sensitizers—substances that, when inhaled, have the potential to trigger allergic reactions in the respiratory system, leading to conditions like asthma.

COOLANT CONTROL

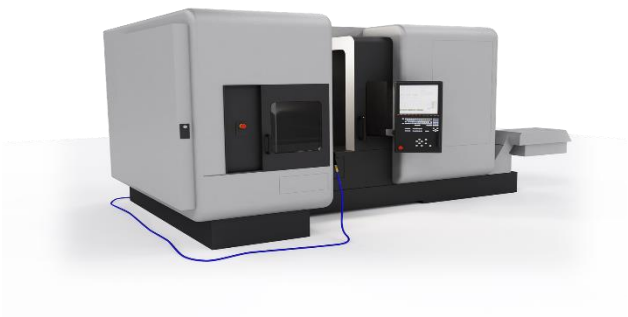
Controlling the volume and flow rate of coolant to the tool is crucial in minimizing the production of mist or vapor, thereby reducing the risk of inhalation. To achieve this, coolant application should be at the lowest possible pressure and directed specifically at the tool/work piece interface. It's important to avoid coolant flowing over unprotected hands. Implementing automatic systems to stop or divert the delivery when not in use is also recommended. These measures not only enhance safety but also optimize fluid usage, contributing to cost reduction.

VENTILATIONS

To mitigate the risk of exposure to oil mists and vapors, ensuring proper ventilation, extraction, and air filtration systems, including Local Exhaust Ventilation (LEV), is essential. These systems prevent the buildup and recirculation of airborne contaminants. Additionally, enhancing natural ventilation, such as opening doors or windows, can contribute to reducing vapor levels in the workspace. These measures collectively enhance air quality and create a safer working environment.

SPLASH GUARDS

. Implementing splash guards and enclosures is effective in shielding workers from accidental splashes and minimizing the contamination of nearby surfaces. However, it's important to note that even if machines are fully covered, operators can still be exposed to fluid when opening the cabinet door. To address this, incorporating a time delay on doors can allow mists and vapors to be removed through ventilation before exposure occurs. Regular checks, testing, and prompt replacement of defective equipment are essential to maintain the effectiveness of these control measures



USE OF COMPRESSED AIR

The use of compressed air to remove coolant and swarf from machined components has been demonstrated in studies to elevate the risk of fluid aerosolization and deposition onto clothes and the operator's skin. Whenever feasible, it is advisable to avoid employing compressed air and instead opt for alternative methods for component cleaning. If the use of compressed air is unavoidable, exercise caution by employing low pressure and implementing suitable controls to safeguard health.

PROTECTION
FOR SKIN

Coolants can come into contact with the skin, especially the hands and forearms, at various stages of the manufacturing process. These substances have the potential to cause skin irritation, and the presence of contaminants in the fluid can elevate the risk of developing skin problems. Therefore, implementing effective coolant management controls is crucial. Additionally, the sharp edges of swarf, filings, and other foreign particles suspended in the fluid can lead to abrasions and cuts, further contributing to skin irritation.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment (PPE) is designed to minimize contact with coolants and can be effective in protecting workers from skin irritation. However, PPE should only be used as a last line of defense, as contact with the coolant can still occur when using PPE, such as touching the outside or contaminating the inside of clothing when putting on or removing it. All PPE should be used in accordance with risk assessments, regularly examined for any tears or holes, cleaned, tested, and replaced. Users should also be aware of the increased risk of finger entrapment in moving parts when wearing gloves, and suitable gloves should be used.

HYGIENE

Good personal hygiene is essential for reducing the risk of developing dermatitis. A pre-work barrier cream can be used in conjunction with PPE. It should be applied before starting work, after washing hands, and every 24 hours to provide an additional layer of protection between the skin and contaminants. Avoid using oily rags to clean hands; instead, hands, forearms, and any other body parts that may have come into contact with metalworking fluids should be regularly washed with soap and hot water. After finishing work, a reconditioning after-work cream, Hand Care Conditioning, should be applied to help replace and restore the skin's natural oils.

Should you have any questions or require further assistance, please feel free to contact our technical support team at info@kouper.in / +91- 9611517922. Your satisfaction and the optimal performance of your metalworking fluids are our top priorities.

Your Right choice lubricant for Right application

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