

Monitoring Cooling Lubricant Concentration using Refractometry

Monitoring Cooling Lubricant Concentration using Refractometry

Maintaining the correct concentration of cooling lubricants (also known as metalworking fluids or coolants) is essential for efficient and reliable machining operations. Cooling lubricants are widely used in the mechanical, automotive, and precision engineering industries to provide cooling, lubrication, corrosion protection, and chip removal.

Incorrect concentration levels can significantly affect process quality. Over-concentration may result in foaming, residue formation, increased chemical consumption, and higher operating costs. Under-concentration, on the other hand, can lead to insufficient lubrication, corrosion, microbial growth, and accelerated tool wear.

Cooling lubricants typically consist of a concentrate mixed with water to form an emulsion. The composition and stability of this mixture can change during operation due to evaporation, contamination, or improper dosing. For this reason, continuous quality control is necessary to ensure consistent performance and product quality.

Several methods are used to monitor cooling lubricant condition and concentration. The most common and reliable technique is refractometric measurement. Refractometry is based on measuring the refractive index of the cooling lubricant emulsion.

Since the refractive index changes proportionally with the concentration of the lubricant concentrate in water, it provides a fast and accurate means of determining concentration.

In addition to refractometry, supplementary parameters such as temperature, pH value, and fluid condition are often monitored to ensure overall process stability. However, concentration remains the key parameter for daily control and automatic dosing.

Modern inline process refractometers allow continuous real-time monitoring of cooling lubricant concentration directly in the circulation system. This eliminates the need for manual sampling and provides immediate detection of deviations from the target concentration.

Key advantages of inline refractometric measurement include:

- Continuous and real-time concentration monitoring
- High accuracy and reproducibility
- Minimal maintenance requirements
- Automatic temperature compensation
- Integration into process control systems

Such systems enable automatic correction by controlling dosing valves or lubricant supply units, ensuring constant operating conditions and improved production efficiency.



Solution From SCHMIDT + HAENSCH

The SCHMIDT + HAENSCH inline concentration sensor iCS² is designed for robust industrial use and provides reliable inline measurement of cooling lubricant concentration and temperature. The sensor provides a continuous real-time measurement of the concentration and temperature of the the cooling lubricant. It can also be used to operate magnetic valves for dosing the concentrate.

Advantages of using the iCS²:

- Exceptional robustness against ambient light and contamination
- Simple, flexible and cost-effective integration
- Compact, lightweight design, ideal for tight installation spaces and modern process environments



iCS²
Inline Concentration Sensor

Product packages	Product	ID-N°
iCS² custom	iCS ² custom	300003
	optional accessories:	
	VariVent Adapter	16560
	Sensor cable M8 Pigtail 150 cm	15669
	Analog Control Unit	350006
iCS² CL	iCS ² custom	300000
	optional accessories:	
	VariVent Adapter	16560
	Sensor cable M8 Pigtail 150 cm	15669
	Analog Control Unit	350006

ADVANTAGES

- Cost and time saving
- Precise, Reliable and Fast Measuring Method
- Ensure Unchanged High Product Quality
- Reduction of Damages on Cutting Tools

TYPICAL INDUSTRIES

- Electronic industry
- Mechanical industry
- Machine building industry