

Monitoring of coolant emulsions in wire drawing

Importance of Regular Monitoring for Coolant Emulsions in Metal Processing Industry

Coolants are used in the metal processing industry for both chip-forming and non-chip-forming operations to cool and lubricate the process. In wire drawing, coolant emulsions are employed due to their primary cooling effect, necessitated by the high linespeeds involved.

A coolant emulsion consists primarily of water, with the addition of lubricating oil, emulsifiers, solvents such as alcohols, defoamers, bactericides, and adhesive additives. Regular monitoring of coolant emulsions is essential for process safety, employee safety, and cost-effective production, which has been further emphasized by various regulations in recent years. In addition to pH measurement and determination of nitrate and nitrite levels, concentration analysis of the emulsion plays a significant role.

During operation, coolant emulsions can become diluted through oil discharge via chips or can become concentrated due to higher operating temperatures and the associated evaporation of water. Regular monitoring helps to increase the service life of the emulsion and, ultimately, the machine parts by reducing undesired wear.

A common method for determining the concentration of emulsions is through refractive index measurement in °Brix. This value is then multiplied by a refractometer factor specific to the coolant to determine the coolant concentration. This measurement can be carried out using a handheld refractometer. However, inaccuracies can arise due to variations in the emulsion temperature in the tank and the presence of substantial emulsion turbidity caused by wear. Particularly with „richer“ emulsions, measurement with a handheld refractometer can only provide a rough approximation.

To overcome the limitations associated with handheld refractometers and ensure precise measurement of coolant concentration, the metal processing industry has been exploring direct approaches with in-line process refractometers and highly precise laboratory devices for quality control of the coolant emulsions.



Conductivity Meter & VariRef Laboratory
Refractometer



iPR C2 in-line Process Refractometer



Solution from SCHMIDT + HAENSCH

Using the VariRef refractometer with integrated temperature control offers the advantage of measuring the emulsion at a constant temperature. As a method can be programmed to the software with a specific scale converting the RI to a direct concentration, inaccuracies associated with manual scale reading are eliminated. Due to the measurement principle, disturbances caused by emulsion impurities are largely eliminated.

The integration of an in-line refractometer, like the iPR C2, within wire drawing systems enables the continuous monitoring and dynamic adjustment of emulsion concentration in real-time throughout the production process.

Advantages of using the advanced refractometer

- Precise coolant concentration measurement
- Elimination of measurement inaccuracies
- Real-time monitoring during production processes
- Enhanced process safety
- Cost-effective production optimization
- Compliance with regulations
- Quality control assurance

Product packages

Product

ID-N°

VariRef	e.g. VariRef C 201 R Display	32001 16700
iPR	e.g. iPR C2 VariVent in-line Housing Sealings	16266 on request 17923

Benefit

- Cost savings through extended service life and more precise dosing opportunities
- More accurate and faster measurement
- Possibility for online monitoring

Typical Industries

- Metal processing industry
- Cable industry
- Wire industry

Used by

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