CASE STUDY

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Stable Emulsion to Improve Surface Finish in Magnesium Wheel Machining

Application: Wheel Manufacturing
Location: USA

Challenge

Magnesium is being used at higher levels in wheels due to its tensile strength and lower weight, thus enabling energy efficient designs without sacrificing durability. Due to its inherent corrosion resistance, magnesium alloys are often selected when manufacturing wheels to protect them against the elements.

Despite its benefits, magnesium poses challenges during the metalworking process. Magnesium is a highly reactive metal that generates a significant amount of heat when machined. Additionally, magnesium is one of the components that leads to hard water instability in many water-miscible machining fluids. These factors can degrade metal working emulsions and alter its PH, leading to reduced effectiveness, corrosion, poor surface finishes, and even damaged cutting tools and work pieces.

A prominent manufacturer of heavy-duty truck wheels was experiencing similar issues with their emulsion stability. FUCHS worked with them to select a compatible metal working emulsion that would provide optimal performance under these conditions.

Solution

FUCHS worked with the manufacturer to trial ECOCOOL 7081, an advanced water miscible coolant that produces a tight, stable emulsion without producing insoluable residues for fine surface finishes. This coolant is often recomended for magnesium machining as it withstands high temperatures and reduces burning, smoking, and misting.

ECOCOOL 7081 provides excellent pH stability to minimize biological growth. This helps improve process time and efficiency as it requires less cleaning and the fluid does not have to be changed as freqently.

Advantages

- Enhanced surface finishes
- Excellent pH stability
- Extended sump life

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The fluid successfully extended the sump life, resulting in reduced downtime. The fluid omits minimal odors and presents no dermal irritation, improving operator acceptability.

Results

After implementing ECOCOOL 7081, the manufacturer was able to improve the efficiency of their processes and their **wheels came off the line looking polished.** Compared to the heritage coolant, FUCHS was able to **reduce their total fluid-related costs by 45%**. This included not only the cost of the fluid itself but also costs related to wastewater haul-off, centrifuging, pump replacements, and other improvements.

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