

## DETERMINING TOTAL OIL AND TRAMP OIL IN METALWORKING FLUID EMULSIONS BY FTIR

### WHAT IS TOTAL OIL AND TRAMP OIL IN A METALWORKING FLUID EMULSION?

In condition monitoring, total oil content is a common concentration control for metalworking fluid emulsions. An emulsion's total oil content is a measure of product concentration based on the amount of emulsified and free oil present.

Tramp oil is a measure of non-product oil content in an emulsion. This undesired contaminant may be emulsified or free oil. In some cases, tramp oil may build up in a metalworking fluid sump and negatively impact machining operations.

### HOW IS TOTAL OIL AND TRAMP OIL MEASURED?

Traditionally, total oil and tramp oil are measured by acid split. This industry-recognized test is subjective and introduces health and safety risks. Castrol Industrial Technology developed a Fourier-Transform Infrared (FTIR) test method to quickly and accurately measure total oil content in all Castrol emulsions. Product-dependent factors are applied to the FTIR measurement to calculate the emulsion's concentration and tramp oil contamination. The FTIR method delivers consistent and accurate results while eliminating the health and safety risks associated with acid split testing of Castrol emulsions at customer sites.

### WHY IS MEASURING TOTAL OIL AND TRAMP OIL IMPORTANT IN CONDITION MONITORING?

Measuring an emulsion's total oil content is important as the product's formulated oil provides lubricity and corrosion protection while machining. In general, concentration by total oil should trend with other concentration control parameters in Castrol's used oil analysis program. A metalworking fluid sump with lean concentration by total oil may experience shortened tool life due to reduced lubricity, formed rust on machined surfaces due to reduced corrosion protection, and other machining complications. Typically, when concentration by total oil trends consistently higher than alkalinity, tramp oil contamination is present in the sump.

Measuring an emulsion's tramp oil content helps prevent the buildup of undesired oil contaminant in a metalworking fluid sump. A buildup of tramp oil contaminant in a sump may result in the following: filter media blockages, stains and residues on machined surfaces and unpleasant sump odors. Lastly, measuring an emulsion's total oil and tramp oil content by FTIR supports regular sump maintenance and helps Castrol's customers achieve full product performance of their metalworking fluid.