Formulation and Testing of a Microfiltration Compatible Synthetic Metalworking Fluid

The mid-2000s brought a wave of innovations in the machining industry spurred on by rising costs and environmental impacts of metalworking fluids. One innovation was developed by an ISTC team headed by Kishore Rajagopalan.

A popular technique to reduce the cost of metalworking fluids was to recycle fluid back into the process while removing impurities. A proposed method of the time was to use microfiltration. However, membrane technologies were not compatible with synthetic metalworking fluids, which have a longer service life, higher bacterial growth resistance, and less mist generation. Typically the membranes would foul because either coagulates would physically block the pore space or the metalworking fluid would interact with the membrane, chemically causing blockage.

It was initially thought that no metalworking fluid could be developed to meet industry specifications and be compatible with membranes to use microfiltration to remove contaminants. However, Rajagopalan's team developed a new formula for a metalworking fluid that met both qualifications. Their formulation was very sensitive to trace contaminants; thus the team recommended that care be taken to address these issues during any new metalworking fluid formula.

Meet the Scientists

Kishore Rajagopalan

Publications

Formulation and testing of a Microfiltration Compatible Synthetic Metalworking Fluid

Applicability of Microfiltration for Recycling Semi-Synthetic Metalworking Fluids