



Investigation of Chlorinated Paraffin Alternatives for Drawing and Forming Lubricants

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Abstract

Chlorinated paraffins are very effective in functioning as extreme pressure additives in lubricants used for drawing and forming applications undergoing heavy duty operating conditions. Tribological surface analyses have revealed that chlorinated paraffins form a strong boundary film at high pressures and temperatures that significantly reduces friction and wear between the die and work piece. This ultimately leads to extended tool life, operating machinery at higher speeds, and reduced energy costs. Recent implementations by the US Environmental Protection Agency (EPA) have led to restriction of short chained chlorinated paraffins due to their bioaccumulation and toxicity in aquatic organisms at low concentrations. The EPA also plans to further evaluate whether medium and long chained chlorinated paraffins should be addressed. Consequently, the study of chlorinated paraffin alternatives proves to be a hot topic in the field of metalworking lubricants. In this seminar, the development of a non-chlorinated drawing and forming lubricant will be discussed with investigation of polymerized ester and amine phosphate alternatives. Theories regarding tribological surface chemistry and film formation of different extreme pressure and anti-wear additives will also be examined.