

## **Performances of New Lubricants in Cold Forging**

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### **ABSTRACT**

In the past, the commonly used conversion type coatings (e.g. phosphates) as lubricants contains high content of zinc phosphate and the waste generated are high concentration of acids, chlorides and fluorides. This needs to be chemically treated before proper disposal. There is an increasing demand for a new generation of environmental friendly lubricants for the bulk forming of metals, in particularly cold forging and extrusion of precision metal components. The result will be towards a cleaner working conditions and minimizing environmental impact. However, with the new generation of the lubricants, the tribology and the surface characteristics of the lubricants are not quite understood and how these factors will affect the performances during forging. In this research, a number of new environmental friendly lubricants were used and cold forging experiments were conducted. Friction and sticking properties of the lubricants were studied on a component after cold forging and the relationship to its surface topography were evaluated. Various characterization techniques such as scanning electron microscopy, micro cross-sectioning and interfacial/interlayer studies were utilized to study the lubricant performances.

**Keywords:** cold forging, lubricants, environmental friendly and surface topography