

## Documents

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**Comparative Study on the Wears of ZTA-TiO<sub>2</sub>-Cr<sub>2</sub>O<sub>3</sub> Ceramic Cutting Tool and Commercial Ceramic Cutting Tool (2022)** *Key Engineering Materials*, 908 KEM, pp. 196-201.

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#### Abstract

The ZTA-TiO<sub>2</sub>-Cr<sub>2</sub>O<sub>3</sub> ceramic cutting tool is a new cutting tool that possesses good hardness and fracture toughness. Yet, the performance of the ZTA-TiO<sub>2</sub>-Cr<sub>2</sub>O<sub>3</sub> cutting tool is still unknown and needs further study. In this research, the comparison of the ZTA-TiO<sub>2</sub>-Cr<sub>2</sub>O<sub>3</sub> and Kennametal ceramic cutting tool is investigated. The turning process by using ZTA-TiO<sub>2</sub>-Cr<sub>2</sub>O<sub>3</sub> and Kennametal commercial ceramic cutting tools is performed on the Bridgeport ROMI PowerPath CNC lathe machine. The parameters utilized are spindle speed in the range of 907 to 1543 rpm, feed rate from 0.08 to 0.22 mm/rev, and depth of cut of 0.2 mm. Analysis of the flank wear and crater wear were performed by using an optical microscope (NIKON MM-4001L), while the chipping area was observed by scanning electron microscopy, SEM (JEOL JSM-IT100). The surface roughness of the machined surface is measured via portable surface roughness (Mahr MarSurf M3000C). The comparison between the cutting tool produced in this research and the commercial cutting tool shows that the wear performance of the ZTA-TiO<sub>2</sub>-Cr<sub>2</sub>O<sub>3</sub> ceramic cutting tool is lower than the Kennametal commercial ceramic cutting tool. Even though this newly fabricated cutting tool is far behind compared to the commercial cutting tool, it shows some promising aspects such as the ability to cut at a higher speed. © 2022 Trans Tech Publications Ltd, Switzerland.

#### Author Keywords

Ceramic; Cr<sub>2</sub>O<sub>3</sub>; TiO<sub>2</sub>; Tool Wear; ZTA

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