

## Effect of dimple diameter and pattern on frictional properties of macro-dimpled aluminium surface

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### ABSTRACT

This paper presents the effect of different dimple size and dimple distribution on the reduction of surface friction and to produce dimple surface texture using ball-nose milling method. The dimple is a geometrical feature created on flat steel as surface texture to improve tribological performance. The dimple surface texture produced by using ball-end-nose 3-axis CNC milling method. The dimple shape is circular with size varies between 0.5 mm to 3.0 mm. The height of dimples was set constant at 0.25 mm. Dimples were distributed with two arrangement which is linear and radial. Five samples with different dimple size produce for each dimple arrangement. The geometry of dimples then measured using optical microscopy and image analysis. The samples than tested for surface friction with and without lubricant using Universal Testing Machine (UTM) equipped with ASTM D1894 complied apparatus. The lubricated friction test conducted under the constant volume of hydraulic-oil ISO-68 with the face-to-face condition. The results show that the size and distributions of dimple have a significant impact on the friction performance of the textured surface. The friction reduction behaviour was significantly observed on samples with surface texture compared with untextured one, the specimens. When the test load increases, the effect of friction reduction from all forms of dimple size decreases. This study provided insight on improving life of moving parts in machinery and automotive components.

### KEYWORDS

Surface texture; Dimple structure; Surface friction

**ACKNOWLEDGEMENT**

The authors would like to acknowledge the Ministry of Education Malaysia (MOE) for the funding of this research under the Fundamental Research Grant Scheme (FRGS/1/2016/TK03/UMP/02/12) RDU160132.