

Surface Texturing in Machine Elements ? A Critical Discussion for Rolling and Sliding Contacts

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Surface texturing has gained great attention in the tribological community since precisely defined surface features can help to reduce friction and/or wear irrespective of the acting lubrication regime. The ability to positively influence tribological performance under different lubrication conditions makes surface texturing particularly interesting for machine elements since they may experience different conditions over the lifetime or sometimes even over one cycle/stroke. However, despite the great effort by both researchers and industry to introduce surface texturing in machine elements, many questions remain unclear regarding the optimal design of surface textures, as well as the positive and negative effects on the component's performance. The aim of this review article is to critically summarize the state of the art of surface texturing applied to machine elements, with a special emphasis on piston rings, seals, roller bearings, and gears. After a brief introduction, the first section focuses on surface texturing in sliding components (piston rings and seals), whereas the second section deals with surface texturing in rolling components (roller bearings and gears). Based upon the main evidence from the literature, the final section provides more general design guidelines for surface texturing in machine elements.