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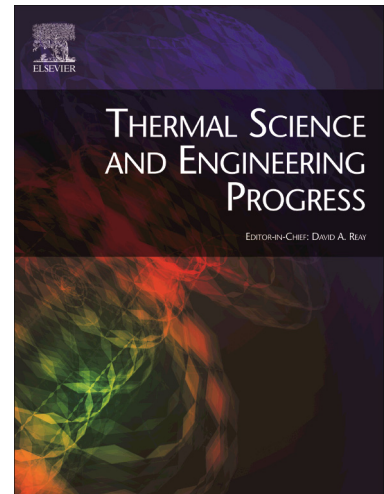
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Thermal Analysis of mechanical face seal using analytical approach

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Abstract- In this paper, analytical methods are applied to investigate the influences of significant factors on the temperature distribution of mechanical face seals as key component of the mechanical instruments. In this study, collocation and numerical methods are used to solve the thermal equation of the mechanical face seal in various operating conditions. This work also focuses on the role of material of mechanical seal on temperature distribution to reveal this factor in the performance of the mechanical face seal. The effect of various parameters (thermal conductivity, operating temperature and heat convection coefficient) on the temperature distribution of mechanical face seals has been studied in different boundary temperatures. The results show that thermal radiation has extensively influenced on the temperature distribution of the mechanical seal. It can be found that thermal radiation of the surface seal significantly reduces the temperature and the performance of the seal highly increases. Moreover, the results depict that mechanical face seal with Hastelloy X material performs with high efficiency in high temperature operating conditions.

Keywords: Thermal radiation; Mechanical face seal; Collocation method, Temperature distribution

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