

## Experimental and Computational Investigation of Flow Field and Thermal Behavior of a Mechanical Seal

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**Abstract :** Turbulent flow inside the seal chamber of a pump operating at nearly high Reynolds number is investigated. A comparison of a 3-D computational model for flow and thermal analysis of a mechanical seal with experimental thermal results is presented. The computational model adequately predicts the flow field in the seal chamber and thermal characteristics with the rotating and stationary rings and the twister flow around the seal parts by solving N-S and energy equations in ANSYS-CFX software. The Reynolds stress model (RSM) is applied as a turbulence model for this purpose. Experimental work is discussed which quantifies the temperature of five different points of the working fluid in chamber, mass flow at inlet and the fluid pressure at inlet and outlet. Experimental measurements are combined with computational modeling to obtain local and average heat transfer characteristics. Numerical results of three cases including different flush rates are reported.

**Keywords :** mechanical seal, CFD\_CFX, reynolds stress model, flow field, heat transfer analysis, stream line, heat transfer coefficient, heat flux, nusselt

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