

Numerical Investigation of Flow Characteristics inside the External Gear Pump Using Urea Liquid Medium

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Abstract : In selective catalytic reduction (SCR) unit, the injection system is provided with unique dosing pump to govern the urea injection phenomenon. The urea based operating liquid from the AdBlue tank links up directly with the dosing pump unit to furnish appropriate high pressure for examining the flow characteristics inside the liquid pump. This work aims in demonstrating the importance of external gear pump to provide pertinent high pressure and respective mass flow rate for each rotation. Numerical simulations are conducted using immersed solid method technique for better understanding of unsteady flow characteristics within the pump. Parametric analyses have been carried out for the gear speed and mass flow rate to find the behavior of pressure fluctuations. In the simulation results, the outlet pressure achieves maximum magnitude with the increase in rotational speed and the fluctuations grow higher.

Keywords : AdBlue tank, external gear pump, immersed solid method, selective catalytic reduction

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