Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

The Effect of Convex Sleeve on Cavitation Inception in the Rotary Valve of the Power Steering System[1] GWI TAEK KIM, Seoul National University, SUN HONG PARK, MANDO Corp., MYUNG HWAN CHO, JUNG YUL YOO, Seoul National University — The rotary valve in power steering system helps the drivers turn the wheel with ease, when they set the vehicle in motion. It is well known that the hiss noise in the rotary valve occurs by the cavitating oil due to high pressure drop at the orifice. In this paper, the flows in two types (Round and Straight types) of rotary valves have been analyzed numerically by using three-dimensional cavitation model embedded in the commercial code, FLUENT 12.0. The shapes of the sleeve grooves are convex and rectangular respectively in the Round and Straight types. The numerical results have been compared with the hiss noise level measured in a semi-anechoic chamber. It is found that the shape of the sleeve grooves affects considerably the volume of the oil vapor generated from cavitation. These results can be utilized for the improved design of the hydraulic rotary valve with hiss noise reduction.

[1]The authors are supported by the Korea Research Foundation Grant funded by the Korean Governmnet (MOEHRD) (KRF-0420-20070058)

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Date submitted: 06 Aug 2010 Electronic form version 1.4