

Abstract Submitted  
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**Large Eddy Simulation of Turbulent Flow in a Ribbed Pipe<sup>1</sup>**

CHANGWOO KANG, KYUNG-SOO YANG, Inha University, Korea — Turbulent flow in a pipe with periodically wall-mounted ribs has been investigated by large eddy simulation with a dynamic subgrid-scale model. The value of Re considered is 98,000, based on hydraulic diameter and mean bulk velocity. An immersed boundary method was employed to implement the ribs in the computational domain. The spacing of the ribs is the key parameter to produce the d-type, intermediate and k-type roughness flows. The mean velocity profiles and turbulent intensities obtained from the present LES are in good agreement with the experimental measurements currently available. Turbulence statistics, including budgets of the Reynolds stresses, were computed, and analyzed to elucidate turbulence structures, especially around the ribs. In particular, effects of the ribs are identified by comparing the turbulence structures with those of smooth pipe flow. The present investigation is relevant to the erosion/corrosion that often occurs around a protruding roughness in a pipe system.

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