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THE MODERNIZATION OF GEAR MICROPUMP CASING WITH THE USE OF FINITE ELEMENT METHOD

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ABSTRACT

This paper presents the results of modernization of gear micropump casing in order to achieve minimization of overall dimensions and mass of the construction. Three different cases of the pump casing size were analyzed during numerical simulations with the use of finite element method (FEM). The dimensions of the first of the casings were identical to prototype unit, the second model was characterized by 15% reduction in size and the third casing was reduced by 25%. During the analysis, stress and displacement distribution in pump casings were observed. In the first modernized casing (85%), maximal stress value was equal to 104MPa, and the maximal value of displacement 0.012mm. In the second modification of pump casing (75%), the highest stress values achieved 134MPa, and maximal displacement 0.017mm. Strength and stiffness criteria in both modernized pump bodies were achieved.

KEYWORDS: Gear Micropump, Pump Casing, Finite Element Method