

RESEARCH AND DEVELOPMENT OF THE AXIAL RELIEVING OF THE PUMP ROTOR ASSEMBLY

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Basis for the development of the considered axial relieving of the pump rotor assembly is hydrostatic seal. Its use for a rotor of an impeller pump allows reducing power waste. As a result the pump efficiency increases.

Large values of the choked pressure and rim speed of a rotating ring are necessary for efficient work of the sealing. Regulation of a face gap is provided with an equilibrium condition of the floating ring. It is influenced by a secondary seal with a rubber ring.

At increase in the choked pressure the rubber ring is wedged and works as a resilient element. It leads to violation of self-established ring mobility.

The secondary seal is replaced with the cylindrical choking channel as a floating ring for ensuring the best mobility of a ring. The presented work is devoted to theoretical researches of this replacement and development of design option of a hydrostatic seal.

The rubber ring is used as a pivot bearing and provides free angular movements of the face surface. The volume losses visibly decrease. Such decrease of axial relieving of the pump rotor leads to increasing the efficiency of an impeller pump up to 5%.

The main objective is to ensure the maximum axial mobility of the self-established ring in the hydrostatic seal. It is necessary to provide the steady state radial position of the floating ring. By using a face couple frictional force and hydrostatic pressure, the most stable position of the ring can be achieved.

Minimum leakages are a necessary condition of productive seal work. The condition is guaranteed by the least radial space of the cylindrical gap and provides decrease.

The hydrostatic seal with the movable self-established ring can be used as a good alternative to the floating rings. These seals can be applied to high-speed centrifugal pumps.

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