
PLOTTING THE "RESOURCE — ENERGY CONVERSION EFFICIENCY" COMPROMISE CURVE FAMILY FOR A CENTRIFUGAL PUMP

A.A. Protopopov

proforg6@yandex.ru

SPIN-код: 4175-5118

N.Yu. Isaev

isaev.nikita@bmstu.ru

SPIN-код: 7569-3665

Bauman Moscow State Technical University, Moscow, Russian Federation

Abstract

Service life and energy conversion efficiency are the main characteristics of centrifugal pumps, same as of many other machines. Often these two parameters compete, that is, increasing the value of one of them means we have to sacrifice the other. This stems from the fact that when rotor frequency increases, the service life of the bearings catastrophically drops, while the pump efficiency conversely increases. There exists a necessity to find a compromise solution, when, for a preset value of one parameter, the second reaches its maximum value. This problem is far from trivial, since a number of parameters, pump output flow in particular, affect these characteristics. We consider a solution to this problem for the case of a low-discharge centrifugal pump with a selector valve, used in the thermal control system of the International Space Station.

Keywords

Pump, blade, rotor, mathematical model, hydraulic head

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Protopopov A.A. — Assist. Lecturer, Department of Fluid Mechanics, Hydraulic Machines and Hydraulic and Pneumatic Automation, Bauman Moscow State Technical University, Moscow, Russian Federation.

Isaev N.Yu. — student, Department of Fluid Mechanics, Hydraulic Machines and Hydraulic and Pneumatic Automation, Bauman Moscow State Technical University, Moscow, Russian Federation.

Scientific advisor — Lomakin V.O., Cand. Sc. (Eng.), Assoc. Professor, Department of Fluid Mechanics, Hydraulic Machines and Hydraulic and Pneumatic Automation, Bauman Moscow State Technical University, Moscow, Russian Federation.
