



⚙️ Rotating-Pump Design Code

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Pump Design (PUMPDES) is a computer program for designing a rotating pump for liquid hydrogen, liquid oxygen, liquid nitrogen, water, methane, or ethane. Using realistic properties of these fluids provided by another program called "GASPAK," this code performs a station-by-station, mean-line analysis along the pump flow path, obtaining thermodynamic properties of the pumped fluid at each station and evaluating hydraulic losses along the flow path. The variables at each station are obtained under constraints that are consistent with the underlying physical

principles. The code evaluates the performance of each stage and the overall pump. In addition, by judiciously choosing the givens and the unknowns, the code can perform a geometric inverse design function: that is, it can compute a pump geometry that yields a closest approximation of given design point. The code contains two major parts: one for an axial-rotor/inducer and one for a multistage centrifugal pump. The inducer and the centrifugal pump are functionally integrated. The code can be used in designing and/or evaluating the inducer/centrifugal-

pump combination or the centrifugal pump alone. The code is written in standard Fortran 77.

*This program was written by James F. Walker and Shu-Cheng Chen of **Glenn Research Center** and Dean D. Scheer of Sverdrup Technology, Inc. Further information is contained in a TSP (see page 1).*

Inquiries concerning rights for the commercial use of this invention should be addressed to NASA Glenn Research Center, Innovative Partnerships Office, Attn: Steve Fedor, Mail Stop 4-8, 21000 Brookpark Road, Cleveland, Ohio 44135. Refer to LEW-17576-1.