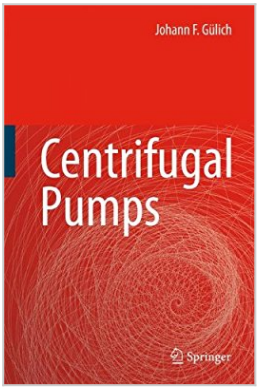

Centrifugal Pumps

By Johann Friedrich Gülich

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An up-to-date and unparalleled in-depth treatment of all kinds of flow phenomena encountered in centrifugal pumps is given, including the complex interactions of fluid flow with vibrations and wear of materials. The scope includes all aspects of hydraulic design, 3D-flow phenomena and partload operation, cavitation, numerical flow calculations, hydraulic forces, pressure pulsations, noise, pump vibrations (notably bearing housing vibrations diagnostics and remedies), pipe vibrations, pump characteristics and pump operation, the effects of highly viscous flows, pumping of gas-liquid mixtures, hydraulic transport of solids, fatigue damage to impellers or diffusers, material selection under the aspects of fatigue, corrosion, erosion-corrosion or hydro-abrasive wear, pump selection, and hydraulic quality criteria. Information on the methods and procedures for the various calculations and failure diagnostics discussed in the text are presented in tables which may be considered almost unique in the open literature. This comprehensive handbook focuses on practical application in the industry and is free of mathematical or theoretical ballast. In order to find viable solutions in practice, the physical mechanisms involved must be thoroughly understood. The book is focused on fostering this understanding which will benefit the pump engineer in industry as well as academia and students.

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Editorial Review

From the Back Cover
This book gives an unparalleled, up-to-date, in-depth treatment of all kinds of flow phenomena encountered in centrifugal pumps including the complex interactions of fluid flow with vibrations and wear of materials. The scope includes all aspects of hydraulic design, 3D-flow phenomena and partload operation, cavitation, numerical flow calculations, hydraulic forces, pressure pulsations, noise, pump vibrations (notably bearing housing vibration diagnostics and remedies), pipe vibrations, pump characteristics and pump operation, design of intake structures, the effects of highly viscous flows, pumping of gas-liquid mixtures, hydraulic transport of solids, fatigue damage to impellers or diffusers, material selection under the aspects of fatigue, corrosion, erosion-corrosion or hydro-abrasive wear, pump selection, and hydraulic quality criteria. As a novelty, the 3rd ed. brings a fully analytical design method for radial impellers, which eliminates the arbitrary choices inherent to former design procedures. The discussions of vibrations, noise, unsteady flow phenomena, stability, hydraulic excitation forces and cavitation have been signficantly enhanced. To ease the use of the information, the methods and procedures for the various calculations and failure diagnostics discussed in the text are gathered in about 150 pages of tables which may be considered as almost unique in the open literature. The text focuses on practical application in the industry and is free of mathematical or theoretical ballast. In order to find viable solutions in practice, the physical mechanisms involved should be thoroughly understood. The book is focused on fostering this understanding which will benefit the pump engineer in industry as well as academia and students.

About the Author

Dr.-Ing. Johann F. Gülich (1939), MS in Mechanical Engineering from the Technical University Hannover (Germany), PhD from the Technical University Darmstadt. Professional curriculum: Project engineer in the nuclear power plant division of Siemens, Erlangen, Germany. Since 1966 with Sulzer Winterthur (Switzerland): Starting as development engineer in the nuclear reactor design; subsequently for 10 years head of the team "Thermo-hydraulics" responsible for the thermal and hydraulic design of steam generators and heat exchangers for nuclear power stations; finally head of the team responsible for the hydraulic development of centrifugal pumps, during several years also for the mechanical development of centrifugal pumps. Pump consultant since retirement in 2001. JF Gülich is author of numerous journal publications and holds several patents on centrifugal pumps and steam generators for nuclear power plants.

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