
CONTENTS

List of Contributors / ix

Preface / xvii

SI Units—A Commentary / xix

Chapter 1 Introduction: Classification and Selection of Pumps 1.1

Chapter 2 Centrifugal Pumps 2.1

- 2.1 Centrifugal Pump Theory, Analysis, and Performance / 2.3
 - 2.1.1 Centrifugal Pump Theory / 2.3
 - 2.1.2 CFD Analysis of Flow and Performance / 2.97
 - 2.1.3 Centrifugal Pumps: Hydraulic Performance and Behavior / 2.121
 - 2.1.4 Centrifugal Pump Mechanical Behavior and Vibration / 2.191
- 2.2 Centrifugal Pump Construction / 2.249
 - 2.2.1 Centrifugal Pumps: Major Components / 2.249
 - 2.2.2 Centrifugal Pump Priming / 2.317
 - 2.2.3 Sealless Pumps / 2.329
 - 2.2.3.1 Magnetic Drive Pumps / 2.331
 - 2.2.3.2 Canned Motor Pumps / 2.349

Chapter 3 Displacement Pumps 3.1

- 3.1 Power Pump Theory / 3.3
- 3.2 Power Pump Design and Construction / 3.21
- 3.3 Steam Pumps / 3.37
- 3.4 Displacement Pump Performance, Instrumentation, and Diagnostics / 3.63
- 3.5 Displacement Pump Flow Control / 3.75
- 3.6 Diaphragm Pumps / 3.85
- 3.7 Screw Pumps / 3.99
- 3.8 Vane, Gear, and Lobe Pumps / 3.123

Chapter 4 Solids Pumping 4.1

- 4.1 Hydraulic Transport of Solids / 4.3
- 4.2 Application and Construction of Centrifugal Solids Handling Pumps / 4.33
- 4.3 Construction of Solids-Handling Displacement Pumps / 4.49

Chapter 5 Pump Sealing 5.1

- 5.1 Centrifugal Pump Packing / 5.3
- 5.2 Centrifugal Pump Mechanical Seals / 5.17
- 5.3 Centrifugal Pump Injection-Type Shaft Seals / 5.63

Chapter 6 Pump Bearings 6.1

- 6.1 Centrifugal Pump Bearings / 6.3
- 6.2 Oil Film Journal Bearings / 6.13
- 6.3 Centrifugal Pump Magnetic Bearings / 6.43

Chapter 7 Jet Pumps 7.1

- 7.1 Jet Pump Theory / 7.3
- 7.2 Jet Pump Applications / 7.23

Chapter 8 Materials of Construction 8.1

- 8.1 Metallic Materials and Damage Mechanisms / 8.3
- 8.2 Materials of Construction for Nonmetallic (Composite) Pumps / 8.51

Chapter 9 Pump Drivers and Power Transmission 9.1

- 9.1 Pump Drivers / 9.3
 - 9.1.1 Electric Motors and Motor Controls / 9.3
 - 9.1.2 Steam Turbines / 9.37

- 9.1.3 Engines / 9.55
- 9.1.4 Hydraulic Turbines / 9.75
- 9.1.5 Gas Turbines / 9.87
- 9.2 Speed-Varying Devices / 9.97
 - 9.2.1 Permanent Magnet Adjustable Speed Drives / 9.97
 - 9.2.2 Single-Unit Adjustable-Speed Electric Drives / 9.111
 - 9.2.3 Variable Speed Fluid Drives / 9.129
 - 9.2.4 Gears / 9.147
- 9.3 Pump Couplings / 9.169

Chapter 10 Pump Noise 10.1**Chapter 11 Pump Systems 11.1**

- 11.1 General Characteristics of Pumping Systems and System-Head Curves / 11.3
- 11.2 Branch-Line Pumping Systems / 11.83
- 11.3 Waterhammer / 11.91
- 11.4 Minimum Flow Control Systems / 11.123

Chapter 12 Pump Services 12.1

- 12.1 Water Supply / 12.3
- 12.2 Sewage Treatment / 12.29
- 12.3 Drainage and Irrigation / 12.47
- 12.4 Fire Pumps / 12.63
- 12.5 Steam Power Plants / 12.79
- 12.6 Nuclear / 12.117
 - 12.6.1 Nuclear Electric Generation / 12.117
 - 12.6.2 Nuclear Pump Seismic Qualifications / 12.139
- 12.7 Chemical Industry / 12.151
- 12.8 Petroleum Industry / 12.169
- 12.9 Pulp and Paper Mills / 12.191
- 12.10 Food and Beverage Pumping / 12.233
- 12.11 Mining / 12.243
- 12.12 Marine Pumps / 12.261
- 12.13 Heating and Air Conditioning / 12.299
- 12.14 Pumped Storage / 12.309
- 12.15 Metering / 12.327
- 12.16 Cryogenic Pumps for Liquefied Gas Service / 12.335
- 12.17 Portable Transfer of Hazardous Liquids / 12.361
- 12.18 Aerospace / 12.367
 - 12.18.1 Aircraft Fuel Pumps / 12.367
 - 12.18.2 Liquid Rocket Propellant Pumps / 12.397

Chapter 13	Intakes and Suction Piping	13.1
13.1	Intakes, Suction Piping, and Strainers /	13.3
13.2	Intake Modeling /	13.37
Chapter 14	Selecting and Purchasing Pumps	14.1
Chapter 15	Installation, Operation, and Maintenance	15.1
Chapter 16	Pump Testing	16.1
Appendix	Technical Data	A.1
Index		I.1