

1. Record Nr.	UNINA9910583084003321
Autore	Nolan Dennis P
Titolo	Fire Pump Arrangements at Industrial Facilities
Pubbl/distr/stampa	San Diego : , : Elsevier Science & Technology, , 2017 ©2017
Edizione	[3rd ed.]
Descrizione fisica	1 online resource (257 pages)
Disciplina	628.925
Soggetti	Industrial buildings - Fires and fire prevention - Equipment and supplies Fire pumps
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Front Cover -- Fire Pump Arrangements at Industrial Facilities -- Copyright Page -- Dedication -- Contents -- List of Figures -- List of Tables -- About the Author -- Preface -- Acknowledgments -- Notice -- Introduction -- Typical Fire Water Pump Installation -- 1. Historical Applications of Firewater Pumping Systems -- Ancient Water Pumps -- Reciprocating Hand and Steam Driven Fire Pumps -- Rotary Pumps -- Invention of Centrifugal Pump -- Modern Fire Pumps -- Municipal Water Pumping Plants and Mains -- Offshore Facilities -- 2. Philosophy of Protection -- Protection Options -- Process emergency control measures -- Incident fuel consumption -- Provide protective measures -- Passive systems -- Active systems -- Insurance requirements -- Internal company policies and standards -- Risk Assessments -- 3. Firewater Flow Requirements -- Risk Areas -- Exposure Cooling Requirements -- Fire Control Requirements -- Suppression Requirements -- Egress Water Sprays -- Residual Pressure Requirements -- 4. Duration of Firewater Supplies -- Capability of Public Water Mains -- Primary supplies -- Reserve supplies -- 5. Sources of Firewater Pump Supply -- Seas and Oceans -- Rivers, Channels, Ponds, and Lakes -- Water Wells (Natural Underground Reservoirs) -- Manmade Reservoirs (Impounded Supplies) -- Storage tanks -- Municipal and Private Firewater Distribution Mains -- Specialized Offshore Raw Seawater Systems -- Firewater Usage by

Other Services -- Emergency Water Sources -- Water Quality -- Enhancements to Firefighting Water -- Marine Growth -- Biocide Injection -- Other Marine Growth Control Methods -- Evaluation and Prevention of Freezing Water -- Future Use, Sources and Development -- 6. Pump Types and Applications -- Dynamic Pumps -- Centrifugal pumps -- Pump/impeller design relationships -- Single and multistage arrangements.

Volute and turbine pump classification -- Axial flow pumps -- Positive displacement pumps -- Rotary pumps -- Gear pumps -- Lobe pumps -- Sliding vane pumps -- Reciprocating pumps -- Firewater pump characteristics -- Characteristic firewater pump "curve" -- Main and standby firewater pumps -- Booster firewater pumps -- Water mist firewater pumps -- Jockey pumps -- Firewater circulation pumps -- Foam pumps -- Packaged and skid units including temporary installations -- Retrofit Improvements to Existing Firewater Pumps -- Management of change -- Future expansion -- Reliance on mobile firewater pumping apparatus -- Portable pumps -- NFPA 20 versus API 610 and other pump types -- 7. Pump Installation, Piping Arrangements, and Accessories -- Code Requirements -- Listing Requirements (United States and International Agencies) -- Typical Installation -- Location, Separation, and Protection From Risk Exposures -- Pump Separation -- Pump Room or Building Construction -- Special Locations -- Offshore facilities -- Arctic Locations -- Arid Locations -- Tropical Locations -- Earthquake Zones -- Multiple Pump Installations -- Pump Rotation -- Relief Valves -- Variable Speed Pressure Limiting Control -- Circulation Relief Valves -- Pressure and Flow Control Valves -- Isolation Valves -- Bypass Capability -- Pressure Gages -- Pressure Recorders -- Flow Measurement Capability -- Check Valves -- Air Release Valve -- Supervision of Isolation Valves -- Inlet Screens, Strainers, and Filters -- Submerged Pump Intake Openings -- Cavitation, Net Positive Suction Head and Vortices -- Water Hammer or Surge -- Pumping System Hydraulic Design -- Vibration Limitation -- Torsional Vibration Analysis -- Backflow Prevention -- Area and Task Lighting -- Ventilation -- Fire Sprinkler Protection.

Electrical Power Arrangements-Commercial Feeders, Transformers, Substations, and Switchgear -- Utility Services -- Drainage -- Outside Installations -- 8. Materials of Construction -- Durability -- Corrosion Considerations -- Cathodic Protection -- Coatings -- Fiberglass Materials -- Freshwater Concerns -- Common Pump Materials -- Nonmetallic Piping Considerations -- 9. Pump Drivers and Power Transmission -- Electric Motors -- NEMA Classification -- Splash Shield or Partitions -- Gasoline Engines -- Diesel Engines -- Engine Gage Panel -- Diesel Engine Fuel Arrangements -- Fuel Refilling Aspects -- Fuel Contamination -- Engine Starting Systems -- Starting Batteries -- Engine Cooling System -- Engine Exhaust System -- Air Supplies and Ventilation -- Instrument Panel -- Steam Turbine -- Power Transmission Options -- Driver Pump Coupling -- Right Angle Gear Drives -- Lineshafts -- Indirect Hydraulic Drive -- Acoustical Concerns -- Maintenance Access -- 10. Firewater Pump Controllers -- Firewater Pump Controllers -- Diesel Engine Firewater Pump Controllers -- Electric Motor Firewater Pump Controllers -- Controller Power Supplies -- Dual Power Source Controllers -- Automatic Transfer Switches -- Remote Alarm and Shutdown Panels for Fire Pump Controllers -- Low Suction Pressure Cut-Off -- Jockey Pump Controllers -- Foam Pump Controllers -- Controller Listing or Approval -- Multiple Firewater Pump Installations -- Automatic Activation -- Firemain Pressure Switch Activation -- Remote Activation -- Local

Activation -- Startup Attempts -- Color Coding of Panel Indicators -- Piping and Instrumentation Diagrams -- Controller Indicators -- First-Up Fault Feature -- Cause and Effects Charts -- Firewater Pump Shutdown -- Specialized Installations -- Controller Location and Access Requirements -- Facility/Plant Electronic Monitoring of Fire Pumps -- 11. Reliability. Failure Categories -- Insurance Industry Experience -- Fault Tree Analysis -- Single Point Failures (SPF) -- Number of Firewater Pumps -- Pump Failures -- Electrical Motor Failures -- Diesel Engine Failures -- Gearbox Failures -- Controllers Faults -- Plant Perils and Pumping System Exposure -- Reliance on Commercial Electrical Power Sources -- 12. Classified Area Pump Installations -- Diesel Engine Ignition Hazards -- Primary Ignition Hazards -- Secondary Ignition Hazards -- Hot Surfaces -- Hot Exhaust Gases -- Exhaust System (Muffler) -- Exhaust System Spark or Flame Discharge -- Engine Overspeeding -- Flashback in Air Intake -- Material Selection -- Rated Instrumentation and Electrical Hardware -- Decompression Ports -- Electric Motors -- Controllers -- 13. Firewater Pump Acceptance and Flow Testing -- Safety Precautions -- Factory Acceptance Test -- Site Acceptance Test and Commissioning -- Periodic Performance Tests-Frequencies and Duration -- Pump Curve Test Points -- Fuel Examination -- Specific Speed Verification -- Accuracy of Test Gages -- Weekly Testing -- Controller and Interface Testing -- Foam Pump Testing -- Basic Test Procedure -- Pump Installation Major Maintenance and Inspections -- 14. Human Factors, Quality Control, and Audits -- Human Factors -- Identification -- Painting -- Flow Arrows -- Starting Instructions -- Access -- Guards -- Environmental and Health Factors (e.g., Noise Levels) -- Emergency and Prefire Plans -- Documentation -- Training -- Security -- Quality Control -- Reporting and Investigating Fire Pump Failures -- Company Inspections/Audits and Insurance Surveys -- Implementing and Tracking Recommendations for Improvements -- Recent Major Incidents Which Fire Pump Failures Were Contributing Cause -- International Standards Related to Fire Pumps. Appendix A: Selected Major Incidents Affecting the Performance of Firewater Pumping Systems -- Appendix B: Purchase Data/Specification Sheet -- Acronyms -- Glossary -- Bibliography -- Index -- Back Cover.

---

## Sommario/riassunto

Fire Pump Arrangements at Industrial Facilities, Third Edition delivers a practical reference from an author with a successful professional career in fire protection and loss prevention engineering in the oil and gas industry. While most regulatory standards are left to interpretation and try to cover multiple industries in one location, this book focuses on the equipment, standards and operations specific to the petroleum industry, covering quality controls, pump drivers and scheduled maintenance and audits so the equipment remains in safety compliance. Enhanced with new sections on human factors, case studies for modeling fire accidents and a look at recent events that have further shaped the safety and testing of fire pumps, the book provides the engineer and manager with a critical oil and gas resource for every aspect of firewater pumps. Remains the go-to reference for loss prevention specialists and fire engineering specific to the oil and gas industry Enhanced with new sections on quality audits and new case studies that evaluate operational issues and applications Fills in the practical hands-on information gap not covered in the regulatory standards

---