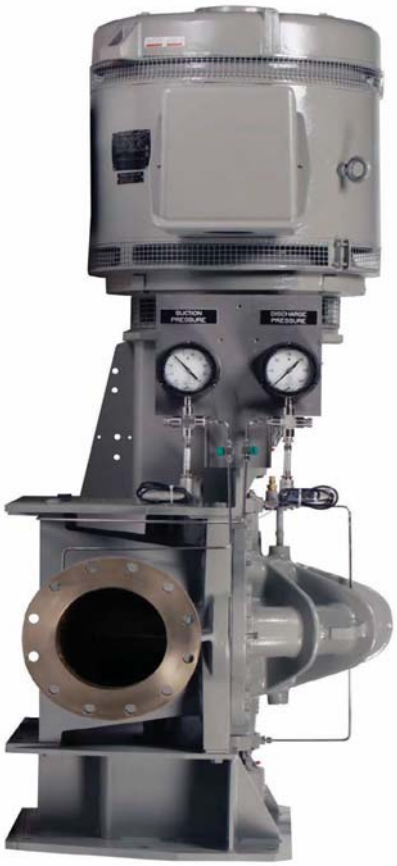
Buffalopumps

CUSTOM ENGINEERED CENTRIFUGAL PUMPS



CRITICAL APPLICATIONS - QUALITY PERFORMANCE

ISO 9001-2008

Bulletin 993

Buffalo Pumps has been manufacturing quality custom-engineered centrifugal pumps since its founding in 1887. We specialize in critical applications for the power-generation, US Navy, commercial marine, oil & gas, chemical processing, and refrigeration industries. We partner with our customer's engineering teams to ensure our pumps meet the demanding specifications required for these critical services. All sales, design, manufacturing, and testing is completed in our plant in North Tonawanda, NY. Please contact one of our sales engineers for application assistance.

Navy / Marine

Performance Range / Capabilities:
Flow Rate to 7500 GPM (1700 m3/hr)
Heads to 700 Feet (213 m)
HP to 1000 HP (750 kW)
NPSHr to 1 foot (.3 m)
Available in all materials of construction including composite
Complete range of testing available including shock and type I vibration
Split case in vertical / horizontal
End suction in vertical / horizontal
Built to full Navy or commercial marine specifications

Applications:
Fire Fighting
Air Conditioning / Chilled Water
Central Seawater
Bilge
Ballast
Fuel Oil
Potable Water
Chlorination
Demineralized Water
Fresh and Seawater Cooling
Condensate Drain
Hot Water Circulating

Lube Oil

Performance Range / Capabilities:
Flow Rate to 4500 GPM (1023 m3/hr)
Heads to 250 PSI (700 Feet) (213 m)
HP to 300 HP (224 kW)
Submerged depth to 8 Feet (2.5 m)
Working Pressure to 400 PSI (27 Bar)
Available in all materials of construction
API 610 features available as option
Performance Testing in oil as standard
Centrifugal or Screw available

Applications:
Main AC Lube Oil
Pre / Post Lube Oil
Emergency DC
Seal Oil
Gear Box
Starting Packages
Electric Motor Drive
Turbines / Compressors / Engines

Refrigeration

Performance Range / Capabilities:
Flow Rates to 1000 GPM (227 m3/hr)
Heads to 320 Feet (100 m)
Power to 75 HP (50 kW)
Working Pressure to 580 PSI (40 Bar)
NPSHR to 3 Feet (1 m)

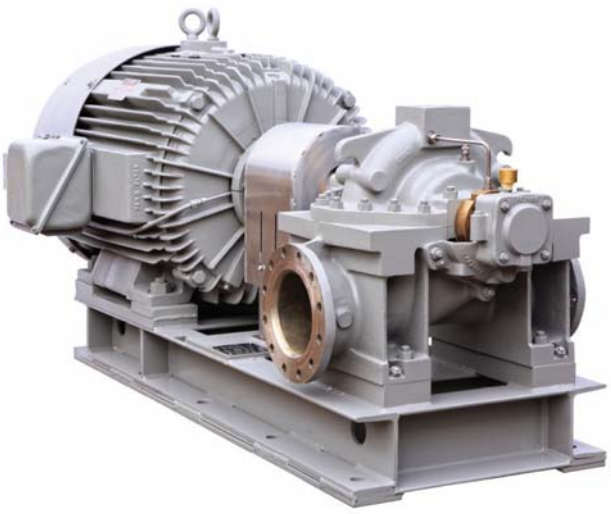
Applications:
Ammonia
CO2
HFC and HCFC Refrigerants
LiBr / Water in Absorption Service
Superheated Water
Transformer Oil Cooling

NAVY / MARINE

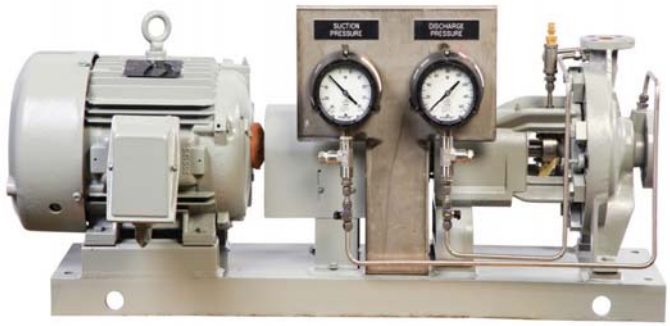
Navy Titanium Fire Pump built to NAVSEA drawing for emergency fire fighting service and in various configurations and orientations

Vertical axial-split case pump built to ASTM F998 for commercial marine duty

Navy standard end suction pumps built to MIL-P-17639 in a complete size range from 1C to 17C for a wide variety of services



Horizontal split-case pump built to MIL-P-17639 on JP-5 service



Special-purpose system pumps with ANSI or Navy standard pump ends with gauges for local monitoring

LUBE OIL

Main / Auxiliary / Emergency Lube Oil Pump for bearing or seal service

Custom lengths and protective coatings available to meet demanding OEM specifications

Piggy-back arrangement saves tank space by coupling DC motor with dual-shaft AC motor

Other materials of construction available - 316 stainless steel shown

Positive displacement pump option with extended suction pipe for reservoir list

REFRIGERATION

COM Canned motor pumps in service on Ammonia recirculation package

COM pump for service under vacuum on absorption chiller application

COM Pump designed for transformer oil cooling service

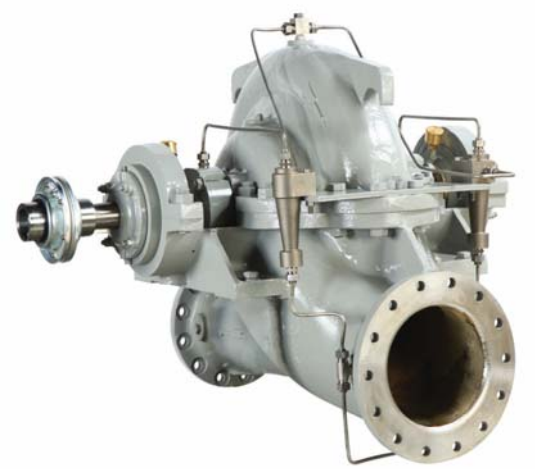
Oil-Filled stator design for high temperature service

High Pressure design (580 PSI) for CO2 Cascade system

Unique absorption double-end pump for solution and solution spray service

OEM Aftermarket Support / Repair Parts

Unique conical bearing / journal geometry and carbon graphite composition provides for extended bearing life for our canned motor pumps



Replacement Navy pumps ends tested to duplicate original performance of existing installations

Replacement parts available in Buffalo Pumps' patented composite material or original metal construction for seawater service

Pre-assembled oil-lubricated bearing conversion kits available for our lube oil pumps reduce maintenance and extend bearing life

Rotating assemblies available for Navy and marine duty pumps

OEM rings, sleeves, seals, and impellers available to match original performance

ADVANCED TESTING CAPABILITY

All performance testing is done in accordance with Hydraulic Institute Standards and applicable MIL specifications.

- 1000 HP capability (AC)
- 100 HP capability (DC)
- Flow rates to 10,000 GPM / Heads to 700 feet
- Operation on inverter to test performance at different operating speeds
- Navy Pump Testing in Freshwater Seawater
- Structureborne and airborne noise testing
- Bearing stabilization
- Reverse rotation
- Full NPSHR and suction lift testing available
- Shock Qualification and Type I Vibration available off-site
- Durability Testing
- Acceleration time testing
- Endurance / life cycle testing under varying conditions
- Lube Oil pump testing to simulate varying oil levels and tank bottom
- Lube Oil Pump Testing in lube oil at varying viscosities (70 SSU to 400 SSU)
- Measurement of vibration / noise levels with dynamic signal analysis equipment
- Pressure boundary parts hydro-pressure testing to 750 psi. Leak testing with mass spectrometer to 6 mm Hg(a) and visco probe test to 1x10-6 cc/sec

Buffalopumps

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Hydraulic Institute — Creating Pump Standards Since 1917

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ABS — FOUNDED 1862

ANAB ACCREDITED ISO/IEC 17021 MANAGEMENT SYSTEMS CERTIFICATION BODY

RINA

SRI Quality System Registrar

APPLICATION DATA WORKSHEET

Navy / Marine

Ship / Project Reference: _____

Flow Required: _____ US GPM
_____ cubic meters / hour

Head / Pressure Required:
_____ psig
_____ feet

Applicable Pump Specification

_____ MIL-P-17639
_____ F998 w/Supplemental
_____ Other

Materials of Construction: (if not covered in MIL specifications)

_____

_____

Service: _____

Liquid / Temperature:
seawater _____ F/C
fresh water _____ F/C
other _____

Testing Required:
_____ Full Range Performance
_____ Shock Qualification
_____ Vibration
_____ Structureborne / Airborne Noise

Motor Requirements: (if not covered in MIL specifications)

_____

_____

Lube Oil

Project Reference: _____

Additional specifications attached: yes _____
no _____

Flow required: _____ US GPM
cubic meters / hour

Pressure Required: _____ psig/m/bar

Motor Requirements: _____

Paints / Coatings: _____

Materials of Construction:
Buffalo Pumps Standard _____ or
Other _____

Compliance / Certification / Language: _____

Service:
Main AC LO pump _____
Emergency DC LO pump _____
AC Seal Oil pump _____
DC Seal Oil pump _____

Lube Oil:
ISO Grade _____
Normal operating temperature _____ F/C
Minimum operating temperature _____ F/C
Maximum operating temperature _____ F/C

Pump performance test required:
Buffalo Pumps Standard _____ or
Other _____

Tank opening: _____ X _____
_____ diameter

Discharge pipe detail: _____

Refrigeration

Project Reference: _____

Flow Required: _____ US GPM
_____ cubic meters / hour

Pressure Required: ___feet ___meters ___psig ___bar

Pressure Rating: psi _____ bar _____

Materials of Construction:
Buffalo Pumps Standard Cast Iron / Ductile Iron / Steel or
Impeller _____
Casing _____
Motor wetted components _____

Service:
Recirculator _____
Transfer _____
Absorption _____
Cooling _____
Transformer cooling oil _____
Other _____

Liquid:
Ammonia _____ LiBr _____
CO2 _____ Water _____
R-22 _____ Superheated water ___
R-123 _____ Other _____
normal operating temp. ___ F/C minimum operating temp. ___ F/C
maximum operating temp. ___F/C

Motor Requirements: specification attached _____
_____ HP / KW _____ rpm _____ frequency
_____ hazardous area _____ other