

# Military-Marine

ROTARY VANE/POSITIVE DISPLACEMENT PUMPS  
CENTRIFUGAL PUMPS  
HAND PUMPS



Where Innovation Flows



## Military-Marine | Experts in Mission Critical Flow Solutions

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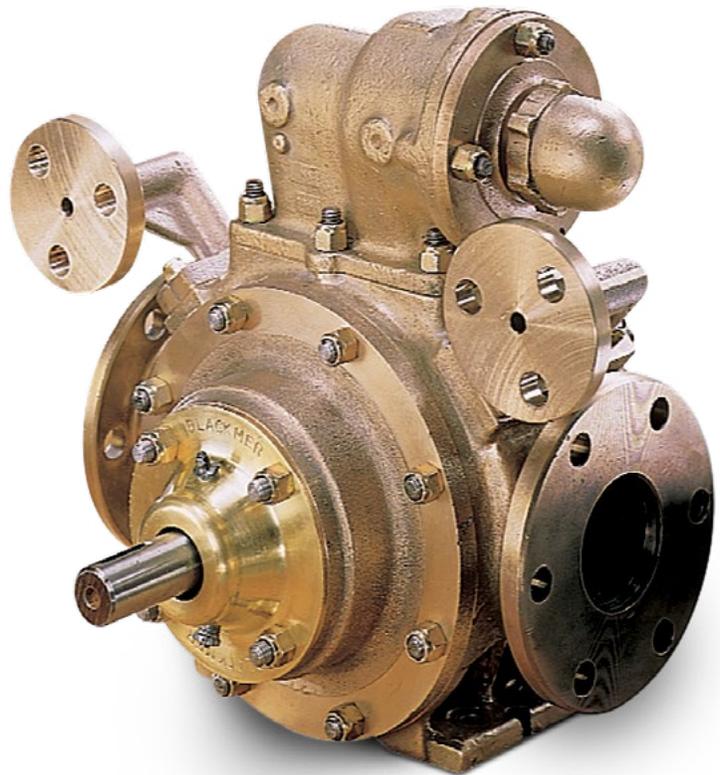
### Blackmer is Proud to Serve All Branches of the U.S. Military with Reliable Pump Solutions

For more than 100 years, on both land and sea, Blackmer has proudly served all branches of the U.S. Military. Around the world, Blackmer pumps help keep the U.S. Military on the move, providing the world's most reliable pumping solutions for airbase, field support and shipboard operations under the most difficult conditions imaginable.

Blackmer offers a complete line of positive displacement sliding vane and centrifugal pumps to meet your most demanding requirements. Time-tested and field-proven in critical applications, our pumps deliver sustained high performance and the lowest overall cost of ownership. In addition, all Blackmer pumps utilize technology developed to exceed the most stringent commercial and military standards for design, construction and operation.

When reliable performance is critical to your mission, it's good to know Blackmer pumps, expertise and support are there to serve you, and why U.S. Military bases around the world share a common demand...

**Better Get Blackmer.**



## Design And Construction

The design and construction of Blackmer military and marine pumps have been refined through over seventy years of real-world use. That's why they boast features you won't find on other pumps – features that improve performance, reduce maintenance and extend life.

## Greater Operating Efficiency

Typically, a Blackmer positive displacement pump requires 20% less energy than other positive displacement-type pumps when handling fluids ranging from 30 to 100,000 ssu (2 to 21,000 cSt). The key to this greater operating efficiency lies in the Blackmer pump's operating principle. As the accompanying schematic shows, every revolution of a Blackmer pump transfers a consistent volume of liquid in a sealed chamber from inlet to outlet. Each vane provides positive mechanical and hydraulic "work" to the liquid. Sliding vanes maintain close tolerances and effective sealing, even after significant wear, so efficiency-robbing "slip" is minimized throughout the pump's life. Throughout the pump's operating range, volumetric efficiency remains above 90%, allowing the Blackmer pump to deliver consistent performance over an extended period of time.

## Easier, Less Frequent Maintenance

No pump is maintenance-free. However, the Blackmer pump's operating principle minimizes maintenance requirements – and the pump's design simplifies maintenance procedures.

With mechanical seals, isolated bearings, and self-adjusting sliding vanes, Blackmer pumps require far less attention than other pumps to maintain reliable, leak-free, high-efficiency performance. When maintenance is required, however, most work – including removing and replacing pump-wearing surfaces – can be done while the pump remains attached to its piping and drive. This keeps overall maintenance costs to a minimum, and adds even more to the pump's long-term cost-effectiveness.

## Better Performance

Since the Blackmer sliding vane design maintains tight clearances and efficient operation, the Blackmer pump has exceptional self-priming and line-stripping capabilities which are essential for many marine applications. And while it's not designed for dry running, the sliding vane configuration minimizes the wear and damage dry running can cause.

## Rotary Vane Pump Components

### 1. External ball/roller bearings:

Completely protected from pumpage by mechanical seals, these externally lubricated low-friction bearings last longer and reduce power requirements.



### 2. Bronze pump body and heads:

Nodular iron and highly ductile bronze resists thermal and mechanical shocks, while bronze provides superior corrosion resistance essential for many marine applications. And while it's not designed for dry running, the sliding vane configuration minimizes the wear and damage dry running can cause.



### 3. Mechanical seals:

Designed to meet the specifications of ASTM F1511, Blackmer mechanical seals provide optimal fluid isolation and bearing protection. A variety of seal materials are available to assure fluid compatibility.



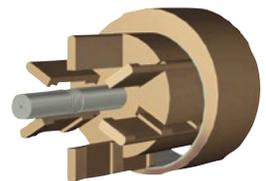
### 4. Lock collars:

Special Blackmer design allows pump units to be mounted in vertical or horizontal orientations to provide maximum design and installation flexibility.



### 5. Easily replaceable wearing parts:

The liner and vanes can be replaced quickly – with the pump still connected to drive and piping – to bring internal pump tolerances back to original levels.



### 6. Symmetrical bearing support:

The pump rotor is centered between the two bearings to distribute loads equally on both bearings. This minimizes wear to the bearings and shaft, improving reliability and lengthening life.



### 7. Adjustable relief valve:

The integral relief valve provides essential protection against excessive pressure build-up and the damage it can cause.



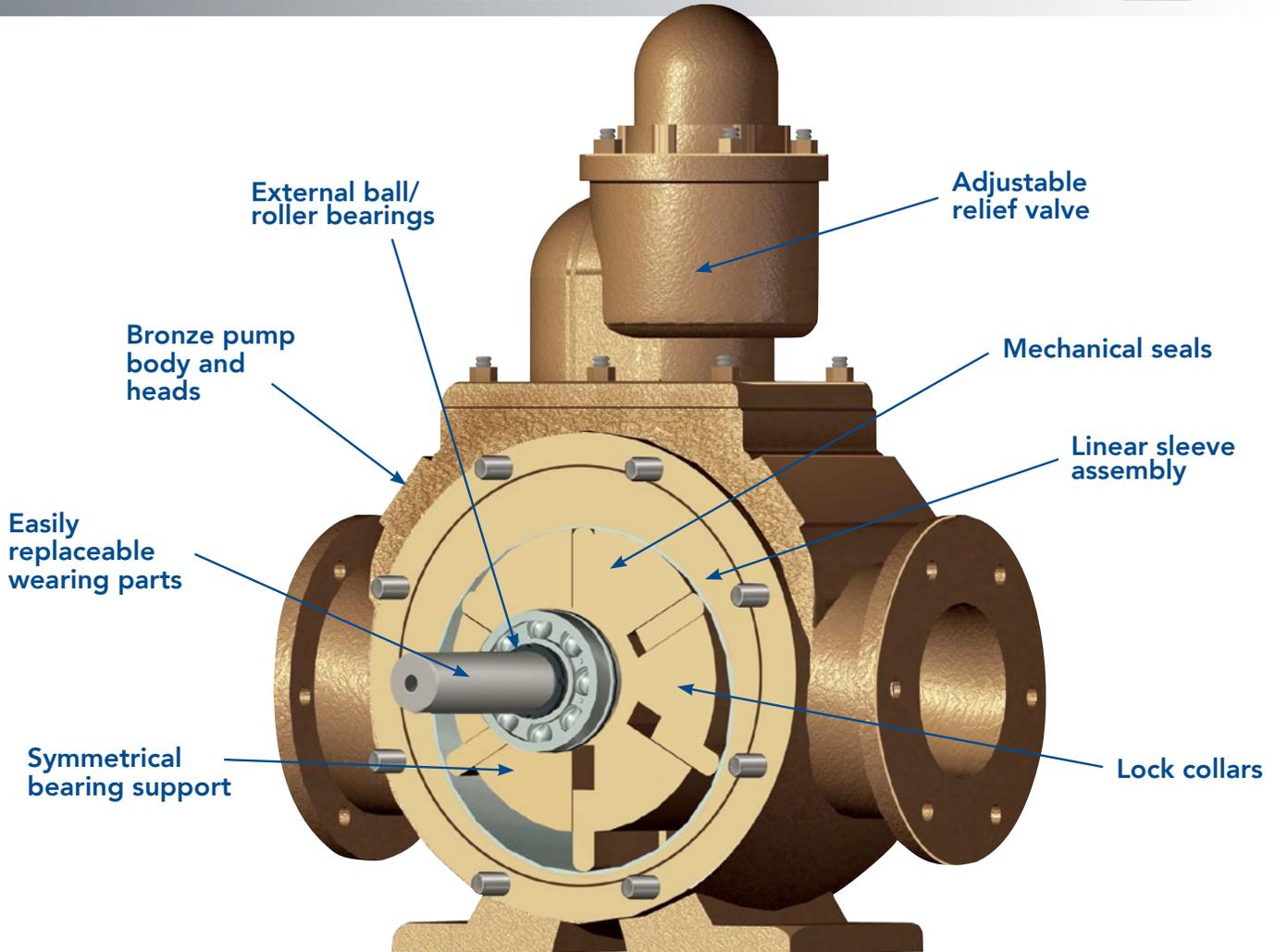
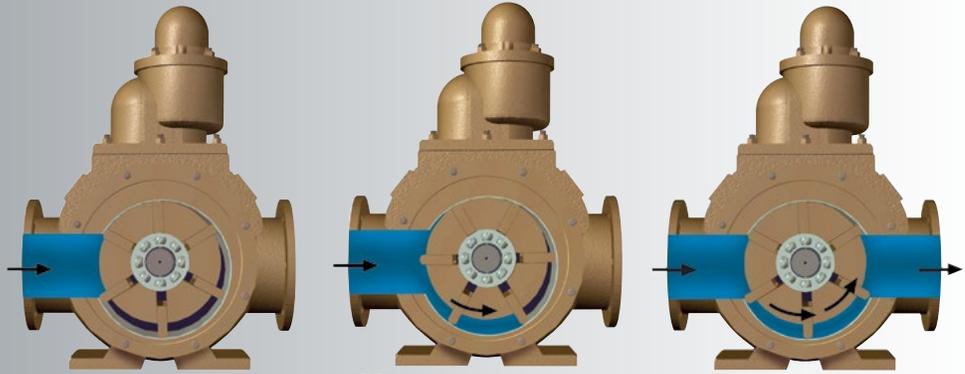
## Self-Compensating Sliding Vanes:

The design and construction of Blackmer military and marine pumps have been refined through over seventy years of real-world use. That's why they boast features.

## How Blackmer Sliding Vanes Maintain Efficiency

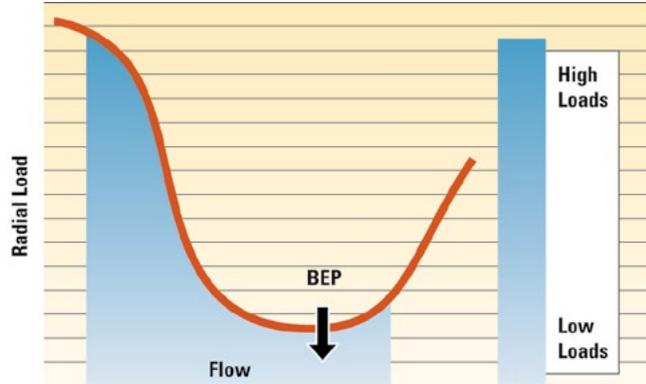


## How Blackmer's Sliding Vane Action Works.



## Blackmer Centrifugal Heavy Duty Process Pumps

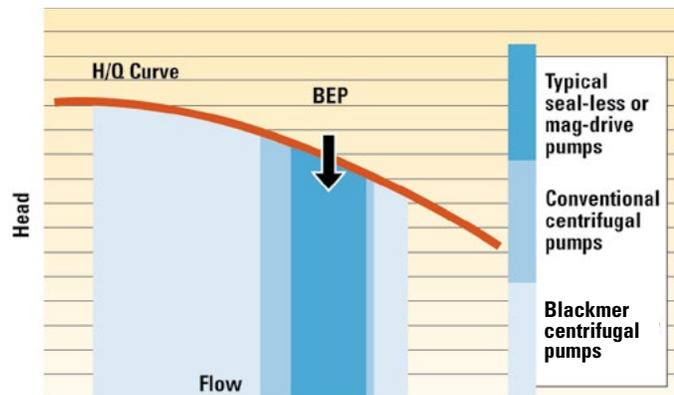
Wider Window of Operation Off the BEP (Best Efficiency Point)



Many processes demand operation off the BEP where higher loads can create damaging vibration.

### Process Pump Challenges:

- Due to process changes and variations, the majority of process pumps operate off the BEP where radial loads create high stresses.
- Conventional pumps are prone to damaging shaft vibration under off-BEP conditions.
- Seal and bearing failures result from vibration damage.

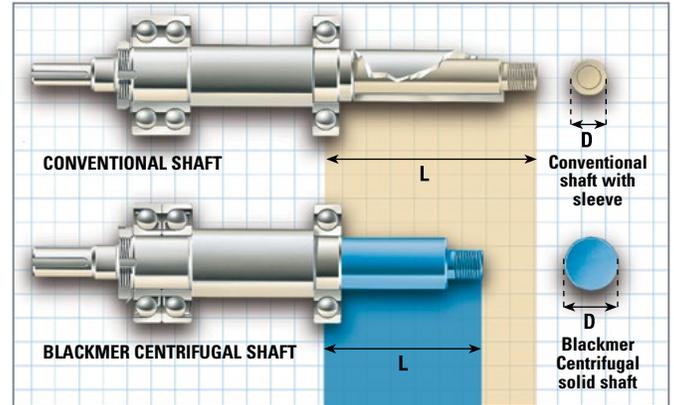


Blackmer Centrifugal pumps resist vibration for a larger operational window off the BEP and greater reliability.

### Blackmer Centrifugal Is The Solution:

- Heavy-duty design for the toughest applications in the process industry.
- Blackmer Centrifugal pumps are designed to prevent vibration under high radial loads.
- Blackmer Centrifugal pumps offer the widest operational window off the BEP of any standard process pump.
- Seals and bearings last longer for greater system reliability.
- When your process demands that pumps vary from the BEP, Blackmer Centrifugal will save you money and prevent lost production.

## Shaft



### Solid design, low deflection shaft prevents common vibration damage

- Prevents common vibration damage.
- Heavier duty construction and lower stiffness ratios than competing pumps.
  - Frame S – 46 (1.9)
  - Frame LD17 – 17 (.65)
  - Frame M – 19 (.87)
- Greater stability at seal area improves seal life.
- Short shaft overhang reduces bearing load to extend bearing life.

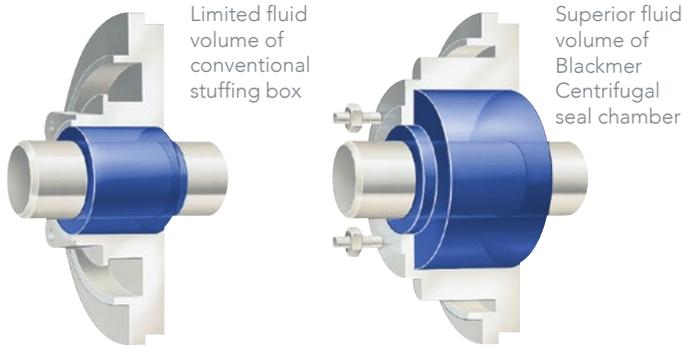
## Bearings



### Heavy duty bearings with longer bearing life

- Larger bearings than competing pumps for greater load capacity and bearing life.
- Bolted retainer cover locks thrust bearing into cartridge for enhanced reliability.
- Angular contact thrust bearings as required by API 610 specification.

## Detailed Features Of Reliability – Enhancing Components



### Large Bore Seal Chamber

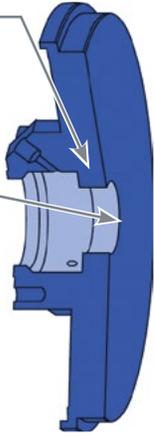
#### Lubricates, cleans, cools the seal to prevent premature seal failures

Most conventional pumps confine seals within the stuffing box designed for packing. As a result, the seal is subjected to punishing conditions with little fluid volume to provide cooling and cleaning. This style seal chamber with a large fluid volume is now universally considered to be a superior seal environment, enhancing reliability and extending seal life. The Blackmer Centrifugal seal chamber is standard equipment and is unmatched in reliability due to its large volume design. Optional models are available with cooling jackets and are easy to install and, most importantly, easy to clean. Two industry-tested seal chamber designs provide the right seal environment for virtually any process application. Large volume seal chambers accept standard-sized glands. Available seal chamber jackets provide optimum cooling or heating of seal chamber fluid.

### Straight Bore

Large seal chamber provides optimum volume for seal lubrication and cooling.

Cast restriction bushing reduces fluid exchange between casing and seal chamber and allows maximum cooling of fluid. Other bushing options are available, including carbon and SpiralTrac®1.



### Taper Bore

Air or gas buildup can be detrimental to seal life. Taper design allows trapped air and gases to escape, while providing maximum fluid circulation around the mechanical seal. This is standard construction for the LD17 configuration. Carbon bushing option available with certain seals.



<sup>1</sup> SpiralTrac is a registered trademark of the manufacturer, EnviroSeal Engineering Products Ltd., Waverly, Nova Scotia.

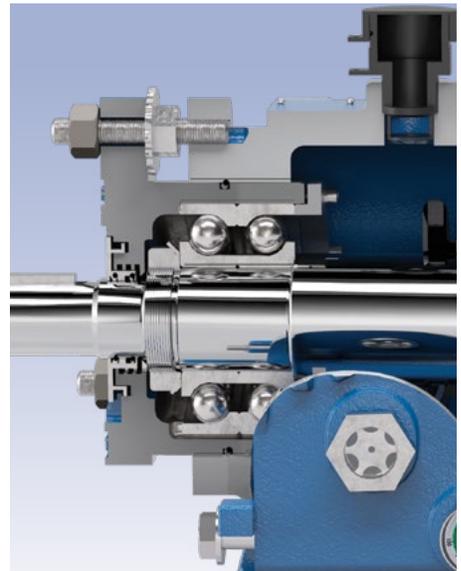
## Bearing Housing

### Bearing protectors preserve L10 life

Patented Blackmer Centrifugal labyrinth seals (pat. #4,572,517) are standard on Blackmer Centrifugal pumps and offer non-wearing, lifetime protection superior to common lip seals.



Patented Blackmer Centrifugal labyrinth seals (pat. #4,572,517) are standard construction. Small amounts of dirt and water can cause complete bearing failure in a short period of time. Blackmer Centrifugal labyrinth seals keep dirt and moisture out, prolonging oil and bearing life.



## Blackmer Centrifugal Heavy-Duty Process Pumps – Interchangeability Chart

Motor Adaptor	Power End	Back Cover	Impeller Open	Casing	Pump Size ANSI
	<b>Frame S ANSI</b> 				1 x 1½ – 6 2 x 3 – 6 1 x 1½ – 8 1½ x 3 – 8
	<b>Frame A ANSI</b>  <b>LD17</b> 				2 x 3 – 8 3 x 4 – 8 2 x 2 – 8 Vortex 1 x 2 – 10 1½ x 3 – 10 2 x 3 – 10 3 x 4 – 10 4 x 6 – 10 3 x 3 – 10 Vortex 1½ x 3 – 13 2 x 3 – 13 3 x 4 – 13 4 x 6 – 13 4 x 4 – 12 Vortex
	<b>Frame M</b> 				6 x 8 – 13 8 x 10 – 13 6 x 8 – 15 8 x 10 – 15

### Blackmer Centrifugal Pumps Featuring LD and Close-Coupled Designs

**Standard For Reliability** – High-strength, low-maintenance line of innovative process pumps that have set the standard for high quality and durability.

**Features** – Exclusive features eliminate common seal and bearing failures. Pump is actually designed around the seal and bearings where 90% of failures occur.

**Construction** – Heavy-duty construction allows wider window of operation off the BEP.

**Durability** – Lowest shaft stiffness ratio (L3/D4) pumps in the process industry.

- Frame S – 46 (1.9)
- Frame LD17 – 17 (.65)
- Frame M – 19 (.87)

Approved for high-impact shock and vibration in accordance with MIL-S-901D, Grade A and MIL-STD-167 Type 1.



## Mission-Critical Reliability Starts with Blackmer

The design and construction of Blackmer military and marine pumps have been refined through over seventy years of real-world use. That's why they boast features.

### We're On The Base



### We're In





## The Field



## We're On The Sea



# We're On The Base

- From the port to the powerplant and throughout the airbase
- Mission-critical reliability and sustained high performance
- Sliding vane, centrifugal and hand pumping technologies are ideally suited to handle fuel oil, lube oil, JP-5, diesel, gasoline, LPG, solvents, potable water and sewage water



## Blackmer Successes

Blackmer TXD pumps have been the standard of the petroleum truck pump industry since the mid 1950s





#### Blackmer Centrifugal LD17 Centrifugal Pumps

- Designed for high volume and severe duty applications the Blackmer Centrifugal is ideal for unloading and transferring liquids from terminal tanks to loading platforms.
- The most stable shaft in the industry, eliminating vibration for a larger operational window off the BEP (Best Efficiency Point) for greater reliability.



#### BXL/BHXL Series General Duty Pumps

- Designed with high suction lift capabilities.
- Ideal for pumping JP-5, AFFF and Navy fuel oil.
- Shock and vibration qualified.



#### TX(S)D Series Sliding Vane

- Fast, quiet and highly reliable.
- A truck-mounted transfer pump specifically designed for transfer of clean lubricating liquids and petroleum products such as fuel oil, diesel, gasoline, avgas and jet fuel.



#### ML/HXL Series Sliding Vane Pumps

- Designed for high capacity transfer. Suited for barge, ship, AST/UST and terminal transfers.
- Self-priming and high suction capabilities enable them to strip tanks, barges and rail cars clean.



#### LB Series Reciprocating Gas Compressors

- Single-stage, oil-free compressors, the LB Series is available with transfer capacities of 40-640 gpm. (150-2,420 L/min).
- Can transfer liquid and recover vapors and is especially well suited to applications such as rail car unloading that offer poor suction conditions to pumps.

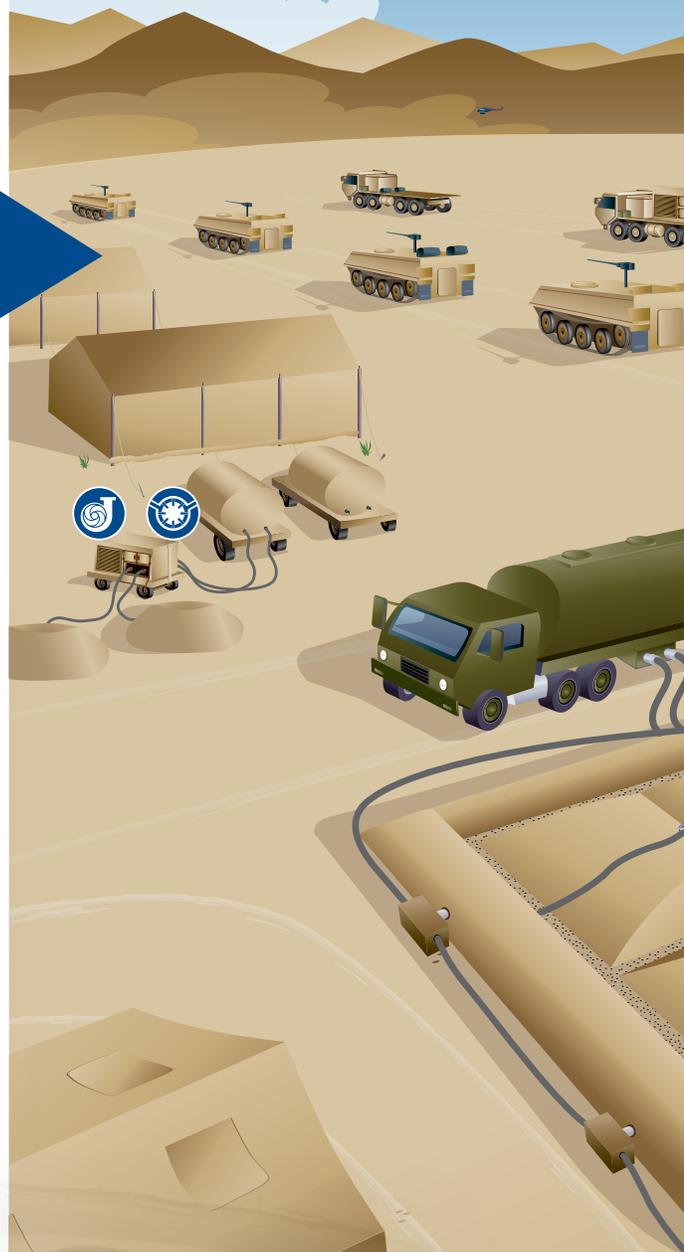


#### Rotary Sliding Vane Hand Pumps

- Field-proven reliability for safe transfer and dispensing of non-corrosive liquids.
- Superior quality make these pumps ideal for mobile and stationary operations.

# We're In The Field

- Blackmer technologies provide maximum uptime and easy maintenance, even in the harshest, most demanding applications
- Designed and constructed to exceed the most stringent military standards
- Blackmer mobile and stationary pumps are exceptionally durable and offer long-lasting value.



## Blackmer Successes

In the 1960s, aided U.S. Military operations by manufacturing fueling carts used for loading, unloading, fueling and defueling of ground vehicles and aircraft





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## Blackmer Successes

Since the 1940s,  
every capital ship in  
the U.S. Navy has  
had Blackmer pumps  
on board





## Blackmer Pumps are Found in All Areas of Military Fluid Transfer:

AC Chilled Water Booster

AC Saltwater Circulating

AFFF

- Injection
- Proportioning
- Replenishment

Auxiliary Lube Oil

Auxiliary Fuel Transfer

Auxiliary Machinery Coolant Water

Bilge Service

- Pumping
- Stripping

Cargo JP-5 Stripping

Cargo Oil Stripping

Diesel Generator Lube Oil Transfer

Evaporator Service

- Condensate
- Distillate
- Feed
- Brine

Fresh Water Drain Collecting

Fuel Oil

- Service
- Stripping
- Transfer

Hand Pumps

SSTG

- Auxiliary Salt Water Circulating
- Auxiliary Condensate

Helicopter Defueling

Incinerator Fuel Transfer

JP-5

- Defueling
- Service
- Stripping
- Transfer

Lube Oil

- Service
- Transfer

Main Feed Booster

Potable Water

Shaft Bearing Lube Oil

If you don't see your application listed, contact the Blackmer Military and Marine Group for further information and assistance.



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[psgdover.com/blackmer/contact-us/  
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568 Central Drive, Suite 101

Virginia Beach, VA 23454

CAGE: 3S0K8

Contact: Kenneth Ralph

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National City, CA 91950

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