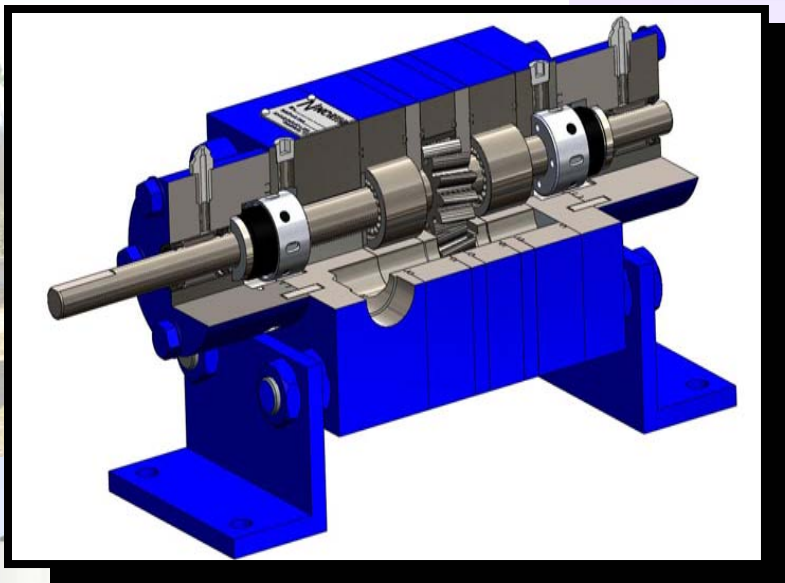




 **Northern Pump**  
Division of McNally Industries, LLC





Northern<sup>®</sup> Pump  
Division of McNally Industries

**Manufacturing the Highest  
Quality Gear Pumps for  
over 100 years**



# Philosophy

- **Products tailored to each application**
- **Engineered to solve customer problems**
- **Customized, not Compromised**
- **Rugged - applications in the field for decades**
- **Life Cycle - Best Value**
- **Every application reviewed**



# Industries Served

- **Chemical Processing Industry**
- **Coating Industry**
- **Precision Metering Applications**
- **Power Generation Facilities**
- **Food Service Industry**
- **Oil Refineries and Pipeline Service**
- **Medical Device and Pharmaceutical Industry**
- **Military Applications**

# Why We Lead

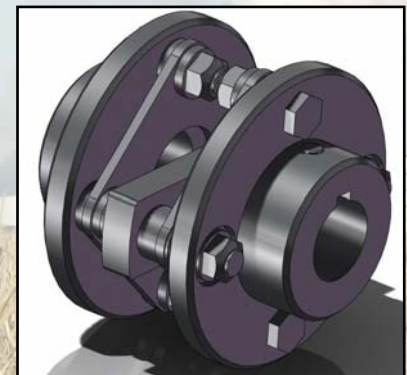
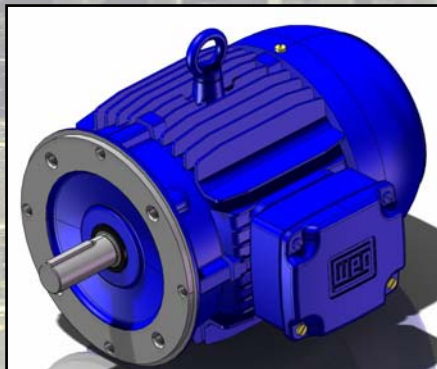
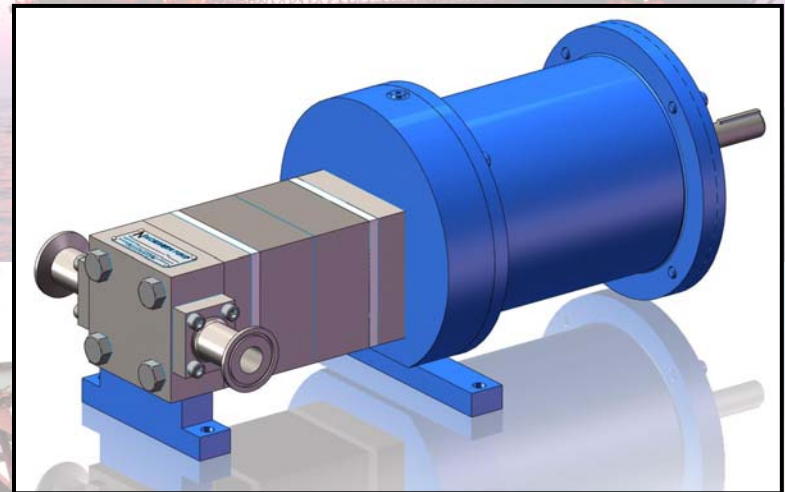
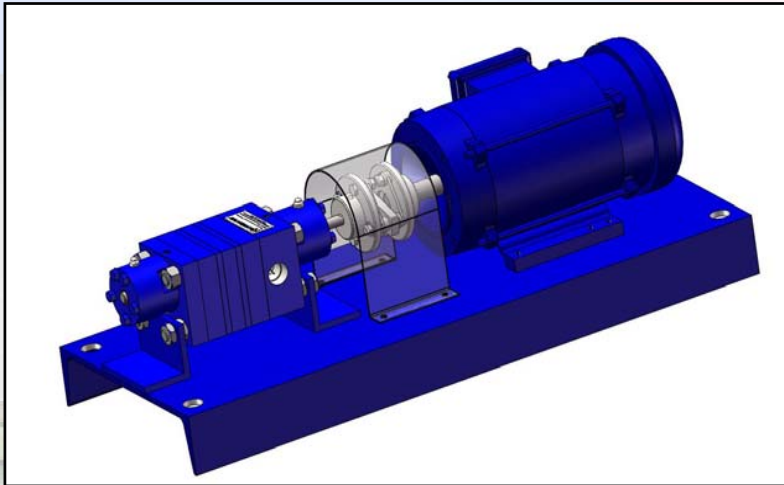
- Providing engineered solutions to customers
- Designing and building systems
- Support and enhance existing products
- Development of new products and systems
  - NPC Pumps
  - Mag Drive Pump
  - Modular Pump Designs

# What We Provide

- **Design Engineering / Project Management**
- **Specialized services to meet specifications**
  - **Custom Paint Solutions**
  - **Custom Part Design**
  - **Custom Materials of Construction**
  - **Special Material Process**
- **Spare parts and technical support**
- **Additional engineering support.....**

# Designing Your System

CAD Models



# Making Your Decision

## Product & Process & Information

**NORTHERN® PUMP**  
A Division of McNally Industries

INSTRUCTIONAL DRAWING

### APPLICATION OF HIGH TEMPERATURE PAINT SYSTEM FOR NORTHERN SUBMERGED SULFUR PUMPS

#### 1.0 SCOPE

This process DRAWING covers the application of Sherwin Williams COR-COTE® HT Tank Lining and HI-Temp Coating to Northern® Submerged Molten Sulfur Pumps.

McNally Part Number 100679

#### 2.0 PRODUCT DESCRIPTION

COR-COTE® HT Tank Lining and HI-Temp Coating is an epoxy novolac amine formulated for use under thermal insulation at elevated temperatures and for immersion service in water and hydrocarbons such as gasoline, fuel oil, and diesel fuel at ambient and elevated temperatures.

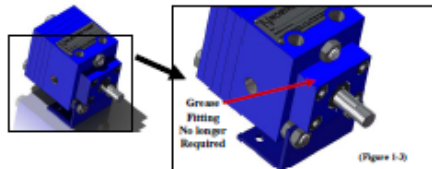
- Temperature resistant to 425°F, constant; 450°F intermittent (dry service)
- Self priming
- Chemical resistant
- Resistant to thermal shock
- Ambient temperature cure
- High build / edge retention in one coat

#### 2.1 RECOMMENDED USES

- Steel and stainless steel tanks and piping under insulation
- Non-insulated structural steel and piping subjected to chemical or abrasion attack
- Use in areas subject to wet-dry cycling up to 300°F
- Use in areas where temperature resistance up to 450°F is required (dry service)
- Suitable for storage of gasoline, fuel oil, diesel fuel, and other similar hydrocarbon cargoes
- Not certified for potable water immersion
- Water and wastewater facilities

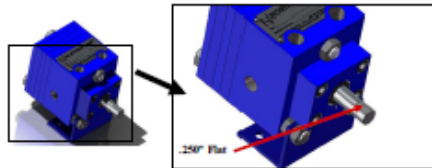
**NORTHERN® PUMP**  
A Division of McNally Industries

This pump is equipped with a John Crane brand type 9 Mechanical Seal. On the DEMO pump, the support bearing was a Steel Roller type bearing. Grease seal bearing on pump equipped with mechanical seals with grease purpose bearing grease every 6 months or every 500 hours of operation, whichever occurs first. The bearing has been greased at the factory, and should not need to be greased during the 90 day run. Replace mechanical seals if leaking occurs. The production will be constructed with a Carbon Graphite bearing in the place of a steel roller bearing. This would eliminate the need for additional lubrication and the grease fitting. (Figure 1-3)



(Figure 1-3)

The shaft diameter is .4979 ± .0002. The use of a .500 nominal diameter coupling is acceptable. However, it is recommended to use a coupling with a diametrical dimension of .498 ± .0005. A .250" wide flat is installed on the shaft for use with a coupling equipped with a set screw. (Figure 1-4)



(Figure 1-4)

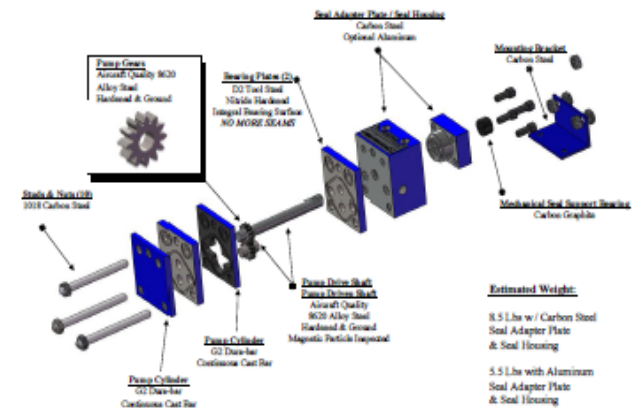
The information contained in this publication is the property of McNally Industries LLC. Use is limited to the employee, supplier, customer and distributor of McNally Industries LLC conducting official business in support of McNally Industries LLC operations.

Application of High Temperature Paint System for Northern Submerged Sulfur Pump	DATE	REVISION	DWG NUMBER
	10/05/09	-	ID-1001

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**NORTHERN® PUMP**  
A Division of McNally Industries

Custom Pump Design  
Designed for: McKee Foods  
4300-03-MCKEE



#### Estimated Weight:

- 8.5 Lbs w/ Carbon Steel Seal Adapter Plate & Seal Housing
- 5.5 Lbs with Aluminum Seal Adapter Plate & Seal Housing

# Pump Manufacturing

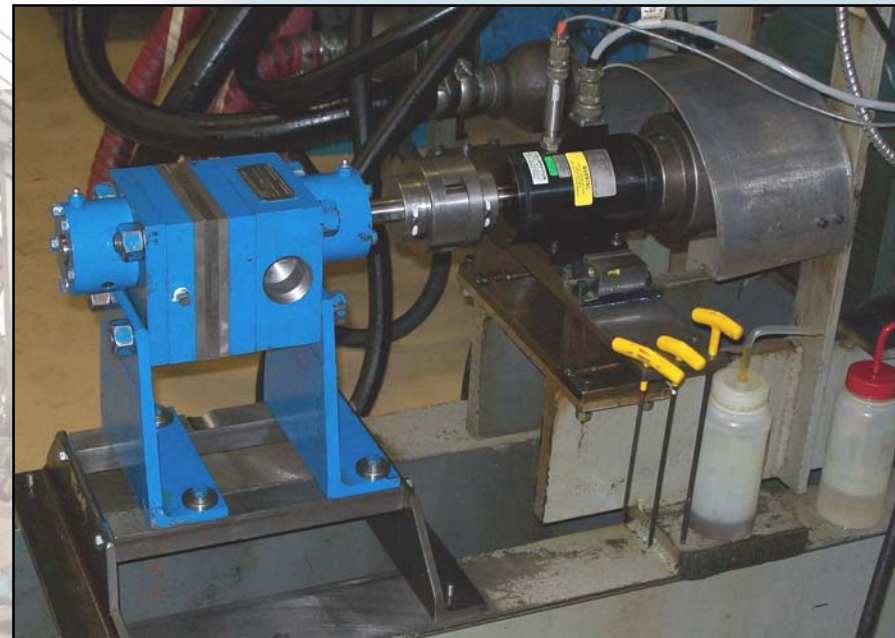
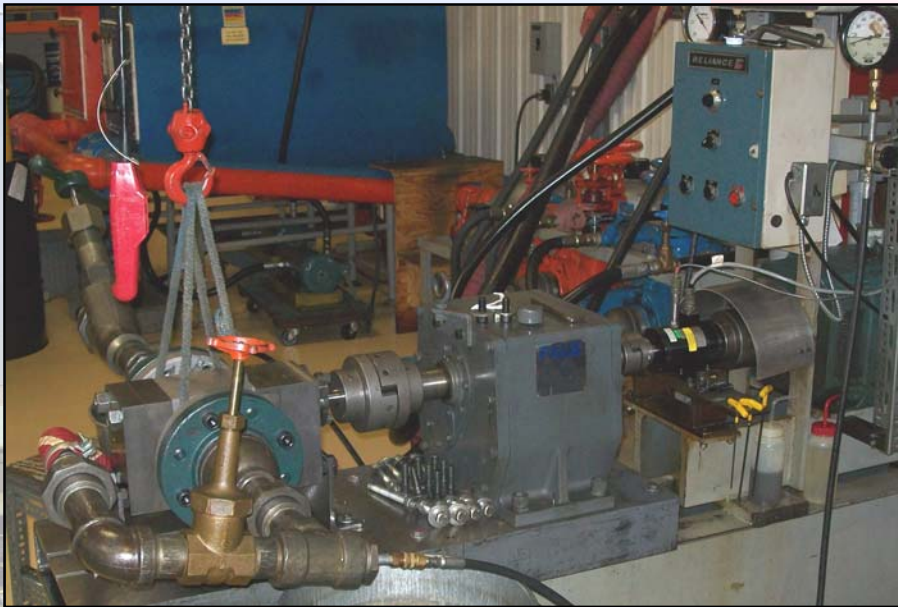
- In-House
- Experienced
- Resourceful
- Controlled Process



# Comprehensive Testing

## Hydrostatic & Performance Testing

100% Performance Testing



Hydrostatic testing  
when requested

# Comprehensive Testing

## Certified Test Data

**NORTHERN® PUMP**  
 Division of McNally Industries  
 340 W. Benson Avenue, P.O. Box 125, Grantburg, WI 54840  
 800.866.1410 / 715.682.5177 / FAX: 715.682.5174  
 E-MAIL: info@northern-pump.com  
 WEBSITE: http://www.northern-pump.com

### Pump Materials and Capacity Information

**Manufacturer of Pump:** Northern Pump Division of McNally Industries  
**Pump Model:** 4600-15-D1755  
**Standard Dimension Designation:** 4600-15 (5.5" x 5.5" x 1.5" cylinder & gears)  
**Pump Serial Number:** 4940  
**Rotation of Pump:** Clockwise (Standing over the motor, looking toward input shaft of the pump)  
**Materials of construction:**

- Gears & Shafts: Aircraft Quality 8620 Alloy Steel - Hardened & Ground
- Bearings: 5210 Alloy Roller Bearings - Hardened & Ground
- Cylinder: ASTM A108 Carbon Steel-W/braced Iron Liner Insert
- Bearing Plates: ASTM A108 Carbon Steel
- Wear Plates: D2 Tool Steel - Nitride Hardened
- Seal Adapter Plate: ASTM A108 Carbon Steel
- Seal Housings: ASTM A108 Carbon Steel
- Dowel Studs: ASTM A108 Carbon Steel
- Nuts: ASTM A108 Carbon Steel
- Mounting Brackets & Unit base: ASTM A36 Structural Steel
- O-Ring Elastomer Material: Viton

**Design Discharge Pressure:** 700 PSI  
**Rated Flow Capacity:** .0177 in<sup>3</sup> per rev. (30.9 Gallons per Min. @1750 RPM)  
**Relief Valve Set Pressure:** No relief valve installed  
**Speed in Revolutions per Minute:** 1750 RPM  
**Mechanical Seal Information:**

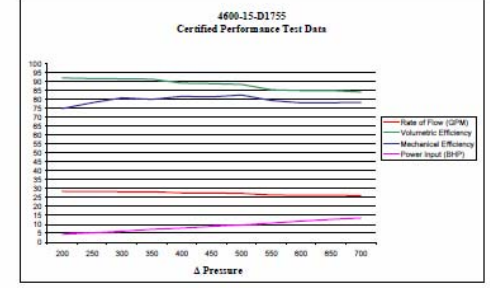
- Manufacturer: John Crane
- Type: BS-1 Mechanical Seal
- Size: 1.000" Nominal Shaft Size (John Crane Part Number MI71998)
- Face / Seat Material: Tungsten Carbide Face and Seat
- Elastomer: Viton O-Ring
- Body Material: Stainless Steel

When your reputation depends on it!

**NORTHERN® PUMP**  
 Certified Test Data and Performance Report

Pump Order Data	
Pump Model Number	4600-15-D1755
Pump Serial Number	4940
Northern Sale Order Number	494136
Customer P.O. Number	17744
Customer	Shrier Martin Process Equip.
Pump Performance Description	
Pump Speed	1750 RPM
Inlet Pressure	0-700 PSI
Differential Pressure	200-700 PSI
Discharge Pressure	700 PSI Max
Rate of Flow (GPM)	26 GPM @ 700 PSI ΔPressure
Collection Period (Actual Time)	1 Min. @ Each Increment
Pump Displacement (In <sup>3</sup> /rev)	4.09
Liquid Data	
Liquid Description	#2 Fuel Oil
Liquid Temp. (F @ Start of Test)	70°F
Liquid Temp. (F @ End of Test)	81°F
Liquid Viscosity (cP)	5
Power Data (@ maxΔP, RPM, Flow)	
BHP Required	See Performance Curve
Volumetric Efficiency	See Performance Curve
Mechanical Efficiency	See Performance Curve
Hydrostatic Test	
Test Pressure	1050 PSI (+5)
Time @ Test pressure	30 Minutes Minimum
NPSHR Test	
NPSHR @ -.5% Flow Rate	15" Hg (-7.36 PSI)

Pump Displacement (In <sup>3</sup> per Rev)	Test RPM	Pump Capacity (GPM)	Δ Pressure	Rate of Flow (GPM)	Rate of Flow (GPM) (BHP)	Power Input (BHP)	Actual Slip (In <sup>3</sup> per Rev)	Volumetric Efficiency	Mechanical Efficiency
4.09	1750	30.8848	200	28.8	3.7620000	4.241	0.3290	91.88	74.88
4.09	1750	30.8848	250	28.4	3.7488000	6.303	0.3412	91.68	78.11
4.09	1750	30.8848	300	28.4	3.7422000	6.138	0.3478	91.60	80.87
4.09	1750	30.8848	350	28.3	3.7367920	7.218	0.3648	91.04	80.06
4.09	1750	30.8848	400	27.8	3.8446520	7.89	0.4463	88.11	81.87
4.09	1750	30.8848	450	27.5	3.8328040	8.88	0.4671	88.82	81.37
4.09	1750	30.8848	500	27.4	3.8198000	9.88	0.4786	88.36	82.41
4.09	1750	30.8848	550	28.5	3.8914000	10.90	0.5090	86.36	79.40
4.09	1750	30.8848	600	28.3	3.8742400	11.8	0.8168	84.84	78.08
4.09	1750	30.8848	650	28.3	3.8742400	12.77	0.8168	84.84	78.18
4.09	1750	30.8848	700	28.1	3.8426800	15.8	0.8474	84.17	78.32



Hydrostatic Test conducted by Dale Erickson (3498) Date: 11/5/2009  
 Performance Test conducted by Steve Lee (4212) Date: 11/5/2009  
 NPSHR Test conducted by Steve Lee (4212) Date: 11/5/2009  
 Reporting Engineer: R. Annasick (3082) Date: 11/5/2009

# Main Pump Lines

## 4000 Series

- Up to 1200 psig Inlet
- 0.05 to 200 GPM
- Up to 2000 psig Disc.
- Up to 28" Hg Suction
- 0.5 to 1,500,000 cP
- Temperatures to 850 F
- RPM up to 3600
- Many Materials Available

## NPC Series

- Disassembles in Minutes
- Pulse free flow
- Up to 150 psig Disc.
- Up to 250 RPM
- 20 to 1,500,000 cP
- Corrosion Resistant

## Other

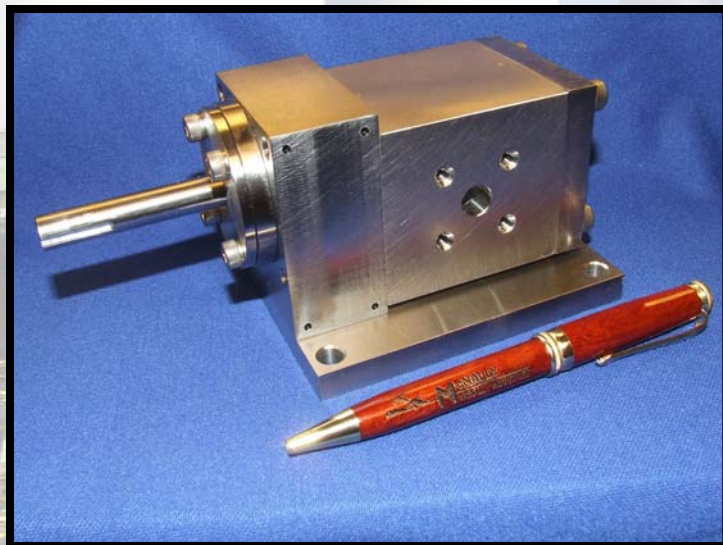
- Horizontal Molten Sulfur
- Vertical Sump Pumps
- Magnetic Drive
- Military Pumps
- Contract Design
- OEM Replacements

# Success Stories

## Coating Solution Systems

**NPC Pump**

**NPC Coating  
Solutions**



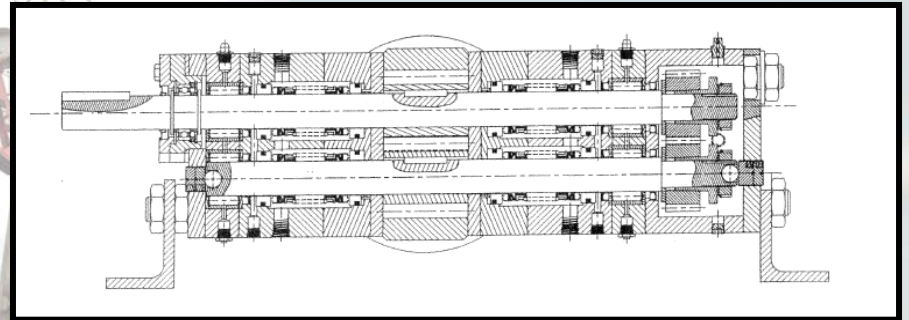
# Success Stories

## Customer Specific Solutions



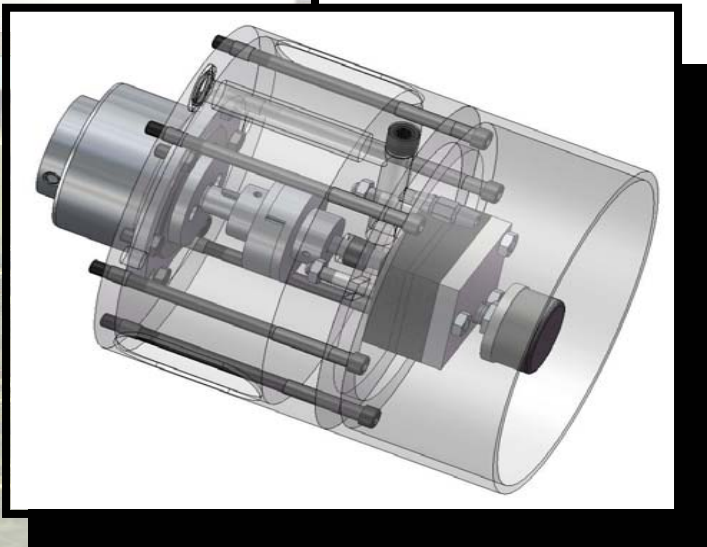
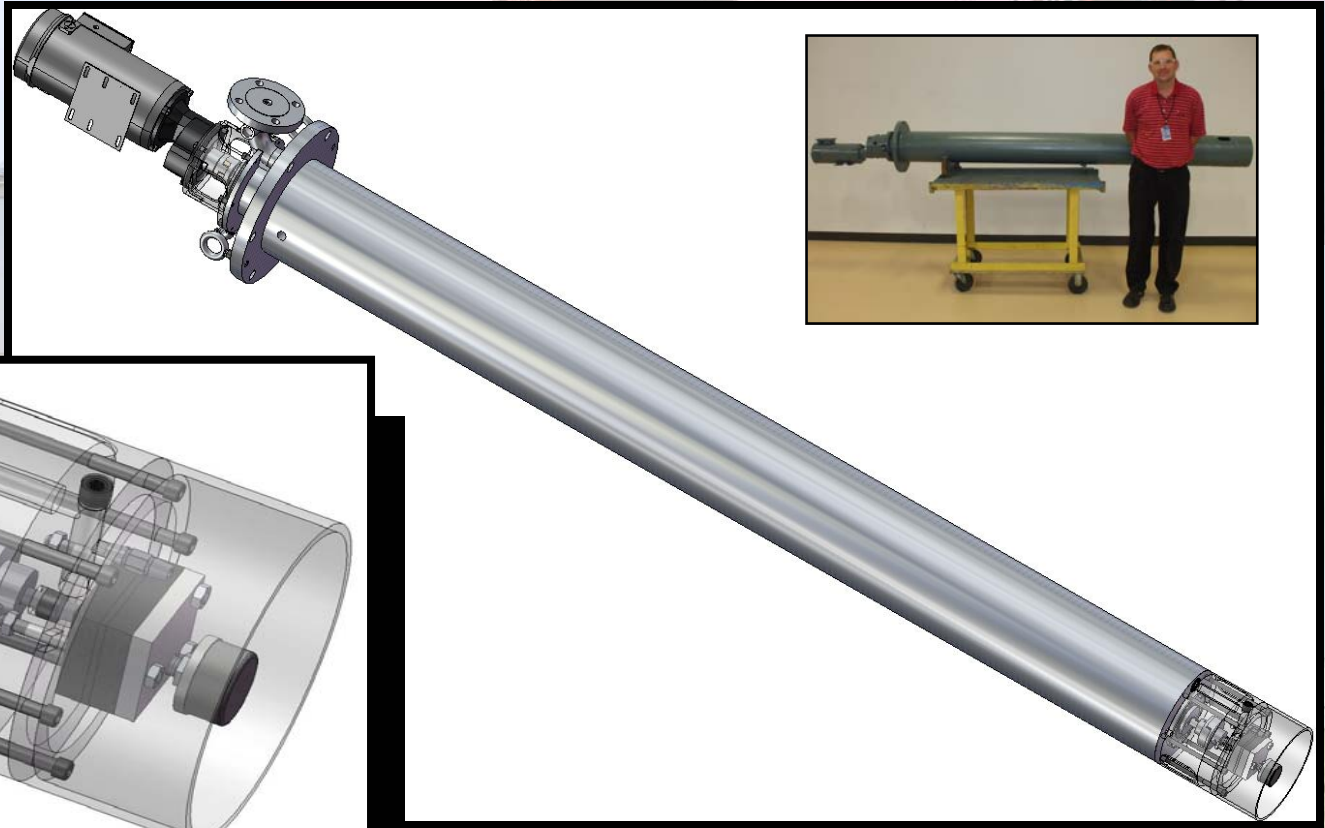
**Magnetic Drive Pump**

**T- Pump**



# Success Stories

## Vertical Unit



# Success Stories

## Military Pumping Systems

Phalanx Coolant  
Pump

F-22 PAO  
Pump System

Land Combat  
Transmission  
Pump

