

Positive Displacement Rotary Vane Pumps

For Fluid Processing and Transfer Applications





The Blackmer Pump Story

Blackmer was first established in 1903, and has been manufacturing rotary pumps since that time. In 1965, Blackmer became a division of the Dover Corporation, a U.S. Fortune 500 Company and a diversified producer of capital goods.

Today, Blackmer is the world's leading manufacturer of rotary vane pumps. The company offers the best combined characteristics of sustained high level performance; energy efficiency, trouble-free operation and low maintenance cost. Blackmer pumps are widely used by the U.S. defense agencies, and have long been the preferred technology for transfer, transport and delivery of petroleum products and liquefied gases. Blackmer's unique sliding vane design is now recognized worldwide for handling industrial process fluids, Volatile Organic Compounds, abrasive slurries and viscous liquids.

World-class quality – ISO 9001 Certified

Blackmer's worldwide reputation for superior product quality begins with extensive research and development, computer-aided design, and integrated manufacturing capabilities. Blackmer operates its own modern foundry and metallurgical laboratory. Computerized machine tools and statistical process controls (SPC) are used throughout the manufacturing process to ensure the highest quality standards.

All Blackmer pumps are produced and tested in conformance with ISO 9001 certification.

How Blackmer sliding vane pumps achieve high volumetric efficiency

As shown in Figure 1, Blackmer pumps use a rotor with sliding vanes, which draw the liquid in behind each vane, through the inlet port and into the pumping chamber. As the rotor turns, the liquid is transferred between the vanes to the outlet where it is discharged. Each vane provides a positive mechanical and hydraulic push to the liquid.

Vaness are actuated by three forces: (1) centrifugal force from the rotor's rotation, (2) push rods moving between opposing pairs of vanes, and (3) liquid pressure entering through the vane grooves and acting on the rear of the vanes. Each revolution of a Blackmer pump displaces a constant volume of fluid. Variance in pressure has minimal effect. Energy-wasting turbulence and slippage are minimized and high volumetric efficiency is maintained.

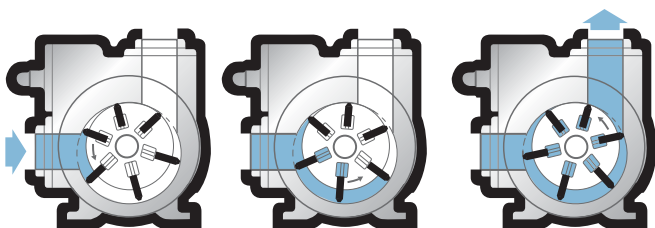


FIGURE 1. How Blackmer's sliding vane action works

Self-adjusting vanes sustain performance

The performance of gear pumps will constantly diminish as wear increases clearances. To compensate for the reduced performance, you must increase the pump speed (which further accelerates pump wear) or tolerate reduced capacity until performance drops to a totally unacceptable level. The vanes on a Blackmer pump automatically slide out in their rotor slots to continuously adjust for wear, as shown in Figure 2. No more speeding up to compensate for reduced flow, and no more putting up with poor performance. Blackmer pumps maintain near-original efficiency and capacity throughout the life of the vanes.

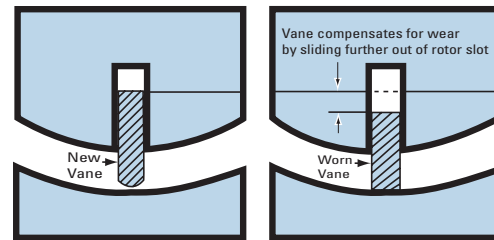


FIGURE 2. How Blackmer's sliding vanes maintain efficiency

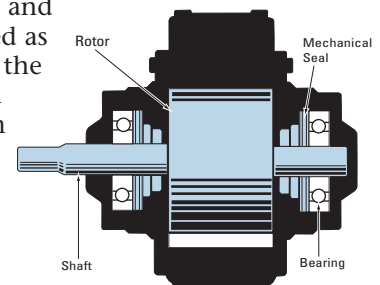
Efficiency means energy savings

The high volumetric efficiency and symmetrical bearing support of Blackmer pumps means they require less horsepower than other positive displacement pumps. So, you spend less on motors initially and less on electricity to operate the pumps once they are installed. How much less? Typically a Blackmer pump may require up to 30% less power than other positive displacement pump types in handling fluids from 30 to 500,000 SSU (1 to 108,000 cSt).

Symmetrical bearing support and rugged construction assures reliable performance

Blackmer pumps are available with grease lubricated ball or roller bearings and mechanical shaft seals. Models are also available with external gland bearings or internal self-lubricating sleeve bearings, which have small vacuum passages in the heads to assure bearing lubrication and cooling.

Blackmer mechanically sealed pumps are often the first choice for demanding applications, such as abrasives, viscous or thin, non-lubricating fluids. Blackmer manufactures its own mechanical seals to match the criteria of the application, and Blackmer seals are designed as an integral component of the pump. This unique design isolates the pumpage from the bearings, maintains seal face alignment and maximizes seal flushing for cooling. The result is optimum seal and bearing life.



Vane replacement in minutes, easy maintenance

Vane replacement, when necessary, is easy. Simply remove the outer head, slide out the old vanes, insert the new ones, and reinstall the head. In a matter of minutes, your pump is back in operation. Routine inspection is equally as easy.

Several Blackmer pump models are equipped with replaceable liners and end discs. They protect the pump casing and offer the economy of simple replacement, restoring the pump to like-new efficiency, should the liner ever show significant wear.

Self-priming and dry run capability

Blackmer's unique mechanical seal and seal-less designs allow dry running for priming and line stripping. The self-adjusting sliding vanes help maintain this capability for consistent priming.

Volatile Organic Compounds

Blackmer sliding vane pumps have long been the preferred pump technology for handling Volatile Organic Compounds (VOC's), and a wide range of thin products. Since Blackmer pumps are designed with no metal-to-metal contact, they are ideal for handling non-lubricating fluids efficiently.

High viscosity or shear sensitive fluids

Blackmer pumps are ideal for handling viscous or shear sensitive fluids. Slow operating speeds, hydraulic vane actuation and high efficient design minimize shear and agitation of the liquid.

Abrasive fluids

Blackmer wear-resistant pump models have specially hardened and replaceable wear surfaces. Low speed operation and external bearings that are completely isolated from the pumpage provide extended life on tough abrasive service.

Sealing options

A wide selection of Blackmer mechanical seal options are available for a broad range of application requirements. Commercial mechanical seals in single or multiple configurations, shaft packing, lip seals or triple lip seals are also available for select pump models.

Seal-less option

Blackmer also offers a line of magnetically coupled pumps that provide zero shaft leakage of expensive, hazardous or toxic fluids.

Materials of construction

Blackmer pumps are offered in cast iron, ductile iron, or 316 stainless steel construction.

Technical assistance

The chart below gives recommended pump types for fluids commonly handled by Blackmer pumps. This is only a partial list and, in some applications, selecting the right pump may require more detailed information than is presented here. Blackmer has a worldwide stocking distributor network and a staff of Application Engineers to assist you in specifying the proper pump for your application. Please log on to our website, www.blackmer.com, for the name of the nearest distributor in your area.

Typical Blackmer Pump Applications

SERVICE	FLUID	RECOMMENDED PUMP TYPES	SERVICE	FLUID	RECOMMENDED PUMP TYPES
	GENERAL-DUTY PUMPS:			ABRASIVE LIQUID PUMPS:	
Petroleum	Refined Fuel Transfer	X, GX	Fluid Recovery	Waste Solvents (VOC's)	XLW, MLX
	Greases	NP, MLN		Waste Petroleum Products	XLW, MLX
Food	Chocolate	NP, MLN	Printing	Ink	XLW, MLX
	Syrups	NP, MLN	Paints	Oil Base Paints	XLW, MLX
	Molasses	NP, MLN	Paper	Calcium Sterate	XLW, MLX
	Edible Oils	X, GX	Processing	Filled Polyol	XLW, MLX
Paper	Black Liquor	NP, MLN		Magnetic Tape - Iron Oxide	XLW, MLX
	Sodium Silicate	NP, MLN		Crude Oil	XLW, MLX
Transfer	Solvent (VOC's) Transfer	All Lines			
	Tallow	NP, MLN			
	Fire Fighting Foam (AFFF)	NP, MLN			
	Wax	NP, MLN			
	Creosote	NP, MLN			
	Glues, Adhesives	NP, MLN			
	Asphalt	NP, MLN			
	HEAVY-DUTY PUMPS:			316 STAINLESS STEEL PUMPS:	
Petroleum	Lube Oil Packaging	All Line	Food	Corn Syrups	SNP
	Refineries	MLX, HXL		Chocolates	SNP
Marine	Stripping	XL, MLX		Fruit Juices	SNP
	Fluid Transfer	MLX, HXL	Paints	Latex Emulsions	SNP
	Fuel and Lubrication	XL, X, GX	Soap	Sulphonic Acid	SNP
				Liquid Soaps	SNP
Processing	Caustics	All Lines	Processing	Solvents (VOC's)	SMVP
	Solvents (VOC's)	All Lines		Caustic Soda	SNP, SMVP
	Asphalts	HXL, ML		Resins	SNP
	Molasses	HXL, ML			
	Polyol	XL			
	Polyol Catalyst (TDI)	MVP			
	Industrial Liquefied Gases	XL			



General-Duty Pumps

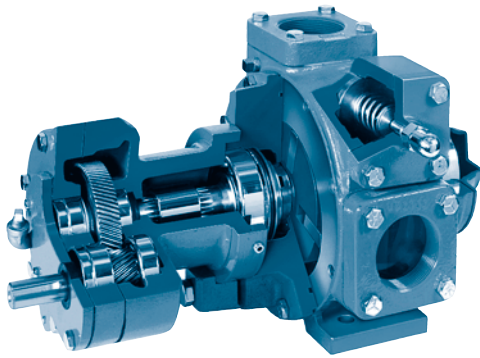
Blackmer GX, X, NP and MLN pump models have long been popular for transferring a wide range of non-corrosive, non-abrasive industrial liquids and petroleum products. The GX and X models are fitted with Blackmer mechanical seals and external grease lubricated ball bearings. The X1 and X1P motor speed pump models have one-inch NPT tapped ports, and are fitted with a foot bracket for base mounting, or an integral bracket for direct mounting to a NEMA C-face motor. The X1P model offers 50% more capacity than the X1 pump.

The GX models feature an integral head mounted gear reduction drive that is self-aligning. The GX

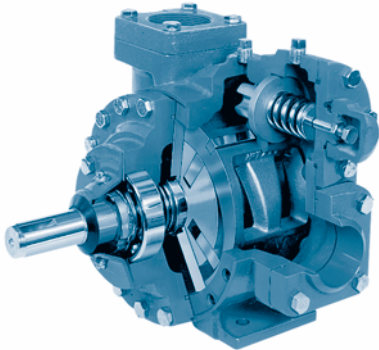
pumps are the first choice for economy and compactness. The X type pumps can be used with a wide variety of gear reducers and drive arrangements.

Standard NP and MLN pump models are constructed with self-lubricating internal sleeve bearings and PTFE impregnated shaft packing. Sealing options include single or multiple commercial mechanical seals, lip seals or triple lip seals. Jacketed heads are available for both models.

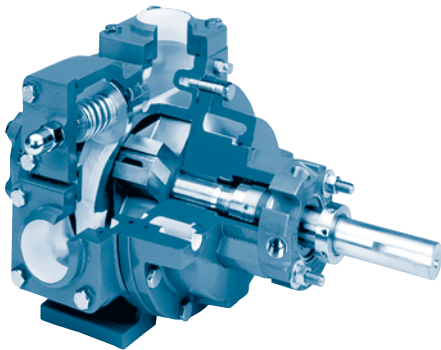
The GX, X, and NP pump models (two through four-inch port sizes) are offered with standard NPT tapped or optional weld, ANSI or DIN companion pipe flanges. The MLN4 model has ANSI compatible flanges.



GX2 cutaway



X2 cutaway



NPJ2 cutaway

Materials of Construction

PUMP SERIES	CYLINDER AND HEADS	ROTOR	SHAFT	BEARINGS	SHAFT SEAL	O-RING OPTIONS	VANE OPTIONS
GX, X	Cast Iron	Cast Iron	Steel	External Ball	Blackmer Mechanical	FKM PTFE	Duravane Laminate Bronze Iron
NP	Cast Iron or Ductile Iron	Ductile Iron		Metal Impregnated Carbon Sleeve	Packing, Mechanical Seal or Lip Seal		
MLN	Ductile Iron	Ductile Iron					

Pump Ratings

PUMP SERIES	MAXIMUM DIFFERENTIAL PRESSURE		MAXIMUM WORKING PRESSURE		MAXIMUM FLUID TEMPERATURE	
	PSI	BAR	PSI	BAR	°F	°C
GX, X	125	8.6	175	12.1	300	149
NP	200	13.8	250	17.2	500	260
MLN	200	13.8	250	17.2	400	204

Pump Performance Data

PUMP MODEL	PORT SIZE (INCHES)	PUMP SPEED (RPM)	NOMINAL FLOW RATE AT 50 PSI (3.4 BAR)		MAXIMUM VISCOSITY AT PUMP SPEED SHOWN	
			GPM	LPM	SSU	cSt
X1	1	1,750	10	38	3,000	630
		1,450	8	30	3,000	630
X1P	1	1,750	16	61	1,000	220
		1,450	12	45	1,000	220
GX2 X2	2	640	74	280	1,000	220
		280	31	117	20,000	4,250
GX2.5 X2.5	2½	640	131	496	1,000	220
		280	58	220	20,000	4,250
GX3 X3	3	640	266	1,007	500	105
		280	115	435	20,000	4,250
GX4 X4	4	500	510	1,930	500	105
		230	224	848	20,000	4,250
NP1.5	1½	640	46	174	1,000	220
		56	4	15	75,000	16,500
NP2	2	640	72	273	1,000	220
		100	10	38	75,000	16,500
NP2.5	2½	640	132	500	1,000	220
		100	22	83	75,000	16,500
NP3	3	640	269	1,018	1,000	220
		100	38	144	75,000	16,500
NP4	4	500	512	1,938	5,000	1,050
		100	94	356	75,000	16,500
MLN4	4	600	565	2,139	5,000	1,050
		68	60	227	500,000	108,000



Heavy-Duty, Ductile Iron Pumps

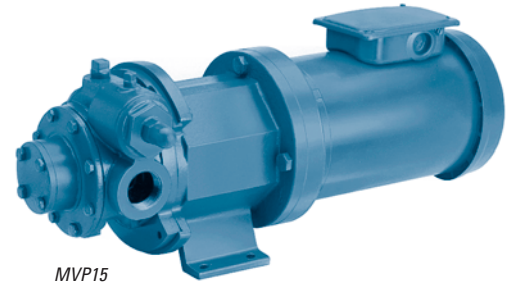
Blackmer XL, MVP, MLX and HXL pump models are commonly used in refineries, lube oil plants and general industry for processing, filling and transfer applications. These models are constructed of ductile iron (ASTM536, Grade 60-40-18) that will withstand sudden thermal shock and stress well beyond the capabilities of cast iron. All models feature replaceable casing liners and end discs that allow easy rebuilding of the pumping chamber to like new condition, without removing the pump from the piping. The XL, MLX and HXL models are fitted with Blackmer mechanical seals, and external grease lubricated ball or spherical roller bearings.

For applications that are hard to seal, or when zero shaft leakage of expensive, hazardous or toxic fluids is required, a Blackmer MVP pump is the answer. These seal-less, magnetically coupled vane pumps provide the Best Available Control Technology to prevent fugitive emissions.

All MVP models are fitted with PTFE elastomers and self-lubricating carbon sleeve bearings that allow dry running for priming and line stripping. Samarium cobalt magnets are standard on all coupling sizes.

Materials of Construction

PUMP SERIES	CASING AND HEADS	ROTOR	SHAFT	LINER	END DISCS	BEARINGS	SHAFT SEAL	O-RING OPTIONS	VANE OPTIONS ²
XL	Ductile Iron	Iron	Steel ¹	Iron	Cast Iron	External Ball	Blackmer Mechanical	FKM PTFE	Duravane Laminate Bronze Iron
MVP						Carbon Sleeve	Seal-less		
MLX HXL						Spherical Roller	Blackmer Mechanical		



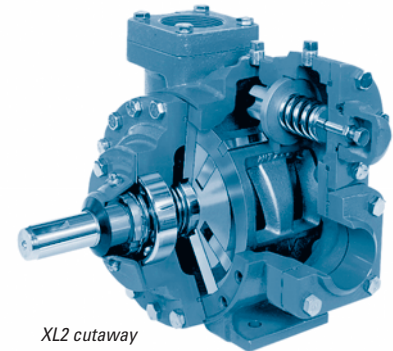
MVP15

Pump Ratings

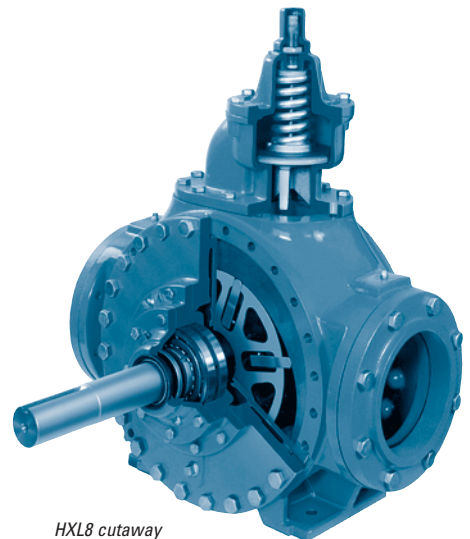
PUMP SERIES	MAXIMUM DIFFERENTIAL PRESSURE		MAXIMUM WORKING PRESSURE		MAXIMUM FLUID TEMPERATURE	
	PSI	BAR	PSI	BAR	°F	°C
XL	150	10.3	350	24.1	300	149
MVP	150	10.3	175	12.1	200	93
MLX	200	13.8	250	17.2	300	149
HXL6	125	8.6	150	10.3	400	204
HXL8, HXL10	150	10.3	250	17.2	400	204

Pump Performance Data

PUMP MODEL	PORT SIZE (INCHES)	PUMP SPEED (RPM)	NOMINAL FLOW RATE AT 50 PSI (3.4 BAR)		MAXIMUM VISCOSITY AT PUMP SPEED SHOWN	
			GPM	LPM	SSU	cSt
XRL1.25	1¼	1,750	17	64	5,000	1,050
MVP15	1½	1,450	14	53	5,000	1,050
XL1.25	1¼	1,750	23	87	5,000	1,050
MVP20	1½	1,450	19	72	5,000	1,050
XL1.5	1¼	1,750	35	132	5,000	1,050
MVP30	1½	1,450	29	110	5,000	1,050
MVP50	2	1,750	60	227	5,000	1,050
		1,450	49	185	5,000	1,050
MVP100	2	1,750	122	462	5,000	1,050
		1,450	95	360	5,000	1,050
XL2	2	780	82	310	5,000	1,050
		230	24	91	50,000	10,500
XL3	3	780	185	700	5,000	1,050
		230	50	189	50,000	10,500
XL4	4	640	346	1,310	5,000	1,050
		155	77	291	50,000	10,500
MLX4	4	600	565	2,139	5,000	1,050
		200	180	681	100,000	21,000
HXL6	6	350	755	2,858	1,000	220
		68	130	492	100,000	21,000
HXL8	8	350	1,200	4,542	1,000	220
		68	215	814	100,000	21,000
HXL10	10	230	2,220	8,404	5,000	1,050
		68	640	2,423	100,000	21,000



XL2 cutaway



HXL8 cutaway

¹The MVP50 and MVP100 pump models have a hardened ductile iron shaft.
²Optional bronze or iron vanes are not available for the MVP seal-less pump models.



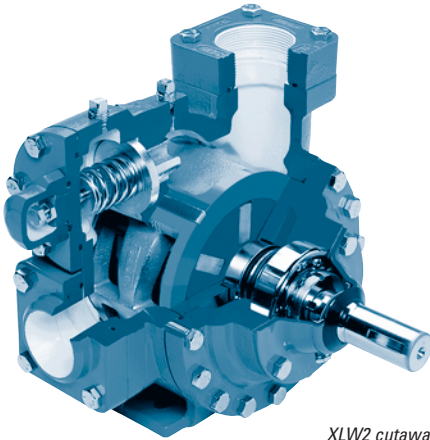
Wear-Resistant, Abrasive Liquid Pumps

Blackmer wear-resistant pumps are specially designed for handling liquids with suspended abrasive particles, such as inks, paints, crude oil, waste oils and solvents. These models are constructed with specially hardened and replaceable wear surfaces for extended service life. All models have ductile iron construction with replaceable liners and end discs for quick, easy replacement.

The XLW and MLX models are fitted with external grease lubricated ball or roller bearings, and feature special Blackmer abrasion-resistant mechanical seals, which are an integral component of the pump. This construction minimizes seal face movement, and completely isolates the bearings from the pumpage.

Materials of Construction

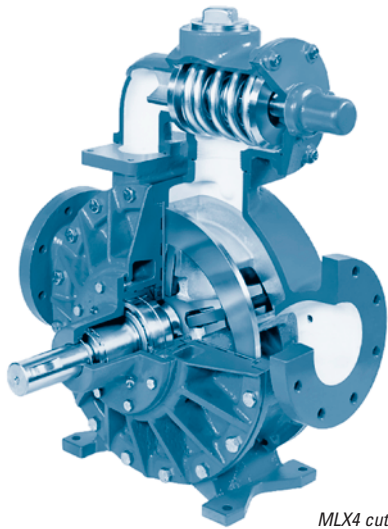
PUMP SERIES	CASING AND HEADS	ROTOR	SHAFT	LINER	END DISCS	BEARINGS	SHAFT SEAL	O-RING OPTIONS	VANE OPTIONS
XLW MLX	Ductile Iron	Hardened Ductile Iron	Hardened Steel	Hardened Ductile Iron	Hardened Cast Iron	External Ball or Roller	Blackmer Mechanical	FKM PTFE	Hardened Iron or Laminate



XLW2 cutaway

Pump Ratings

PUMP SERIES	MAXIMUM DIFFERENTIAL PRESSURE		MAXIMUM WORKING PRESSURE		MAXIMUM FLUID TEMPERATURE	
	PSI	BAR	PSI	BAR	°F	°C
XLW	150	10.3	350	24.1	300	149
MLX	200	13.8	250	17.2	300	149



MLX4 cutaway

Pump Performance Data

PUMP MODEL	PORT SIZE (INCHES)	PUMP SPEED (RPM)	NOMINAL FLOW RATE AT 50 PSI (3.4 BAR)		MAXIMUM VISCOSITY AT PUMP SPEED SHOWN	
			GPM	LPM	SSU	cSt
XRLW1.25	1¼	870	8	30	20,000	4,250
		300	2.5	9	50,000	10,500
XLW1.25	1¼	870	11	42	10,000	2,200
		300	3.5	13	30,000	6,300
XLW1.5	1½	870	17	64	10,000	2,200
		300	5.5	21	20,000	4,250
XLW2	2	350	37	140	30,000	6,300
		190	20	76	75,000	15,750
XLW3	3	350	76	288	30,000	6,300
		190	41	155	75,000	15,750
MLX4	4	300	280	1,060	50,000	10,500
		200	190	719	100,000	21,000



316 Stainless Steel Pumps

Blackmer SNP and SMVP pump models are typically used in handling a wide variety of corrosive or caustic fluids, and liquid foods such as sugars, syrups and flavor extracts. Both series have 316 stainless steel construction and self-lubricating carbon sleeve bearings which allow dry running for priming and line stripping. All models are fitted with PTFE seal rings, replaceable end discs and non-metallic vanes that eliminate galling and provide extended pump life.

The SNP models are available with PTFE impregnated shaft packing, lip seals, triple lip seals, lantern rings or commercial mechanical seals. An optional two-way relief valve is available on all models through

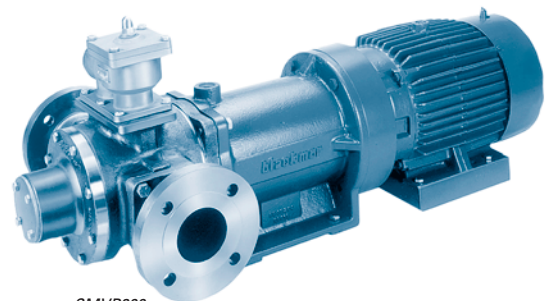
2½-inch port size. ANSI compatible flanges are standard on sizes through 2½-inches. The SNP3 has an internal relief valve and weld companion flanges.

For control of fugitive emissions, the SMVP seal-less series is offered with samarium cobalt magnetic couplings that assure zero shaft leakage. Blackmer SMVP pumps provide the Best Available Control Technology for handling expensive, hazardous or toxic fluids.

ANSI compatible flanges are standard on all SMVP pump models. Optional DIN flanges are available for the SMVP200 and SMVP300 models.

Materials of Construction

PUMP SERIES	CYLINDER AND HEADS	ROTOR	SHAFT	END DISCS	BEARINGS	SHAFT SEAL	SEAL RINGS	VANE OPTIONS
SNP SNPJ	316 Stainless Steel	316 Stainless Steel	Stainless Steel	Carbon or Chem Disc ¹	Metal Impregnated Carbon Sleeve	Packing, Mechanical Seal or Lip Seal	PTFE	Duravane Laminate
SMVP						Seal-less		



SMVP200

Pump Ratings

PUMP SERIES	MAXIMUM DIFFERENTIAL PRESSURE		MAXIMUM WORKING PRESSURE		MAXIMUM FLUID TEMPERATURE	
	PSI	BAR	PSI	BAR	°F	°C
SNP, SNPJ	150	10.3	200	13.8	400	204
SMVP	125	8.6	175 ²	12.1	200	93

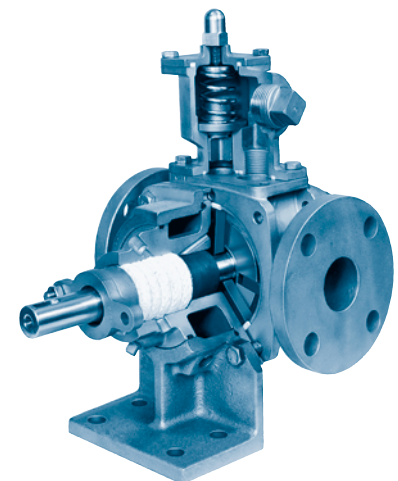
Pump Performance Data

PUMP MODEL	PORT SIZE (INCHES)	PUMP SPEED (RPM)	NOMINAL FLOW RATE AT 50 PSI (3.4 BAR)		MAXIMUM VISCOSITY AT PUMP SPEED SHOWN	
			GPM	LPM	SSU	cSt
SNP1.25 SNPJ1.25	1½	1,750	16	61	5,000	1,050
		640	6	23	15,000	3,150
SNP1.5 SNPJ1.5	1½	1,750	36	136	5,000	1,050
		640	11	42	15,000	3,150
SNP2 SNPJ2	2	640	73	276	1,000	220
		190	21	80	40,000	8,500
SNP2.5 SNPJ2.5	2½	640	132	500	1,000	220
		190	40	151	40,000	8,500
SNP3	3	640	265	1,003	500	105
		190	76	288	40,000	8,500
SMVP15	1½	1,750	16	61	5,000	1,050
		1,450	13	49	5,000	1,050
SMVP30	1½	1,750	36	136	5,000	1,050
		1,450	31	117	5,000	1,050
SMVP50	2	1,750	60	227	5,000	1,050
		1,450	50	189	5,000	1,050
SMVP100	2	1,750	122	462	5,000	1,050
		1,450	95	360	5,000	1,050
SMVP200	3	1,150	210	795	2,250	500
		950	175	662	4,500	1,000
SMVP300	4	1,150	315	1,192	2,250	500
		950	260	984	4,500	1,000

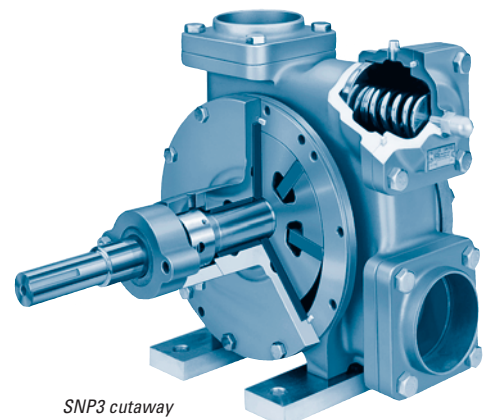
¹Chem Discs are standard for the SMVP50 through SMVP300 seal-less pump models.

²Note: Chem Discs are not available for the SMVP15, SMVP30 or SNP pump model.

³The maximum working pressure for the SMVP200 and SMVP300 pump models is 150 psi (10.3 BAR). Please consult factory for applications that require higher working pressures.



SNP1.25 - 1.5 cutaway



SNP3 cutaway

Auxiliary Equipment

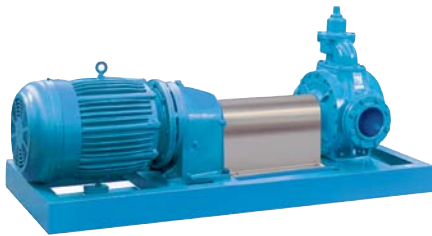
Gear reducers and drive arrangements

Blackmer manufactures a wide range of gear reducers and drive arrangements to meet a broad range of application requirements.

Blackmer helical gear reducers are designed for use with 1750, 1150, 1450 and 950 rpm motors up to 30 hp. Blackmer also offers a line of commercial gear reducers for applications that require higher horsepower.

Standard drive arrangements include base mounted units complete with pump and foot-mounted motor, or a NEMA C-face motor.

Special drive arrangements such as gear motors, variable-speed motors, hydraulic drives, gasoline or diesel engines can be furnished. Consult factory for details.



Hand pumps for transfer and dispensing

Blackmer offers a full line of hand operated rotary pumps for transfer and dispensing of solvents, fuels, lube oils and a wide range of non-corrosive liquids. FM approved models for flammables, geared models for viscous liquids to 30,000 SSU (6,300 cSt), or high volume output. A complete line of accessories is available. For more information and specifications, see Bulletin 301.



Gas compressors for liquid transfer, vapor recovery and pressure boosting

Blackmer oil-free gas compressors deliver high efficiency in handling a wide range of industrial gases.

Both air and water cooled models with single or two-stage options are available. Working pressures to 750 psia (51.7 BAR), capacities to 125 CFM (212 m³/h). For more information and specifications, request HD Compressor Catalog.



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