

CRL SERIES

POSITIVE DISPLACEMENT PUMPS FOR LIQUEFIED CO₂ APPLICATIONS | PRODUCT BROCHURE



Blackmer

Where Innovation Flows



In its liquid form, CO₂ is non-lubricating and stored at sub-zero temperatures in vessels under high pressures, making it extremely difficult to transfer. The Blackmer® CRL Series Sliding Vane Pump offers a robust and efficient solution, engineered to handle the toughest liquid CO₂ applications with confidence and reliability.

MAXIMUM PUMP PERFORMANCE FOR LIQUEFIED CO₂ SERVICE

Blackmer CRL Series | Positive Displacement Pumps for Liquefied CO₂ Applications

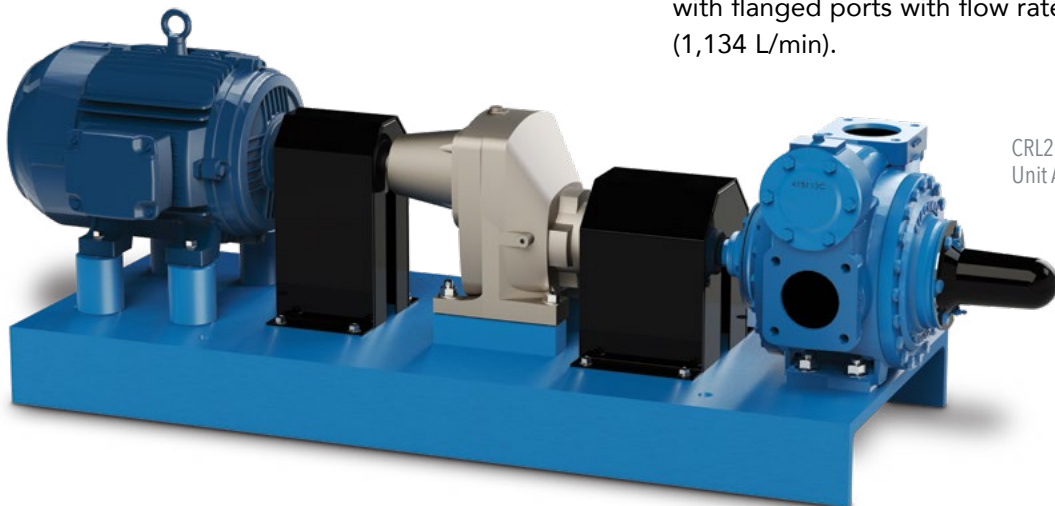
Featuring a unique sliding vane design and engineered with over 30,000 hours of combined laboratory and field testing, the Blackmer CRL Series was designed for liquefied CO₂ applications. The CRL Series Sliding Vane Pumps deliver sustained high-level performance, energy efficiency, trouble-free operation and low maintenance costs.

The complete CRL Series line is available in 1.25-, 1.5-, 2-, 3- and 4-inch sizes for industrial and food-processing systems, refrigeration, process plants, and transport loading and unloading. Flow rate capacities range from 2 to 320 gpm (8 to 1,211 L/min) with working pressures up to 525 psi (36.2 bar) and operating temperatures

down to -30°F (-34°C). Designed for maximum performance, the CRL Series can effectively manage liquid CO₂ transfer with differential pressures up to 100 psi (6.89 bar).

The 1.25- and 1.5-inch models are motor speed pumps for cylinder filling, low-volume motor fueling and small vaporizers. They feature 180° porting orientation with NPT tapped ports and a max speed of 1,150 rpm, with flow rates up to 22 gpm (83 L/min)

The 2-, 3- and 4-inch models are foot-mounted pumps for bulk transfer, recirculation and truck systems. They top out at 640 rpm with a 90° porting orientation with flanged ports with flow rates up to 300 gpm (1,134 L/min).



CRL2 Integrated
Unit Assembly

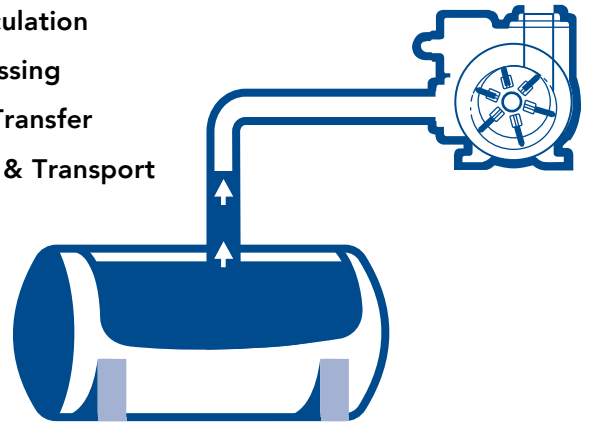
Integrated Unit Assembly

Blackmer fully Integrated Unit Assemblies are the pre-engineered and pre-designed drop-in pumping solution. These unit assemblies include a motor, gearbox, baseplate, coupling safety covers and a CRL Sliding Vane Pump (2-, 3- and 4-inch size).

No alignment is required with these pre-configured, fully Integrated Unit Assemblies, as they are ready for immediate drop-in installation.

Applications

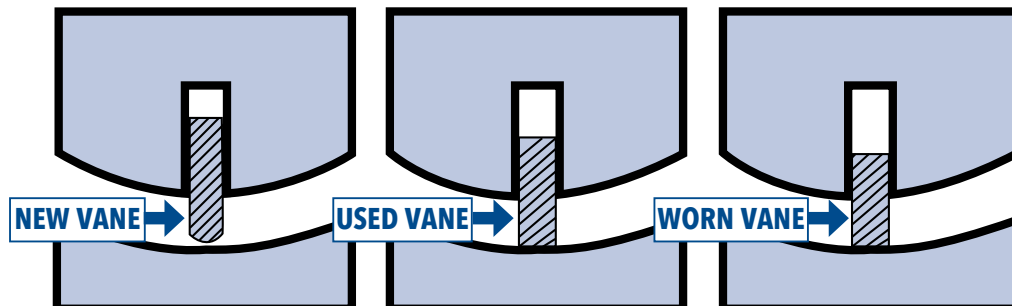
- **Recirculation**
- **Processing**
- **Bulk Transfer**
- **Truck & Transport**



Sliding Vane Pump Advantage

Blackmer positive displacement pumps have revolutionized the pumping industry with their unique sliding vane technology. This innovative rotary vane design allows the pumps to self-adjust for wear to help maintain flow rates. This design creates excellent self-priming and dry-run capabilities while providing sustained performance and trouble-free operation.

- Maintain consistent flow rates throughout the life of the pump due to a unique sliding vane pump design that self-adjusts for wear
- Sliding vane design provides sustained performance and trouble-free operation
- Specially designed to suppress cavitation and reduce wear
- Easy maintenance: vanes can be easily replaced without removing the pump from the piping system
- Low maintenance and low life-cycle costs: pumps are renewable and repairable
- Highly efficient: sliding vane pumps require less horsepower than other pumps, meaning spending less on motors initially and less on electricity to power the pump
- Excellent at self-priming: eliminates expensive priming systems
- Extended dry-run capability: eliminates nuisance current monitoring systems
- Rebuild economically with replaceable end discs and liners for like-new performance



Blackmer® CRL Series | Motor Speed Pumps

Discs

Replaceable end discs protect the heads from wear.

Vanes

Non-metallic laminate provides exceptional sealing and self-adjust to maintain performance over the operating life of the pump. Laminate vanes are self-lubricating and abrasion-resistant and provide added strength and wear resistance when moving dry, non-lubricating fluids like CO₂.

External Bearings

Reduce pump wear due to balanced shaft load, and decrease required maintenance due to greased bearing housing external from working fluid.

O-Ring

O-rings come standard to provide a strong seal for extreme applications.

Rotors

Developed with minimal clearance to improve inlet performance. The closed rotor design allows for line stripping, priming evacuated piping systems and vertical lift of fluid to the pump inlet.

Single Mechanical Seal

Internal mechanical seals allow for extended dry run and continuous operation with non-lubricating liquids.

Relief Valve

Designed to protect the pump from excessive pressure, the relief valve is also adjustable.

Porting Orientation

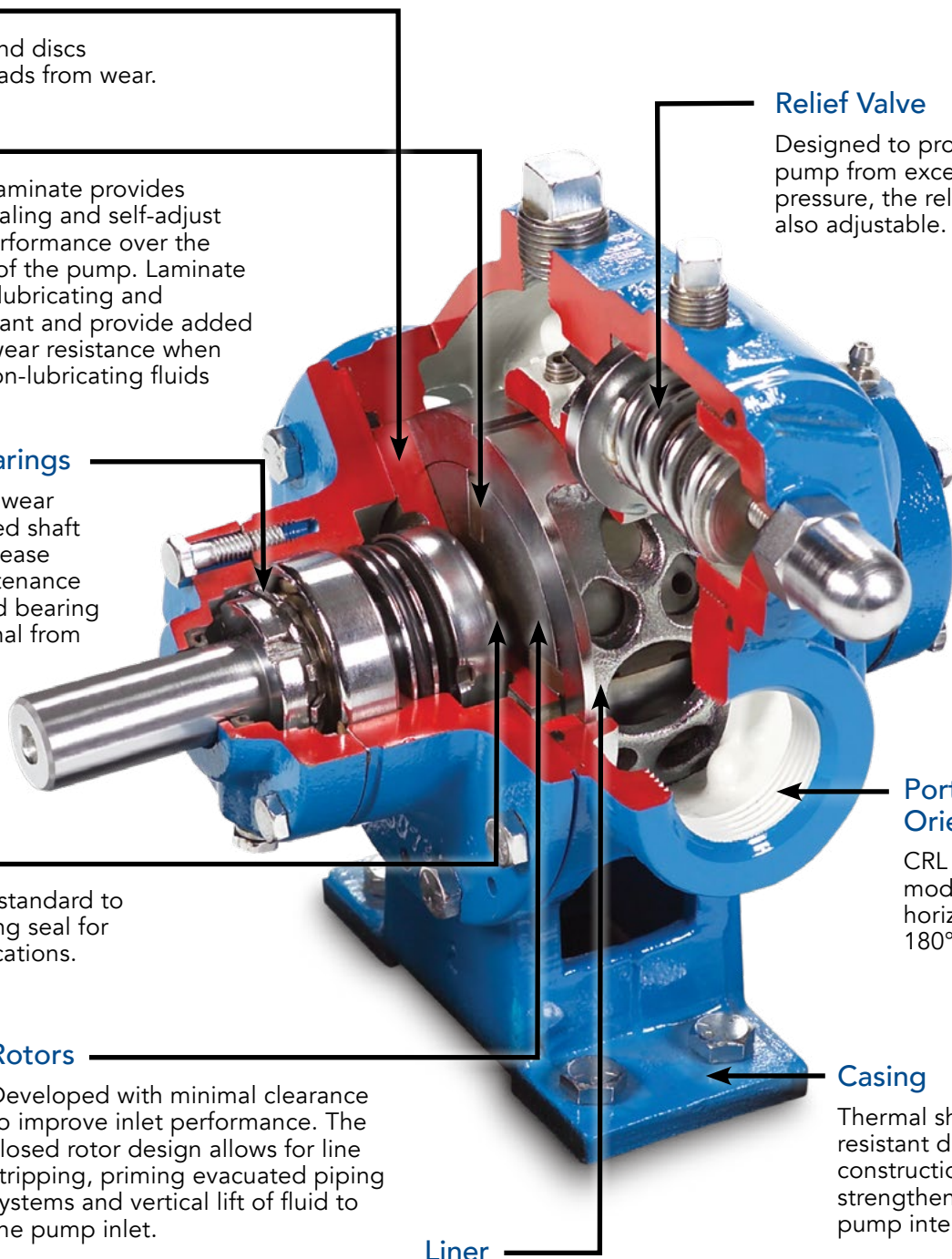
CRL 1.25 & 1.5-inch models features horizontal inline 180° porting.

Casing

Thermal shock-resistant ductile iron construction is used to strengthen the pump internals.

Liner

Replaceable liner allows for easy rebuilding of the pump to new condition without changing the pressure containing components. This can be done without removing the pump from the piping.



Blackmer® CRL Series | Bulk-Transfer Recirculation Pumps

End Discs

Replaceable end discs allow for easy rebuilding of the pump to new condition without changing the pressure containing components.

Threaded Lock Collars

The two-piece threaded lock collars precisely position the rotor and shaft, allowing the pump to operate under high inlet pressures. In addition, this positive lock thrust control helps prevent premature wear to internal components, because it features no metal to metal contact.

Double-Ended Drive Shaft

Allows the pumps to be mounted in multiple ways to enhance mounting flexibility, and allow for clockwise or counter-clockwise rotation. Single-ended drive shafts are also available.

External Roller Ball Bearings

Low friction grease-lubricated ball bearings are completely isolated from the pumpage by mechanical seals for trouble-free service and long life.

Discharge Port

90° porting features either NPT or butt-welded connections.

Cavitation Suppression Liner

Specifically designed to mitigate the negative effects of cavitation – such as excessive noise, vibration, and deterioration of the pump internals, the Cavitation Suppression Liner allows for the transfer of multi-phase liquids with high vapor pressures and zero NPSH. The liner can be easily replaced.

Internal Relief Valve

This spring actuated relief valve is designed to protect the pump from excessive pressure.

Inlet Port

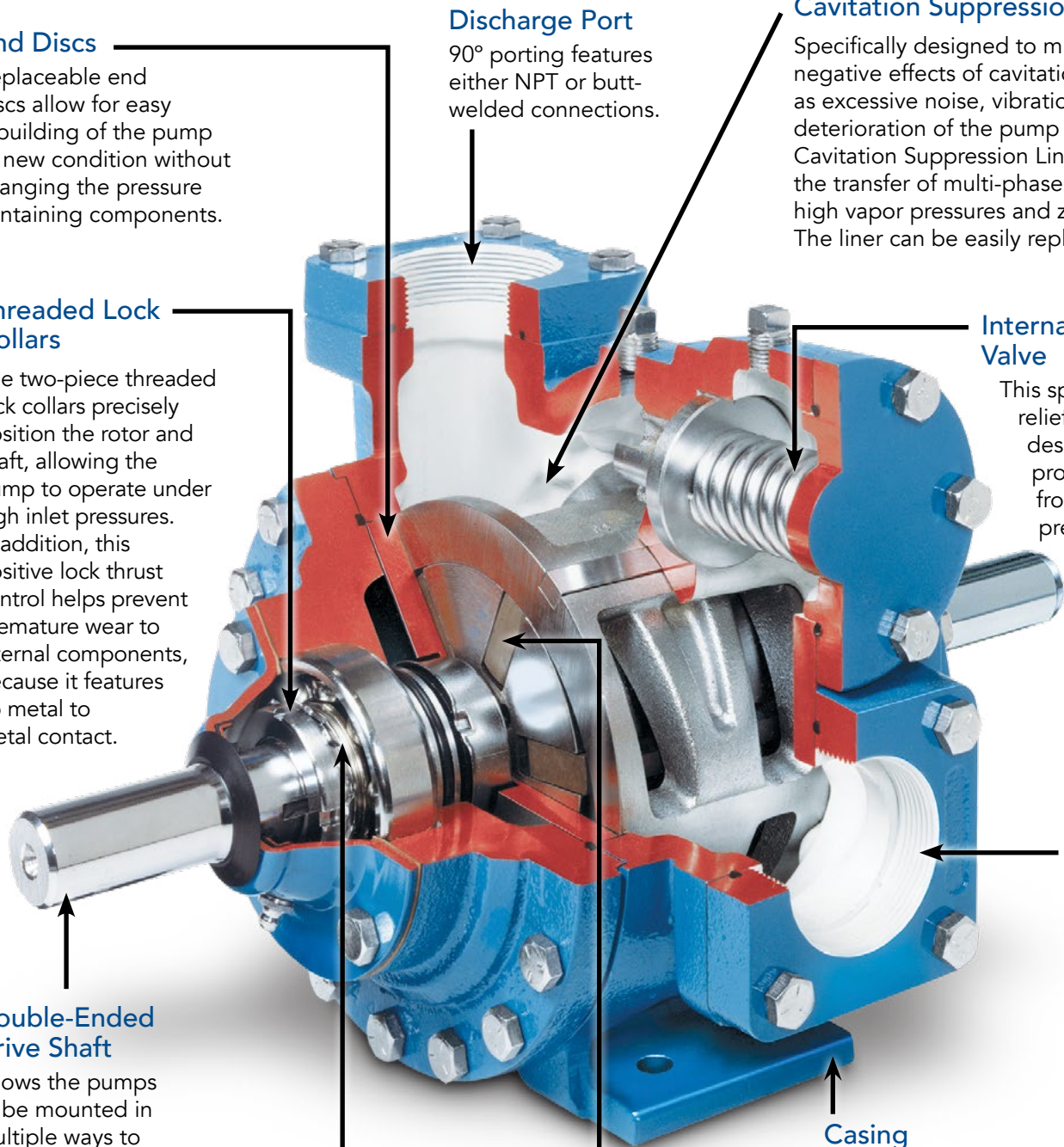
90° porting features either NPT or butt-welded connections.

Casing

Constructed with ductile iron, like all pressure parts in the CRL 2-4 models, provides greater resistance to both thermal and mechanical shock.

Vaness

Non-metallic laminate is designed to resist wear under non-lubricating conditions. They provide exceptional sealing which maintains performance over the operating life of the pump. These self-adjusting and easily replaceable vanes provide the best technology solution for pumping CO₂.



Blackmer® CRL Series | Performance

Fluid Connections

PUMP MODEL	STANDARD	OPTIONAL
CRLR1.25	1 ¼" NPT Tapped Ferts	-
CRL1.25	1 ¼" NPT Tapped Ferts	-
CRL1.5	1 ½" NPT Tapped Ferts	-
CRL2	Two 2" NPT Flanges Ductile Iron: ASTM A536	Two 2" Weld Flanges Ductile Iron: ASTM A216 WCB
CRL3	Two 3" NPT Flanges Ductile Iron: ASTM A536	Two 3" Weld Flanges Ductile Iron: ASTM A216 WCB
CRL4B	One 4" Weld Flange (inlet) Steel: ASTM A216 WCB & One 3" Weld Flange (discharge) Steel: ASTM A216 WCB	Two 3" NPT Flanges Ductile Iron: ASTM A536 Two 3" Weld Flanges Steel: ASTM A216 WCB Two 4" Weld Flanges Steel: ASTM A216 WCB

Maintenance Kits

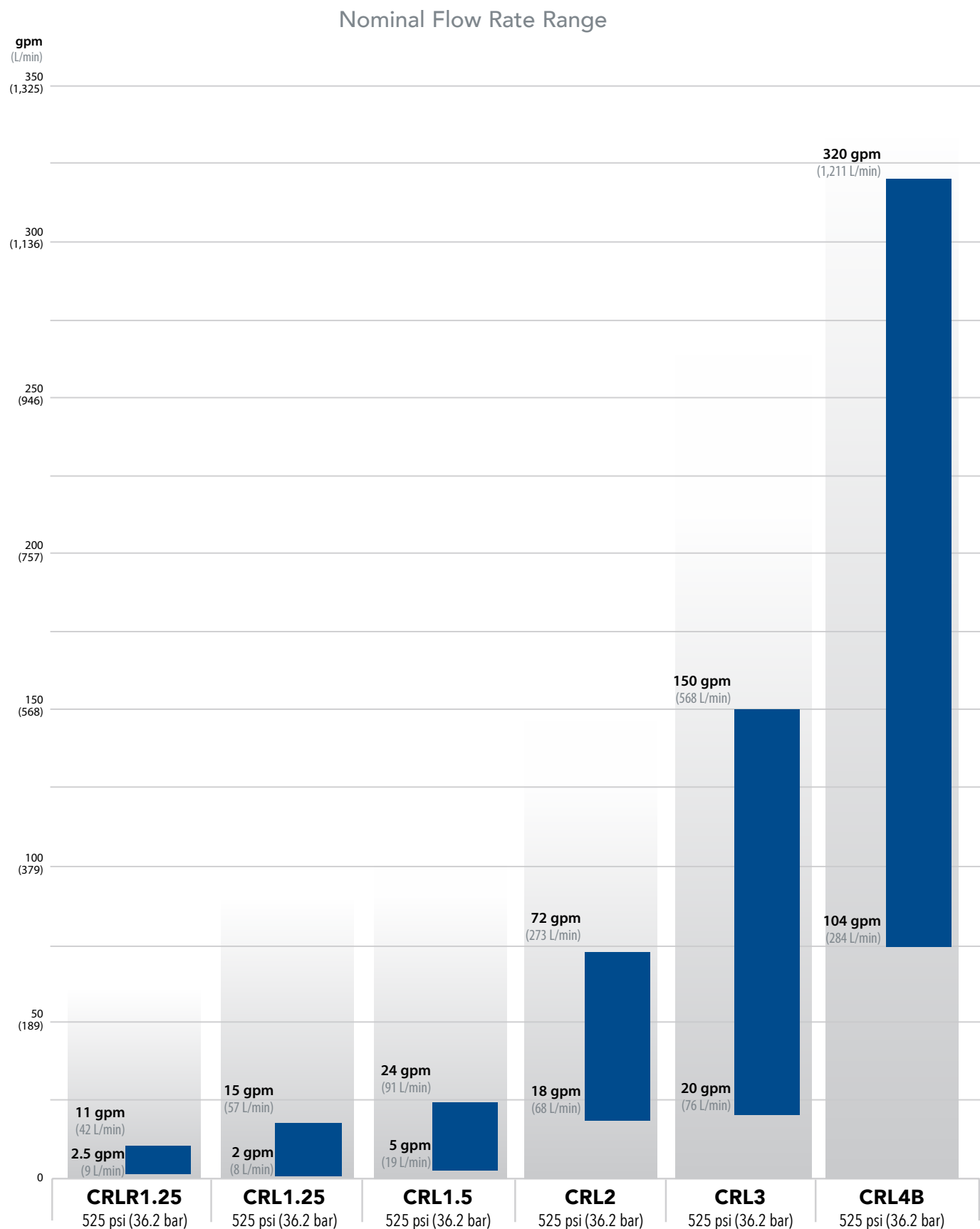
MODEL(S)	DESCRIPTION	PART NUMBER
CRLR1.25	Kit – Maintenance	898902
CRLR1.25	Kit – Rebuild	899002
CRL1.25	Kit – Maintenance	898903
CRL1.25	Kit – Rebuild	899003
CRL1.5	Kit – Maintenance	898904
CRL1.5	Kit – Rebuild	899004
CRL2	Kit – Maintenance	898905
CRL2	Kit – Rebuild	899005
CRL3	Kit – Maintenance	898906
CRL3	Kit – Rebuild	899006
CRL3-OE1	Kit – Rebuild	899119
CRL3-OE1	Kit – Maintenance	899219
CRL4B	Kit – Maintenance	898907
CRL4B	Kit – Rebuild	899007
CRL4B-OE1	Kit – Maintenance	899131

Maximum Operating Limits

Pump Model	Nominal Flow Rate Range	Viscosity Range	Minimum Operating Temperature	Maximum Operating Temperature	Min./Max. Speed	Maximum Differential Pressure	Maximum Working Pressure
	gpm (L/min)	cP	°F (°C)	°F (°C)	RPM	psi (bar)	psi (bar)
CRLR1.25	2.5 - 11 (9 - 42)	0.2 - 4,250	-30 (-34)	240 (115)	750 - 1,150	70 (4.83)	525 (36.2)
CRL1.25	2 - 15 (8 - 57)	0.2 - 4,250	-30 (-34)	240 (115)	750 - 1,150	100 (6.9)	525 (36.2)
CRL1.5	5 - 24 (19 - 91)	0.2 - 4,250	-30 (-34)	240 (115)	750 - 1,150	100 (6.9)	525 (36.2)
CRL2	18 - 72 (68 - 273)	0.2 - 4,250	-30 (-34)	240 (115)	330 - 640	100 (6.9)	525 (36.2)
CRL3	20 - 150 (76 - 568)	0.2 - 4,250	-30 (-34)	240 (115)	330 - 640	100 (6.9)	525 (36.2)
CRL4	75 - 320 (284 - 1,211)	0.2 - 4,250	-30 (-34)	240 (115)	330 - 640	100 (6.9)	525 (36.2)

Note: Optional materials of construction may be required to meet specific application requirements – refer to Blackmer Material Specification Sheets.
For operating conditions that exceed those listed, consult factory.

Blackmer® CRL Series | Performance



Maximum Differential Pressure 150 psi (10.3 bar)
(Internal relief valve setting)



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