



**Illinois Location:**

(847) 841-7867

860 Church Rd Elgin, IL 60123

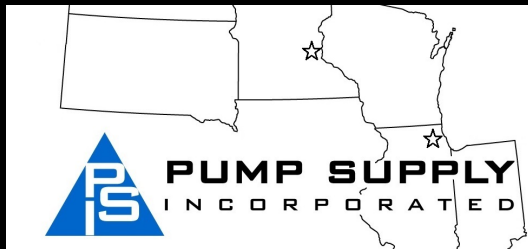
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## Technical Handbook



# Model S3

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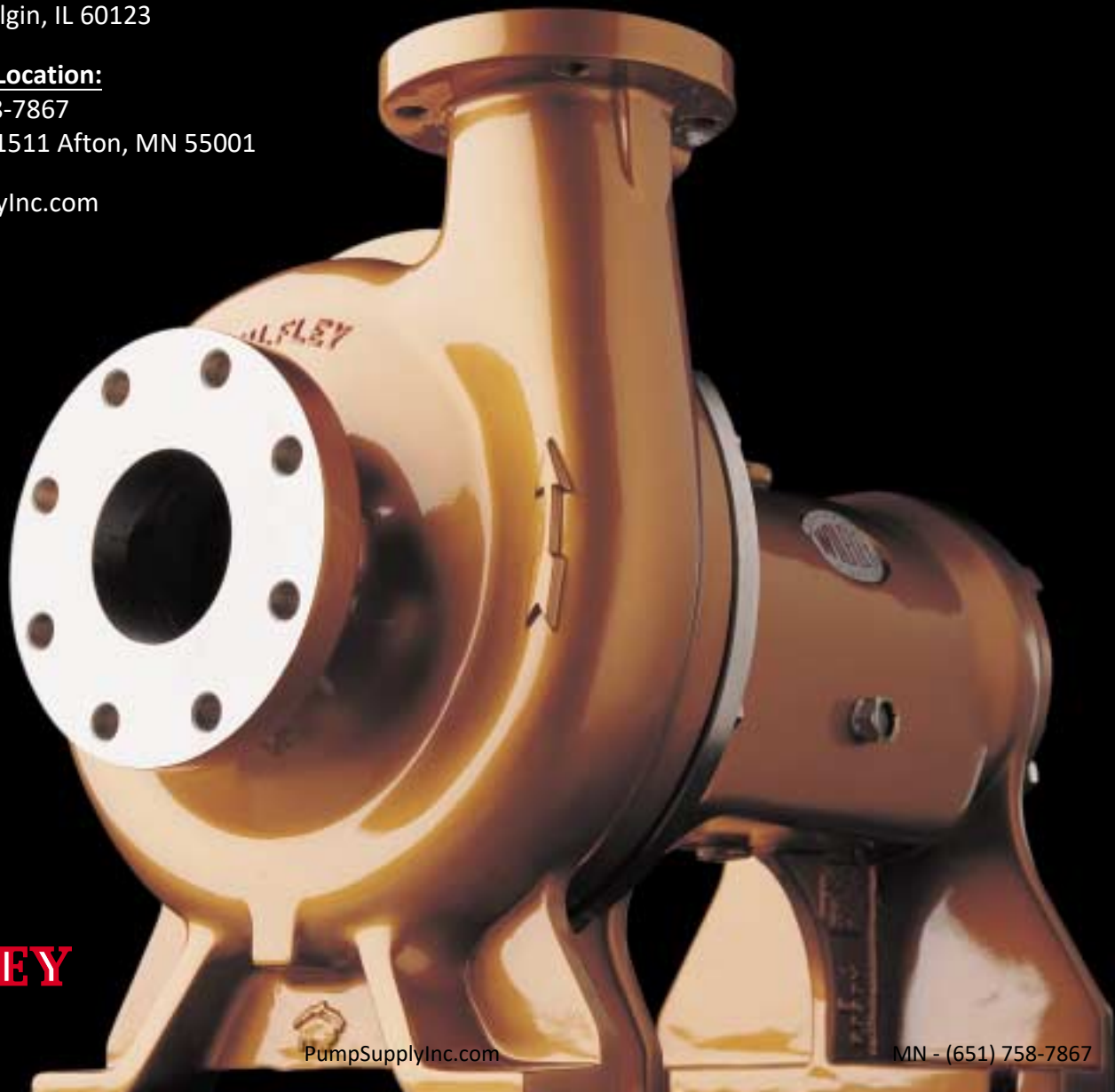
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**WILFLEY**

## Wilfley Model S3 Chemical Slurry Pumps



Wilfley hydraulic seal in actual operation.

The combined corrosive and abrasive action of many of today's modern processes have required compromises from traditional pumps. Slurry pumps have generally been too heavy in design and uncompromising for alloy construction. Acid pump designs have been too light for some of the robust applications. A clear need for an alternate choice was the reason for the birth of the Wilfley S3.

This unique Wilfley S3 was designed specifically for corrosive/slurry applications. The pumps have a strong, solid power frame that can withstand high heads, speeds and specific gravities. It can be upgraded for extreme duties.

The pump's hydraulic parts are designed to be made of a wide range of materials. The pump designs are flexible enough to customize pumps for specific services.

Clearly, the most outstanding feature of the S3 is the Expeller/DryLockt seal combination. The Expeller has been a hallmark of Wilfley pumps since 1919. Wilfley invented it and has perfected its operation during the last 80 years.

The Expeller seals the pump while running. The DryLockt is an adaptation of the seal that has made Wilfley's A7 ANSI chemical pump a leader in corrosive fluid handling. The repeatable and predictable smooth action of the seal ensures leak free startups and stops.

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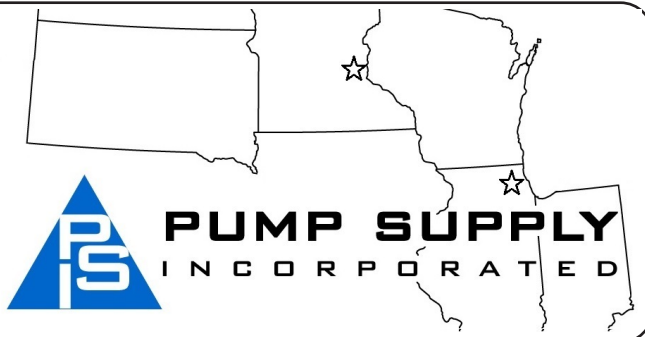
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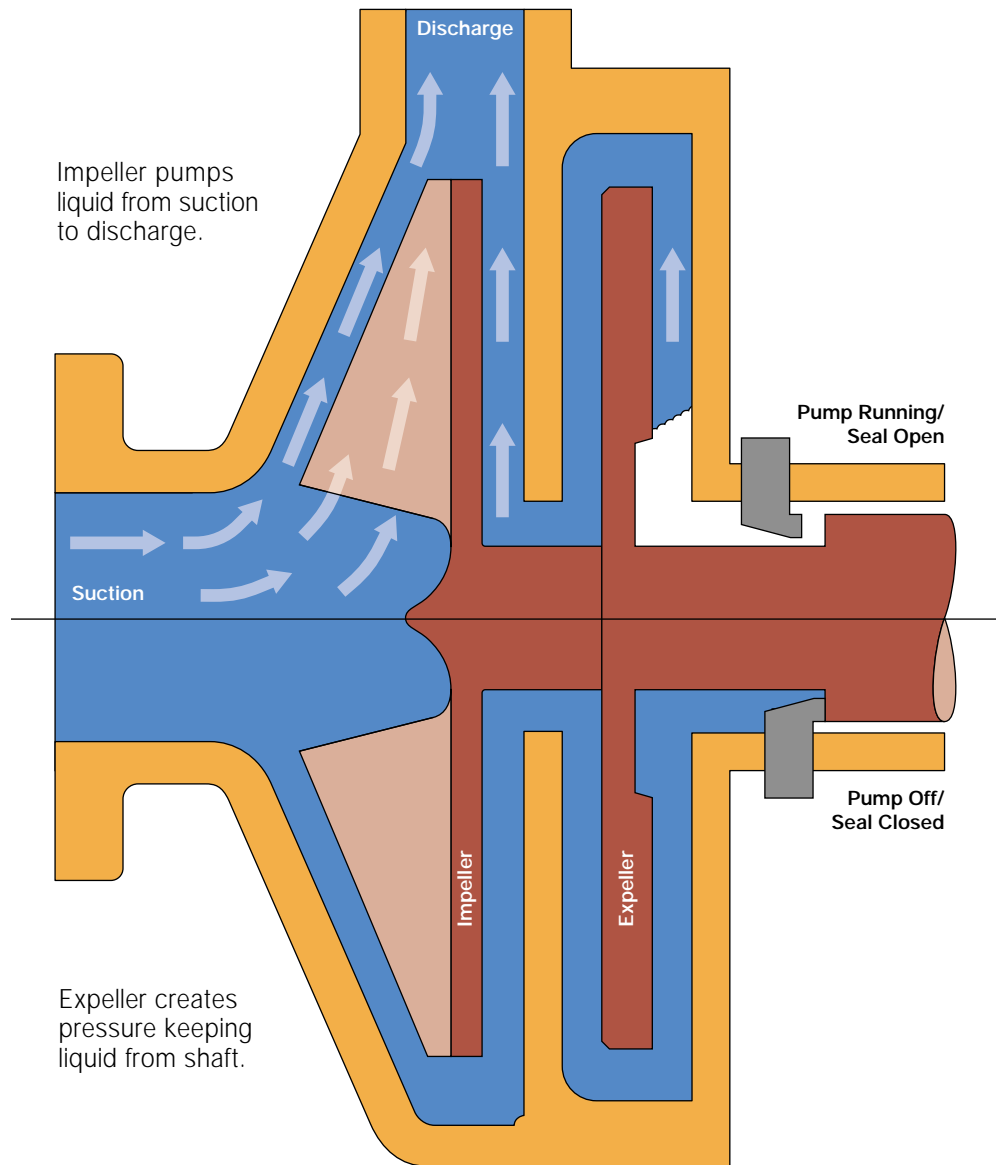
The DryLockt has been modified to thrive in the most aggressive slurries. There is no rubbing contact while the pump is running and no need for cooling flushes. However, multiple flush ports are available to clear any caking materials.

Wilfley free engineering service matches the pump to your specific application. Systems will be analyzed to ensure leak free, efficient and reliable pump operation. Each pump is tested before leaving our plant. It is through this thorough preparation that we can guarantee the operation of Wilfley pumps to your complete satisfaction.

Wilfley's application and engineering staff continue to provide the most up to date information and innovative technology on pumps and pump processes to customers and the world. The S3 joins Wilfley's line of slurry and acid pumps to provide coverage of your centrifugal pump needs.

To contact the Wilfley office or agent nearest you, please contact A.R Wilfley & Sons directly.



P.O. Box 2330  
 Denver, CO 80201 USA  
 1-800-525-9930  
 or 303-779-1777  
 fax 303- 779-1277  
 www.wilfley.com



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## Wilfley Model S3 Features and Benefits

Extra wall thickness extends wear life (1/4" corrosion allowance vs. 1/8" with standard ANSI/ASME).

Shaft sleeve available in a wide variety of materials for corrosion resistance.

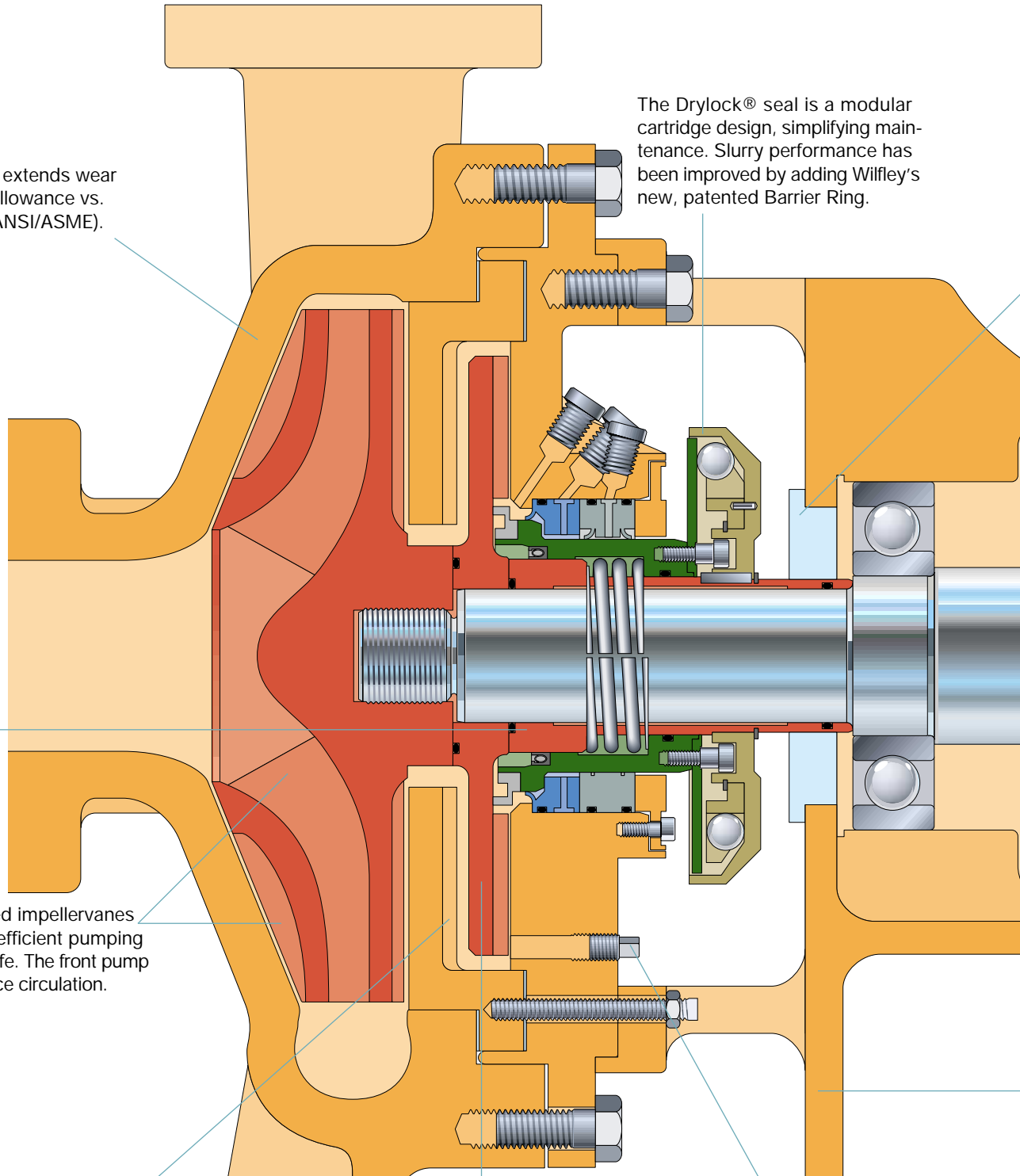
The large closed impellervanes provide highly efficient pumping and long wear life. The front pump out vanes reduce circulation.

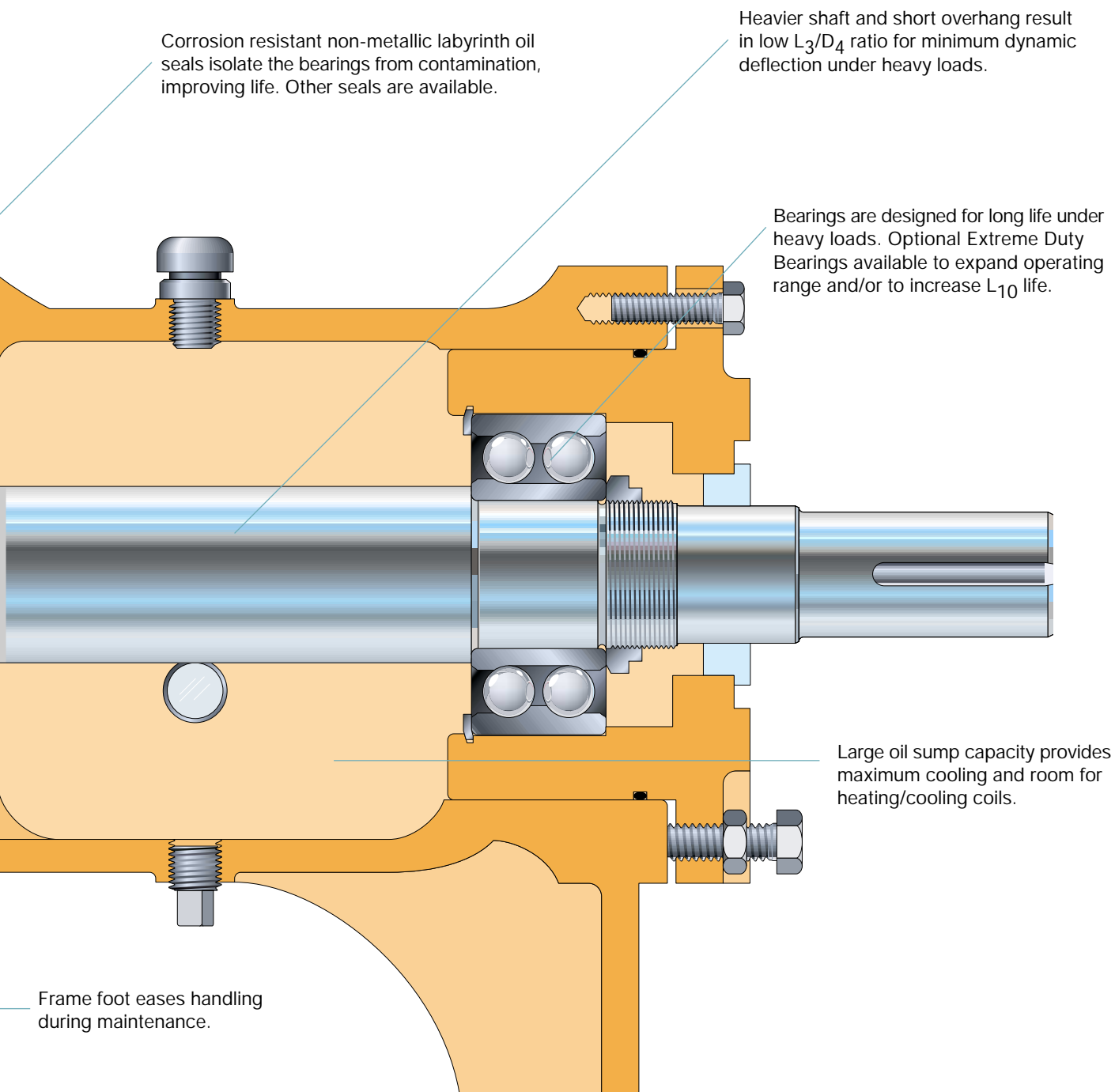
Expeller performance has been enhanced by adding fixed radial vanes on the case plate which serve as self flushing vortex breakers.

The Drylock® seal is a modular cartridge design, simplifying maintenance. Slurry performance has been improved by adding Wilfley's new, patented Barrier Ring.

The Wilfley expeller is a non-contacting hydrodynamic seal that provides long, trouble free life minimizing operating costs and downtime.

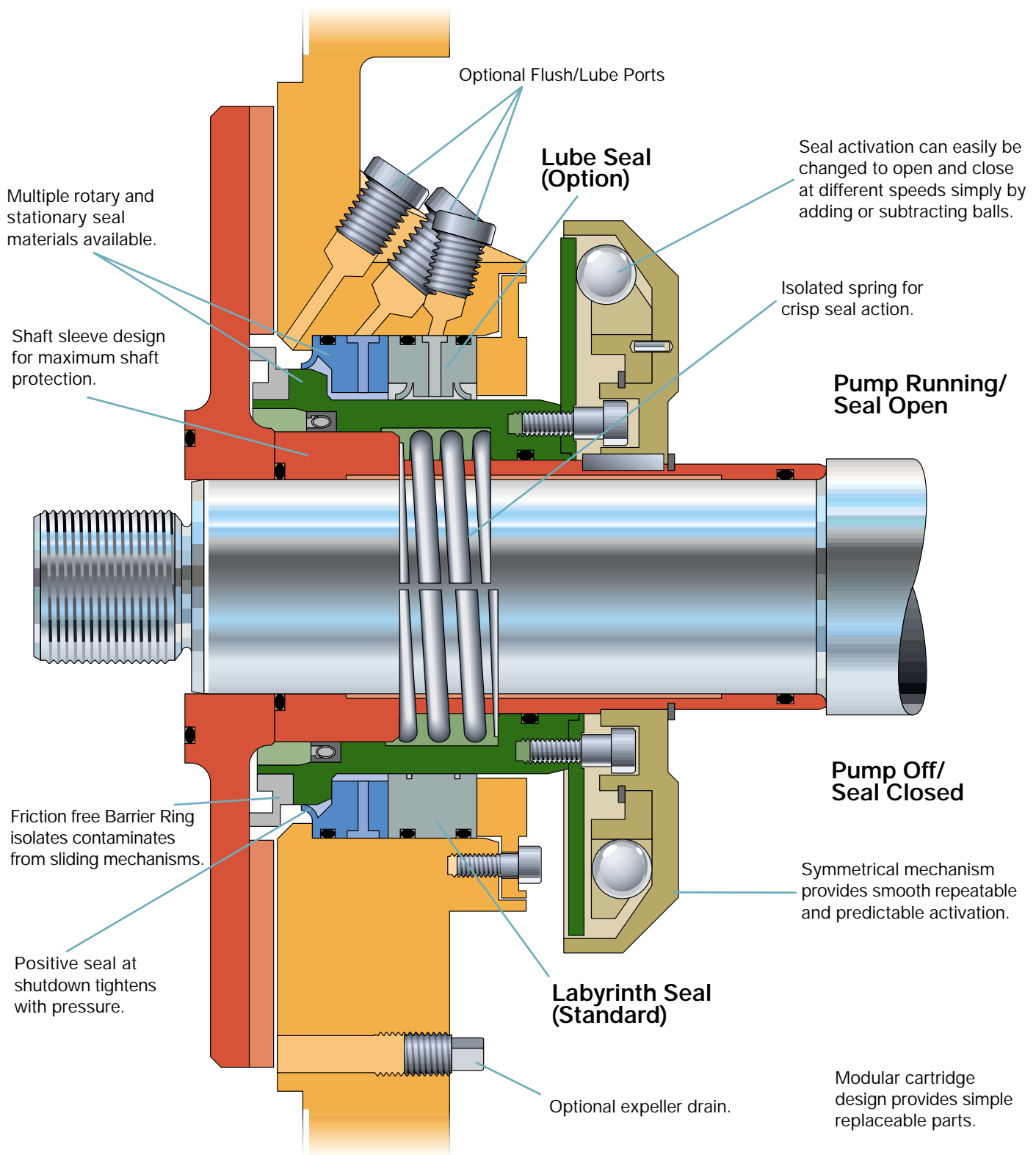
Optional expeller drain and casing drain (not shown) available for both operational and safety purpose.





- A wide range of materials are available.
- Guards (not shown) isolate all moving parts.

# Wilfley DryLock® Seal





## Wilfley Model S3 Features and Benefits



Actuator Assembly

### DryLock®

The DryLock® uses the action of centrifugal force combined with the smooth actuation of bearing balls to open and close the seal. As the pump starts up, the expeller evacuates the liquid in the seal area. The balls of the DryLock® are forced outward and slide up a ramp in the ball housing.



The ramp forces the balls against the actuator plate and opens the seal faces. Upon shut-down, the balls lose their centrifugal force allowing the spring-loaded actuator plate to move back into its closed position. The seal is then closed.



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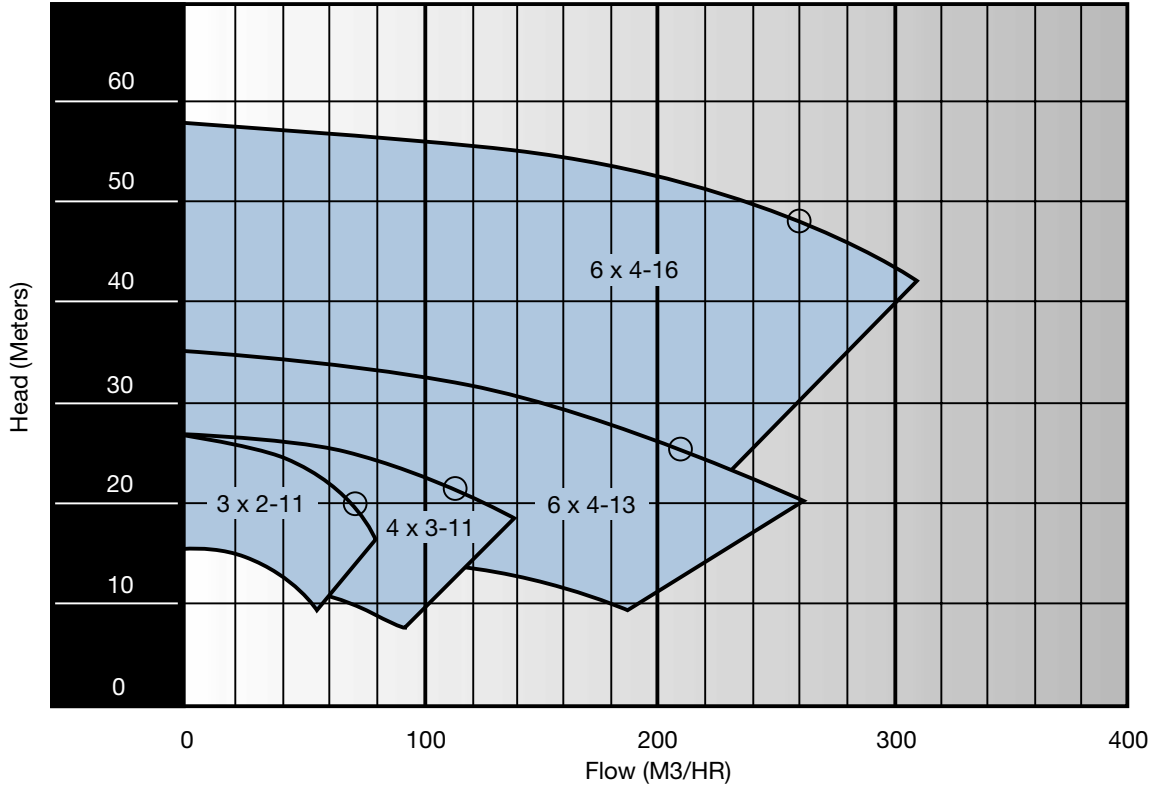
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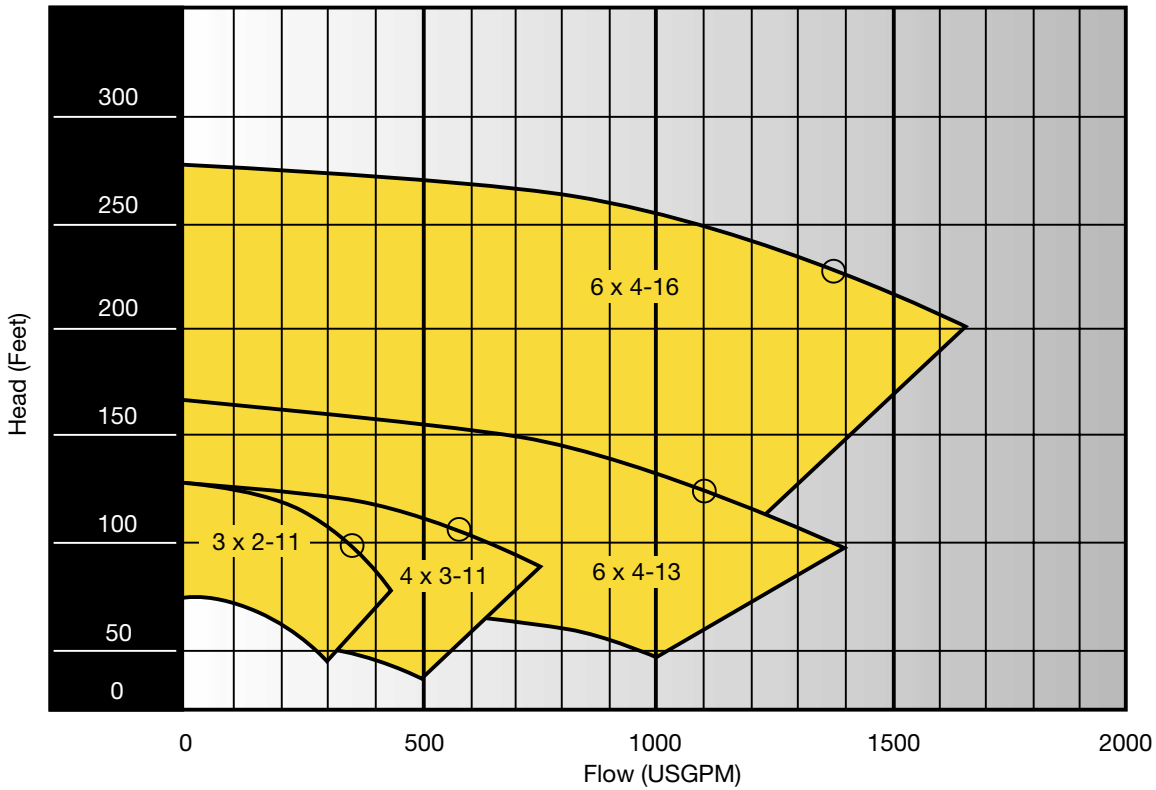




### 1450 RPM



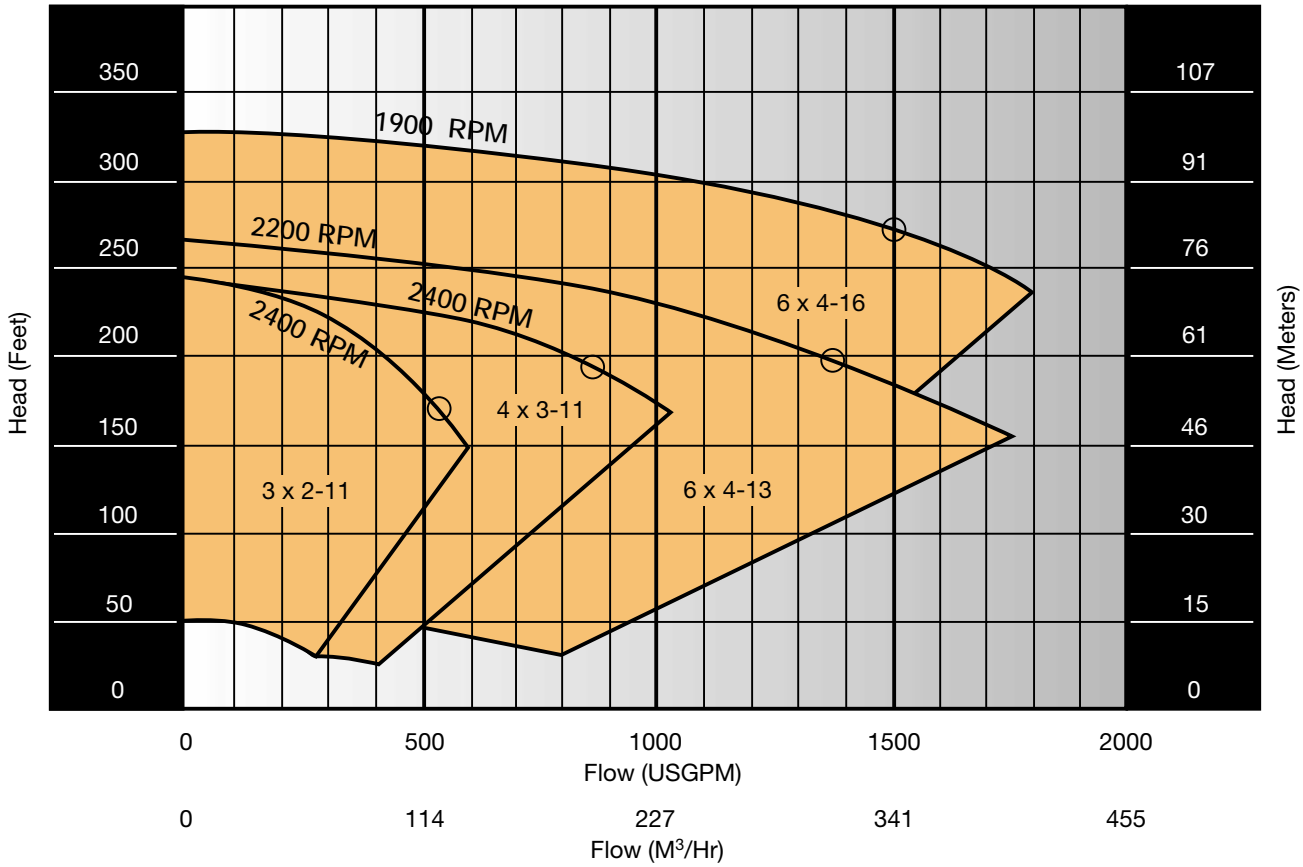
### 1750 RPM



○ = Best Efficiency Point



**VARIABLE SPEED**



○ = Best Efficiency Point

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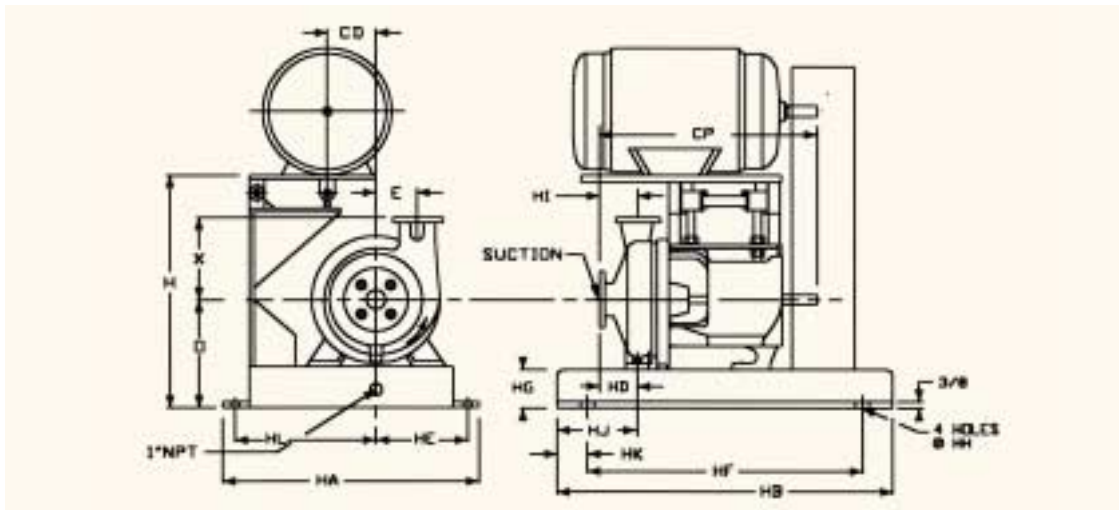
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**WILFLEY**

## Dimensions

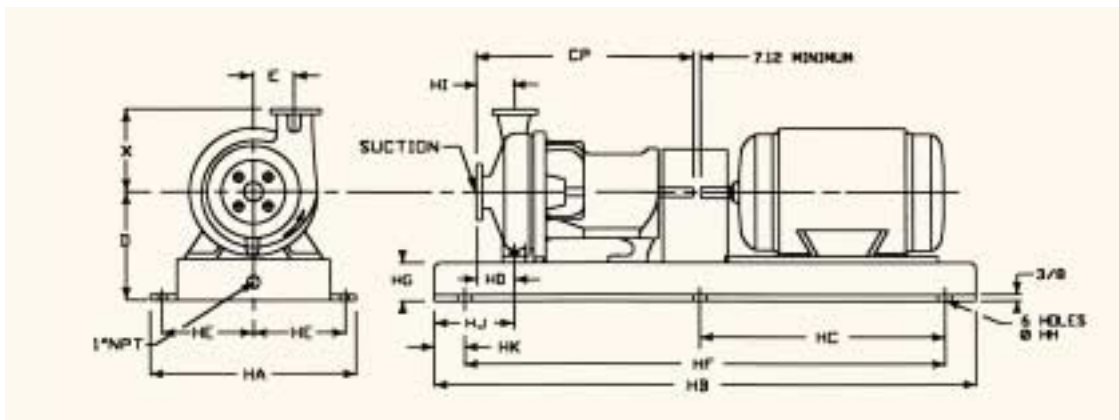
### Offset Overhead Motor Mount

Frame	Pump Size	H	HA	HB	HD	HE	HF	HG	HH	HI	HJ	HK	HL	CP	CD	X	D	E	Max. MTR. Frame		
																					IEC
1	3x2 - 11	34	35	36	4.25	13	26	4.5	1	5.5	5.5	5	20	33.12	9	10.3	15.7	5.9	326T	365U	200L
	4x3 - 11	34	35	36	4.37	13	26	4.5	1	5.5	5.5	5	20	33.12	9	10.3	15.7	5.9	326T	365U	200L
2	6x4 - 13	41	38	44	6.08	14	30	4.5	1	7.5	7.25	7	25	41.47	10	13.3	19	7.5	365T	405U	250M
	6x4 - 16	41	38	44	6.8	14	30	4.5	1	7.5	7.25	7	25	41.47	10	13.3	19	9	365T	405U	250M



### Direct Drive Motor Mount

Frame	Pump Size	HA	HB	HC	HD	HE	HF	HG	HH	HI	HJ	HK	CP	X	D	E
1	3x2 - 11	28	75	32.5	4.25	13	65	4.5	1	5.5	5.5	5	33.12	10.3	15.7	5.9
	4x3 - 11	28	75	32.5	4.37	13	65	4.5	1	5.5	5.5	5	33.12	10.3	15.7	5.9
2	6x4 - 13	30	95	40.5	6.08	14	81	4.5	1	7.5	7.25	7	41.47	13.3	19	7.5
	6x4 - 16	30	95	40.5	6.2	14	81	4.5	1	7.5	7.25	7	41.47	13.3	19	9



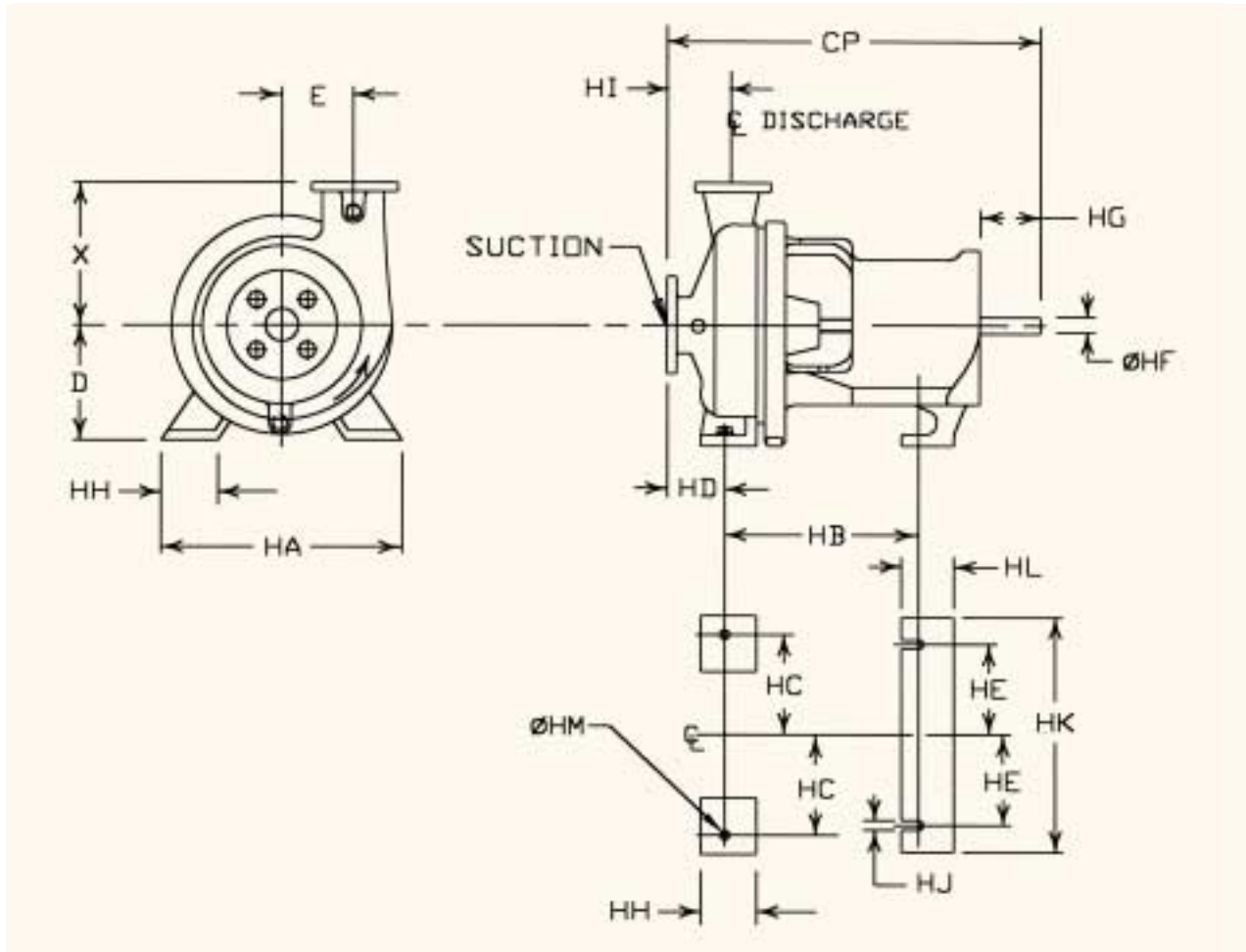
Dimensions shown are not for construction unless certified.  
 Dimensions are shown in inches.  
 Field shimming by customer may be required to meet dimensions. Baseplate dimensions are for fabricated steel.



## Dimensions

### Bare Pump

Frame	Pump Size	HA	HB	HC	HD	HE	ØHF	HG	HH	HI	HJ	HK	HL	ØHM	CP	X	D	E
1	3x2 - 11	14	20	5.88	4.25	5.31	1.97	4.9	3	5.5	.68	13.8	2.8	.688	33.12	10.3	11.2	5.9
	4x3 - 11	14	20	5.88	4.37	5.31	1.97	4.9	3	5.5	.68	13.8	2.8	.688	33.12	10.3	11.2	5.9
2	6x4 - 13	20.75	24.62	9	6.08	6.25	2.75	6	3.5	7.5	.438	16	3.5	.875	41.47	13.3	14.5	7.5
	6x4 - 16	20.75	24.62	9	6.2	6.25	2.75	6	3.5	7.5	.438	16	3.5	.875	41.47	13.3	14.5	7.9



Dimensions shown are not for construction unless certified.  
 Dimensions are shown in inches.  
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## Model S3 Options and Engineering Specials

Features	Options	Engineered Specials
<b>Bearings</b> Frame 1 - Inboard - Deep Groove Ball Bearing, Single Row - Outboard - Angular Ball Bearing Double Row	<b>Extreme Duty Bearings</b> Inboard - Spherical Roller Bearing	Outboard - Taper Roller Bearing
Frame 2 - Inboard - Cylindrical Roller Bearing - Outboard - Angular Ball Bearing Double Row	Inboard - Cylindrical Roller Bearing Outboard - Taper Roller Bearing	
Oil lubricated bearings	Grease, oil mist	
Non-metallic labyrinth bearing seal	Magnetic and Metallic Bearing Seals	
Frame and bearing carrier material: Ductile iron	316SS	Corrosion resistant alloys
Frame with large sight glass on the right side when viewed from coupling end.	Oil cooling provisions, constant level oiler	
O-Ring material: Viton	Kalrez® Teflon® encapsulated Viton® Aflas®	
Wet end material: WCD4™, Maxalloy 5™	1/2" NPT connection for case drain Steam jackets Connections for gauges	Special materials
150 lbs. flat faced flanges	300 lbs flat faced flanges 150 lbs & 300 lbs raised faced flanges	
DryLock® seal with Barrier Ring Labyrinth spacer	Lube seal	Packing Mechanical seal
	Flush connections for seals and expeller cavity Expeller cavity drain	Flushing and drain hardware

### Special Modifications

A.R. Wilfley & Sons is dedicated to manufacturing pumps that maximize their full potential. Wilfley routinely accommodates customer requests for steam jackets, special paint, flush ports, special drain plugs and other modifications required to fit specific needs.

Many applications require special motor and drive configurations, including baseplates and mounting brackets. Fabricated baseplates are standard.

Wilfley engineers assist in any special configurations that the liquid and process require. Wilfley's famous high-quality workmanship applies to all special designs to customers' needs.



## Construction Details



	Frame One		Frame Two	
General	3x2 - 11	4x3 - 11	6x4 - 13	6x4 - 16
Pump weight (lbs)	600	700	1000	1100
Max. working* temperature (°F)	300		300	
Max. working pressure (psi)	200		200	
Max. solids size	0.75		0.875	
Shaft Diameter at Impeller (in.)	1.5		2.125	
Diameter at Sleeve (in.)	2.125		3	
Diameter at Coupling in.(mm)	50 (1.9685)		70 (2.756)	
Diameter between bearings (in.)	2.835		4.25	
Shaft overhang (in.)	8.73		10	
Bearing span (in.)	10.57		14.5	
Bearings Standard radial bearing	313M		NUP317EC	
Standard thrust bearing	5312A		5316A	
Extreme duty radial bearing	NU313EC		NU317ECP	
Extreme duty thrust bearing	31312ADF		31316ADF	

\*Modified seal configurations are available for special pumping conditions up to 400° F.

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## Materials

### Materials

A.R. Wilfley & Sons manufactures S3 centrifugal pumps in a variety of materials including special combinations of alloys.

Wilfley's engineering staff has the expertise and experience to assist in material selections. To help in this service, Wilfley maintains an extensive library of pump services and corrosion/abrasive data. Wilfley is continually testing the effects of both abrasion and corrosion on a wide variety of materials as well as actively developing new ones.

Wilfley's in-house metallurgical department has developed unique materials to survive in the most hostile environments. These proprietary materials were developed to extend the wear life of parts in extreme corrosive and abrasive conditions.

CD4MCu and Maxalloy 5™ are commonly used alloys. Wilfley's foundry and metallurgical staff have developed proprietary processes enhancing these alloys for improved pump performance.

#### WCD4™

This derivative of CD4MCU provides outstanding corrosion resistance and an increased hardness to 320 – 350 Brinell.

#### Maxalloy 5™

This is a machinable 27% Chrome Alloy Wilfley has developed with exceptional corrosion resistance and hardness over 600 Brinell.

Please consult Wilfley directly for any special alloy combination requirements.

Wet End			
Item Number	Item Name	Material	
		WCD4™	Maxalloy 5™
1	Casing	WCD4™	Maxalloy 5™
1a	Cap Screw	18-8	18-8
3	Gasket, Casing	Teflon®	Teflon®
14	Impeller	WCD4™	Maxalloy 5™
15	Casing Plate	WCD4™	Maxalloy 5™
17	Expeller	WCD4™	Maxalloy 5™
Power End			
61	Frame	DI**	DI**
61a	Breather	MS	MS
61b	Drain Plug	Steel	Steel
62	Shaft	WMS*	WMS*
62a	Bearing, Inboard	Steel	Steel
62b	Bearing, Outboard	Steel	Steel
62c	Locknut	Steel	Steel
67	Oil Seal, Inboard	Teflon®	Teflon®
72	Bearing Carrier	DI**	DI**
72a	O-ring, Bearing Carrier	Viton®	Viton®
72b	Jam Nut	18-8	18-8
73	Retaining Ring	Steel	Steel
75	Cap Screw	18-8	18-8
76	Oil Seal, Outboard	Teflon®	Teflon®
79	Sight Glass	18-8	18-8
Seals			
	DryLock®	WCD4™	Maxalloy 5™

\* WMS – hardened steel

\*\* DI – ductile iron

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## General Installation Recommendations

### Choosing Pump Location

Locate the pump as close to the liquid source as practical so the suction pipe is short and direct with a minimum of elbows, fittings and valves.

Place the pump in a location so the unit is accessible for inspection during operation as well as for maintenance operations involving removal and disassembly.

### Foundation

The foundation should be strong enough to absorb any vibration and to form a permanent support for the baseplate. This is important in maintaining the alignment of the direct connected unit. Foundation bolts of the proper size should be embedded in the concrete located by the outline drawing.

### Alignment

The pump and motor are aligned at the factory before shipment. However, realignment is necessary after the complete unit has been installed. Guidelines for checking and aligning the pump components may be found in the Hydraulic Institute Standards.

### Piping

Both suction and discharge pipes should be supported independently near the pump so when the flange bolts are tightened no strain will be transmitted to the casing.

A check valve should be installed in the discharge line to prevent fluid from flowing back through the pump while it is shut down. Gate valves should be installed in both discharge and suction lines to isolate the pump during maintenance.

Care must be taken in sizing and locating suction piping to prevent cavitation.

### Ordering Information

Wilfley pumps are engineered to operate in compliance with your specifications. Careful evaluation of pumping conditions is needed to provide accurate pump recommendations and quotations.


This list will help establish specific pumping system conditions.

- Liquid
- Temperature
- Static Head
- Discharge Pipe Size
- Length, Discharge Pipe
- Discharge Pipe Fittings
- Equivalent Length Discharge Pipe
- Total Head
- Maximum Suction Pressure
- Minimum Suction Pressure
- Capacity
- Specific Gravity
- % Solids by Weight
- Mesh Analysis
- Viscosity
- NPSH Available

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