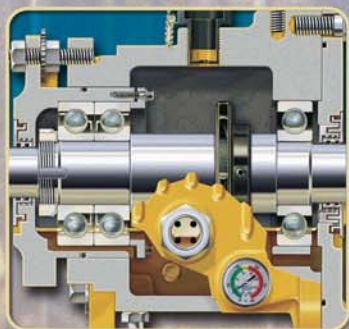


## System One®



## Centrifugal Pumps

- Refining Processes
- Chemical Processing
- Paint/Coatings/Oils
- Pulp & Paper
- Wastewater
- Military/Marine



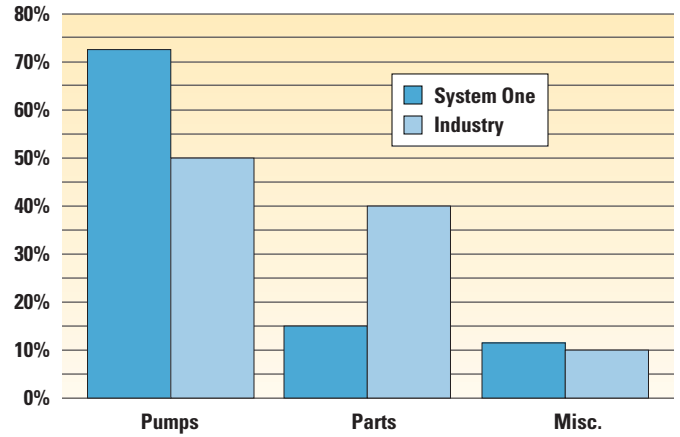
## The High-Strength, Low-Maintenance Line of Innovative Process Pumps

The criteria for the development of the System One Pump differed from that of the competition:

- Total operating cost over the life of the pump was thoroughly analyzed and the main causes of failure – mechanical seals and bearings – became the focus for the design.
- Most pump companies today rely on sales of spare parts to maintain their business, whereas System One concentrates on the sales of new pumps and the improvement of product reliability.

This philosophy resulted in the System One pump which offers the highest strength of construction and the most comprehensively engineered design to reduce or eliminate maintenance problems.

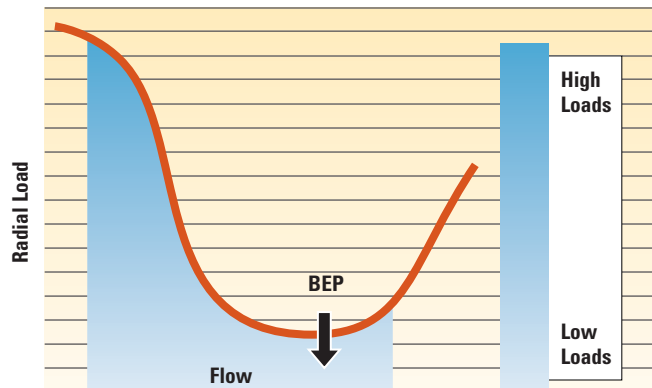
### Product Line Sales Analysis



Comparison of System One pump parts sales to industry averages (from the Hydraulic Institute)

### Exclusive Features Reduce Common Seal and Bearing Failures

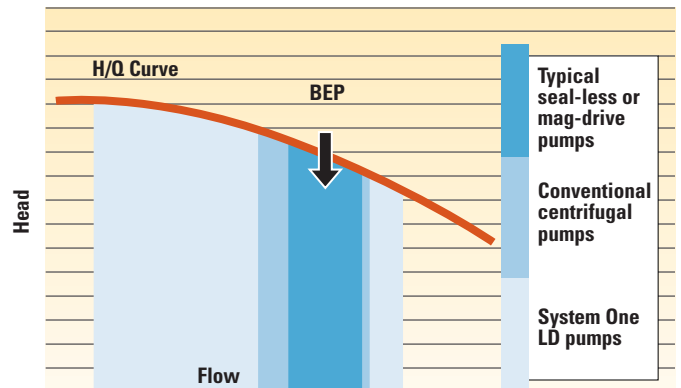
System One pumps are designed to maximize system reliability. All critical elements, including the seal, are protected from damaging conditions that plague conventional pumps. In fact, the new industry standards for improved sealing environments – and stronger, more vibration-resistant pumps – were initiated by the success of the patented System One pump (pat. #4,406,465).



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

### Wider Window of Operation Off the BEP

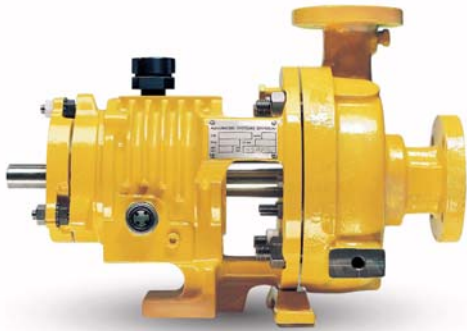
The vast majority of process pumps are required to operate off the Best Efficiency Point (BEP) where radial loads create high stresses. Process changes and variations are common occurrences that create this situation. Conventional pumps are prone to damaging shaft vibration under these conditions, and thus are limited to a small window of operation around the BEP. Seal and bearing failures from vibration damage are common indicators of exceeding these narrow limits. System One LD pumps are designed to prevent vibration under high radial loads, resulting in the widest operational window of any standard process pump. Seals and bearings last longer for greater system reliability. If your process demands that pumps vary from the BEP, then System One will save you money and prevent lost production.



System One LD pumps resist vibration for a larger operational window off the BEP and greater reliability.

## Frame S & SD

Frame S pump puts mid-size strength into a small frame pump that meets ASME/ANSI dimensional specifications. Frame SD is the DIN/ISO (metric) version. Capacities to 450 GPM (102 m<sup>3</sup>/hr).



## Frame A/LD17

Frame A pump meets ASME/ANSI dimensional specifications for mid-sized pumps. Available in optional LD17 configuration for severe duty applications. Also available in IPP Metric construction. Capacities to 1400 GPM (320 m<sup>3</sup>/hr).



## Vortex

Vortex pump puts System One strength and reliability in the service of handling entrained solids without clogging. Available in the LD17 and IPP Metric configurations. Capacities to 1500 GPM (340 m<sup>3</sup>/hr).



## Frame M

System One Frame M pump incorporates proven design features that provide maximum reliability and long life for the most demanding applications. Capacities to 4500 GPM (1022 m<sup>3</sup>/hr).



## System One Design Details

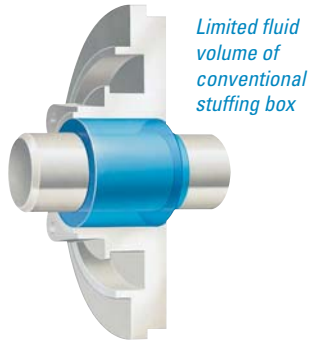
		Frame S	Frame SD (DIN/ISO)	LD17 (& IPP & Vortex)	Frame A (& IPP & Vortex)	Frame A HT (High Torque)	Frame M
<b>Shaft</b>	L <sup>3</sup> /D <sup>4</sup> RATIO	46 (1.9)	1.9	17 (.65)	53 (1.74)	17/53 (.65/1.74)	19 (.87)
	Diameter at Impeller	0.75 (19)	20	1 (25)	1 (25)	1.25 (32)	1.5 (38)
	Diameter at Seal	1.500 (38)	38	1.875 (48)	1.875 (48)	1.875 (48)	2.625 (67)
	Diameter Between Bearings	2 (50)	50	2.45 (62)	2.45 (62)	2.45 (62)	3.25 (83)
	Diameter at Coupling	0.87 (22)	24	1.375 (35)	1.375 (35)	1.375 (35)	2.375 (60)
<b>Bearings</b>	Radial	6308	6308	6310	6310	6310	6314
	Thrust	5308	7308 (2)	7310 (2)	7310 (2)	7310 (2)	7314 (2)
<b>Seal Chamber</b>	Seal Bore (Nose)	2.38 (60)	58	2.69 (68)	2.69 (68)	2.69 (68)	3.38
	Inside Bore	3.44 (87)	100	3.00 (76)	3.75 (95)	3.75 (95)	4.12 (105)
	Depth	2.25 (57)	53	2.19 (56)	2.9 (74)	2.9 (74)	2.56 (65)
	Gland Bolting	(4) .37-16 on 3.5" BC (4) M9 on 89 BC	(4) M10 x 1.5 on 95 BC	(4) .5-13 on 4.62" BC (4) M12 on 117 BC	(4) .5-13 on 4.75" BC (4) M12 on 121 BC	(4) .5-13 on 4.75" BC (4) M12 on 121 BC	(4) .62-11 on 4.75" BC (4) M16 on 146 BC
<b>Power Limits</b>	HP (KW) per 100 RPM 316SS shaft	1.1 (9)	1.1 (9)	3.4 (2.6)	3.4 (2.6)	NA	14 (10)
	HP (KW) per 100 RPM 17-4pH shaft	NA	NA	4.2 (3.1)	4.2 (3.1)	5.6 (4.2)	NA

Frame SD built to DIN/ISO specifications. IPP is ASME/ANSI dimensional with metric hardware and metric 16 bar flanges.

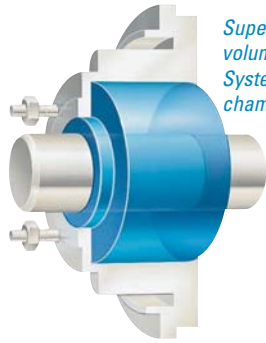


# Detailed Features of Reliability-Enhancing Components

## Seal Chambers



Limited fluid volume of conventional stuffing box



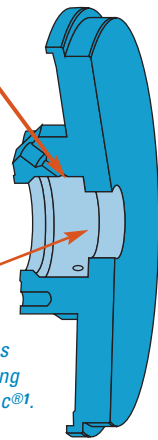
Superior fluid volume of System One seal chamber

**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 System One 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.

### Straight Bore

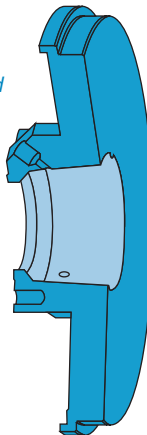
Large seal chamber provides optimum volume for seal lubrication and cooling.

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.



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.

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

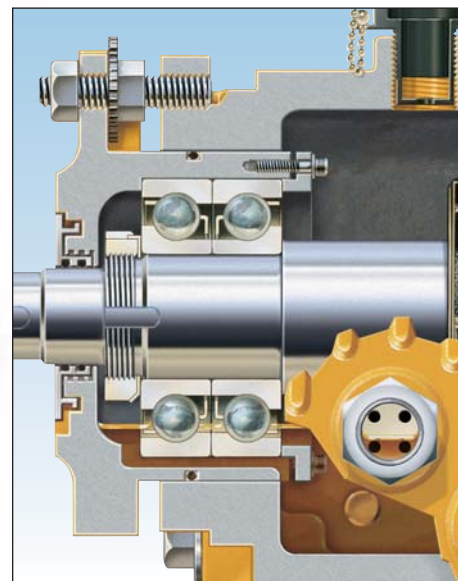
## Bearing Housing

### Bearing protectors preserve bearing life

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



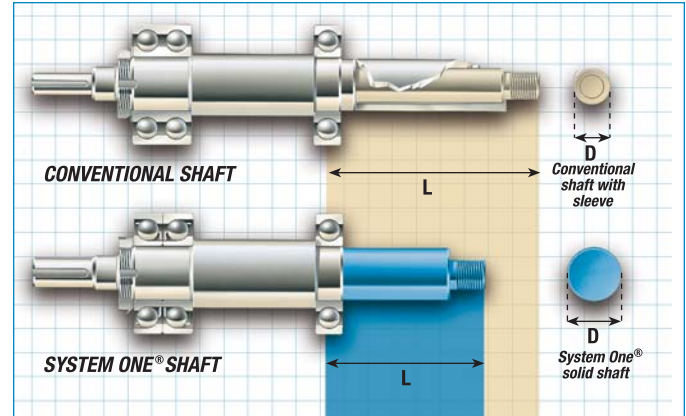
Patented System One labyrinth seals (pat. #4,572,517) are standard construction. Small amounts of dirt and water can cause complete bearing failure in a short period of time. System One labyrinth seals keep dirt and moisture out, prolonging oil and bearing life.



## Shaft

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

System One shafts all offer heavier duty construction and lower stiffness ratios than competing pump models. System One shafts provide greater stability at the seal area for lower vibration and deflection. Seals last longer. This is part of our philosophy of enhancing total system reliability. Since today's mechanical seals do not fret the shaft, no sacrificial sleeve is needed. Shorter shaft overhang significantly reduces bearing loads thus extending bearing life.



## Cooling Coil

### Cooling coil is more efficient than jackets

In high temperature applications, an efficient cooling coil can be installed in place of magnetic plugs. This approach provides greater cooling effectiveness and no risk of condensation common with conventional jacketed designs. In addition, jackets only cool the frame and can constrict the bearing mount at the same time that the bearing is experiencing thermal growth, resulting in wear and premature failure. This differential thermal growth problem is avoided in the System One by cooling the oil directly, thus cooling the bearings at the same time.

### Larger sump for cleaner, cooler oil

Oil capacity is typically 50% to 100% greater than competing pumps for better heat dissipation, lubrication and longer bearing life. External cooling fins contribute to effective passive cooling.



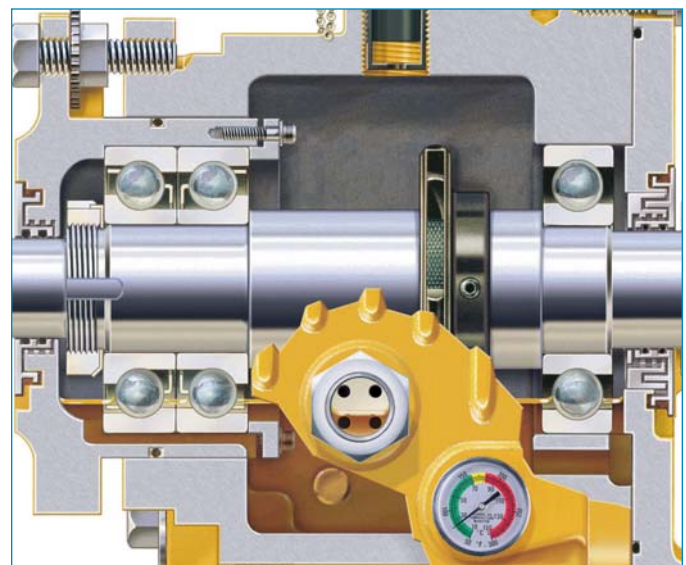
## Bearings

### Heavier duty bearings, with longer bearing life

In keeping with the heavy duty construction of System One pumps, bearings are larger than in competing pumps, resulting in greater load capacity and bearing life. Additional reliability is provided by locking the thrust bearing into the cartridge with a bolted retainer cover. The Frame S pump uses a 5308 thrust bearing (optional 7308 pr.) and a 6308 radial bearing. The Frame A uses a pair of 7310 angular contact thrust bearings with a 6310 radial bearing, and the Frame M incorporates a pair of 7314 angular contact thrust bearings with a 6314 radial bearing. Angular contact thrust bearings meet API 610 specifications.

### Universal foot is safer and eases set-up

The bearing frame foot will support the entire housing and shaft assembly in a safe and stable position for ease of maintenance. Standard for Frame A and LD17. Optional on Frame S and Frame M.

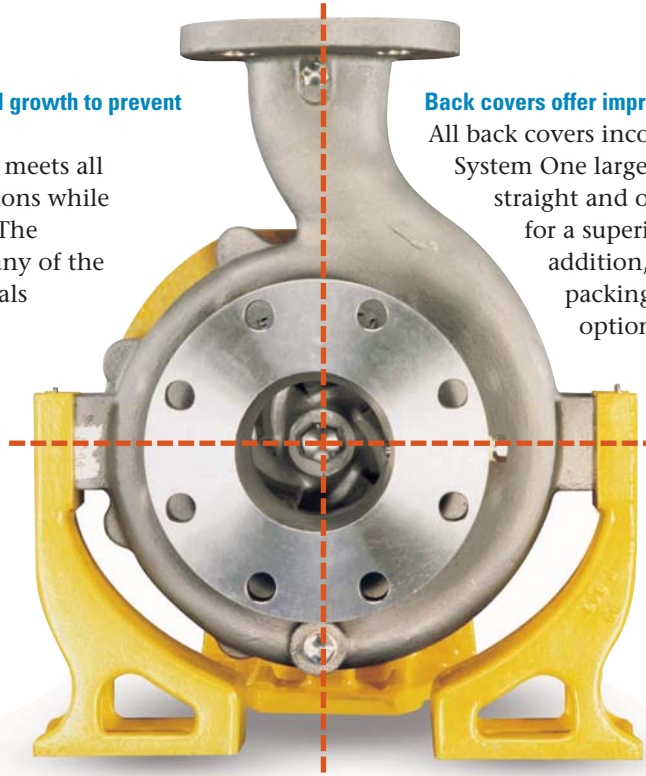




## Wet Ends

### Centerline design provides balanced thermal growth to prevent mechanical stresses

The System One Frame A pump casing meets all ASME/ANSI specifications and dimensions while offering a centerline mounted design. The centerline configuration eliminates many of the stresses and strains that can damage seals and bearings due to thermal growth in elevated temperature applications. Centerline design, required by API 610 specifications, is standard on all Frame A and LD17 pumps. The Frame S offers an optional bearing frame foot with overhung casing, while the Frame M offers steel centerline casing legs as an option. Casing wall thickness includes 1/8" (3.2 mm) corrosion allowance.



### Back covers offer improved mechanical reliability

All back covers incorporate the state-of-the-art System One large bore seal chamber in both straight and open taper bore configurations for a superior sealing environment. In addition, a separate patented radial packing chamber is available as an option for those applications where packing is desired. The 13" (330 mm) back covers are bolted to the casing by their own flange, offering improved mechanical reliability compared to conventional designs. Carbon, polyurethane and SpiralTrac<sup>1</sup> throat bushings are available when required.



### Patented micrometer impeller adjustment mechanism results in precise, repeatable settings

Impeller clearances are set by a patented micrometer adjustment mechanism (pat. #4,439,096). This enables the pump to achieve maximum efficiency with precise repeatability.

### Precision cast/ high efficiency impellers

System One pump wet end components incorporate the finest quality castings available today. Impellers are investment cast with precision vane layout, resulting in superior finish and balance for maximum hydraulic efficiency. The impeller design incorporates back pump-out vanes for reduction of pressure in the seal chamber, plus threaded-to-shaft attachment.



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

## Mounting

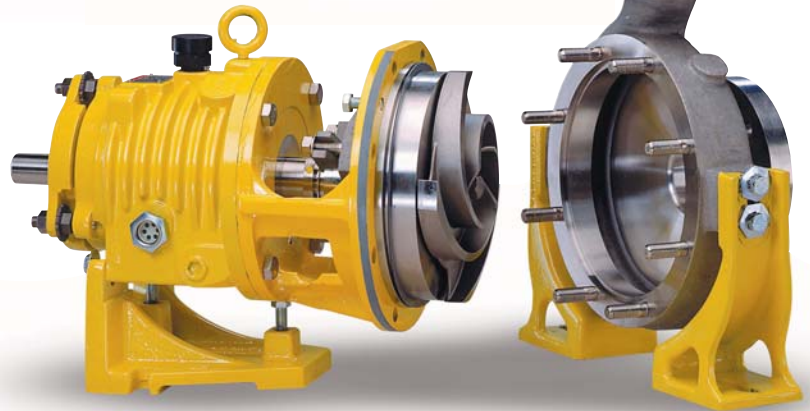
### Maximum installation flexibility

System One pumps allow maximum flexibility to meet any application criteria. Vertical mounting is accomplished by the simple addition of a motor adaptor. Side discharge is possible with the addition of a special foot. System One pumps are the only ASME/ANSI pump with these mounting configuration options.



Right or left side discharge available.

A unique feature of System One Frame A/ LD17 pumps is the self-supporting power end which provides ease of maintenance.



### Accurate motor alignment is automatically, mechanically achieved

Every System One pump is equipped to accept a C-Frame (NEMA)/D-Flange (IEC) motor adaptor. This provides precise alignment of motor and power end without special tools or excessive labor. Because alignment is mechanical, it is fast and repeatable thus preventing misalignment-induced vibration.

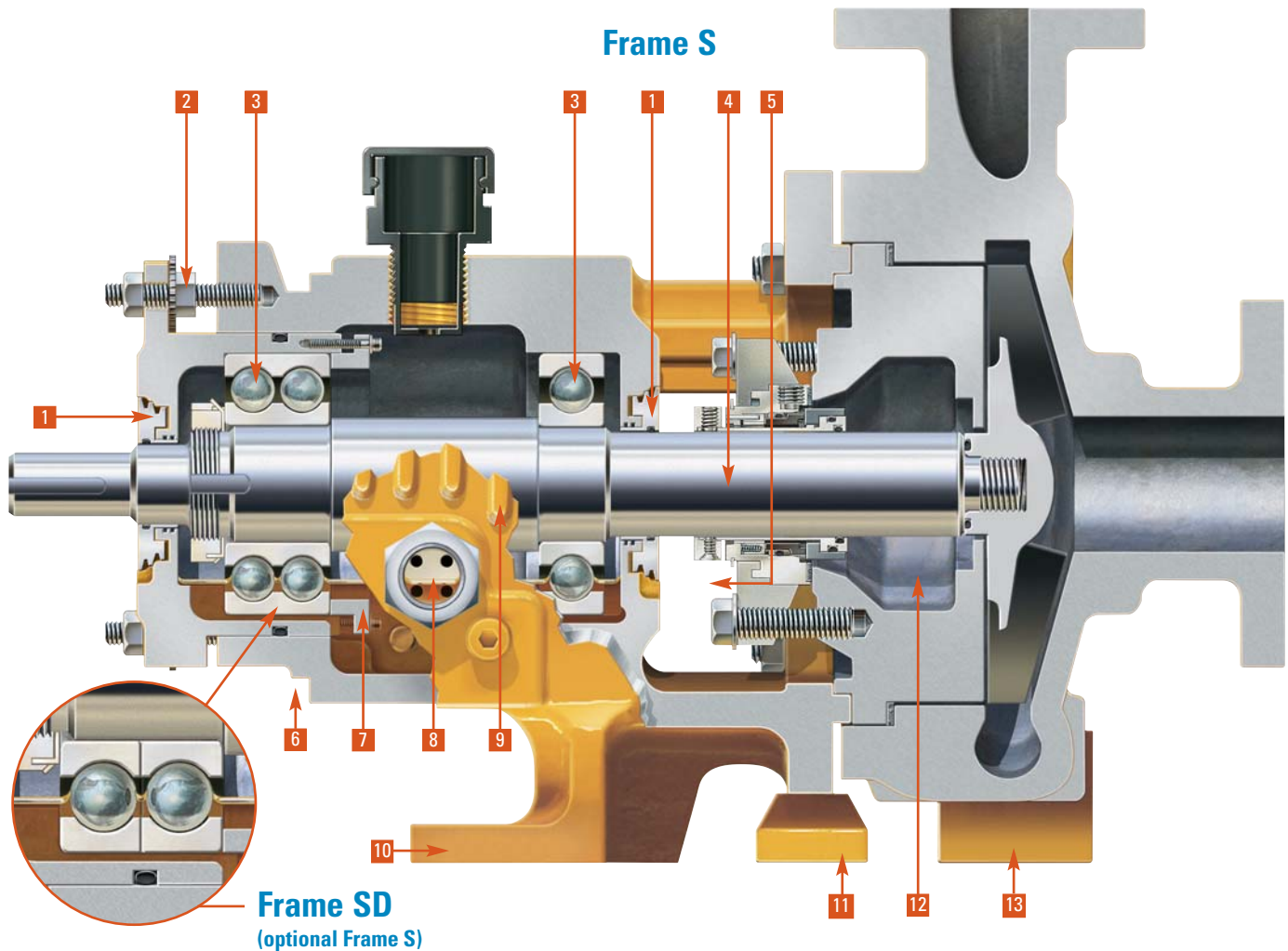


Optional suction adaptor allows standard ASME/ANSI pump to become an inline version. Suction and discharge can be 180° opposite or 90° to each other.



## Construction

Mid-frame strength and reliability in small-frame space.



**1** Patented lifetime labyrinth seals (pat. #4,512,517) protect bearings from intrusion of contaminants without causing the shaft damage typical of lip seals.

**2** Patented micrometer adjustment nuts (pat. #4,439,096) fine tune impeller setting for maximum efficiency.

**3** Heavy duty bearings (two sizes larger than industry standard) provide maximum durability and life. Angular contact thrust bearings optional on Frame S, standard on Frame SD.

**4** Large shaft cross-section combined with short span adds to structural integrity and resists vibration for longer bearing and seal life.

**5** Open frame concept for ease of seal maintenance.

**6** Rabbet for C-Frame (NEMA) or D-Flange (IEC) motor adaptor for instantaneous and precise motor alignment.

**7** Positive locking thrust bearing retaining cover for maximum bearing holding power and minimum axial movement.

**8** Sight glass for easy observation of oil condition and level.

**9** Cooling fins to reduce temperature of oil and bearings.

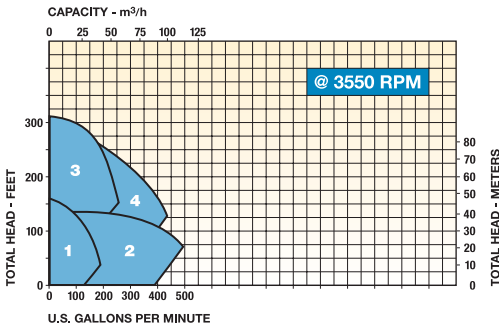
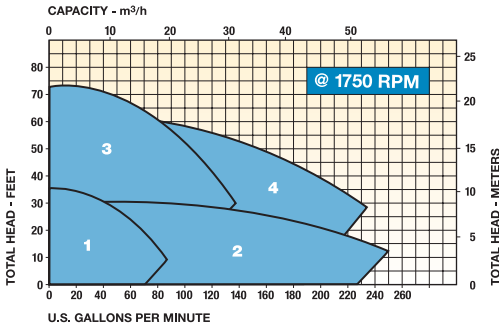
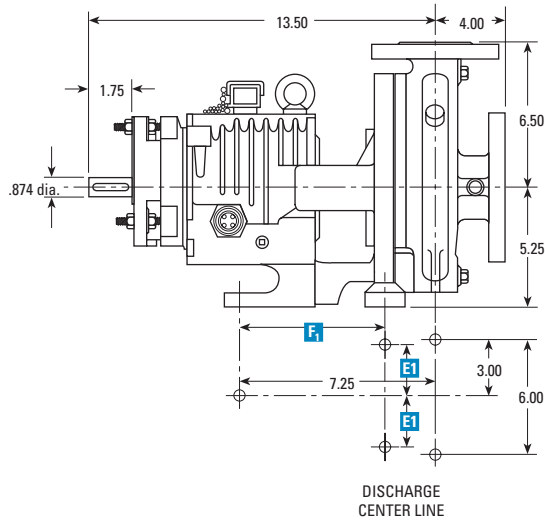
**10** Self-supporting foot.

**11** Frame mounted foot provides self-supporting power end and ideal mounting configuration for high temperature applications.

**12** Seal chamber with large fluid volume promotes better cooling and cleaning action for longer seal life. Optional seal chamber jacket capability for cooling the mechanical seal.

**13** Optional casing mounted foot to conform to ASME/ANSI standard. (Standard on Frame SD to DIN/ISO spec.)

## Frame S (ASME/ANSI)

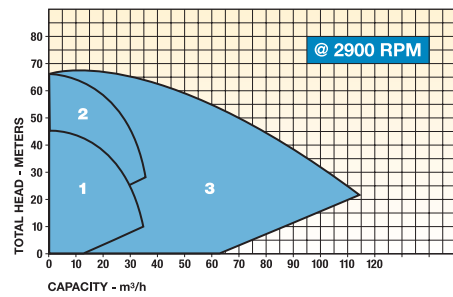
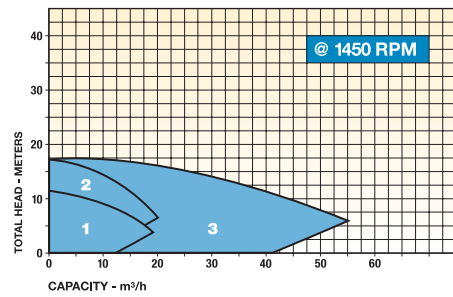
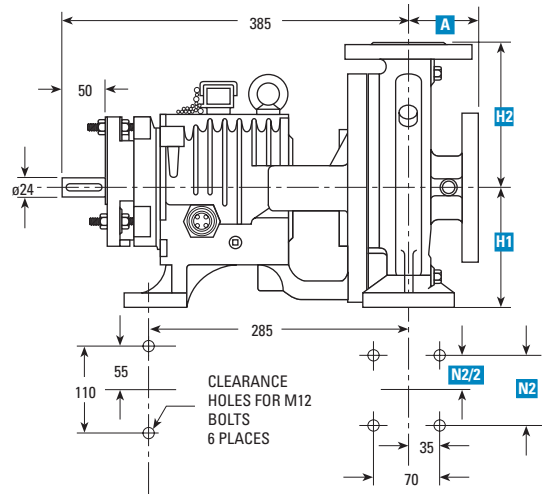


### Frame S Pump – ASME/ANSI

	Pump Size	F <sub>1</sub>	2E <sub>1</sub>
1	1 x 1.5-6	4.88	5.50
2	2 x 3-6	4.88	5.50
3	1 x 1.5-8	4.25	7.50
4	1.5 x 3-8	4.25	7.50

All dimensions are in inches.

## Frame SD (DIN/ISO)



### Frame SD Pump – DIN/ISO

	Pump Size	A	H <sub>1</sub>	H <sub>2</sub>	N <sub>2</sub>
1	32 x 50-160	80	132	160	190
2	32 x 50-200	80	160	180	190
3	50 x 80-200	100	160	200	212

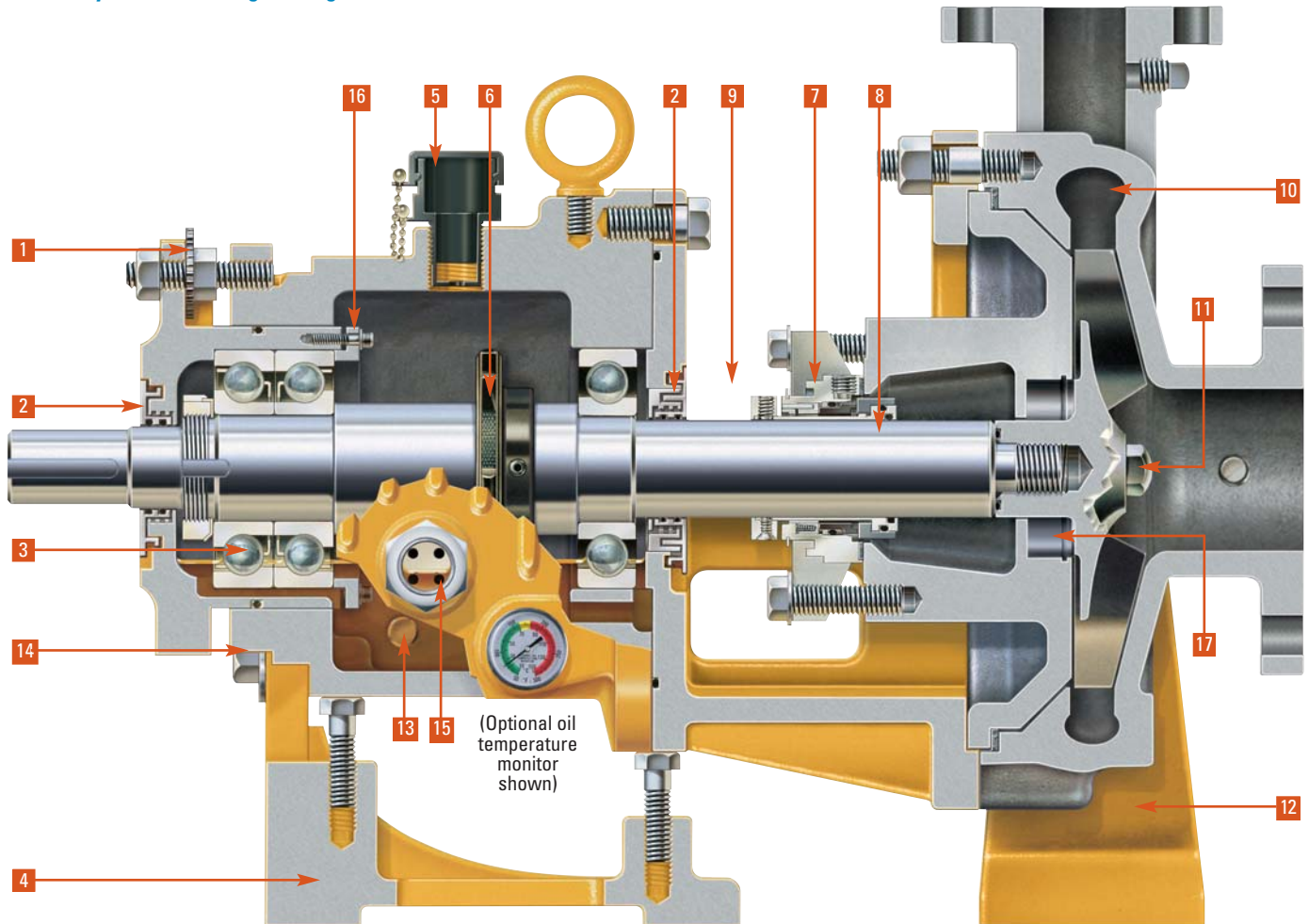
All dimensions are in millimeters.

- Heavy duty alternative to standard small frame pumps
- Lowest L3/D4 stiffness ratio of any competitive size pump
- Designed and built for the toughest applications



## Construction

Low maintenance, long life, maximum value process pump.  
Dramatically reduces bearing, sealing device and shaft failures.

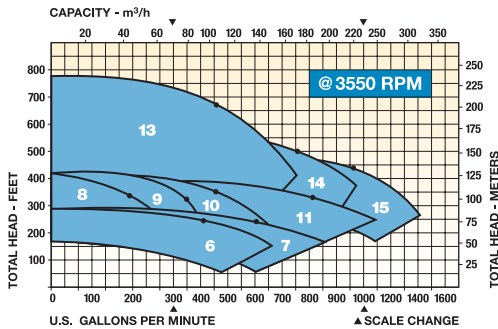
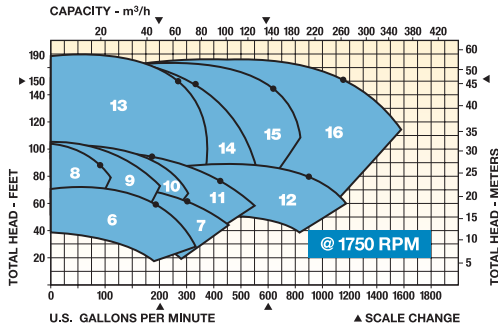
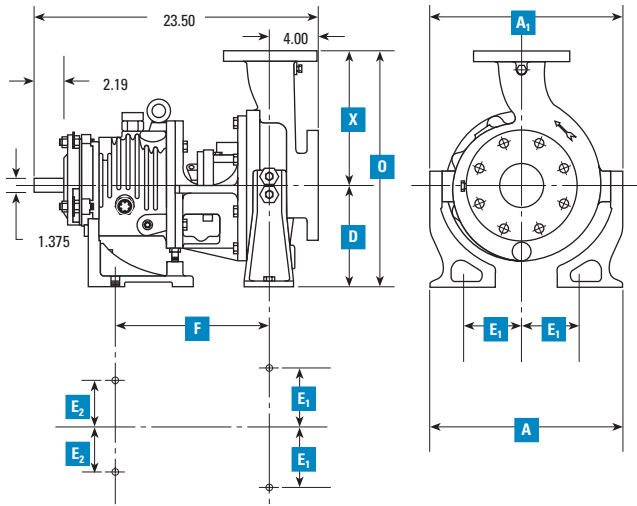


- 1** Patented micrometer adjustment nuts (pat. #4,439,096) fine tune impeller setting for maximum efficiency.
- 2** Patented System One Labyrinth Seals (pat. #4,572,517) provide a non-wearing lifetime protection for radial and thrust bearings.
- 3** 7310 (pr) angular contact bearings provided for maximum thrust capacity.
- 4** Full support rear leg assures bearing frame remains upright during pump disassembly. Full adjustability aids in alignment.
- 5** Large oil inlet for easy filling of oil. The sealed cover minimizes dirt and moisture entry.
- 6** Flinger filter constantly cleans oil during pump operation.
- 7** All standard mechanical seals can be installed on a System One pump. Optional seal chamber jacket for cooling the mechanical seal.
- 8** Solid alloy shaft (no sleeve) and minimal overhang assure the highest rigidity and corrosion resistance.
- 9** Frame adaptor has a 180° unobstructed opening for ease of maintenance.

- 10** State-of-the-art casting methods provide smoothest possible surfaces for highest efficiency.
- 11** Cast-in impeller nut makes removal easy.
- 12** Centerline casing support legs are adjustable for pipe variations and minimize heat effects to meet API 610 spec.
- 13** Two magnetic plugs are provided to maintain clean oil and are removable for insertion of cooling coil.
- 14** Rabbet for C-Frame (NEMA) or D-Flange (IEC) motor adaptor for instantaneous and precise motor alignment.
- 15** Oil sight glass for constant monitoring of oil level and condition.
- 16** Positive locking thrust bearing retainer cover for maximum bearing holding power and minimum axial movement.
- 17** Bushing options include carbon, polyurethane and SpiralTrac<sup>1</sup>.
- 18** Patented System One Packing Chamber available with spiral wrapped packing that does not contact shaft.

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

## Frame A (ASME/ANSI)

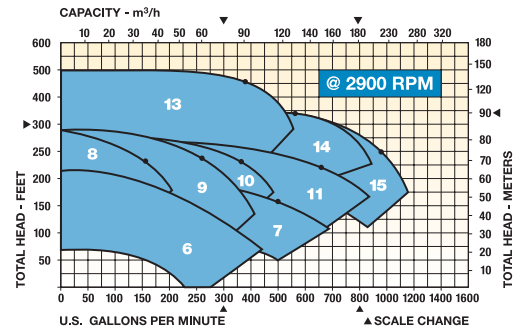
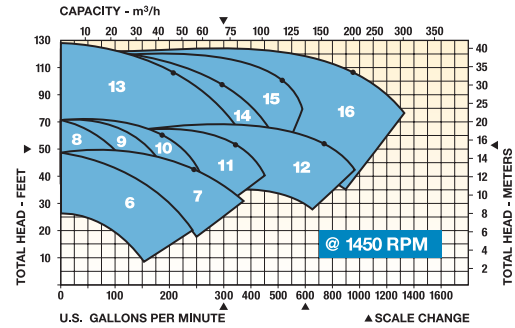
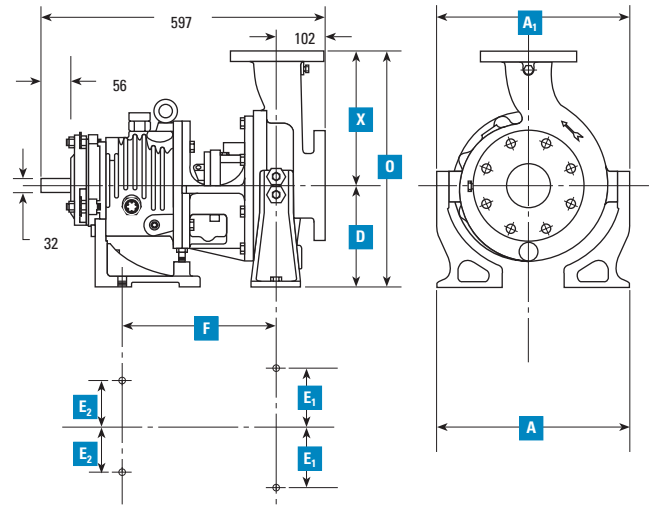


### Frame A Pump – ASME/ANSI

Pump Size	Discharge	Suction	X	D	O	F	2E <sub>1</sub>	2E <sub>2</sub>	A	A <sub>1</sub>	
6	2 x 3-8	2.0	3.0	9.50	8.25	17.75	12.50	9.75	7.25	15.00	15.00
7	3 x 4-8	3.0	4.0	11.00	8.25	19.25	12.50	9.75	7.25	15.75	15.75
8	1 x 2-10	1.0	2.0	8.50	8.25	16.75	12.50	9.75	7.25	15.75	15.75
9	1.5 x 3-10	1.5	3.0	8.50	8.25	16.75	12.50	9.75	7.25	16.13	16.13
10	2 x 3-10	2.0	3.0	9.50	8.25	17.75	12.50	9.75	7.25	16.38	16.38
11	3 x 4-10	3.0	4.0	11.10	8.25	19.25	12.50	9.75	7.25	13.63	17.63
12	4 x 6-10	4.0	6.0	13.50	10.00	23.50	12.50	9.75	7.25	14.44	19.94
13	1.5 x 3-13	1.5	3.0	10.50	10.00	20.50	12.50	9.75	7.25	15.00	20.50
14	2 x 3-13	2.0	3.0	11.50	10.00	21.50	12.50	9.75	7.25	15.38	20.88
15	3 x 4-13	3.0	4.0	12.50	10.00	22.50	12.50	13.00	7.25	16.63	22.13
16	4 x 6-13	4.0	6.0	13.50	10.00	23.50	12.50	13.00	7.25	17.56	23.07

All dimensions are in inches.

## Frame A (IPP Metric)



### Frame A Pump – IPP Metric

Pump Size	Discharge	Suction	X	D	O	F	2E <sub>1</sub>	2E <sub>2</sub>	A	A <sub>1</sub>	
6	50 x 80-200	50	80	241	200	441	318	250	184	279	381
7	80 x 100-200	80	100	279	200	479	318	250	184	298	400
8	25 x 50-250	25	50	216	200	416	318	250	184	298	400
9	40 x 80-250	40	80	216	200	416	318	250	184	318	419
10	50 x 80-250	50	80	241	200	441	318	250	184	314	416
11	80 x 100-250	80	100	279	200	479	318	250	184	346	448
12	100 x 150-250	100	150	343	250	593	318	250	184	367	506
13	40 x 80-330	40	80	267	250	517	318	250	184	381	521
14	50 x 80-330	50	80	292	250	542	318	250	184	391	530
15	80 x 100-330	80	100	318	250	568	318	330	184	422	562
16	100 x 150-330	100	150	343	250	593	318	330	184	460	586

All dimensions are in millimeters.

The only ASME/ANSI B73.1 pump that offers the following features for maximum reliability and flexibility:

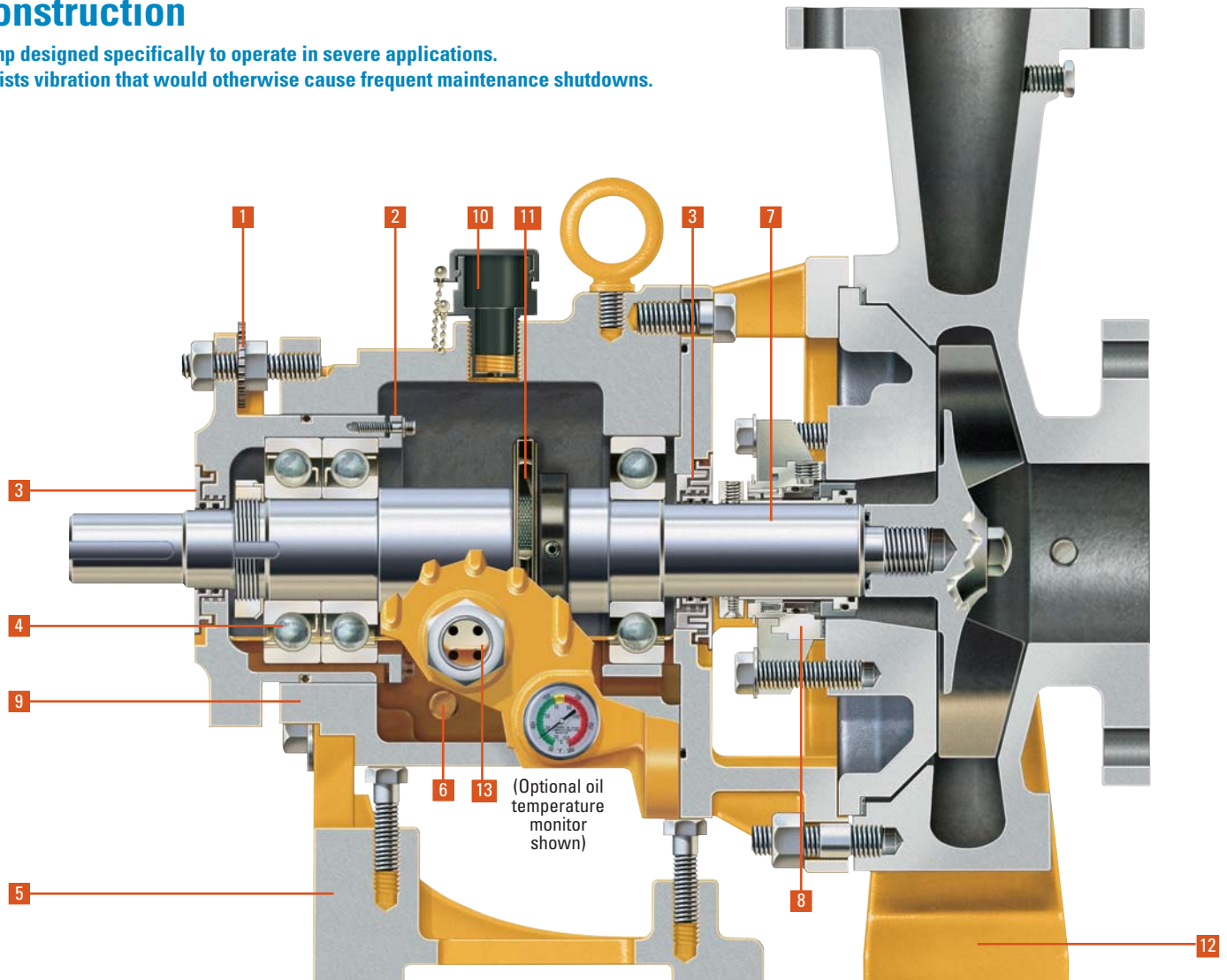
- Centerline mount for high temperature applications
- Optional left or right side discharge
- Optional vertical mount configuration



## System One LD17 Pump (ASME/ANSI/IPP Metric)

### Construction

Pump designed specifically to operate in severe applications.  
Resists vibration that would otherwise cause frequent maintenance shutdowns.



**1** Patented micrometer adjustment nuts (pat. #4,439,096) fine tune impeller setting for maximum efficiency.

**2** Positive locking thrust bearing retainer cover for maximum bearing holding power and minimum axial movement.

**3** Patented System One Labyrinth Seals (pat. #4,572,517) provide a non-wearing lifetime protection for radial and thrust bearings.

**4** 7310 (pr) angular contact bearings are standard for high thrust capability.

**5** Full support rear leg assures bearing frame remains upright during pump disassembly. Full adjustability aids in alignment.

**6** Two magnetic plugs are provided to maintain clean oil and are removable for insertion of cooling coil.

**7** Solid shaft (no sleeve) with minimal overhang provides superior resistance to deflection. Lowest  $L^3/D^4$  stiffness ratio in the industry.

**8** Accepts most standard mechanical seals.

**9** Rabbet for C-Frame (NEMA) or D-Flange (IEC) motor adaptor for instantaneous and precise motor alignment.

**10** Large oil inlet for easy filling of oil. The sealed cover minimizes dirt and moisture entry.

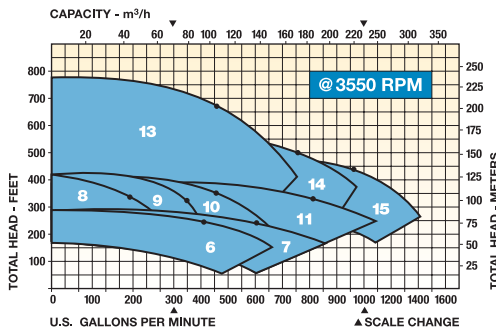
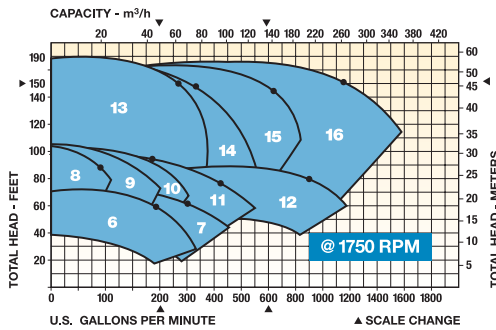
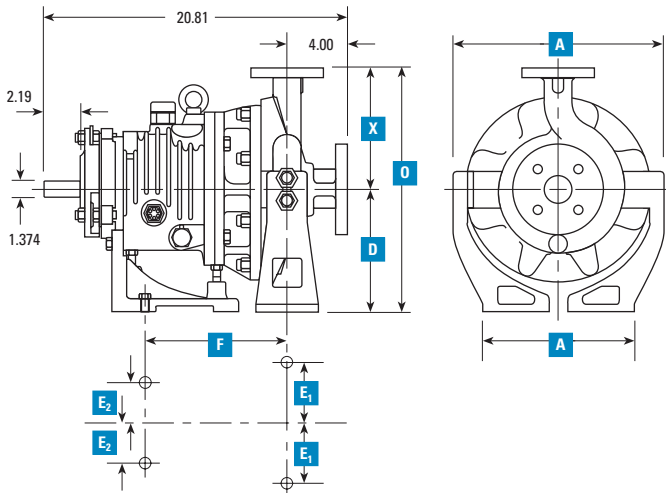
**11** Flinger filter constantly cleans oil during pump operation.

**12** Centerline casing support legs are adjustable for pipe variations and minimize heat effects as required by API 610 spec.

**13** Oil sight glass for constant monitoring of oil level and condition.

■ Optional throat bushing available for specific seals.

## LD17 Pump (ASME/ANSI)

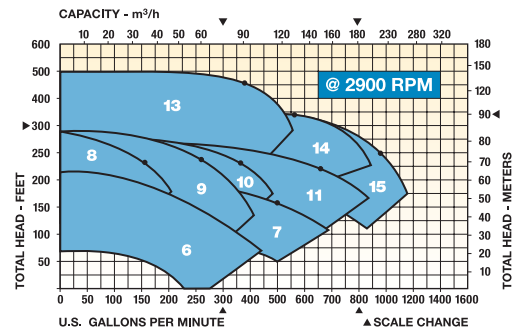
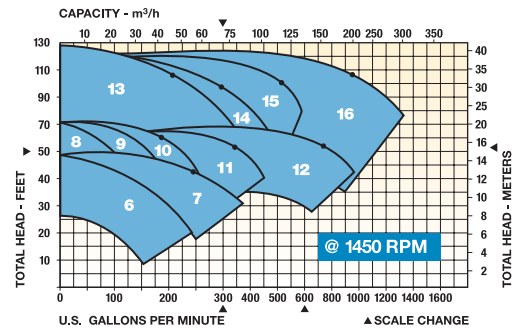
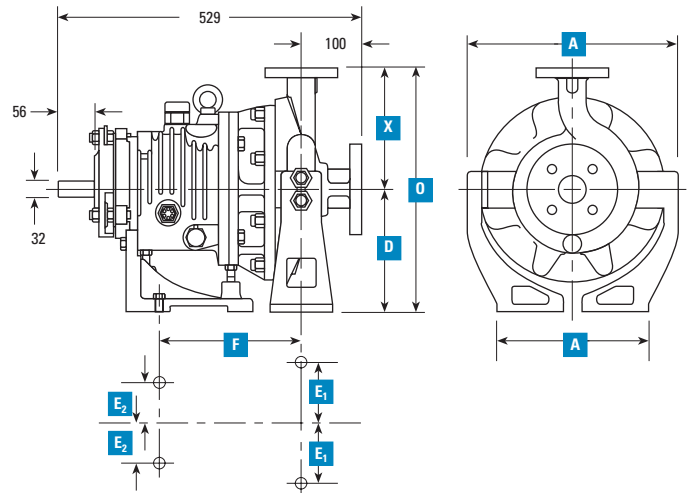


### LD17 Pump – ASME/ANSI

Pump Size	Discharge	Suction	X	D	O	F	2E <sub>1</sub>	2E <sub>2</sub>	A	A <sub>1</sub>	
6	2 x 3-8	2.0	3.0	9.50	8.25	17.75	9.81	9.75	7.25	15.00	15.00
7	3 x 4-8	3.0	4.0	11.00	8.25	19.25	9.81	9.75	7.25	15.75	15.75
8	1 x 2-10	1.0	2.0	8.50	8.25	16.75	9.81	9.75	7.25	15.75	15.75
9	1.5 x 3-10	1.5	3.0	8.50	8.25	16.75	9.81	9.75	7.25	16.13	16.13
10	2 x 3-10	2.0	3.0	9.50	8.25	17.75	9.81	9.75	7.25	16.38	16.38
11	3 x 4-10	3.0	4.0	11.10	8.25	19.25	9.81	9.75	7.25	13.63	17.63
12	4 x 6-10	4.0	6.0	13.50	10.00	23.50	9.81	9.75	7.25	14.44	19.94
13	1.5 x 3-13	1.5	3.0	10.50	10.00	20.50	9.81	9.75	7.25	15.00	20.50
14	2 x 3-13	2.0	3.0	11.50	10.00	21.50	9.81	9.75	7.25	15.38	20.88
15	3 x 4-13	3.0	4.0	12.50	10.00	22.50	9.81	13.00	7.25	16.63	22.13
16	4 x 6-13	4.0	6.0	13.50	10.00	23.50	9.81	13.00	7.25	17.56	23.07

All dimensions are in inches.

## LD17 Pump (IPP Metric)



### LD17 Pump – IPP Metric

Pump Size	Discharge	Suction	X	D	O	F	2E <sub>1</sub>	2E <sub>2</sub>	A	A <sub>1</sub>	
6	50 x 80-200	50	80	241	200	441	249	250	184	279	381
7	80 x 100-200	80	100	279	200	479	249	250	184	298	400
8	25 x 50-250	25	50	216	200	416	249	250	184	298	400
9	40 x 80-250	40	80	216	200	416	249	250	184	318	419
10	50 x 80-250	50	80	241	200	441	249	250	184	314	416
11	80 x 100-250	80	100	279	200	479	249	250	184	346	448
12	100 x 150-250	100	150	343	250	593	249	250	184	367	506
13	40 x 80-330	40	80	267	250	517	249	250	184	381	521
14	50 x 80-330	50	80	292	250	542	249	250	184	391	530
15	80 x 100-300	80	100	318	250	568	249	330	184	422	562
16	100 x 150-300	100	150	343	250	593	249	330	184	460	586

All dimensions are in millimeters.

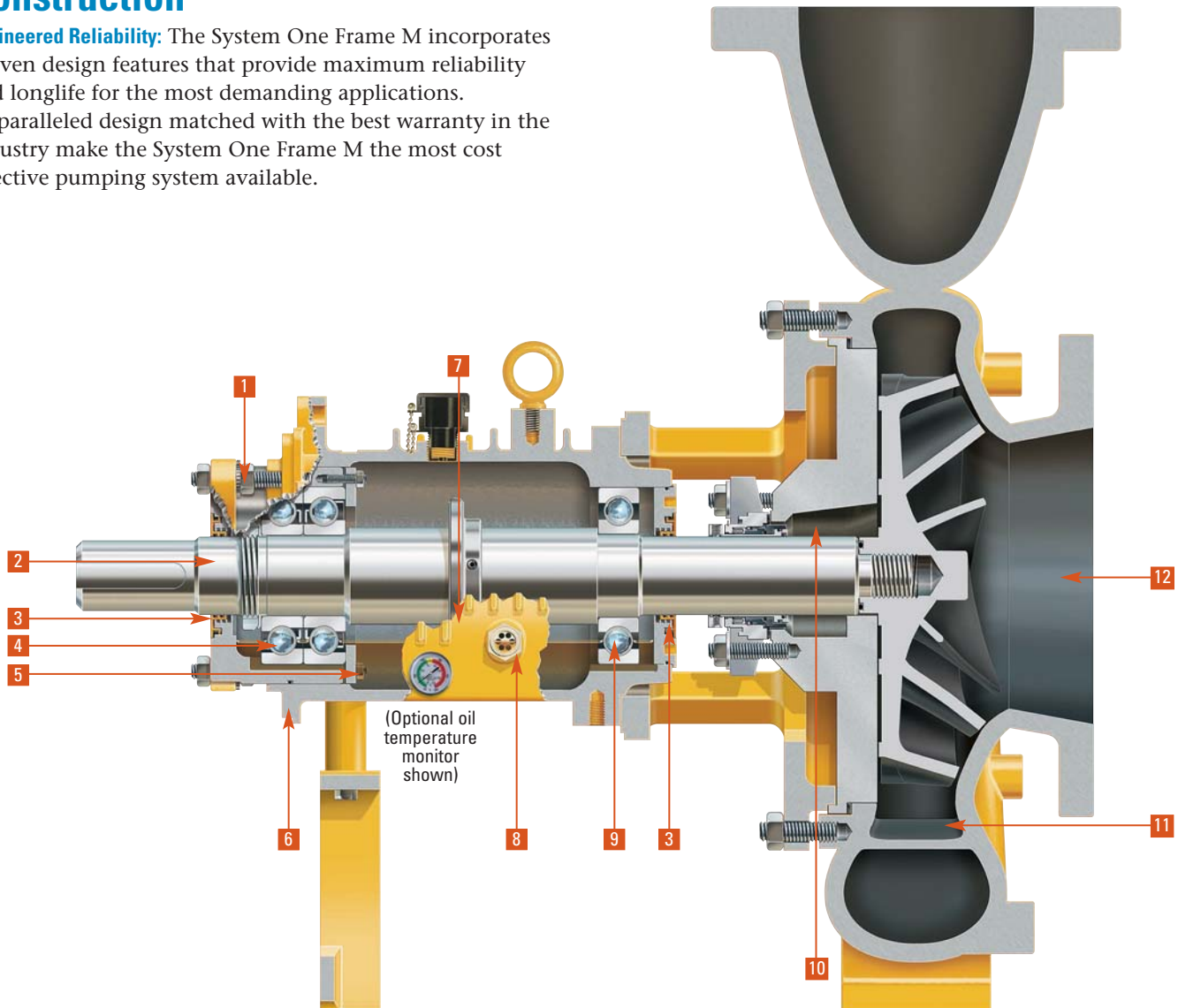
Major benefit of vibration resistant design is reduced emissions.

■ The most stable shaft in the industry keeps mechanical seal faces perfectly centered for the lowest possible VOC emissions.



## Construction

**Engineered Reliability:** The System One Frame M incorporates proven design features that provide maximum reliability and longlife for the most demanding applications. Unparalleled design matched with the best warranty in the industry make the System One Frame M the most cost effective pumping system available.

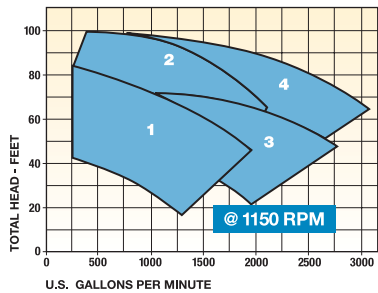
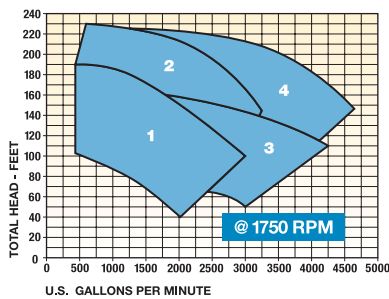
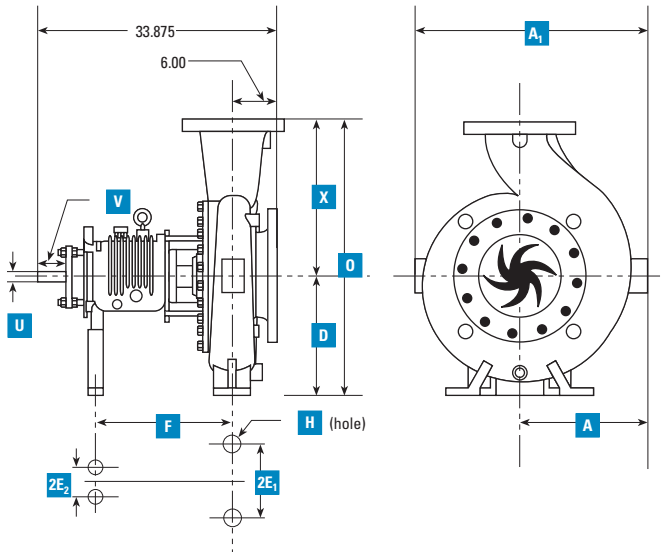


- 1 Patented micrometer adjustment nuts (pat. #4,439,096) fine tune impeller setting for maximum efficiency.
- 2 Solid shaft (no sleeve) with  $L^3/D^4$  ratio of 19 is the lowest for any process pump in this size range.
- 3 Patented non-wearing labyrinth seals (pat. #4,572,517) provide unparalleled protection of oil and bearings.
- 4 Ultra-high capacity angular contact thrust bearings (7314 pr.) provide shaft rigidity and eliminate axial movement even during off BEP operation.
- 5 Bolted retainer cover provides positive clamping of thrust bearing and prevents axial shaft movement.
- 6 Rabbet for C-Frame (NEMA)/D-Flange (IEC) motor adaptor for instantaneous and precise motor alignment. Accepts motor frame sizes up to 449TSC or 315L.

- 7 Cast-in cooling fins and large oil reservoir enhance heat transfer and promote oil cooling. Finned cooling coil available for high temperature applications.
- 8 Large oil sight glass enables instant analysis of oil level and condition.
- 9 Oversized radial bearing (6314) provides greater load carrying capabilities and extended bearing life in even the harshest conditions.
- 10 Large volume seal chamber provides proper cooling and lubrication to seal faces. Available in straight and taper bore to meet all applications. Accepts all standard mechanical seals. Throat bushing options include carbon, polyurethane or SpiralTrac<sup>1</sup>.
- 11 Double volute construction reduces hydraulic forces within the casing thus lowering radial load on the shaft and bearings.
- 12 High efficiency wet ends help reduce energy costs.

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

## Frame M Pump (ASME/ANSI)

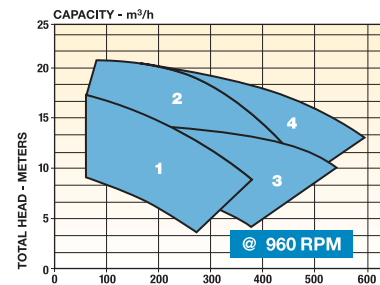
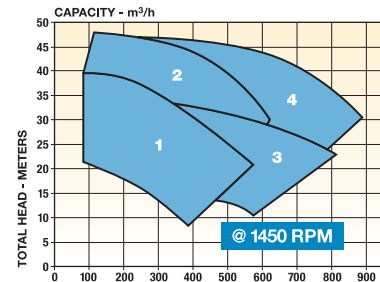
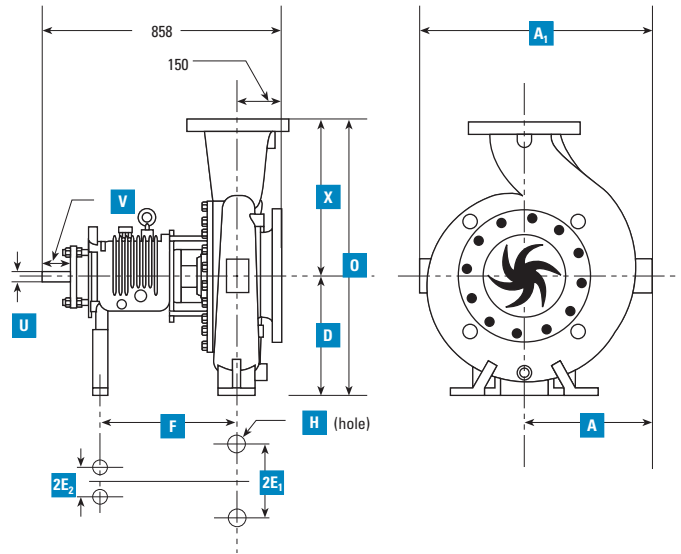


### Frame M Pump – ASME/ANSI

Pump Size	A <sub>1</sub>	A	D	2E <sub>1</sub>	2E <sub>2</sub>	F	H	O	U	V	X	
1	6 x 8-13	25.50	14.00	14.50	16.00	9.00	18.75	0.875	30.50	2.375	4.00	16
2	6 x 8-15	27.25	14.75	14.50	16.00	9.00	18.75	0.875	32.50	2.375	4.00	18
3	8 x 10-13	27.25	15.25	14.50	16.00	9.00	18.75	0.875	32.50	2.375	4.00	18
4	8 x 10-15	28.75	15.75	14.50	16.00	9.00	18.75	0.875	33.50	2.375	4.00	19

All dimensions are in inches.

## Frame M Pump (Metric)



### Frame M Pump – Metric

Pump Size	A <sub>1</sub>	A	D	2E <sub>1</sub>	2E <sub>2</sub>	F	H	O	U	V	X	
1	150 x 200-330	648	356	368	406	229	476	22	775	60	102	406
2	150 x 200-380	692	375	368	406	229	476	22	826	60	102	457
3	200 x 250-330	692	387	368	406	229	476	22	826	60	102	457
4	200 x 250-330	730	400	368	406	229	476	22	851	60	102	483

All dimensions are in millimeters.

The only ASME/ANSI B73.1 pump that offers the following features for maximum reliability and flexibility:

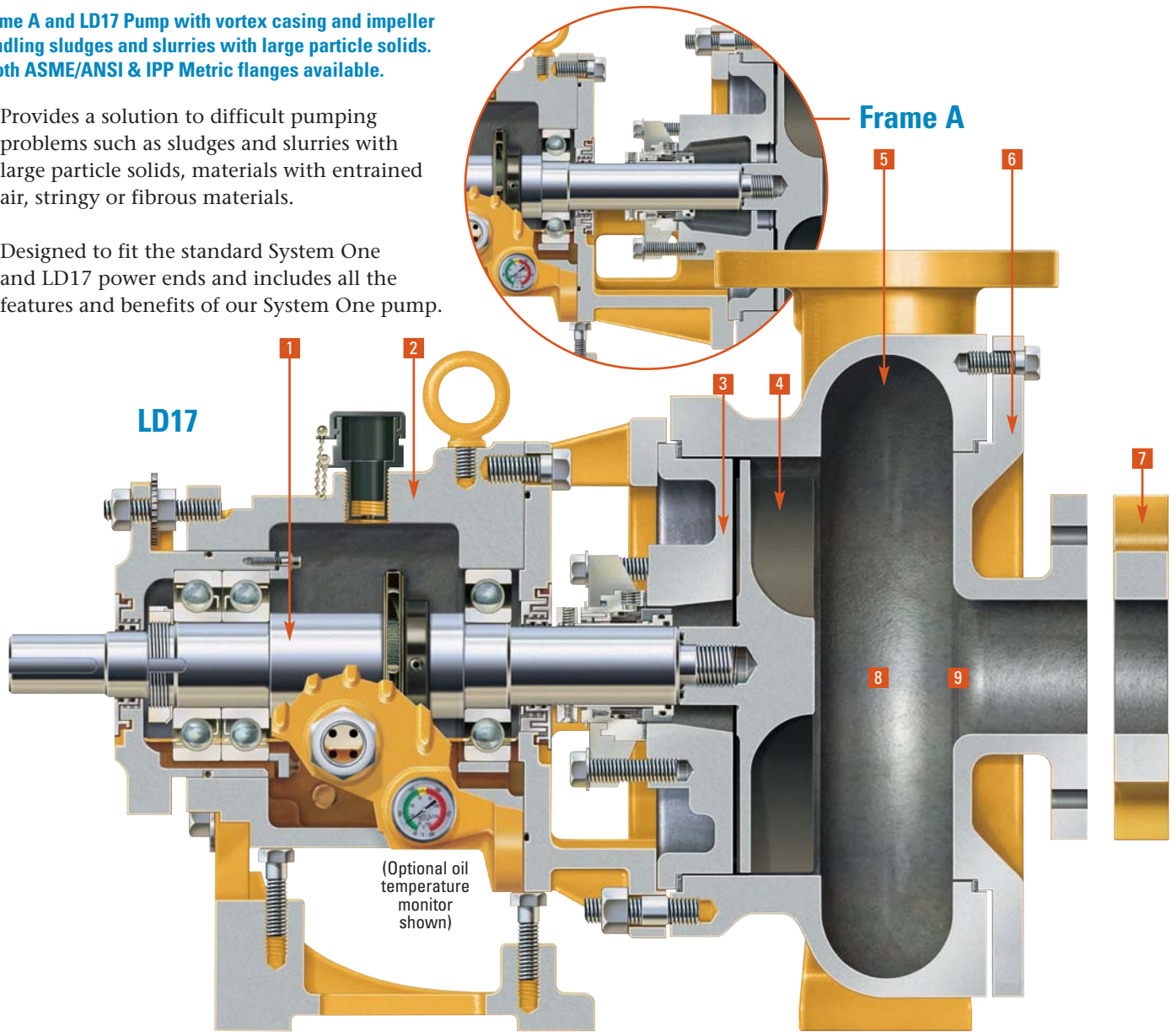
- Centerline mount for high temperature applications
- Optional left or right side discharge
- Optional vertical mount configuration



## Construction

Frame A and LD17 Pump with vortex casing and impeller handling sludges and slurries with large particle solids.  
\*Both ASME/ANSI & IPP Metric flanges available.

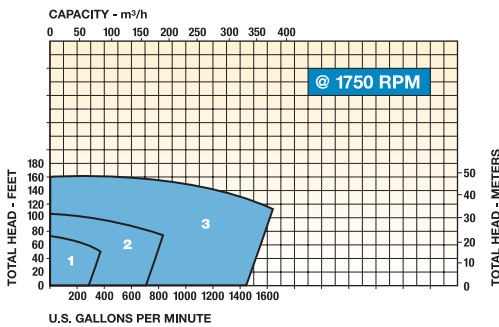
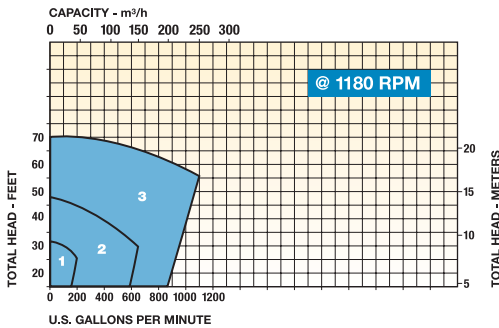
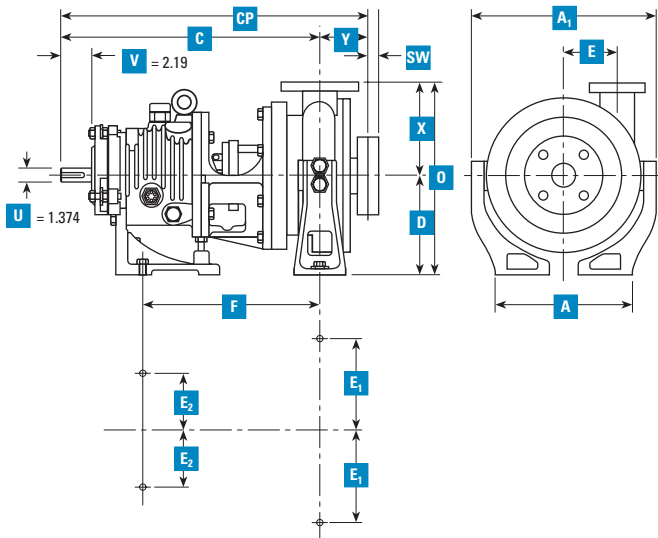
- Provides a solution to difficult pumping problems such as sludges and slurries with large particle solids, materials with entrained air, stringy or fibrous materials.
- Designed to fit the standard System One and LD17 power ends and includes all the features and benefits of our System One pump.



- 1 LD17 shaft<sup>2</sup>
- 2 LD17 power end<sup>2</sup>
- 3 Back cover/seal chamber
  - Taper bore provided on LD17.
  - Straight bore with cast restriction bushing or open taper configurations available for Frame A.
- 4 Vortex impeller recessed out of passageway.
- 5 Vortex casing
- 6 Removable suction cover
- 7 Optional spacer flange allows removal of separate suction cover for cleanout without disturbing piping.
- 8 Solids are drawn into the vortex of swirling liquid and are discharged by centrifugal force through the open area of the casing with minimum impeller contact for minor particle degradation.
- 9 Suction and discharge passageways are one continuous open area.
  - 2" pump can pass a 2" (50 mm) solid
  - 3" pump can pass a 3" (75 mm) solid
  - 4" pump can pass a 4" (100 mm) solid

<sup>2</sup> Also available in Frame A (see circle inset above and System One Frame A Pump section for details of Power End).

## Vortex Pump (FRAME A & LD17)



### Vortex Pump – Frame A & LD17

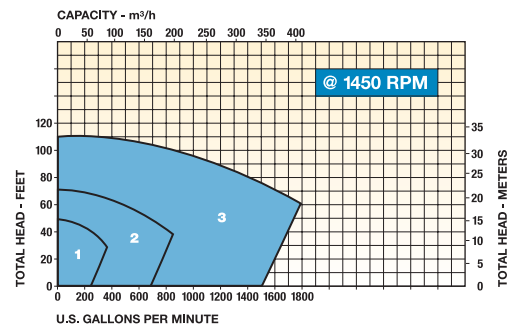
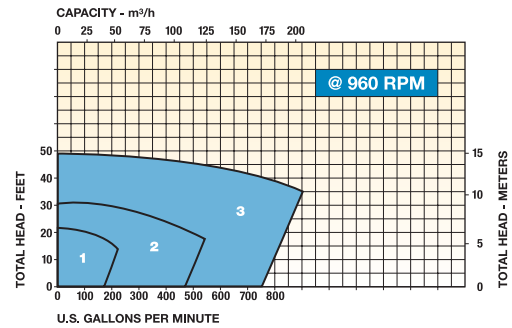
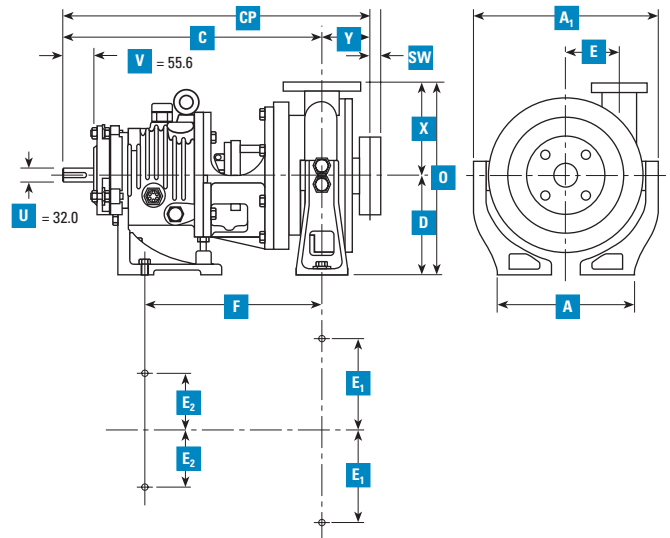
Pump Size	CP FrA	CP LD17	C FrA	C LD17	Y	X	E	D	O	F FrA	F LD17	A	A1	2E1	2E2	SW	
1	2 x 2-8	25.62	22.93	21.62	18.93	4.00	7.75	4.37	8.25	16.0	14.62	11.93	11.25	15.25	7.50	7.25	1.00
2	3 x 3-10	27.18	24.49	22.56	19.87	4.62	9.50	5.50	10.00	19.5	15.58	12.89	13.75	19.25	7.12	7.25	1.12
3	4 x 4-12	29.38	26.69	23.88	21.19	5.50	11.50	6.50	10.00	21.5	16.83	14.14	16.50	22.00	9.88	7.25	1.38

SW dim. indicates width of optional spacer flange.  
All dimensions are in inches.

#### Designed for difficult pumping problems such as:

- Sludges and slurries with large solids
- Pumped materials with entrained air
- Pumped fluids with stringy or fibrous materials
- Minimum product shearing

## Vortex Pump (Metric Flange)



### Vortex Pump – Metric Flange

Pump Size	CP FrA	CP LD17	C FrA	C LD17	Y	X	E	D	O	FF FrA	F LD17	A	A1	2E1	2E2	SW	
1	50 x 50-200	651	582	550	481	100	195	111	200	406	382	303	285	387	191	185	25
2	80 x 80-250	690	622	573	505	117	241	140	250	495	396	327	350	489	181	185	28
3	100 x 100-300	746	678	606	538	140	292	165	250	546	427	359	420	559	250	185	35

SW dim. indicates width of optional spacer flange.  
All dimensions are in millimeters.

#### Especially suited for the following industries:

- Waste treatment
- Food and chemical processing
- Pulp and paper
- Agriculture


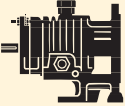




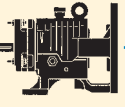



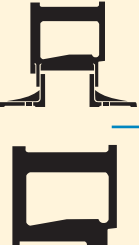
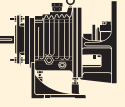
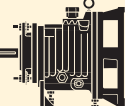
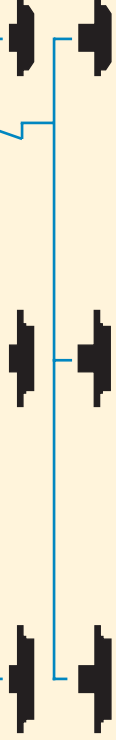



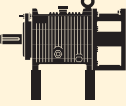





## Parts List

Part Name	# Req. per Pump	Frame S	Frame SD	Frame A & LD17	Frame A & LD17 Vortex	Frame M
Casing	1	D.I., 316SS CD-4, A-20, Hast.	D.I., 316SS CD-4, A-20, Hast.	D.I., 316SS CD-4, A-20, Hast.	D.I., 316SS CD-4, A-20, Hast.	D.I., 316SS CD-4, A-20, Hast.
Casing Gasket	1	1/16" per Application	1.5 mm per Application	1/16" per Application	1/16" per Application	1/16" per Application
Casing Foot	2	Steel	Cast	D.I./Centerline	D.I./Centerline	Cast (Steel CL option)
Impeller	1	CD4MCu A-20, Hast.	CD4MCu A-20, Hast.	CD4MCu A-20, Hast.	D.I., CD4MCu A-20, Hast.	D.I., CD4MCu A-20, Hast.
Impeller Hub O-Ring Seal	1	Teflon®	Teflon®	Teflon®	Teflon®	Teflon®
Suction Cover	1	N/A	N/A	N/A	D.I., 316SS CD-4, A-20, Hast.	N/A
Back Cover	1	D.I., 316SS CD-4, A-20, Hast.	D.I., 316SS CD-4, A-20, Hast.	D.I., 316SS CD-4, A-20, Hast.	D.I., 316SS CD-4, A-20, Hast.	D.I., 316SS CD-4, A-20, Hast.
Mechanical Seal Assembly	1	Refer to Seal Dwg.	Refer to Seal Dwg.	Refer to Seal Dwg.	Refer to Seal Dwg.	Refer to Seal Dwg.
Shaft – bimetallic standard (Steel w/alloy wetted end)	1	316SS A-20, Hast.	316SS A-20, Hast.	316SS, A-20 17-4 Ph, Hast.	316SS, A-20 17-4 Ph, Hast.	316SS A-20, Hast.
Radial Bearing	1	6308	6308	6310	6310	6314
Thrust Bearing	2 1	5308 7308 (2) (opt.)	7308(2)	7310 (2)	7310 (2)	7314 (2)
Thrust Bearing Locknut	1	Steel N08	Steel KM8	Steel N10	Steel N10	Steel N14
Thrust Bearing Lock Washer	1	Steel W08	Steel MB8	Steel W10	Steel W10	Steel W14
Flinger	1	N/A	N/A	Nylon 66	Nylon 66	Alum
Radial Bearing Oil Seal Laby Thrust Bearing Oil Seal Laby	1 1	316SS	316SS	316SS	316SS	316SS
Thrust Bearing Cartridge	1	D.I.	D.I.	C.I.	C.I.	C.I.
Thrust Bearing Retainer Cover	1	Steel	Steel	Steel	Steel	Steel
Thrust Bearing Cartridge O-Ring	1	Buna	Buna	Buna	Buna	Buna
Bearing Frame	1	C.I.	C.I.	C.I.	C.I.	C.I.
Bearing Frame Foot	1	C.I. option	N/A	C.I.	C.I.	C.I.
Oil Sight Glass	1	Steel-Zinc Plated	Steel-Zinc Plated	Steel-Zinc Plated	Steel-Zinc Plated	Steel-Zinc Plated
Frame Adaptor and O-Ring	1	N/A	N/A	D.I./C.I. Buna	D.I./C.I. Buna	D.I. Buna
Micrometer Adjustment Nut	3	304SS	304SS	304SS	304SS	304SS
Cartridge Stud	3	304SS	304SS	304SS	304SS	304SS
Cartridge Locknut	3	304SS	304SS	304SS	304SS	304SS
Oil Filler and Cap	1	Nylon 66	Nylon 66	Nylon 66	Nylon 66	Nylon 66
C-Frame Motor Adaptor	1	C.I.	C.I.	C.I.	C.I.	C.I.

Material and equivalent ASTM: A-20 Grade CN7M, ASTM A-743; 316SS Grade CF8M, ASTM A-743; CD4MCu, ASTM A-743; Shaft, Steel portion, AISI 1018/316SS, ASTM A-276; Shaft 17-4 Ph, ASTM A-276; D.I. Ductile Iron, ASTM A-536; C.I. Cast Iron, ASTM A-48, CL 35. Teflon® registered trademark of DuPont.

# Interchangeability Chart

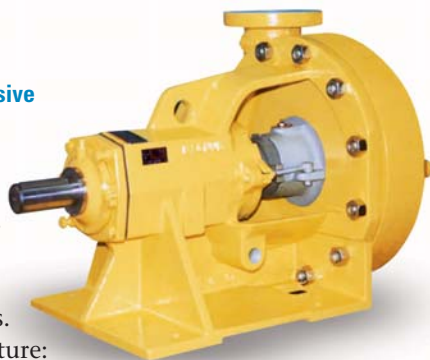
Motor Adaptor	Power End	Back Cover	Impeller Open	Casing	Pump Size ASME/ANSI	Pump Size IPP
	<b>Frame S</b> ASME/ANSI 				1 x 1½ – 6	N/A
					2 x 3 – 6	N/A
					1 x 1½ – 8	N/A
					1½ x 3 – 8	N/A
	<b>Frame SD</b> DIN 				N/A	32 x 50 – 160
					N/A	32 x 50 – 200
					N/A	50 x 80 – 200
	<b>Frame A</b> ASME/ANSI   <b>LD17</b> 				2 x 3 – 8	50 x 80 – 200
					3 x 4 – 8	80 x 100 – 200
					2 x 2 – 8 Vortex	50 x 50 – 200
					1 x 2 – 10	25 x 50 – 250
					1½ x 3 – 10	40 x 80 – 250
					2 x 3 – 10	50 x 80 – 250
					3 x 4 – 10	80 x 100 – 250
					4 x 6 – 10	100 x 150 – 250
					3 x 3 – 10 Vortex	80 x 80 – 250
					1½ x 3 – 13	40 x 80 – 330
					2 x 3 – 13	50 x 80 – 330
					3 x 4 – 13	80 x 100 – 330
					4 x 6 – 13	100 x 150 – 330
4 x 4 – 12 Vortex	100 x 100 – 300					
	<b>Frame M</b> 				6 x 8 – 13	Check with factory
					8 x 10 – 13	Check with factory
					6 x 8 – 15	Check with factory
					8 x 10 – 15	Check with factory



## Magnum Pumps Centrifugal and Vortex

### Industry's finest for abrasive and slurry services

Magnum Pumps are engineered for the toughest applications in all types of demanding abrasive and corrosive services. The slurry pumps feature:



- Solid stainless steel shaft with L<sup>3</sup>/D<sup>4</sup> ratio of 29 (1:1)
- Power end with solid cast base for maximum rigidity
- High chrome materials to 650 Brinnel hardness
- Available in sizes:
  - Centrifugal – 3 x 2 - 13 to 14 x 12 - 23; flows to 7,500 gpm (1,700 m<sup>3</sup>/hr)
  - Vortex – 3", 4", 6"; flows to 2200 gpm (500 m<sup>3</sup>/hr)
- Horizontal, v-belt drive and vertical configurations (see brochures 1301-005, 1301-004)

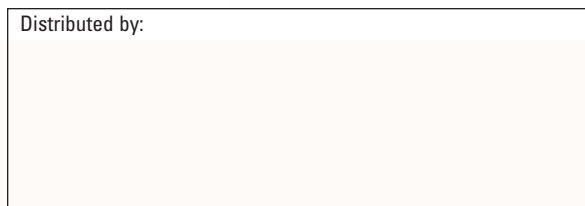
## Base Plates

Specialized base plates available for all System One pumps:

- API specification
- PIP RESP002 specification
- Various materials
  - Steel
  - 316SS
  - Galvanized



Distributed by:



Printed in USA

12/04-1M

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## Bearing Oil Temperature Monitor

Monitor clearly indicates potential failure of bearings and/or lubrication by an increase in oil temperature

The Blackmer Bearing Oil Temperature Monitor is a simple and effective preventative maintenance tool that improves equipment reliability by the constant monitoring of the lubrication environment. All types of pumps and other oil lubricated machinery will benefit from this product. The device simply screws into any 1/4" NPT connection and instantly registers the temperature of the oil.



## Pump Improvement Programs

### Power end conversions

- Upgrade existing pumps to System One heavy duty design
- Low stiffness ratio power end for maximum reliability
- Direct replacements available for popular models
- Universal configurations to fit most other pumps

### Back cover conversions

- Direct replacement for most popular pumps with large bore seal chamber for improved sealing environment

### Labyrinth oil seals

- Ultimate bearing protection
- Non-wearing, non-contacting seal replaces rubber lip seals for all types of rotating equipment
- Standard sizes to 4.50" (110 mm) diameter
- Specials - solid and split to 10" (250 mm) diameter

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SLIDING VANE PUMPS



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RECIPROCATING GAS COMPRESSORS



ROTARY VANE COMPRESSORS



SCREW COMPRESSORS