

PWA-LF

LOW FLOW ANSI PROCESS PUMP



 Engineered, Assembled, & Tested in the USA



COMPETITIVE ADVANTAGES

| Carbon Steel vs. Ductile Iron

High-strength, impact resistant Carbon Steel liquid ends for improved durability and pressure containment at no additional cost.

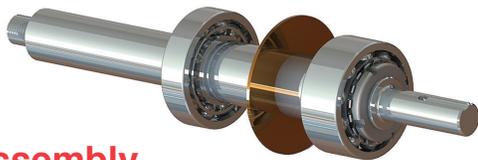
Replaces non-repairable, ductile iron casing and impellers, with repairable carbon steel, for extended component life.



Flange Arrangement Options

Standard ANSI class 150# flange pressure rating, flat or raised face design, provided to meet customer specified requirements at no additional cost.

Optional ANSI class 300# flange (375 PSI MAWP), flat or raised face design.



| Shaft and Bearing Assembly

Upgraded 316 SS vs. 4140 steel pump shaft is standard at no additional cost.

Proven flinger disk lubrication device to ensure effective bearing lubrication. Provides 30% increased bearing L-10 life and minimum 22°F lower bearing operating temperatures compared to flood oil design.

| PWA-LF Case and Impeller

Precisely machined discharge channel and circular casing volute providing higher efficiencies and stable hydraulics at low flows.

Multi vane open radial impeller providing reduced pulsations, vibration and impeller vane stress.

Fully shrouded for exceptional vane strength during low flow operations.

Balance holes reducing bearing thrust loads for extended bearing life and lower stuffing box pressure for increased seal life.



| Power Frame Superiority

Superior high-strength carbon steel vs. inferior cast iron power frame, adapter and bearing housing material.



Addresses environmental and safety concerns.

Exclusive finned bearing frame for maximum heat dissipation.

Convenient dual oil level sight glasses provide flexible viewing as standard.

Internal surfaces cleaned, rust preventative applied, and enamel coated assuring internal casting cleanliness.



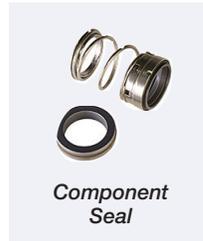
Standard Bore



Tapered Bore



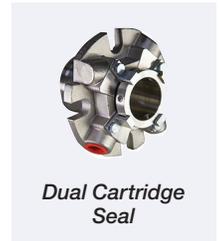
Big Bore



Component Seal



Single Cartridge Seal



Dual Cartridge Seal

| Seal Chamber/Sealing Solutions

Multiple seal chambers for maximum sealing flexibility for all process applications.

Accommodates all mechanical seal manufacturer's component and ANSI cartridge seal configurations.

Supports the full array of CPI seal support system options.

Ensures superior leak protection with maximum heat dissipation, maximizing seal life and pump reliability.

5 Year Unconditional Power Frame Warranty is standard at no additional cost.



LEVERAGING TECHNOLOGY

PumpWorks leverages technology by providing:

- Superior manufacturing capabilities.
- Extensive inventory selection.
- Professional, reliable service.



Inventory

Pump and component inventory in a variety of material options are strategically located through the Northern Hemisphere ensuring consistent, rapid shipment tailored to customer requirements.

Manufacturing

All of our pumps are engineered, inspected, assembled and tested in the United States of America. This ensures consistent quality, product availability, and low cost of ownership.



Service

Fully staffed professional sales and service teams providing superior customer support is available 24/7/365.



ePOD (Electronic Pump On Demand) is a browser-based front end software application allowing the end user and specifiers to intelligently select their own pump on the web.

ePOD software quickly delivers:

- Performance curves
- Comprehensive data sheets

Test drive ePOD at our website www.pumpworks.com today.



Quality

Engineered, assembled and tested in the USA

ePod Pump Selector

Access to end users and specifiers to select your pump application online at www.pumpworks.com, no password or login required.

Delivery

Pump components strategically inventoried for rapid shipment in a variety of material options.

SEAL CHAMBER/SEALING OPTIONS

Multiple seal chambers for maximum sealing flexibility for all process applications

Accommodates all mechanical seal manufacturer's component and ANSI cartridge seal configurations

Supports the full array of CPI seal support system options

Ensures superior leak protection with maximum heat dissipation, maximizing seal life and pump reliability

CIRCULAR CASING

Precisely machined discharge channel and circular casing volute providing higher efficiencies and stable hydraulics at low flows

Precision serrated flange face finish for optimum gasket retention and sealing

Carbon Steel ASTM A216 material standard for improved durability and pressure containment

Class 150# standard and 300# option

Self venting, centerline mounted discharge flange

Casing thickness exceeds ASME B73.1 specification for increased casing life

CASING GASKET

Fully confined to maximize liquid sealing

Protects casing fits from corrosion, therefore increases maintenance ease and proper alignment during reassembly

CASING DRAIN

Optional casing drain and drain piping

LOW FLOW IMPELLER

Multi-vane open radial impeller providing reduced pulsations

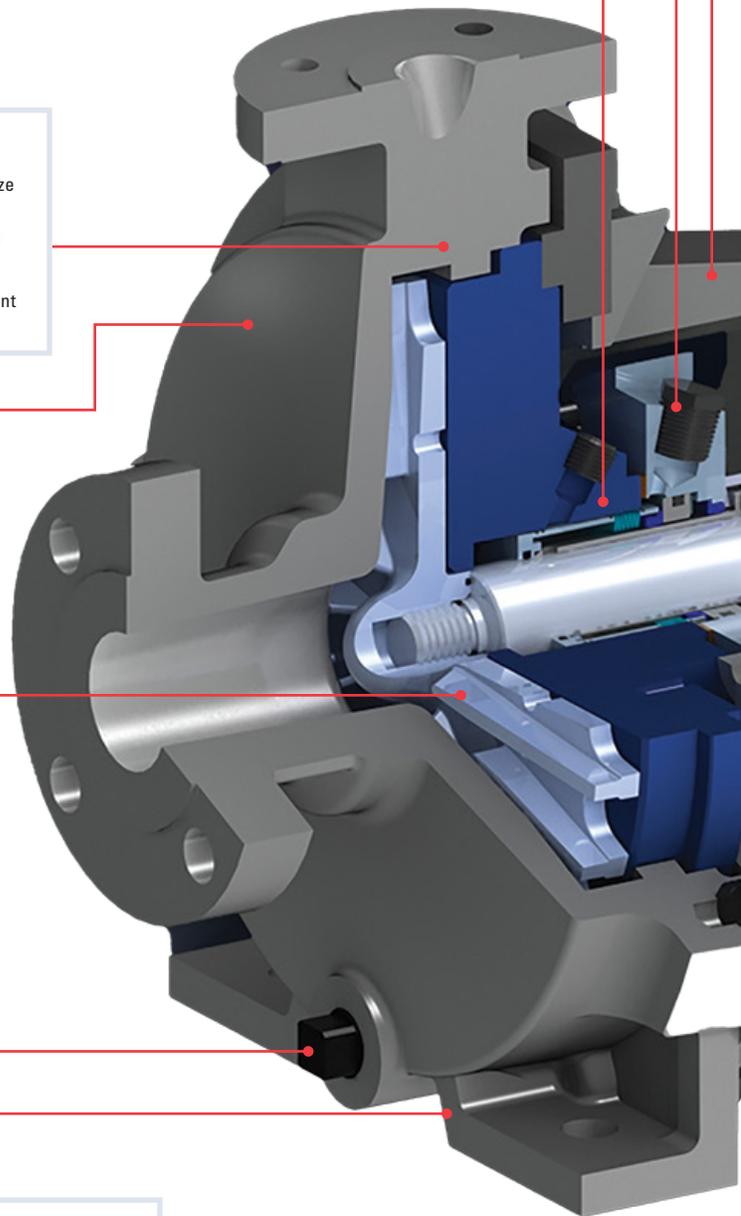
Fully shrouded for exceptional vane strength during low flow operations

Balance holes reducing bearing thrust loads for extended bearing life and lower stuffing box pressure and increased seal life

FOOT MOUNTED CASING

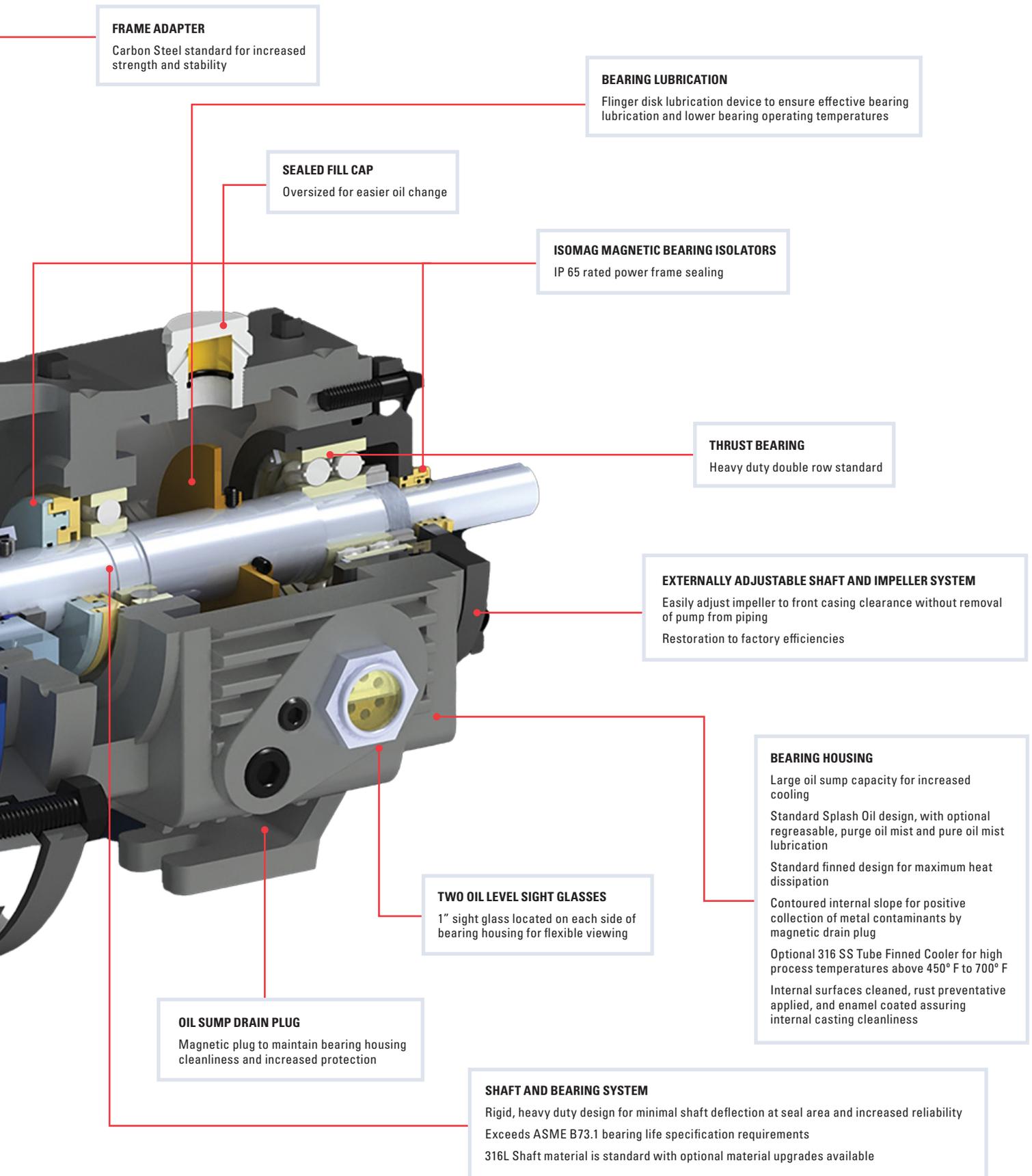
Maximum casing stability and support for back pull out maintenance feature

Reduced vibration





PWA-LF ANSI PROCESS PUMP



FRAME ADAPTER

Carbon Steel standard for increased strength and stability

BEARING LUBRICATION

Flinger disk lubrication device to ensure effective bearing lubrication and lower bearing operating temperatures

SEALED FILL CAP

Oversized for easier oil change

ISOMAG MAGNETIC BEARING ISOLATORS

IP 65 rated power frame sealing

THRUST BEARING

Heavy duty double row standard

EXTERNALLY ADJUSTABLE SHAFT AND IMPELLER SYSTEM

Easily adjust impeller to front casing clearance without removal of pump from piping
Restoration to factory efficiencies

BEARING HOUSING

Large oil sump capacity for increased cooling
Standard Splash Oil design, with optional regreasable, purge oil mist and pure oil mist lubrication
Standard finned design for maximum heat dissipation
Contoured internal slope for positive collection of metal contaminants by magnetic drain plug
Optional 316 SS Tube Finned Cooler for high process temperatures above 450° F to 700° F
Internal surfaces cleaned, rust preventative applied, and enamel coated assuring internal casting cleanliness

TWO OIL LEVEL SIGHT GLASSES

1" sight glass located on each side of bearing housing for flexible viewing

OIL SUMP DRAIN PLUG

Magnetic plug to maintain bearing housing cleanliness and increased protection

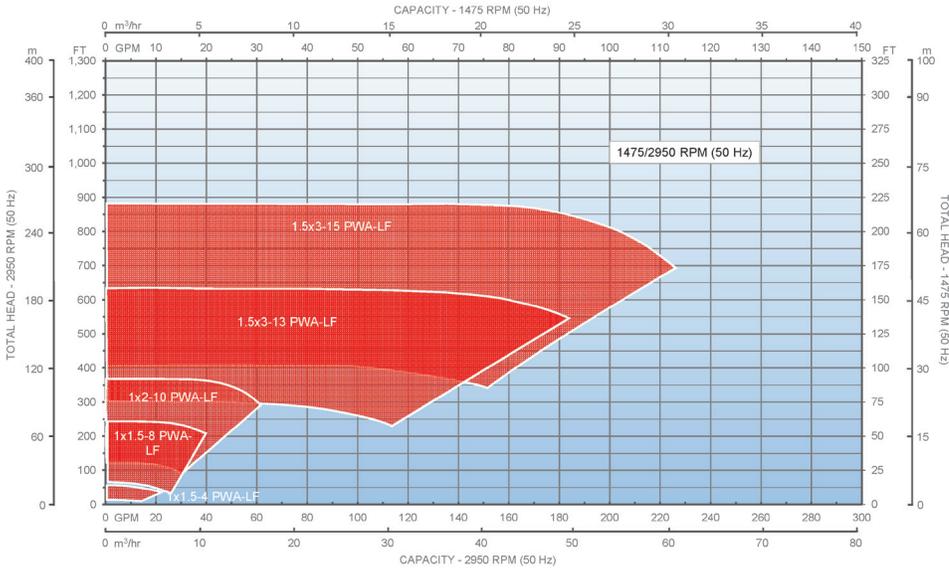
SHAFT AND BEARING SYSTEM

Rigid, heavy duty design for minimal shaft deflection at seal area and increased reliability
Exceeds ASME B73.1 bearing life specification requirements
316L Shaft material is standard with optional material upgrades available

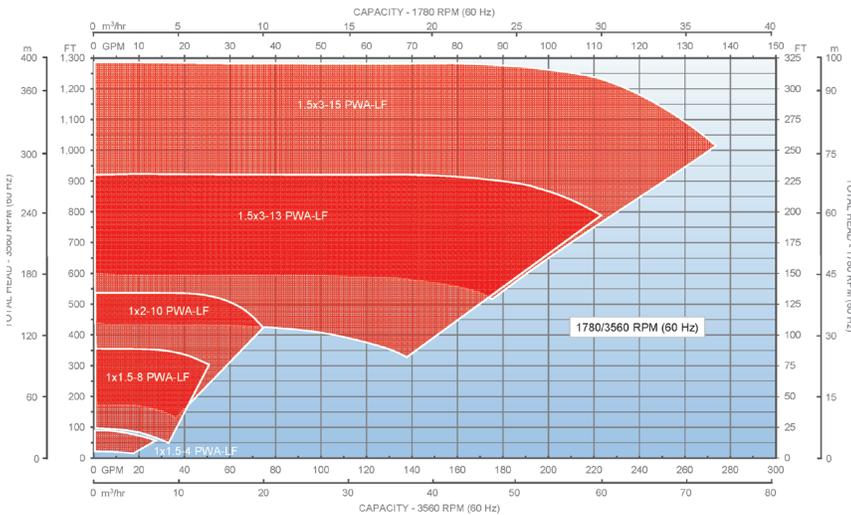


HYDRAULIC PERFORMANCE COVERAGE

| 50 Hz Performance Coverage



| 60 Hz Performance Coverage



Visit our web site at www.pumpworks.com and specify flow and performance needs and obtain pump selection and performance curve.

Performances shown are nominal and are to be used for preliminary selection only.

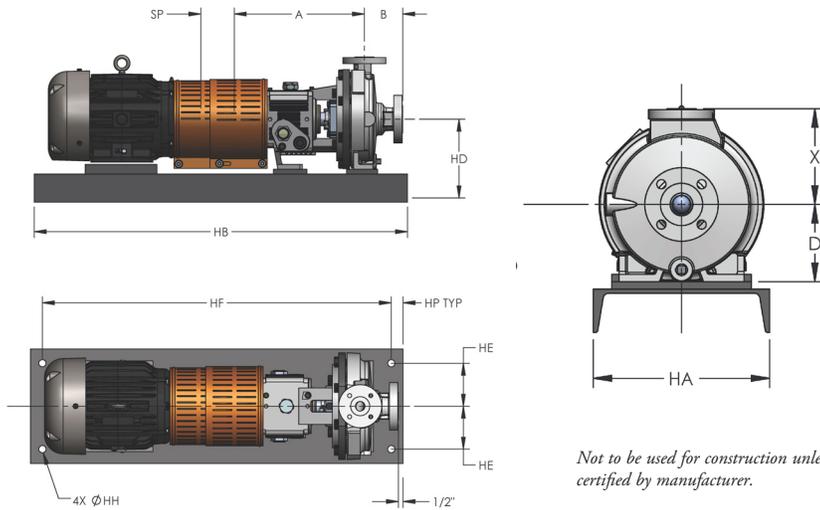
| Capabilities

- Capacities to 61 m³/h | 270 GPM
- Heads to 390 m | 1,280 ft
- Temperatures to 371° C | 700° F
- Pressures to 31 bar | 450 PSIG



PUMP DIMENSIONS AND WEIGHTS

FRAME	SIZE	ANSI DESIGNATION	DISCHARGE SIZE	SUCTION SIZE	X	A	B	D	SP	WEIGHT BARE PUMP lbs (kg)
GROUP 1	1 x 1.5 x 4	AA	1	1.5	6.5 (165)	13.5 (343)	4.0 (102)	5.25 (133)	3.75 (95)	110 (50)
	1 x 1.5 x 8	AA	1	1.5						130 (59)
GROUP 2	1 x 2 x 10	A05	1	2	8.5 (216)	19.5 (495)	4.0 (102)	8.25 (210)	3.75 (95)	280 (127)
	1 x 3 x 11	PumpWorks exclusive	1	3	10.5 (267)	19.5 (495)	4.0 (102)	10.0 (254)	3.75 (95)	355 (161)
GROUP 3	1.5 x 3 x 13	A20	1.5	3	10.5 (267)	19.5 (495)	4.0 (102)	10.0 (254)	3.75 (95)	350 (159)



NEMA MOTOR FRAME	WEIGHT lbs (kg)
182 T	98 (45)
184 T	128 (58)
213 T	197 (89)
215 T	226 (103)
254 T	375 (170)
256 T	412 (187)
284 T	495 (225)
286 T	519 (235)
324 T	700 (318)
326 T	756 (343)
364 T	948 (430)
365 T	1009 (458)
405 T	1330 (603)
444 T	1820 (826)
445 T	1893 (859)
447 T	2343 (1073)
449 T	3020 (1370)

Weights and dimensions are approximate and not to be used for construction.

BASEPLATE DIMENSIONS AND WEIGHTS

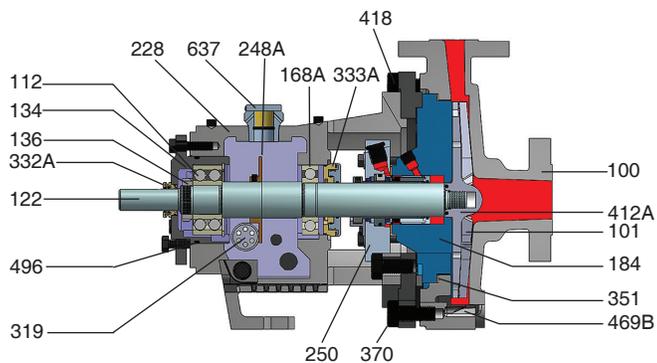
MAX NEMA FRAME	ANSI BASEPLATE NUMBER	HA	HB	HD MAX				HE	HF	HH	HP TYP	WEIGHT lb (kg)
				D=5.25 (133)	D=8.25 (210)	D=10 (254)	D=14.5 (368)					
184 T	139	12 (381)	39 (991)	9 (229)				4.5 (114)	36.5 (927)	0.75 (19)	1.25 (32)	124 (56)
256 T	148	15 (457)	48 (1219)	10.5 (267)				6 (152)	45.5 (1156)	0.75 (19)	1.25 (32)	195 (89)
326 TS	153	18 (533)	53 (1346)	12.88 (327)				7.5 (191)	50.5 (1283)	0.75 (19)	1.25 (32)	258 (117)
184 T	245	12 (381)	45 (1143)		12 (305)	13.75 (349)		4.5 (114)	42.5 (1080)	0.75 (19)	1.25 (32)	133 (61)
215 T	252	15 (457)	52 (1321)		12.38 (314)	14.13 (359)		6 (152)	49.5 (1257)	0.75 (19)	1.25 (32)	189 (86)
286 T	258	18 (533)	58 (1473)		13 (330)	14.75 (375)		7.5 (191)	55.5 (1410)	1 (25)	1.25 (32)	278 (127)
365 T	264	21 (533)	64 (1626)		13.88 (353)	14.75 (375)		7.5 (191)	61.5 (1562)	1 (25)	1.25 (32)	395 (180)
405 TS	268	24 (660)	68 (1727)		14.88 (378)	14.88 (378)		9.5 (241)	65.5 (1664)	1 (25)	1.25 (32)	430 (196)
449 TS	280	26 (660)	80 (2032)		15.88 (403)	15.88 (403)		9.5 (241)	77.5 (1969)	1 (25)	1.25 (32)	437 (198)
286 T	368	24 (660)	68 (1727)				19.25 (489)	9.5 (241)	66.5 (1664)	1 (25)	1.25 (32)	456 (208)
405 T	380	26 (660)	80 (2032)				19.25 (489)	9.5 (241)	77.5 (1969)	1 (25)	1.25 (32)	580 (263)
449 T	398	26 (660)	98 (2489)				19.25 (489)	9.5 (241)	95.5 (2426)	1 (25)	1.25 (32)	839 (382)



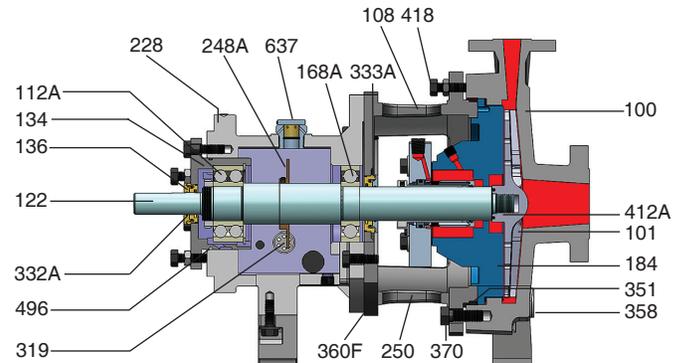
PARTS LIST AND MATERIALS OF CONSTRUCTION

ITEM REF NUMBER	PART NAME	CARBON STEEL W/ 316L SS IMPELLER	316L SS	CA6NM (12 % CHROME)	Duplex SS	Super Duplex SS	ALLOY 20	MONEL	NICKEL	HASTELLOY B, C, & G	TITANIUM
100	Casing	Carbon Steel	•	•	•	•	•	•	•	•	•
101	Impeller	316L SS	•	•	•	•	•	•	•	•	•
105	Lantern Ring	Glass Filled Teflon									
106	Packing, Stuffing Box	Teflon-Impregnated Fibers									
108	Adapter, Frame	Carbon Steel									
112 A	Thrust Bearing	Double Row Angular Contact									
122	Shaft-Less Sleeve	316L SS (Optional Alloy 20 & Duplex SS A2205)			Duplex A2205		•	•	•	•	•
122	Shaft with Sleeve	316L SS (Optional Alloy 20 & Duplex SS A2205)									
126	Shaft Sleeve	316L SS (Optional Alloy 20 & Duplex SS A2205)			Super Duplex SS	Super Duplex SS	•	•	•	•	•
134	Thurst Bearing Housing	Carbon Steel									
136	Bearing Lock Nut and Lock Washer	Steel									
168 A	Radial Bearing	Signle Row Deep Groove									
184	Cover, Stuffing Box (Packed Box)	Carbon Steel	•	•	•	•	•	•	•	•	•
184	Seal Chamber (Mechanical Seal)	Carbon Steel	•	•	•	•	•	•	•	•	•
228	Frame, Bearing	Carbon Steel									
248 A	Flinger with Set Screws	Bronze with Steel Set Screws									
250	Gland-Seal/Packing	316L SS			•	•	•	•	•	•	•
370H	Stud/Nut, Cover to Adapter	304 SS									
319	Sight Glass-Oil	Glass/Steel									
332 A	Labyrinth Seal (Outboard)	Bronze									
333 A	Labyrinth Seal (Inboard)	Stainless Steel/Bronze									
351	Gasket, Casing	Aramid Fiber with Binder									
358	Plug, Casing Drain (Optional)	Carbon Steel	•	•	•	•	•	•	•	•	•
360 F	Gasket, Frame to Adapter	Buna Rubber									
360 C	Gasket, Bearing End Cover	Cellulose Fiber with Binder									
370	Cap Screw, Adapter to Casing	Stainless Steel, ASTM A193									
412 A	O-Ring, Impeller	Glass Filled Teflon									
418	Jacking Bolt	304 SS									
469 B	Dowel Pin, Frame to Adapter	Steel									
496	O-Ring, Bearing Housing	Buna Rubber									
637	Filter Vent	Carbon Steel									

Group 1 Sectional View PWA-LF



Group 2/3 Sectional View PWA-LF





TECHNICAL DATA

All dimensions in inches (mm).

		GP1	GP2	GP3
Shaft*	Shaft Diameter at Impeller	0.75 (19)	1 (25)	1.25 (32)
	Diameter in Stuffing Box/Seal Chamber Less Sleeve With Sleeve	1.375 (35)	1.75 (45)	2.125 (54)
		1.125 (29)	1.5 (38)	1.875 (48)
	Diameter Between Bearings	1.5 (38)	2.125 (54)	2.5 (64)
	Diameter at Coupling	0.875 (22)	1.125 (29)	1.875 (48)
	Overhang	6.125 (156)	8.375 (213)	8.375 (213)
	Maxium Shaft Deflection	0.002 (0.05)		
Shaft Deflection Index (L ³ /D ⁴) Less Sleeve With Sleeve	64	63	29	
	143	116	48	
Sleeve*	Outside Diameter thru Stuffing Box/Seal Chamber	1.375 (35)	1.75 (45)	2.125 (54)
Bearings	Radial	6207	6309	6311
	Thrust	3306	3309 A/C3	7310
	Bearing Span	4.125 (105)	6.75 (171)	6.875 (164)
Large Bore Seal Chamber*	Bore	2.875 (73)	3.5 (89)	3.875 (98)
Stuffing Box*	Bore	2 (51)	2.5 (64)	2.875 (73)
Maximum Power Limits	HP (kW) per 100 RPM	1.1 (0.82)	3.4 (2.6)	5.6 (4.2)
Maximum Allowable Working Pressure (note 3)	MAWP PSI (Kpa)**	up to 285 PSI (1965 Kpa) at 100°F with 150 # flanges		
		up to 375 PSI (2586 Kpa) 100°F with 300 # flanges		
		*Consult Pressure Temperature chart for various temperatures		
Maximum Temperature (note 4)	Oil or Grease Lubricated Bearing Frame without Optional Cooling	350°F (177°C)		
	Oil Lubricated Power Frame with Optional Cooling	700°F (370°C)		
Casing	Corrosion Allowance	0.125 minimum		

Notes:

1. 17 inch pump sizes – Shaft diameter at Stuffing Box / Seal Chamber is 2.25 inches (57) with sleeve. Shaft Sleeve Outside Diameter is 2.75 inches (70) for packing and 2.5 inches (64) for mechanical seals. Seal chamber bore is 4.75 inches (121). Stuffing box bore is 3.625 inches (92).

2. 17 inch pump sizes power limitation per 100 RPM is 20HP (15kW).

3. Hydro-static test pressure equal to 1.5 times Maximum Allowable Working Pressure.

| Test Facilities

- Test flows up to 7,500 GPM.
- Discharge test pressures up to 740 PSI.
- Supply tank rated from full vacuum to 65 psi.
- 460 volt through 500 HP, 3600 RPM.
- Variable Frequency Drive for precise speed control through 500 HP @ 460 volt.



See our Test Facilities Brochure for more information.

| Typical Industries

- Chemical/Petrochemical
- Pulp and Paper
- Food and Beverage
- Oil and Gas
- Primary Metals Manufacturing
- Mining
- Power Generation
- Waste Treatment
- General Industrial



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