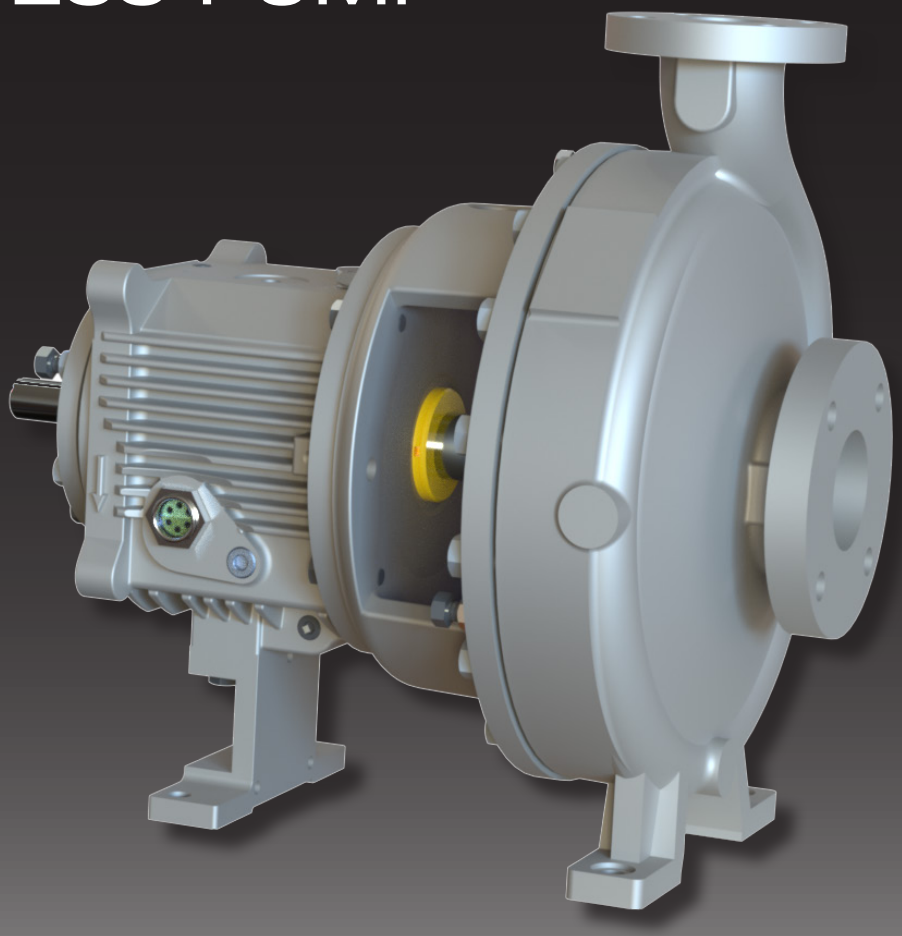
PWA GEN 2

ANSI/ASME B73.1 PROCESS PUMP



PumpWorks™

Engineered, Assembled, & Tested in the USA

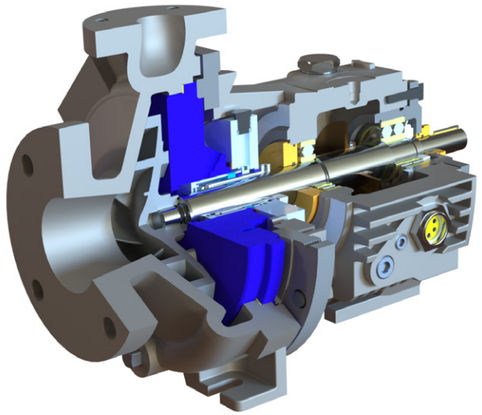
COMPETITIVE ADVANTAGES

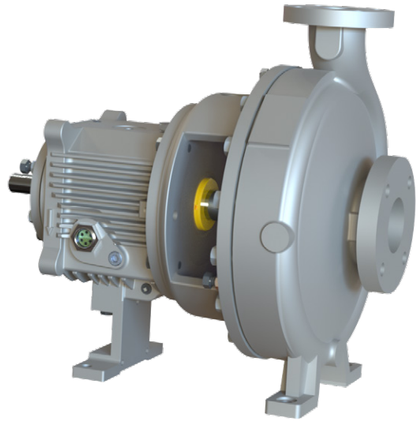
Carbon Steel vs. Ductile Iron

High strength, impact resistant Carbon Steel liquid ends for improved durability and pressure containment.

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

30% Higher Thermalconductivity than Cast Iron for improved heat dissipation, lower oil temperature and longer bearing life.





Innovative Power Frame Features

All new power frame design for enhanced reliability. US Patent 10,288,081.

25% more cooling surface than PWA GEN 1.

Sealed lubrication chamber.

ISOMAG™ magnetic seals IP65 rated Power Frame sealing.

Sloped and segregated drain for contaminant isolation.

Optional Predict-Plus™ GEN 3.5 proactive pump monitor.

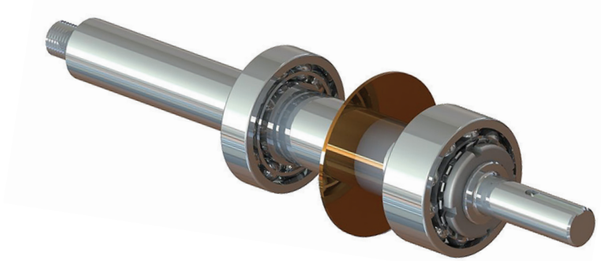
Zero power frame oil maintenance for up to 5 years when using recommended oil.

WARRANTY: PumpWorks will replace the Power End for 5 years after shipment, regardless of cause of failure.

Shaft and Bearing Assembly

Upgraded 316L 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 22ºF lower bearing operating temperatures compared to flood oil design.



PWA | GEN 2 ANSI/ASME B73.1 PROCESS PUMP

LEVERAGING TECHNOLOGY

PumpWorks leverages technology by providing:

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

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.

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.

Service

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

ePOD ELECTRONIC PUMP ON DEMAND

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

SEALED FILL CAP

Oversized for easier oil changes

BEARING HOUSING

25% additional cooling surface area than PWA GEN 1

Sealed lubrication chamber

Sloped and segregated drain for isolation of contaminants

Standard flinger disk design with optional purge or pure oil mist lubrication

Optional finned tube cooler for process temperatures above 450° F

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

CASING

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

Precision serrated flange face finish for optimum gasket retention and sealing

Class 150# standard and 300# option

Self venting, centerline mounted discharge flange

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

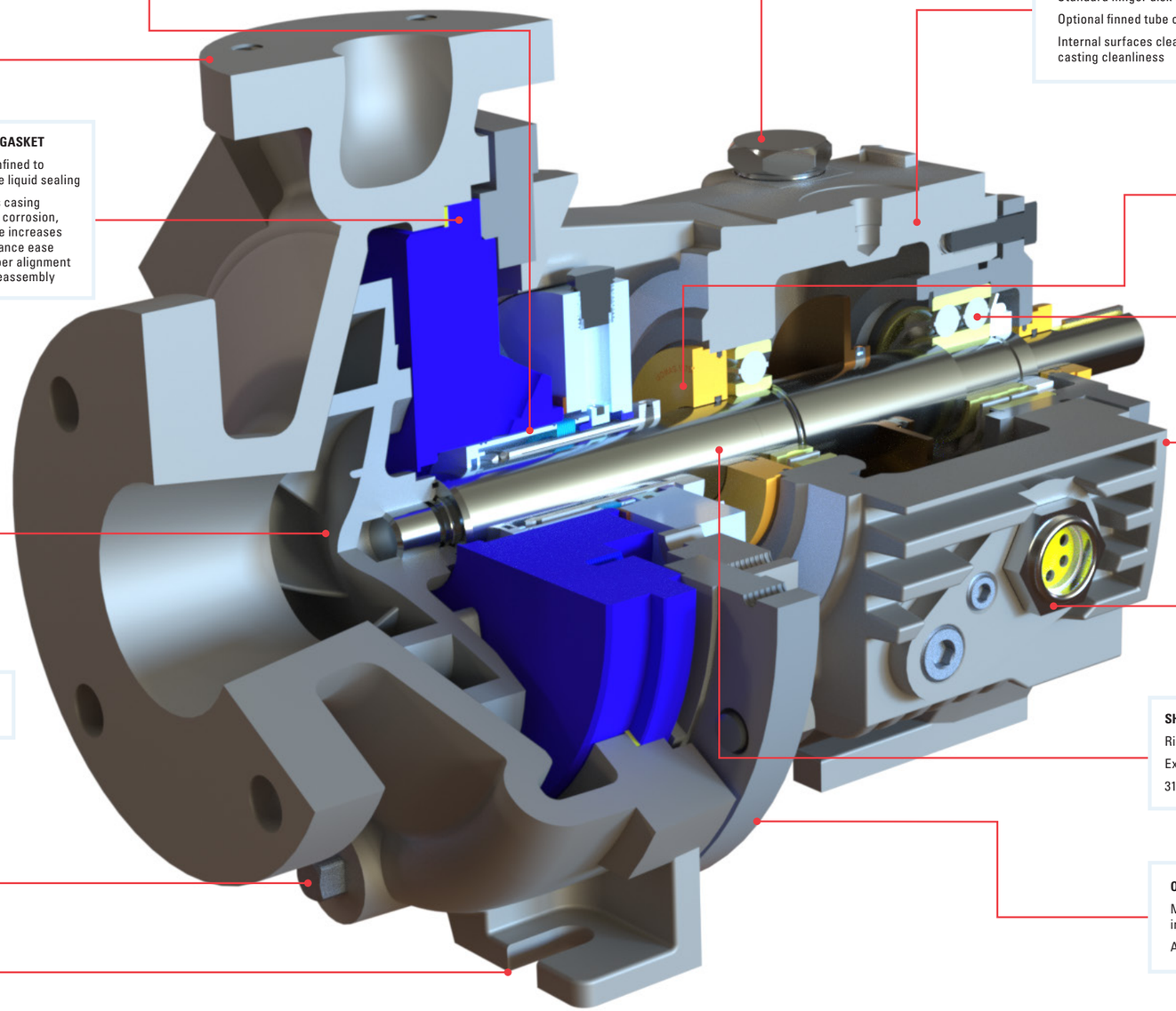
Back pull out design for easy maintenance

Full line of corrosive resistant materials

CASING GASKET

Fully confined to maximize liquid sealing

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



ISOMAG MAGNETIC SEALS

IP 65 rated Power Frame sealing

THRUST BEARING

Heavy duty double row standard

Optional duplex angular contact thrust bearing

EXTERNALLY ADJUSTABLE SHAFT AND IMPELLER SYSTEM

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

Restoration to factory efficiencies

IMPELLER

Semi open for increased corrosion, abrasion and solids wear resistance

Back pump out vanes for reduced thrust loading and seal chamber operating pressure

TWO OIL LEVEL SIGHT GLASSES

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

CASING DRAIN

Optional casing drain

SHAFT AND BEARING SYSTEM

Rigid, heavy duty design for increased reliability

Exceeds ANSI/ASME B73.1 bearing life specifications requirements

316L SS shaft material is standard with optional material upgrades available

FOOT MOUNTED CASING

Maximum casing stability and support for back pull out maintenance feature

Reduced vibration

OIL SUMP DRAIN PLUG (OPPOSITE SIDE)

Magnetic plug to maintain bearing housing cleanliness and increased protection

All PWA drain plugs located on side of frames for easy access

PWA | GEN 2 ANSI/ASME B73.1 PROCESS PUMP

Predict Plus™

YOUR PUMP WANTS TO TALK TO YOU™

Predict-Plus is the only wireless, cloud connected, continuous machinery health monitor designed specifically for your rotating equipment needs.

Always On
Predict-Plus is CONTINUOUSLY monitoring and logging your pump's health.

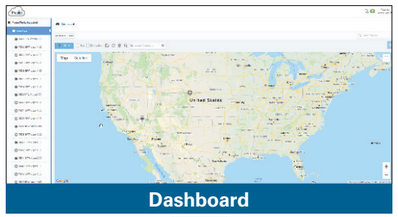
Class 1, Division 1
Intrinsically safe

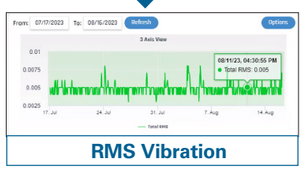
Vibration
Self-Calibrating Tri-Axial Accelerometer to capture FFT and RMS vibration data.

Bearing Temperature
Integrated RTD for bearing temperature monitoring.

Alerts
Proactive alerts via email and SMS from Predict-Cloud.

- Automatic device registration on the cloud via cellular interface
- Long term storage of trend data including Fast Fourier Transform (FFT)
- Affordable & available for new and existing rotating equipment

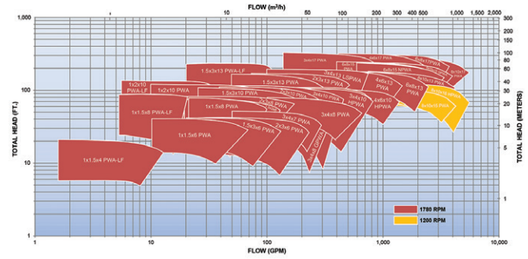


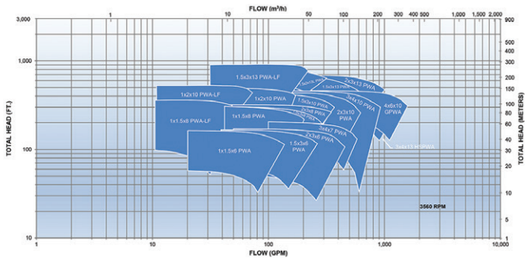


PWA | GEN 2 ANSI/ASME B73.1 PROCESS PUMP

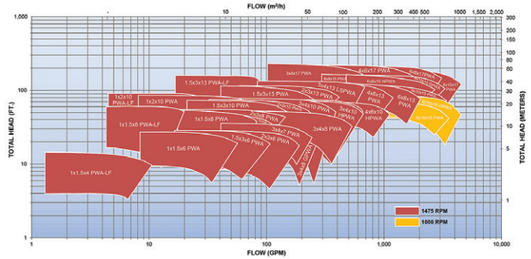
HYDRAULIC PERFORMANCE COVERAGE

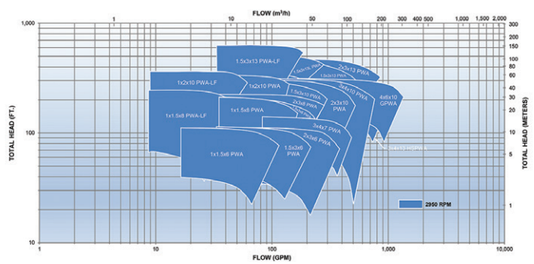
60 Hz Performance Coverage





50 Hz Performance Coverage





Capabilities

- Capacities to 1,364 m³/h | 7,000 GPM
- Heads to 223 m | 730 ft
- Temperatures to 371° C | 700° F
- Pressures to 26 bar | 375 PSIG

Capabilities

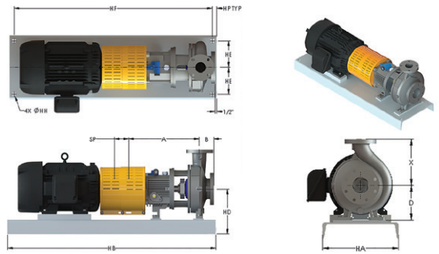
- Capacities to 1,130 m³/h | 5,800 GPM
- Heads to 154 m | 503 ft
- Temperatures to 371° C | 700° F
- Pressures to 26 bar | 375 PSIG

ePOD ELECTRONIC PUMP ON DEMAND

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.

PUMP DIMENSIONS & WEIGHTS



NEMA MOTOR FRAME	WEIGHT lbs (kg)
182T	98 (45)
184T	128 (58)
213T	197 (89)
215T	226 (103)
254T	375 (170)
256T	412 (187)
284T	495 (225)
286T	519 (235)

NEMA MOTOR FRAME	WEIGHT lbs (kg)
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)

Not to be used for construction unless certified by manufacturer.

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 6	AA	1	1.5	6.5 (165)	13.5 (343)	4.0 (102)	5.25 (133)	3.75 (95)	88 (40)
	1.5 x 3 x 6	AB	1.5	3						97 (43)
	2 x 3 x 6	AC	2	3						100 (45)
	1 x 1.5 x 8	AA	1	1.5						105 (47)
	1.5 x 3 x 8	AB	1.5	3						113 (51)
GROUP 2/ GROUP 3	3 x 4 x 7	A70	3	4	11 (280)	19.5 (496)	4 (102)	8.25 (210)	3.75 (95)	231 (104)
	2 x 3 x 8	A60	2	3	9.5 (242)					210 (95)
	3 x 4 x 8	A70	3	4	11 (280)					231 (104)
	3 x 4 x 8G	A70	3	4						
	1 x 2 x 10	A05	1	2	8.5 (216)					210 (95)
	1.5 x 3 x 10	A50	1.5	3						231 (109)
	2 x 3 x 10	A60	2	3	9.5 (242)					242 (109)
	3 x 4 x 10	A70	3	4	11 (280)					278 (125)
	3 x 4 x 10H	A40	3	4	12.5 (318)			10 (254)		289 (130)
	4 x 6 x 10G	A80	4	6	13.5 (343)					320 (144)
	4 x 6 x 10H	A80	4	6						
	1.5 x 3 x 13 & 13L	A20	1.5	3	10.5 (267)					257 (116)
	2 x 3 x 13	A30	2	3	11.5 (292)					289 (130)
	3 x 4 x 13	A40	3	4	12.5 (318)					347 (156
	4 x 6 x 13	A80	4	6	13.5 (343)					425 (191)
GROUP 4/ GROUP 4–17	6 x 8 x 13	A90	6	8	16 (406)	27.875 (708)	6 (152)	14.5 (368)	5.25 (133)	588 (265)
	8 x 10 x 13	A100	8	10	18 (457)					704 (317)
	6 x 8 x 15	A110	6	8						641 (288)
	8 x 10 x 15	A120	8	10	19 (483)					777 (350)
	8 x 10 x 15G	A120	8	10						746 (336)
	8 x 10 x 16H	A120	8	10						893 (402)
	3 x 4 x 17	–	3	4	16 (406)					620 (279)
	4 x 6 x 17	A105	4	6						683 (307)
	6 x 8 x 17	A110	6	8	18 (457)					767 (345)
	8 x 10–17 & 17H	A120	8	10	19 (483)					872 (392)

Dimensions in inches (mm), weights in lbs.(kg). Weights and dimensions are approximate and not to be used for construction.

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

Dimensions in inches (mm), weights in lbs.(kg). Weights and dimensions are approximate and not to be used for construction.

PWA | GEN 2 ANSI/ASME B73.1 PROCESS PUMP

PWA INTERCHANGEABILITY CHART

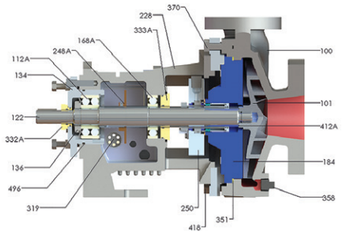
FRAME	SHAFT & FRAME ASSEMBLY	ADAPTER	COVER	IMPELLER	CASE	SIZE
GROUP 1 1-3/8" Shaft Dia. Max BHP-40 HP						1 x 1.5 x 6 AA 1.5 x 3 x 6 AB 2 x 3 x 6 AC 1 x 1.5 x 8 AA 1.5 x 3 x 8 AB
GROUP 2 1-3/4" Shaft Dia. Max BHP-122 HP						3 x 4 x 7 A70 2 x 3 x 8 A60 3 x 4 x 8 A70 3 x 4 x 8G A70 1 x 2 x 10 A05 1.5 x 3 x 10 A50 2 x 3 x 10 A60 3 x 4 x 10 A70 3 x 4 x 10H A40 4 x 6 x 10G A80 4 x 6 x 10H A80 1.5 x 3 x 13 A20 2 x 3 x 10 A30 3 x 4 x 13 A40 4 x 6 x 13 A80
GROUP 3 2-1/8" Shaft Dia. Max BHP-200 HP						1 x 2 x 10 A05 1.5 x 3 x 10 A50 2 x 3 x 10 A60 3 x 4 x 10 A70 3 x 4 x 10H A40 4 x 6 x 10G A80 4 x 6 x 10H A80 1.5 x 3 x 13 A20 2 x 3 x 13 A30 3 x 4 x 13 A40 4 x 6 x 13 A80
GROUP 4 Max BHP-250 HP Group 4-17 H Max BHP-350 HP						6 x 8 x 13 A 90 8 x 10 x 13 A100 6 x 8 x 15 A110 8 x 10 x 15 A120 8 x 10 x 15G A120 8 x 10 x 16H A120 4 x 6 x 17 A105 6 x 8 x 17 A110 8 x 10 x 17 A120

PARTS LIST AND MATERIALS OF CONSTRUCTION

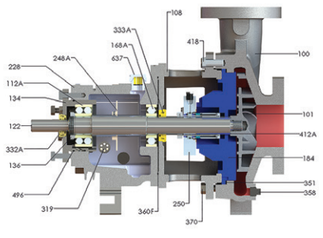
ITEM REF NUMBER	PART NAME	CARBON STEEL	CARBON STEEL W/ 316L SS IMPELLER	316L SS	CA6NM (12 % CHROME)	Duplex SS CD4 Gr1B	Super Duplex SS CD4 Gr5A	ALLOY 20	MONEL	NICKEL	HASTELLOY B, C, & G	TITANIUM
100	Casing	•	Carbon Steel	•	•	•	•	•	•	•	•	•
101	Impeller	•	316L SS	•	•	•	•	•	•	•	•	•
105	Lantern Ring	Glass Filled Teflon										
106	Packing, Stuffing Box	Teflon–Impregnated Fibers										
108	Adapter, Frame	Carbon Steel										
112 A	Thrust Bearing	Double Row Angular Contact–note (1)										
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			•	•	•	•	•	•	•	•
370	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										

(1) Duplex angular contact bearing Standard on Group 3, Bearing Frame and optional on Group 1, 2, and 4.

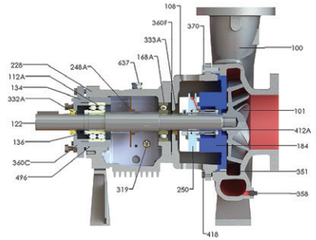
Group 1 *Sectional View PWA Gen 2*



Group 2/3 *Sectional View PWA Gen 2*



Group 4 *Sectional View PWA Gen 2*



PWA | GEN 2 ANSI/ASME B73.1 PROCESS PUMP

TECHNICAL DATA

All dimensions in inches (mm).

		GP1	GP2	GP3	GP4
Shaft*	Shaft Diameter at Impeller	0.75 (19)	1 (25)	1.25 (32)	1.5 (38)
	Diameter in Stuffing Box/Seal Chamber Less Sleeve With Sleeve	1.375 (35) 1.125 (29)	1.75 (45) 1.5 (38)	2.125 (54) 1.875 (48)	2.5 (64) 2 (51) note 1
	Diameter Between Bearings	1.5 (38)	2.125 (54)	2.5 (64)	3.125 (79)
	Diameter at Coupling	0.875 (22)	1.125 (29)	1.875 (48)	2.375 (60)
	Overhang	6.125 (156)	8.375 (213)	8.375 (213)	9.969 (253)
	Maxium Shaft Deflection	0.002 (0.05)			
	Shaft Deflection Index (L^3/D^4) Less Sleeve With Sleeve	64 143	63 116	29 48	25 62
Sleeve*	Outside Diameter thru Stuffing Box/Seal Chamber	1.375 (35)	1.75 (45)	2.125 (54)	2.5 (64) note 1
Bearings	Radial	6207	6309	6311	6313
	Thrust	3306	3309 A/C3	7310	3313
	Bearing Span	4.125 (105)	6.75 (171)	6.875 (164)	9.25 (235)
Large Bore Seal Chamber*	Bore	2.875 (73)	3.5 (89)	3.875 (98)	4.75 (120) note 1
Stuffing Box*	Bore	2 (51)	2.5 (64)	2.875 (73)	3.375 (86) note 1
Maximum Power Limits	HP (kW) per 100 RPM	1.1 (0.82)	3.4 (2.6)	5.6 (4.2)	14 (10.5) note 2
Maximum Allowable Working Pressure	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.

4. Tube Finned Cooler, Jacketed Seal Chamber, Graphite Impeller O-ring and Casing Gasket for temperatures between 450° F (232° C) to 700° F (370° C).

Test Facilities

- Test flows up to 7,500 GPM.
- Discharge test pressures up to 740 PSI.

See our Test Facilities Brochure for more information.

- 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.

Typical Industries

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

PumpWorks™

Pumpworks I pumpworks.com

Member of: Hydraulic Institute

ENGINEERED, ASSEMBLED AND TESTED IN THE USA