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BREMERTON, WASHINGTON
OLYMPIC VIEW INDUSTRIAL PARK
WASTEWATER TREATMENT EXPANSION

RECEIVED

JUL 13 1987

PORT OF BREMERTON

Section 15220

Double Suction Horizontal Split Case Pumps P1 & P2

General Description:

PACO Model 3095 Type KPS single stage, double suction, horizontal, split case centrifugal pump units. Removal of the upper half of the horizontally split housing permits removal of the complete rotating assembly without disturbing piping connections. Each unit is of bronze fitted construction with a dynamically and hydraulically balanced bronze impeller, bronze case wear rings and a close-grained grey iron casing rated for 175 PSI working pressure. Shaft is steel with bronze sleeves, and unit is packing box configuration. Pump can be changed to mechanical seals in the field. Pump ball bearings are cartridge mounted grease lubricated type.

Each pump will be mounted on a steel base and direct connected to motor through Woods flexible coupling. With OSHA compliance coupling guard. Motors are 5 HP, 460 volt, 3 phase, 1750 RPM, TEFC high efficiency type, U.S. electric motors unimount with 1.25 service factor (6.25 BHP available).

Capacity: 275 GPM at 50' Head.
Pump rotation is clockwise.

Enclosures:

- PACO Pumps -- Bulletin
- PACO Pumps -- Performance Curve
- PACO Pumps -- Dimensions

BJM:dl

6/11/87

"It is hereby certified that the material shown and marked in this submittal is that proposed to be incorporated into Contract No. BREMERTON W.WTP is in compliance with the contract drawings and specifications, can be installed in the allocated spaces, and is submitted for your approval."

Certified by DE Date 6-15-87

STEEL BASE, MAXIMUM 3" DISCHARGE

P1 AND P2

PUMP MODEL	FLANGE SIZE		CP		U	W	YY	X	HZ	HR	BARE PUMP WT. (LBS)
	SUCTION	DISCHARGE	SEAL	PACK							
2095-1	2 1/2	2	19 3/4	21 1/8	1	12	8 1/2	8 1/2	12 1/4	7 1/2	160
2013-5							10	10	15 5/8		210
3095-7	4	3	24 1/2	26 1/4	1 1/2	14 1/2	11	11	13	9 7/8	175
3014-5							12	12	16 5/8		390

PUMP MODEL	MOTOR FRAME	(MAX.) C	MU	HB	HP	HG	HA	HK	HJ	HS/HD	HH	MAX. WT. (LBS)
2095-1	143T, 145T	15	7/8	40	1	3	12	10	1	6 1/2	5/8	380
2013-5	182T, 184T	18	1 1/8									
	213T, 215T	22	1 3/8									
	254T, 256T	27	1 5/8									
	284TS, 286TS	28	1 5/8	46	3 1/2	15	12	1 1/2	7	610		
	284T, 286T	29	1 7/8	50	4	20	15	2 1/2	7 1/2	840		
3095-7	143T, 145T	15	7/8	40	1	3	12	10	1	7	5/8	345
	182T, 184T	18	1 1/8									
	213T, 215T	22	1 3/8									
	254T, 256T	27	1 5/8									
	284TS, 286TS	28	1 5/8	46	3 1/2	15	12	1 1/2	7 1/2	610		
	284T, 286T	29	1 7/8	50	4	20	15	2 1/2	8	1600		
	324TS, 326TS	31	1 7/8	50	1	4	20	15	2 1/2	8	5/8	1150
	364TS, 365TS	32	1 7/8									
	324T, 326T	33	2 1/8									
		44	2 3/8									
3014-5	213T, 215T	18 3/8	1 3/8	46	1	3 1/2	15	12	1 1/2	8 1/2	5/8	560
	254T, 256T	23 1/4	1 5/8	50								
	284TS, 286TS	24 1/2	1 5/8									
	284T, 286T	25 1/4	1 7/8									
	324TS, 326TS	26 3/8	1 7/8	52	4	20	15	2 1/2	9	1150		
	324T, 326T	27 7/8	2 1/8	56								

NOTE: ALL DIMENSIONS IN INCHES.

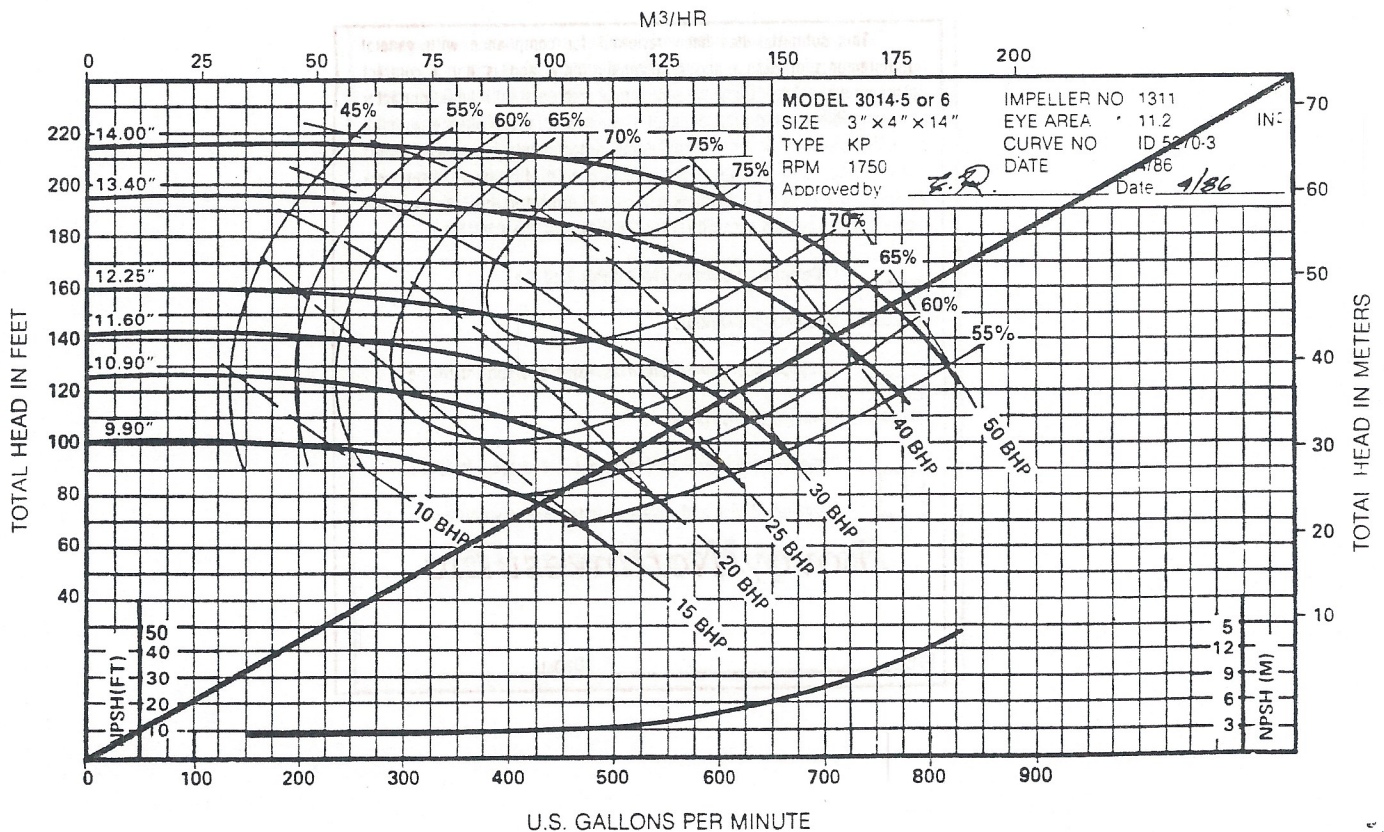
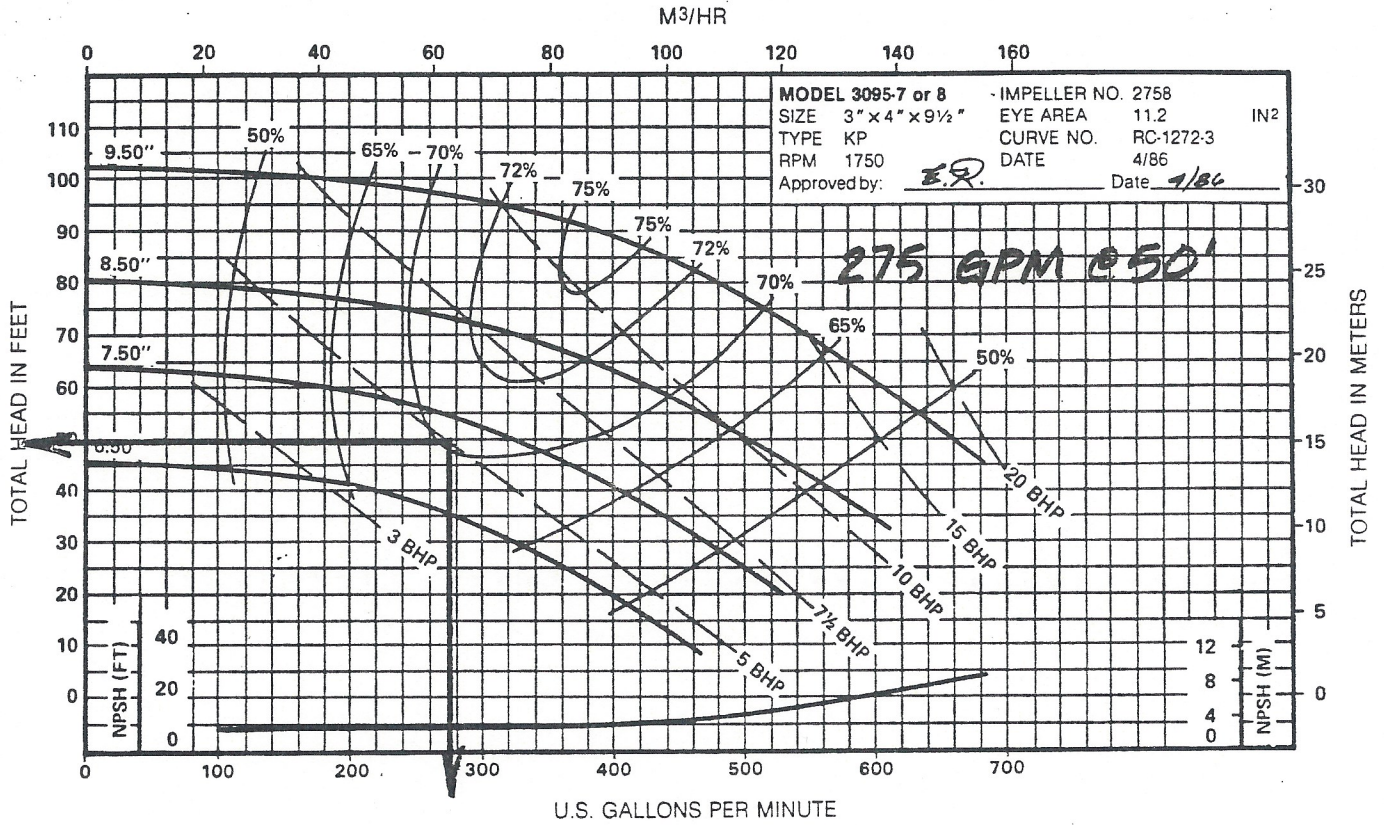
In the interest of Product Improvement, dimensions are subject to change without notice.

SEE B1c.1a FOR DIMENSION NOMENCLATURE.

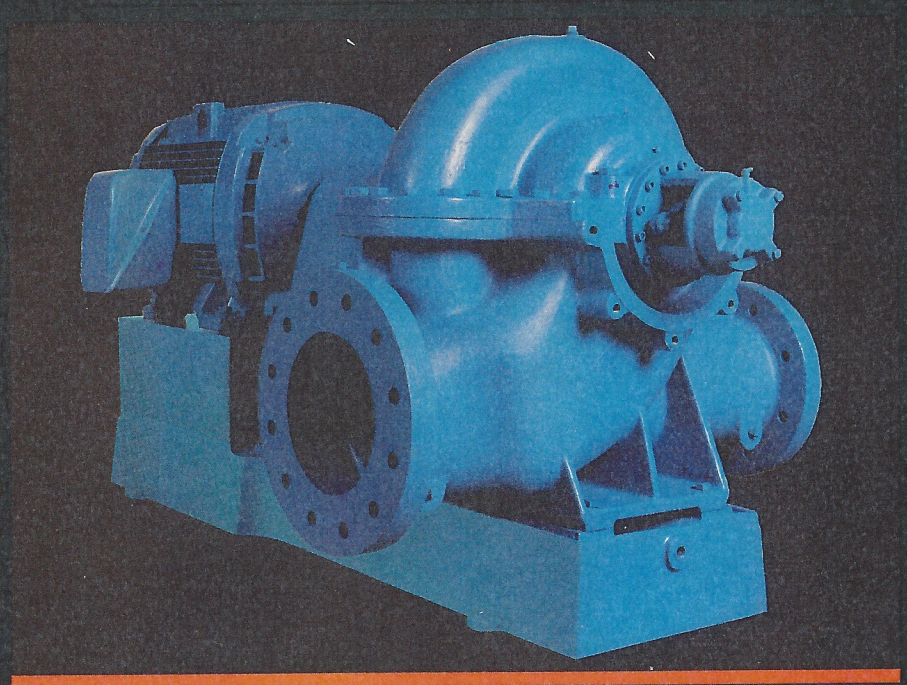
Customer _____	P.O. No. _____	Job No. _____
Project _____	Item No. _____	Date _____
HP <u>5</u> , RPM <u>1750</u> , HZ <u>60</u> , V <u>460</u> , ENCL <u>TEFC</u> , FR <u>184T</u> , TOTAL WGT. <u>305</u>		

PERFORMANCE CURVES — 1750 RPM

P1 AND P2



PACO



**Single Stage
Double Suction
Split Case Pumps**

Paco Pumps One Step Ahead for Over 75 Years

Paco (Pacific Pumping Company) has over 75 years of experience in the design, manufacture, and application of centrifugal pumps and pumping systems.

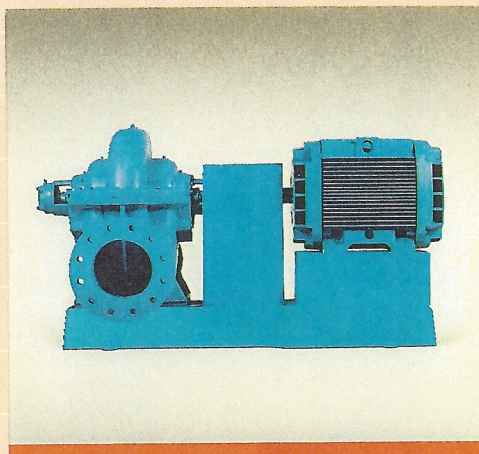
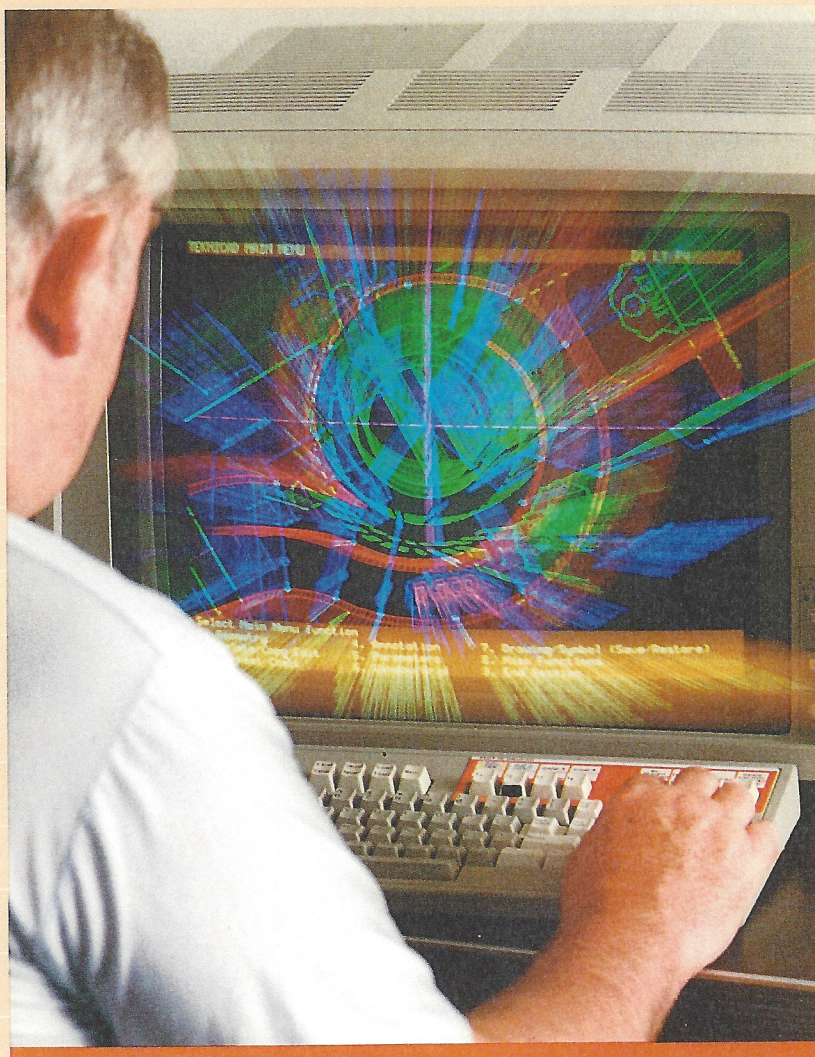


Paco's commitment to state-of-the-art pump design assures maximum user benefits with minimum life cycle cost.

Paco's experience plus their commitment to quality and an aggressive research and development program, has produced the latest development in split case pumps, the KP series. Using computer aided design technology, Paco has developed an energy efficient, longer lasting double suction split case pump with emphasis on ease of maintenance and installation.

The Paco KP series double suction split case pumps are available in sizes through 10" discharge, developing flows to 7000 GPM and heads to 500'. The KP models are available in a variety of metallurgies and mechanical configurations to meet your specific requirements.

Paco's commitment to their customers continues through an extensive service organization. Highly trained technicians can assist customers with initial start up, troubleshooting, repair, and system analysis.



Single Stage Double Suction Split Case Pumps

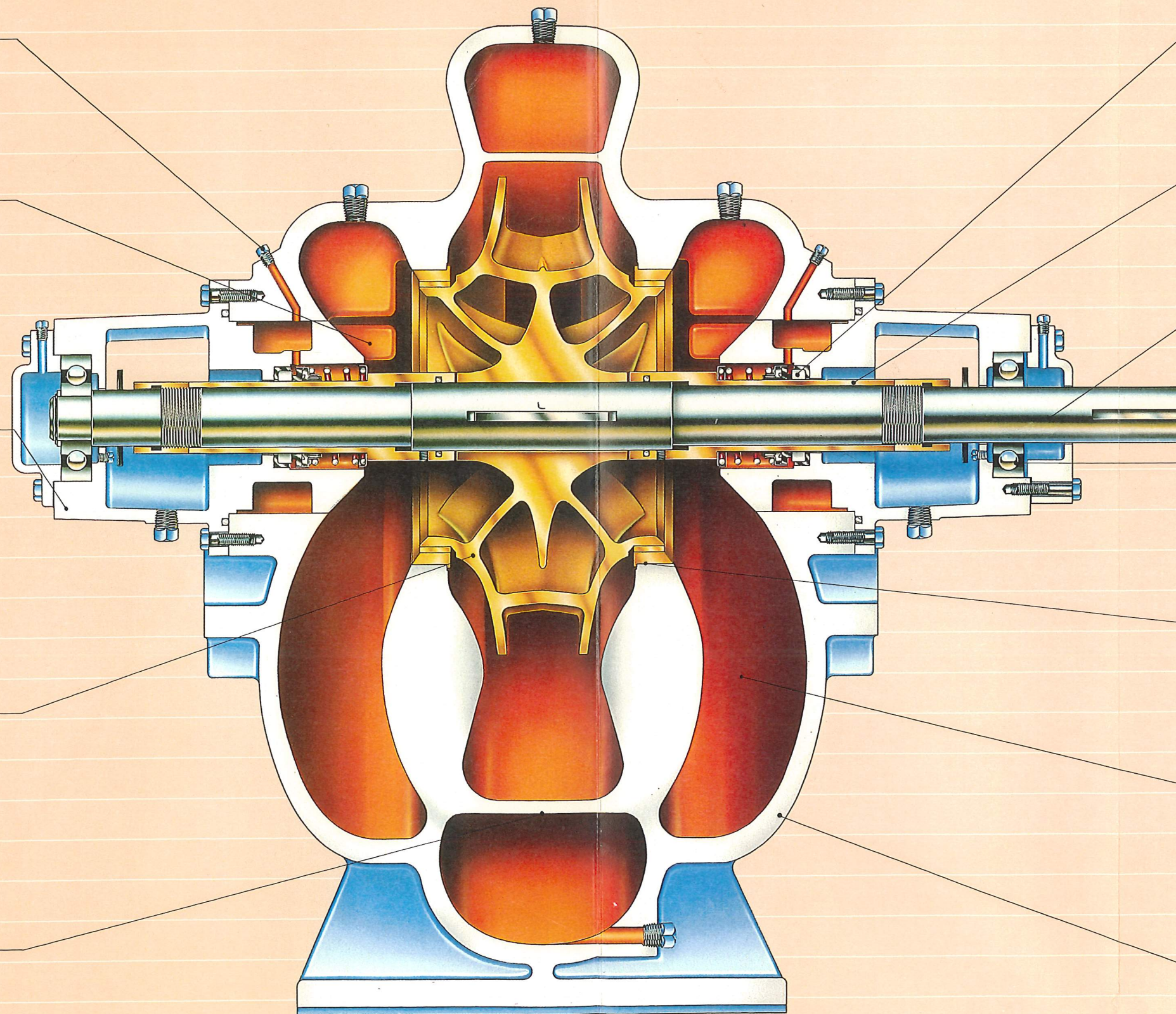
RECIRCULATION: Recirculation lines for external lubrication or abrasive separation are available when required.

SUCTION BAFFLES: Unique integrally cast suction baffles direct flow into the impeller eye for more even suction distribution. Inlet flow is accelerated gradually, suppressing the tendency toward velocity distortion, insuring quiet vibration-free operation.

BEARING HOUSING: Self contained combination bearing housing and seal chamber ensures simple accurate alignment of bearings and seals, providing longer bearing and seal life. 360 degree register fit bolting ensures maximum rigidity and support. The entire cartridge can be removed from the casing for inspection and replacement of sealing components without removing the top casing half.

IMPELLERS: Hydraulically and dynamically balanced double suction Francis Vane type impellers are designed to match the casing using the latest computer aided design technology (CAD). The hydraulic matching of casing and impeller reduces turbulence and recirculation, ensuring high efficiency and quiet performance over the entire range of operation.

VOLUTE: The compensated dual volute design virtually eliminates radial forces acting against the shaft, extending seal and bearing life. The results are combined balanced radial forces and axially balanced hydraulics ensuring quiet, smooth performance throughout the entire range of operation.



SHAFT SEALING: Pumps are available in a variety of mechanical seals or packing configurations specifically selected to meet the application's requirements.

SHAFT SLEEVES: Replaceable shaft sleeves are available in a wide variety of metallurgies protecting the shaft against corrosion and wear.

SHAFT: Large diameter precision ground shaft minimizes vibration. Minimal shaft deflection insures increased bearing and seal life.

BEARINGS: Bearings are selected in conjunction with short bearing span and large diameter shaft to provide a minimum of 50,000 hour (B-10) life.

CASE WEAR RINGS: Replaceable case wear rings protect pump casing from wear and permit simple maintenance of proper running clearances to reduce maintenance costs and maintain high operating efficiency.

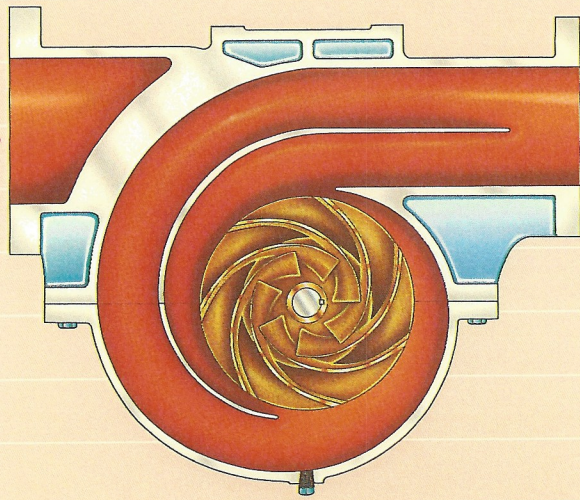
SUCTION CHAMBERS: Suction inlet configuration incorporates precise geometric design, increasing hydraulic efficiency and lowering net positive suction head requirements.

CASING: Suction and discharge flanges are integrally cast into the lower casing half. This allows for removal of the rotating assembly without disturbing connected piping. Casing is foot mounted to reduce vibration.

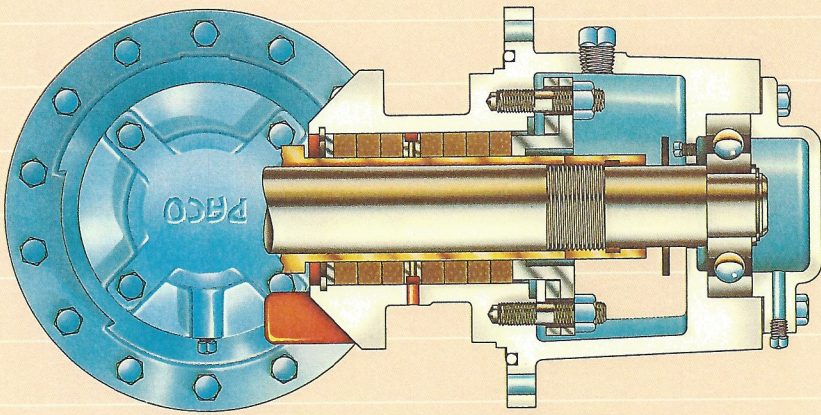
*This cutaway diagram is typical for models 6015, 8015, 8012 and 1012 KP.

Features and Benefits

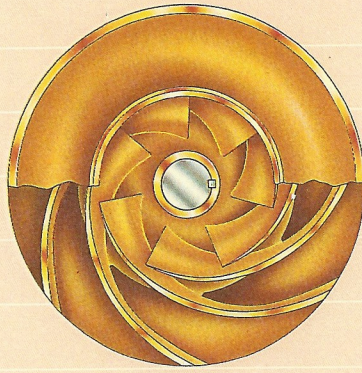
DOUBLE VOLUTE CONSTRUCTION: Paco's compensated double volute design virtually eliminates radial loads by balancing the hydraulic forces of the liquid within the pump casing. This balancing feature extends seal and bearing life, minimizes vibration and provides quiet operation. The double volute design improves efficiency by providing two individual volute passages to guide the flow in the casing. Double volute construction is available on selected pumps ranging above 4" discharge.



BEARING HOUSING: Paco's unique self-contained bearing housing is attached to the upper and lower portions of the casing by a full 360 degree machined registered and bolted fit to optimize alignment and bearing life. This compact design limits shaft deflection by providing rigid shaft support. The combination bearing housing/seal chamber provides ease in maintenance and allows inspection of seals, sleeves and bearings without removing the top casing half.

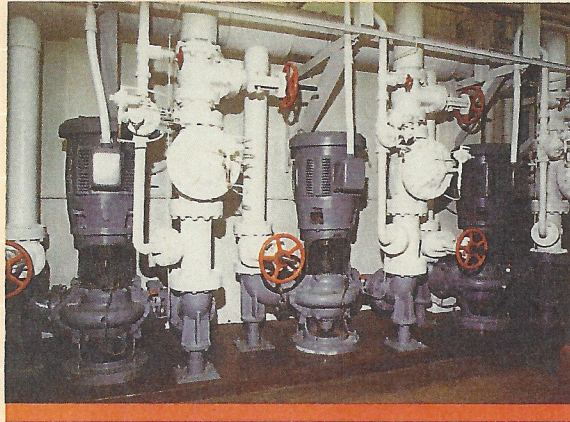


IMPELLER: Paco's pump uses a Francis Vane impeller design specifically matched to the casing to produce broad band high efficiency and low NPSH. The hydraulically balanced double suction impeller, along with balanced radial loads, provides quiet performance, minimum vibration and reduced operating costs.



75 Years of Experience

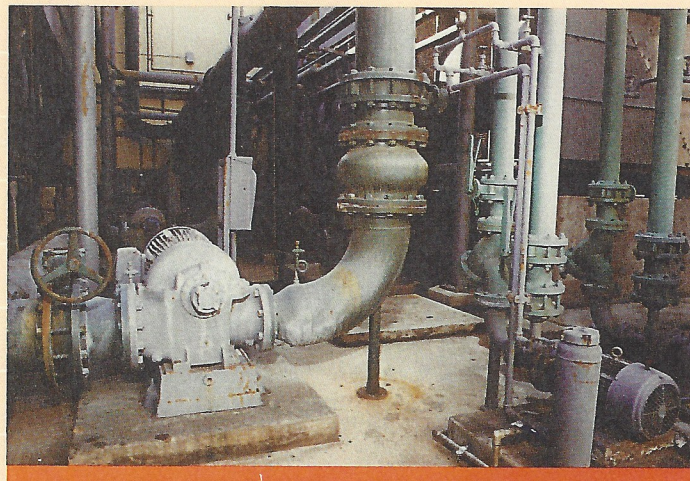
**COMMERCIAL HVAC SYSTEM
INSTALLATION:** Vertical split case
pumps provide chilled water in a
central mechanical equipment room
for a high rise bank. 150 HP pumps
operate 24 hours a day (when
required) with 215 pound suction
pressure to meet a variety of
weather conditions and heat loads.



FILTRATION SYSTEM: Supplying filter
water for the 1984 Olympics required
a rugged and dependable pump.
Paco all bronze KPVS pumps
provided the reliability that was
needed. The vertical configuration
helped reduce the size of the
mechanical equipment room.



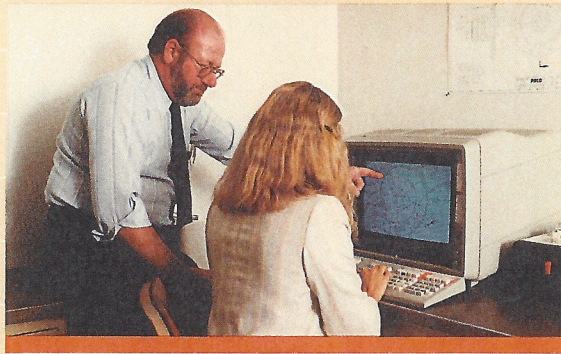
PROCESS SYSTEM: Horizontal split
case pumps provide process cooling
water for this major customer. Energy
efficient operation and mechanical
reliability were major considerations
for this critical application.



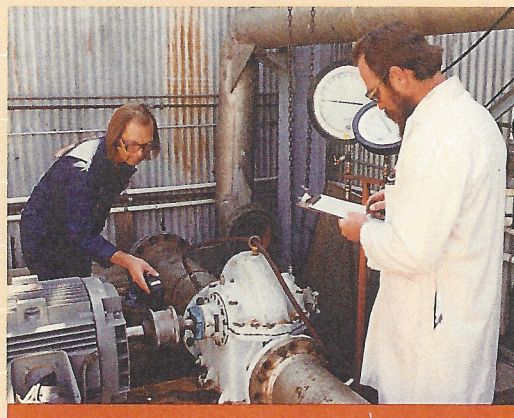
Engineered and Tested for Quality Assurance



QUALITY CONTROL: Ongoing quality assurance/control is essential to maintain product reliability. Here, a Quality Control inspector measures a critical point of the pump volute. Hydrostatic tests are performed in accordance with Hydraulic Institute Standards.

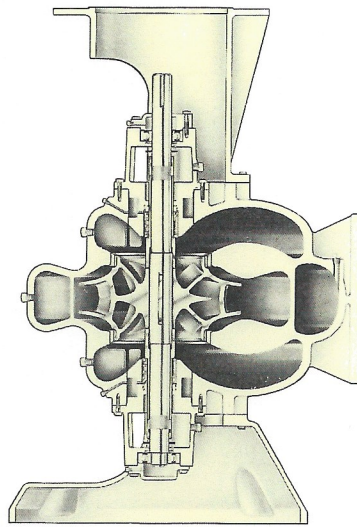
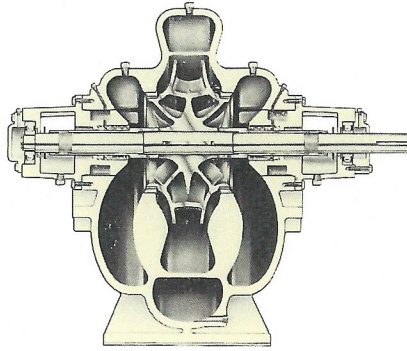


ENGINEERING: Research and development engineers use computer aided design to predict pump performance and efficiency values. CAD results are confirmed by actual tests.



TEST LAB: Rigorous prototype testing is conducted to verify hydraulic performance, NPSH requirements as well as vibration and noise. These tests are conducted in strict accordance with Hydraulic Institute Standards. Ongoing production testing assures actual production units meet published performance. Instruments are calibrated and traceable to the U.S. Bureau of Standards.

Engineering Data



MATERIAL OF CONSTRUCTION

ITEM	CAST IRON BRONZE FITTED		ALL IRON		DUCTILE IRON BRONZE FITTED		ALL BRONZE	
	MATERIAL	SPEC. NO.	MATERIAL	SPEC. NO.	MATERIAL	SPEC. NO.	MATERIAL	SPEC. NO.
Casing	Cast Iron	A48	Cast Iron	A48	Ductile Iron	A536	Bronze	B145
Case Wear Rings	Bronze	SAE 660	Cast Iron	A48	Bronze	SAE 660	Bronze	SAE 660
Bearing Housing	Cast Iron	A48	Cast Iron	A48	Ductile Iron	A536	Bronze	B145
Casing Bolts	Steel	Grade 5 Com. Std.	Steel	Grade 5 Com. Std.	Steel	ASTM Grade 8	St. Steel	AISI-300
Brg. Housing "O" Ring	Synthetic	Buna-N	Synthetic	Buna-N	Synthetic	Buna-N	Synthetic	Buna-N
Case Gasket	Vegetable Fiber	HYD-401	Vegetable Fiber	HYD-401	Vegetable Fiber	HYD-401	Vegetable Fiber	HYD-401
Brg. Housing Bolts	Steel	Grade 5 Com. Std.	Steel	Grade 5 Com. Std.	Steel	ASTM Grade 8	St. Steel	AISI-300
Bearing Cap	Cast Iron	A48	Cast Iron	A48	Cast Iron	A48	Cast Iron	A48
Bearing Cap Bolts	Steel	Grade 5 Com. Std.	Steel	Grade 5 Com. Std.	Steel	Grade 5 Com. Std.	St. Steel	AISI-300
Bearing Cap Gasket	Vegetable Fiber	HYD-401	Vegetable Fiber	HYD-401	Vegetable Fiber	HYD-401	Vegetable Fiber	HYD-401
Impeller	Bronze	B145	Cast Iron	A48	Bronze	B145	Bronze	B145
Impeller Wear Rings	Bronze	SAE 660	Cast Iron	A48	Bronze	SAE 660	Bronze	SAE 660
Impeller Key	Steel	C1018	Steel	C1018	Steel	C1018	St. Steel	AISI-300
Shaft	Steel	High Tensile	Steel	High Tensile	Steel	High Tensile	St. Steel	AISI-300
Shaft Sleeve	Bronze	SAE 660	St. Steel	AISI-300	Bronze	SAE 660	Bronze	SAE 660
Packing Gland	Ductile Iron	A536	Ductile Iron	A536	Ductile Iron	A536	Bronze	B145
Gland Studs	Brass	SAE 40	Brass	SAE 40	Brass	SAE 40	St. Steel	AISI-300
Recirculation Lines	Copper Tubing	Com. Std.	St. Steel Tubing	AISI-300	Copper Tubing	Com. Std.	Copper Tubing	Com. Std.
Recirculation Fittings	Brass NPT	Com. Std.	Steel NPT	Com. Std.	Brass NPT	Com. Std.	Brass NPT	Com. Std.
Lantern Ring (optional)	TFE	TFE	TFE	TFE	TFE	TFE	TFE	TFE
Shaft O-Rings	Synthetic	Buna-N	Synthetic	Buna-N	Synthetic	Buna-N	Synthetic	Buna-N
Mechanical Seal	Refer to mechanical Seal Selection Guide (section B1g.1 page 5) for appropriate seal construction.							

Engineering Data

KP: CASE WORKING PRESSURE LIMITATIONS AT 150° F: FLAT-FACE FLANGES

CASING MATERIAL	125/150/LB FLANGE DRILLING		250/300 LB FLANGE DRILLING	
	CWP (1)	HYDRO (2)	CWP (1)	HYDRO (2)
Cast Iron (ASTM A48)	175 psi	265 psi	300 psi	450 psi
Ductile Iron (ASTM A536)	175 psi	265 psi	450 psi	600 psi
All Bronze (ASTM B145)	175 psi	265 psi	250 psi	375 psi

(1) CWP = Case Working Pressure (2) Hydro = Hydrostatic Test Pressure

GENERAL INFORMATION

	PUMP MODEL NUMBER						
	2095-1,2 2013-5,6 3095-7,8	3014-5,6 4012-1,2 4012-7,8 4015-5,6	5012-7,8 5015-7,8 6012-1,2 6012-3,4	6015-1,2 8012-5,6 8015-3,4 1012-9,0	6019-3,4 8018-5,6	1015-1,2	
Nominal case thickness, min	3/8"	3/8"	1/2"	1/2"	1/2"	5/8"	
Shaft diameter at impeller (max. diameter)	1 1/8"	1 5/8"	1 5/8"	2 1/8"	2 5/8"	3"	
Shaft diameter at sleeve	1"	1 1/2"	1 1/2"	1 7/8"	2 3/8"	2 5/8"	
Shaft diameter at coupling	1"	1 1/2"	1 1/2"	1 3/4"	2"	2 1/4"	
Sleeve O.D.	1 1/4"*	1 3/4"	1 3/4"	2 1/4"	2 3/4"	3"	
Packing box I.D.	1 3/4"	2 1/2"	2 1/2"	3 1/4"	3 1/4"	4"	
Packing box depth	1 7/8"	2 3/4"	2 3/4"	4 1/4"	4 1/4"	4"	
Packing size	1/4"	3/8"	3/8"	1/2"	1/2"	1/2"	
No. of packings rings, with lantern ring (per packing box)	5	5	5	7	7	6	
Lantern ring width	3/8"	3/8"	3/8"	3/8"	3/8"	5/8"	
No. of rings w/o lantern ring (per packing box)	6	6	6	8	8	7	
No. of rings in front of lantern ring (per packing box)	2	2	2	2	2	2	
Seal O.D.	1 1/2"	2 3/8"	2 3/8"	2 15/16"	3 1/2"	3 3/4"	
Basic bearing number, cplg. -end	305	308	308	407	211	312	
Basic bearing number, opp. -cplg. -end	305	308	308	309	211	312	
Minimum bearing life	5 years	10 years	10 years	10 years	10 years	10 years	
Maximum shaft deflection at seal	.002"	.001"	.0015"	.0015"	.0015"	.001"	
1st two digits of pump model no. = Pump Discharge size; last two digits = impeller size (Example: 2095 = 2" pump, 9.5" impeller)							

*No Sleeve when seal type

BEARING CENTERS DISTANCE (INCHES) BY MODEL NUMBER

MODEL NUMBER	BEARING CENTER	
	PACKED	SEALED
2095-1,2 2013-5,6 3095-7,8	15.25"	12.5"
3014-5,6 4012-7,8 4012-1,2 4015-5,6	20.5"	16.5"
6012-1,2	21.5"	17.5"
5012-7,9	23.5"	23.5"

MODEL NUMBER	BEARING CENTER	
	PACKED	SEALED
5015-9,0 6012-3,4	24.5"	24.5"
6015-1,2 8012-5,6	28.6"	28.6"
6019-3,4 8018-5,6	26"	26"
8015-3,4	29.5"	29.5"
1012-9,0	30.5"	30.5"
1015-1,2	30"	30"

Paco Branches

PACO AUSTIN

7312 South IH-35, Suite 118
Austin, TX 78745
(512) 448-2922
Panafax: 214-448-2924

PACO DALLAS

4677 Mint Way
Dallas, TX 75236
(214) 339-3156
Panafax: 214-330-4482

PACO FRESNO

1244 N. Mariposa
Fresno, CA 93703
(209) 268-9679

PACO LOS ANGELES

6838 Acco Street
Commerce, CA 90040
(213) 685-3250
Panafax: 213-721-2753

PACO OAKLAND

P.O. Box 12924
845 92nd Avenue
Oakland, CA 94604
(415) 639-3200
Panafax: 415-639-3230
Telex:33-5312

PACO PHOENIX

14415 North 73rd Street, Suite 105
Scottsdale, AZ 85260
(602) 991-0786
Panafax: 602-991-0885

PACO PORTLAND

2551 N.W. 30th and Industrial Street
Portland, OR 97210
(503) 224-6330
Panafax: 503-241-0399

PACO SEATTLE

14908 N.E. 31st Circle
Redmond, WA 98052
(206) 885-3666
Panafax: 206-885-3635

PACO SACRAMENTO

1331 "T" Street, Suite 20
Sacramento, CA 95314
(916) 443-2412

PACO SAN DIEGO

4636 Mission Gorge Place
San Diego, CA 92120
(619) 582-6613
Panafax: 619-582-0489

REPRESENTED BY