Peerless Pump Company
Indianapolis, IN 46207-7026

DURAMETALLIC MECHANICAL SEALS
Application Data

Duraseal Single RO Inside Unbalanced Pusher

General purpose seal that covers a wide variety of pumping applications and nearly all CPI applications. For use with liquids compatible with 316SS metal parts and Viton elastomers. Standard face combinations are carbon vs. ceramic and Tungsten Carbide vs. carbon, E75--VV or EU5--VV* respectively. Other face or material combinations are available.

Duraseal Type CBR Balanced Non-Pusher

Chemical mechanical seal with metal bellows for liquids compatible with AM350 (304ss) or Hastelloy C having carbon vs. silicon carbide mating faces and Viton or TFE coated Viton elastomers. These seals are also available in Alloy 20 stainless steel or Monel.

Duraseal Double CRO Unbalanced Pusher

Double inside mechanical seal requiring water to be used as the buffer fluid. (Note: buffer liquids must be chemically and thermally compatible with the pumpage as the liquids will mix should the inner seal fail.) Use in conjunction with the specified features of the Supply Tank Assemblies, or an outside source of cool, clean liquid.

Duraseal Double RO Unbalanced Pusher

Double inside mechanical seal. Buffer fluid must be compatible with materials of construction. (Note: buffer fluid must be chemically and thermally compatible with the pumpage as the liquids will mix should the inner seal fail). A double circulating ring for a pump speed of 3600 rpm must be added. Use in conjunction with the specified features of the Supply Tank Assemblies, or an outside source of cool, clean liquid.

* *See page 16 for explanation of seal code designations*

John Crane Mechanical Seals
Application Data

John Crane Type 1 Unbalanced Non - Pusher

Elastomeric bellows seal, for general application across a wide variety of industries. For chemical and hydrocarbon general service use the (F50) carbon. Liquids must be compatible with 18-8 stainless steel and Viton elastomers.

John Crane Type 8-1T Unbalanced Pusher

Elastomeric o-ring seal, for general application across a wide variety of industries. For chemical and hydrocarbon general service use the (F50) carbon. (O58) SiC and (O15) Tungsten faces are available. Liquids must be compatible with 316SS, 20SS, or Hast. C stainless steel and Viton elastomers. Aflas o-rings can be supplied instead of Viton.

John Crane Type 5611 Elastomer Bellows Cartridge Seal

Elastomeric bellows single cartridge seal, with the Type 1 Seal head assembly, can be applied across a wide variety of chemical and hydrocarbon services. The automatic adjustment compensates for abnormal shaft vibration. Temperature ranges from -20°F to 400°F. Liquids must be compatible with 316SS and Viton elastomers.

John Crane Type 5610 / 5620 O-Ring Cartridge Seal

5610 is a single, and 5620 is a double, Elastomeric O-Ring cartridge seal for applications for a wide variety of chemical and hydrocarbon services. On the 5620, Flat drive eliminates sleeve distortion due to set screw dimpling. Temperature ranges -20°F to 400°F. Liquids must be compatible with 316 or 20 stainless steel and Viton elastomers. Other materials / options are available.

John Crane Type 5615 / 5625 Metal Bellows Cartridge Seal

5615 is a single, and 5625 is a double, Metal Bellows cartridge seal for applications for a wide variety of chemical and hydrocarbon services. Hydraulically balanced bellows with a optimized primary ring design reduces horsepower consumption, heat generation and face wear. Temperature ranges -20°F to 400°F. Liquids must be compatible with 316 or 20 stainless steel and Viton elastomers. Other materials / options are available.

* ***See page 19 for explanation of seal code designations***

Seal Manufacturer's Code

John Crane

Example: Code $XF_{50}1O_{58}1$ has Viton elastomer, Carbon rotary face, 303SS metal parts, Silicon Carbide stationary face and 303SS spring(s)

1st Digit – Secondary Seals or Bellows/Elastomer

Code	Material
X	Viton
B	Buna
N	Neoprene
O_{28}	EPR
X_5	Kalrez
O_{39}	Graphite
Q	Teflon
X_{18}	Aflas
For Bellows Seals:	
1/ _	316SS or AM350
H/ _	Hastelloy C

2nd Digit – Rotating Face(s)

Code	Material
F_{50}	Carbon, Standard
F_{51}	Carbon, Standard
F_{55}	Carbon
F_3	Carbon
F_{31}	Carbon for Corrosives
P	Carbon, Generic
V	Glass-filled Teflon
O_{15}	Tungsten Carbide
O_{58}	Silicon Carbide

3rd Digit – Seal Metal Parts

Code	Material
1	303SS, or 316SS, or Alloy 20 as specified
H	Hastelloy B or C as specified
M	Monel

4th Digit – Stationary Face(s)

Code	Material
C	Ceramic
7	Ni-resist
9	Stellite
D	Tungsten Carbide
O_{10}	High Purity Ceramic
O_{15}	Tungsten Carbide
O_{58}	Silicon Carbide
O_8	Silicon Carbide

5th Digit – Spring(s)

Code	Material
1	303SS, or 316SS, or Alloy 20 as specified
H	Hastelloy B or C as specified
M	Monel

Durametallic

Example: Code CR2E(F/V)VV has 316SS metal parts with AM-350 bellows, Carbon rotary face, Silicon Carbide stationary face, 316SS gland with flush, vent & drain (by Dura) and Viton elastomers on both rotary and stationary.
(Note: If gland is furnished by Peerless, Code would be CR2_ _ VV)

Metal Parts/Bellows – 1st Digit

Code	Material
E	316SS
K	A-20
M	MONEL
H	Hast-C
For Bellows Seals:	
I	Hast-C/Hast-C
C	316SS/AM-350

Materials for Seal Face(s) – 2nd Digit (Rotating), 3rd Digit (Stationary)

Code	Material
7	High Purity Ceramic
U	Tungsten Carbide
2	Silicon Carbide
4	Silicon Carbide
Y	Stellite
F	Glass-filled Teflon
R	Carbon (if rotary)
5	Ceramic (if rotary)
5	Carbon (if stationary)

Gland Description, if furnished by Dura; otherwise BLANK

4th Digit – Material

Code	Material
E	316SS
K	A-20

5th Digit – Design

Code	Feature(s)
P	Plain
F	Flush
(F/V)	Flush,Vent,Drain

Elastomers – 6th Digit (On Rotary), 7th Digit (On Stationary)

Code	Material
V	Viton
T	Teflon
Q	Buna
N	Neoprene
F	Glass-filled Teflon
P	Kalrez
G	Grafoil
E	EPR
H	Teflon-jacketed Viton
C/V	Teflon Cove Ring w/ Viton O-ring

HORIZONTAL PROCESS PUMPS
SINGLE STAGE END SUCTION
Types 5596, 8196, 8796
MECHANICAL SEAL SELECTION DATA

Seal Chamber Pressure

Approximate Pressure in Seal Chamber in Psig:

For applications when suction pressure exceeds 0 (zero) Psig.

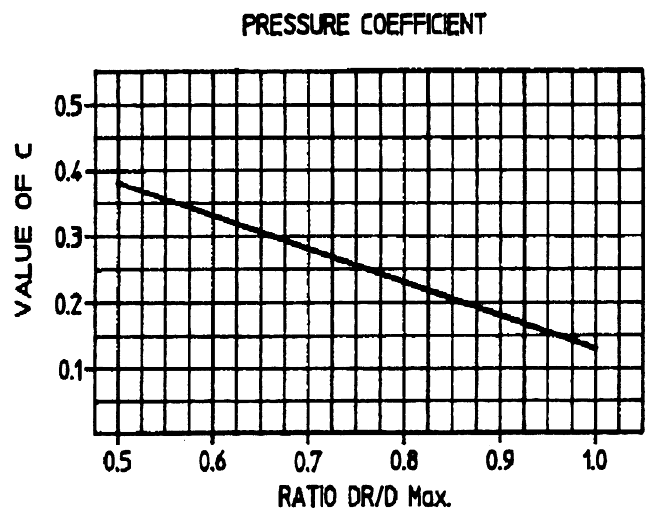
PSC = PS + C x (0.433 x HT x SG)

For applications when suction pressure is less than 0 (zero) Psig.

PSC = C x (0.433 x HD x SG)

Where:

C	=	Pressure Coefficient
D (Max)	=	Maximum Diameter of Impeller in Inches
DR	=	Diameter of Impeller in Inches Required for Rating
HD	=	Discharge Head in Feet of Liquid = HT - HS
HS	=	Suction Lift in Feet of Liquid
HT	=	Total Head in Feet of Liquid
PS	=	Suction Pressure in Psig
SG	=	Specific Gravity of Liquid at Pumping Temperature



Maximum Allowable Seal Chamber Pressures Psig *

1800 Rpm				3600 Rpm			
Pump Frame Size	Mech. Seal Size Inches	Un-Balanced Mech Seal	Balanced Mech Seal	Pump Frame Size	Mech. Seal Size Inches	Un-Balanced Mech Seal	Balanced Mech Seal
ST	1.375	200	400	ST	1.375	135	400
MT	1.750	200	400	MT	1.750	90	225
LTC	2.125	180	400	LTC	2.125	75	150
XLT	2.500	150	350	XLT	2.500	50	110

*Maximum pressure ratings will vary with the lubricity of the pumped liquid and materials of the seal mating faces, refer to the factory when required.

Elastomer Temperature Limits

Elastomer Material	Minimum Temperature		Maximum Temperature	
	°F	°C	°F	°C
Buna-N	+40	-40	+225	+107
Nitrile	+40	-40	+225	+107
Viton	0	-18	+400	+204
Kalrez	0	-18	+500	+260
TFE Coated Viton	-40	-40	+350	+177
Solid TFE	-100	-73	+450	+232
Grafoil	-450	-268	+750	+400

Supply Tank Assemblies

Durametallic Corporation offers two-gallon (7.6l) supply tank assemblies as shown in Figure 6.15. Under some circumstances, these supply tanks can be used to provide a source of clean, pressurized buffer fluid to a double seal assembly. *Dura* Model 900N Supply Tanks have the following standard features:

1. Carbon steel or stainless steel construction.
2. 900 psig (62 bar) design pressure at 400°F (204°C).
3. Hydrostatically tested at 1350 psig (93 bar).
4. Certified in accordance with *ASME* Code Section VIII, Division I.
5. Mounting nuts for easier installation.
6. Vent and fill connections.

Optional features available with *Dura* Supply Tank assemblies include:

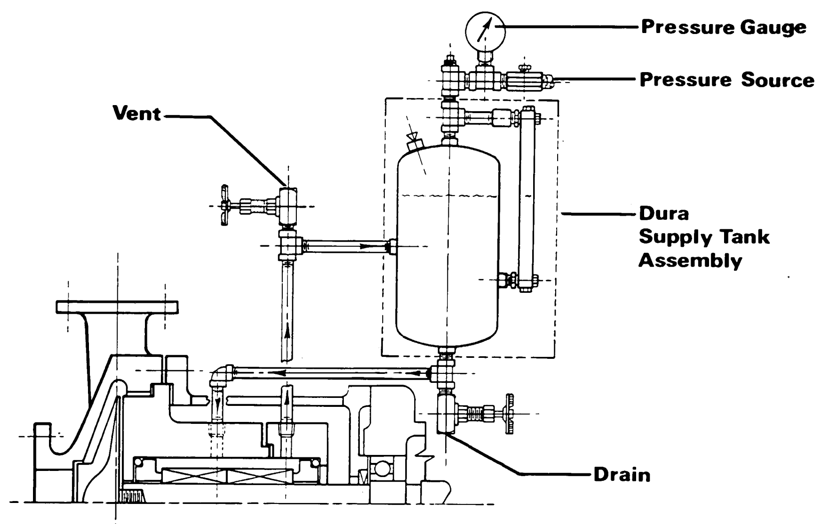
1. Armored level indicator (AG).
2. Low Level Switch (LL).
3. Complete tandem seal system (TSS).
4. Cooling coil (CC).
5. High level switch (HL).

The cooling coil (CC) option is available for applications where the buffer fluid requires more cooling than possible from thermal convection. Stainless steel cooling coils, providing 3 sq. ft. (0.28 m²) of cooling area, are suitable for pressures up to 1650 psig (114 bar) at 400°F (204°C), and are hydrostatically tested at 3000 psig (207 bar).

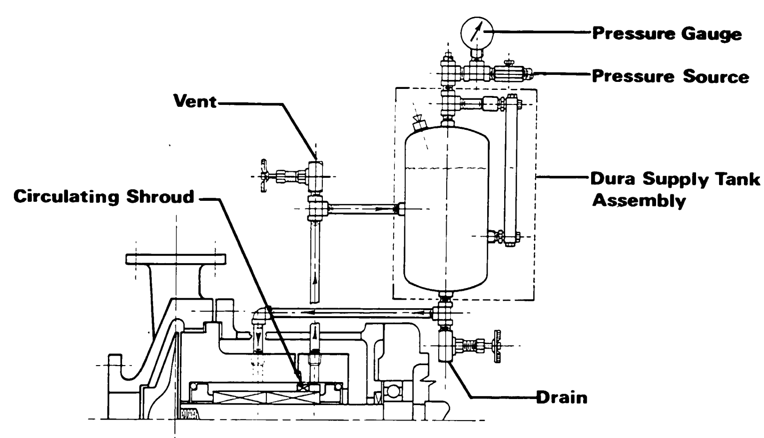
Supply tank assemblies can be used with induced and thermal convection circulating systems in double and tandem seal arrangements.

Supply Tank Assemblies

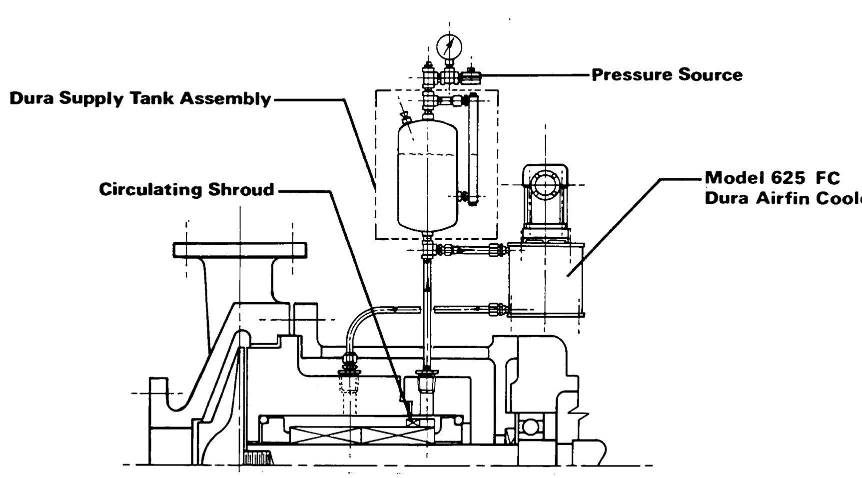
Thermal Convection Cooling



Induced Circulation System



Induced Circulation System with Cooler

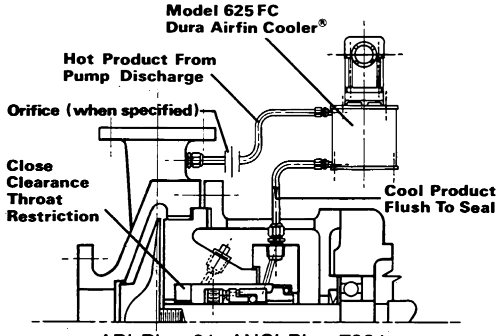


API Plan 53, ANSI Plan 7353

HORIZONTAL PROCESS PUMPS
SINGLE STAGE END SUCTION
Types 5596, 8196, 8796

DURAMETALLIC MECHANICAL SEALS

Dura Airfin Coolers



API Plan 21, ANSI Plan 7321

Dura Airfin Cooler Selection Guide

PUMPING TEMP. °F	MODEL 625 NC				MODEL 625 FC							
	WATER		HEAT TRANSFER FLUID		WATER				HEAT TRANSFER FLUID			
	OUTLET TEMP. °F		OUTLET TEMP. °F		OUTLET TEMP. °F				OUTLET TEMP. °F			
	at ½ GPM	at 1 GPM	at ½ GPM	at 1 GPM	at ½ GPM	at 1 GPM	at 1½ GPM	at 2 GPM	at ½ GPM	at 1 GPM	at 1½ GPM	at 2 GPM
150	145	145	145	145	120	125	130	130	115	120	130	135
200	190	195	190	195	135	155	165	170	130	140	155	165
250	235	240	235	240	155	180	195	210	145	165	180	190
300	280	290	280	290	175	210	225	240	165	195	215	225
350	325	335	—	—	195	235	260	275	180	220	240	260
400	—	—	—	—	220	265	290	315	210	250	275	290
450	—	—	—	—	235	295	325	345	225	270	310	325
500	—	—	—	—	250	320	—	—	250	295	345	—

PUMPING TEMP. °C	MODEL 625 NC				MODEL 625 FC							
	WATER		HEAT TRANSFER FLUID		WATER				HEAT TRANSFER FLUID			
	OUTLET TEMP. °C		OUTLET TEMP. °C		OUTLET TEMP. °C				OUTLET TEMP. °C			
	at 1.9 l	at 3.8 l	at 1.9 l	at 3.8 l	at 1.9 l	at 3.8 l	at 5.7 l	at 7.6 l	at 1.9 l	at 3.8 l	at 5.7 l	at 7.6 l
66	63	63	63	63	49	51	54	54	46	49	54	57
93	88	91	88	91	57	68	74	77	54	60	68	74
121	113	116	113	116	68	82	91	99	63	74	82	88
149	138	143	138	143	79	99	107	116	74	91	102	107
177	163	168	—	—	91	113	121	135	82	104	116	127
204	—	—	—	—	104	129	143	157	99	121	135	143
232	—	—	—	—	113	146	163	118	107	132	154	163
260	—	—	—	—	121	160	—	—	121	146	174	—

Dura Airfin Cooler Pressure Ratings

MAXIMUM TUBE SIDE PRESSURE RATINGS

Hydrostatic	100°F	200°F	300°F	400°F	600°F	800°F
Test Pressure	35°C	95°C	150°C	205°C	315°C	425°C
3000 PSIG	2300 PSIG	2050 PSIG	1800 PSIG	1650 PSIG	1400 PSIG	1200 PSIG
207 BAR	159 BAR	141 BAR	124 BAR	114 BAR	97 BAR	83 BAR

HORIZONTAL PROCESS PUMPS SINGLE STAGE END SUCTION Type 5596,8196,8796

Peerless Pump Company
Indianapolis, IN 46207-7026

DURAMETALLIC MECHANICAL SEALS

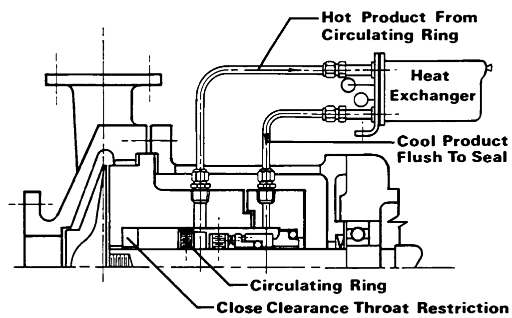
Dura Heat Exchangers

Dura Heat Exchanger Selection Guide

Pumping Temp. °F	PROCESS FLUID					
	WATER		OIL, HEAT TRANSFER FLUID (SPECIFIC GRAVITIES = .7 - .9)		LIGHT HYDROCARBONS (SPECIFIC GRAVITIES = .5 - .7)	
	OUTLET TEMP. °F	COOLING WATER RATE, GPM	OUTLET TEMP. °F	COOLING WATER RATE, GPM	OUTLET TEMP. °F	COOLING WATER RATE, GPM
200	130	4.2	110	3.0	110	3.0
250	160	6.2	125	3.0	120	3.5
300	175	8.0	145	4.2	130	4.2
350	200	10.2	160	5.2	145	5.8
400	220	11.5	170	6.0	150	6.2
450	240	13.5	180	7.0	160	7.3
500	255	15.0	200	8.2	170	8.0
550	260	16.5	220	9.0	180	9.2
600	265	17.5	225	10.0	190	10.2
650	—	—	235	10.8	205	11.6
700	—	—	250	12.0	220	12.5

Pumping Temp. °C	PROCESS FLUID					
	WATER		OIL, HEAT TRANSFER FLUID (SPECIFIC GRAVITIES = .7 - .9)		LIGHT HYDROCARBONS (SPECIFIC GRAVITIES = .5 - .7)	
	OUTLET TEMP. °C	COOLING WATER RATE, LPM	OUTLET TEMP. °C	COOING WATER RATE, LPM	OUTLET TEMP. °C	COOLING WATER RATE, LPM
93	54	16	43	11	43	11
121	71	24	52	11	49	13
149	79	30	63	16	54	16
177	93	39	66	20	63	22
204	104	44	77	23	66	23
232	116	51	82	26	71	28
260	124	57	93	31	77	30
288	121	62	104	34	82	35
316	129	66	107	38	88	39
343	—	—	113	41	96	44
371	—	—	121	45	104	47

Dura Heat Exchanger System with *Dura* Circulating Feature



API Plan 23, ANSI Plan 7323

This is a guide for selecting a *Dura* Heat Exchanger and for determining the cooling water rate required for a bypass flush to operate properly. This table is based on 1 GPM (3.8 LPM) process fluid flow through the heat exchanger using 80°F (27°C) cooling water.

Dura Heat Exchanger Pressure Ratings

HYDROSTATIC TEST PRESSURE		MAXIMUM WORKING PRESSURE AT INLET TEMPERATURE					
		100°F	200°F	300°F	400°F	500°F	800°F
Coil	Shell	38°C	94°C	149°C	204°C	316°C	427°C
3000 PSIG	225 PSIG	2300 PSI	2050 PSI	1800 PSI	1650 PSI	1400 PSI	1200 PSI
207 Bar	16 Bar	159 Bar	141 Bar	124 Bar	114 Bar	95 Bar	83 Bar

Maximum Inlet Temperature: Model 625 FSSS—500°F (260°C.)
Model 625 FSSH—800°F (427°C.)

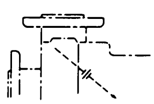
HORIZONTAL PROCESS PUMPS
SINGLE STAGE END SUCTION
Types 5596, 8196, 8796

DURAMETALLIC MECHANICAL SEALS

API Piping Plans

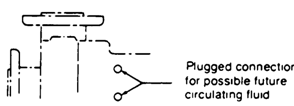
Piping Plan Cross Reference

API Plan 1 ANSI Plan 7301



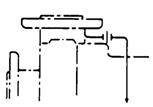
Integral (internal) recirculation from pump discharge to seal.

API Plan 2 ANSI Plan 7302 Dura Seal Manual Fig. 4.8



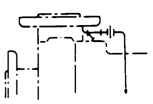
Dead-ended seal box with no circulation of flush fluid. Water-cooled box jacket and throat bushing required unless otherwise specified.

API Plan 11 ANSI Plan 7311 Dura Seal Manual Fig. 4.1(a)



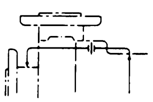
Recirculation from pump case through orifice to seal.

API Plan 12 ANSI Plan 7312



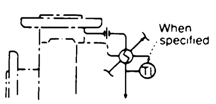
Recirculation from pump case through strainer and orifice to seal.

API Plan 13 ANSI Plan 7313 Dura Seal Manual Fig. 4.1(b)



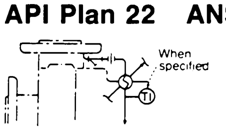
Recirculation from seal chamber through orifice and back to pump suction.

API Plan 21 ANSI Plan 7321 Dura Seal Manual Fig. 4.2, 4.3



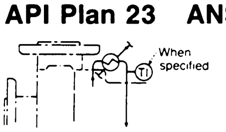
Recirculation from pump case through orifice and cooler to seal.

API Plan 22 ANSI Plan 7322



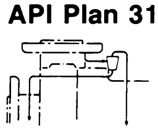
Recirculation from pump case through strainer, orifice, and cooler to seal.

API Plan 23 ANSI Plan 7323 Dura Seal Manual Fig. 4.11, 4.12



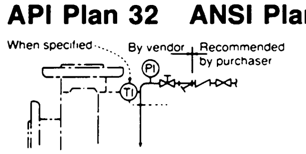
Recirculation from seal with pumping ring through cooler and back to seal.

API Plan 31 ANSI Plan 7331 Dura Seal Manual Fig. 4.27



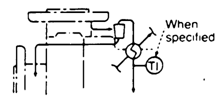
Recirculation from pump case through cyclone separator delivering clean fluid to seal and fluid with solids back to pump suction.

API Plan 32 ANSI Plan 7332 Dura Seal Manual Fig. 4.4, 4.34



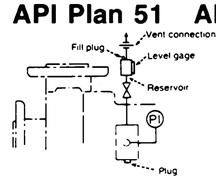
Injection to seal from external source of clean fluid.

API Plan 41 ANSI Plan 7341



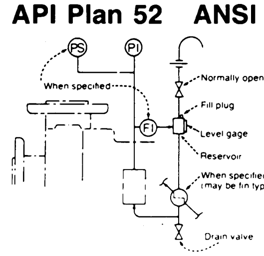
Recirculation from pump case through cyclone separator delivering clean fluid through cooler to seal and fluid with solids back to pump suction.

API Plan 51 ANSI Plan 7351



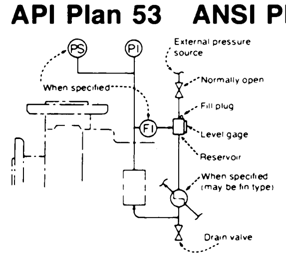
Dead-ended blanket.

API Plan 52 ANSI Plan 7352 Dura Seal Manual Fig. 4.15



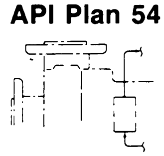
External fluid reservoir nonpressurized; forced circulation.

API Plan 53 ANSI Plan 7353 Dura Seal Manual Fig. 4.13, 4.14, 4.16



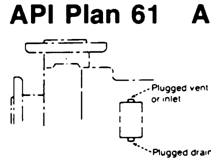
External fluid reservoir pressurized; forced circulation.

API Plan 54 ANSI Plan 7354 Dura Seal Manual Fig. 4.5, 4.6



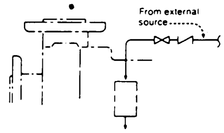
Circulation of clean fluid from an external system.

API Plan 61 ANSI Plan 7361



Tapped connections for purchaser's use.

API Plan 62 ANSI Plan 7362 Dura Seal Manual Fig. 4.25, 4.26



External fluid quench (steam, gas, water, etc.)

ANSI Process Pumps
Engineering Data

CONSTRUCTION DETAILS Metric Equivalents

POWER END		MODEL 8196 STP	MODEL 8196 MTP	MODEL 8196 LTP	MODEL 8196 XLTP
Shaft Diameter	At Impeller	3/4" (19.0)	1" (25.4)	1 1/4" (31.8)	1 1/2" (38.1)
	In Stuffing Box (less sleeve)	1 3/8" (34.9)	1 3/4" (44.5)	2 1/8" (54.0)	2 1/2" (63.5)
	In Stuffing Box (with sleeve)	1 1/8" (28.6)	1 1/2" (38.1)	1 7/8" (47.6)	2" (50.8)
	Sleeve Outside Diameter	1 3/8" (34.9)	1 3/4" (44.5)	2 1/8" (54.0)	2 1/2" (63.5)
	Between Bearings	1 1/2" (38.1)	2 1/8" (54.0)	2 1/2" (63.5)	3 1/8" (79.4)
	At Coupling	7/8" (22.2)	1 1/8" (28.6)	1 7/8" (47.6)	2 3/8" (60.3)
Bearings	Radial	207-S	309-S	311-S	313-S
	Coupling End (Double Row)	5306	5309	Duplex 7310	5313
	Bearing Span	4 1/8" (105)	6 1/4" (159)	5 15/16" (151)	9 1/4" (235)
	Shaft Overhang	6 1/8" (156)	8 3/8" (213)	8 3/8" (213)	9 31/32" (253)
Stuffing Box	Bore	2" (50.8)	2 1/2" (63.5)	2 7/8" (73.0)	3 3/8" (85.7)
	Depth	2 1/8" (54.0)	2 5/8" (66.7)	2 5/8" (66.7)	3" (76.2)
	Packing Size	5/16" x 5/16" (7.9 x 7.9)	3/8" x 3/8" (9.5 x 9.5)	3/8" x 3/8" (9.5 x 9.5)	7/16" x 7/16" (11.1 x 11.1)
	No. of Rings	5	5	5	5
	Width of Lantern Ring	7/16" (11.1)	5/8" (15.9)	5/8" (15.9)	5/8" (15.9)
	Distance – End of Box to Nearest Obstruction	2 3/16" (55.6)	2.78" (73)	2.78" (73)	2 15/16" (74.6)

Optional 8196 L Shaft and Bearing Frame Assembly available for customer preference or special applications on 10" and 13" pumps. General construction details identical to 8196 M except for coupling and shaft diameter.

PUMP END		8196 STP					8196 MTP													8196 XLTP				
		1x1/2-6	1 1/2x3-6	2x3-6	1x1 1/2-8	1 1/2x3-8	2x3-6	2x3-8	3x4-8	3x4-8G	1x2-10	1 1/2 x 3-10	2x3-10	3x4-10	4x6-10	1 1/2 x 3-13	2x3-13	3x4-13	4x6-13	6x8-13	8x10-13	6x8-15	8x10-15	8x10-15G
Max. Diameter Solids		11/32" (8.6)	7/16" (11.2)	3/8" (9.5)	11/12" (8.6)	7/16" (11.2)	3/8" (9.5)	1/2" (12.7)	1 1/8" (28.6)	11/16" (17.5)	7/16" (11.2)	7/32" (5.6)	3/4" (9.5)	5/8" (15.9)	1" (25.4)	7/32" (5.6)	3/8" (9.5)	5/8" (15.9)	1" (25.4)	11/16" (17.5)	1" (25.4)	13/16" (20.6)	1 1/8" (28.6)	13/16" (20.6)
Shaft Defl. Load Factor (M)	3500RPM	3.0	6.2	7.0	6.0	7.8	6.2	8.6	—	15.0	7.2	8.6	9.8	15.0	—	10.0	15.7	35.5	—	—	—	—	—	—
	1750RPM	0.8	1.6	1.8	1.5	2.0	1.6	2.2	7.0	4.1	1.9	2.2	2.5	4.1	16.5	2.6	4.6	11.5	16.5	8.0	15.0	10.0	—	30.0
	1150RPM	0.3	0.7	0.8	0.7	0.9	0.7	1.0	3.1	1.8	0.8	1.0	1.1	1.7	6.8	1.2	1.9	5.0	6.8	3.6	6.7	4.5	11.5	13.6
Min. Casing Thickness		3/8" (9.5)					7/16" (11.2)			1/2" (12.7)							9/16" (14.3)	5/8" (15.9)		1/2" (12.7)*		9/16" (14.3)*		
Casing Corrosion Allowance		1/8 " (3.2)																						
Working Pressure		See Pressure–Temperature Chart																						
Test Pressure		150% of Working Pressure at 100° F. (38° C.)																						
Max. Liquid Temp. (without cooling)		350° F. (177° C.)																						
Max. Liquid Temp. (with cooling)		500° F. (260° C.)																						
Unit Wgt. lbs. (Kg)		See Dimensions																						

* Minimum Thickness Titanium Casing – 3/8" (9.5)

B.H.P. LIMITS Metric Equivalents

Model	R.P.M. 3560		2900		1780		1450		1180		880	
8196 STP	40.0	(30.0)	32.7	(24.4)	20.0	(14.9)	16.3	(12.2)	13.3	(9.9)	9.9	(7.4)
8196 MTP	122.0	(91.0)	99.5	(74.2)	61.0	(45.5)	49.7	(37.1)	40.5	(30.2)	30.2	(22.5)
8196 LTP	200.0	(149.1)	165.0	(123.0)	100.0	(74.6)	81.5	(60.8)	66.4	(49.5)	49.5	(36.9)
8196 XLTP	–	–	–	–	250.0	(186.4)	204.0	(152.1)	166.0	(123.8)	124.0	(92.5)

Subject to change without notice

Peerless Pump Company
Indianapolis, IN 46207-7026

ANSI Process Pumps
Engineering Data

Shaft Deflection and Bearing Life Data

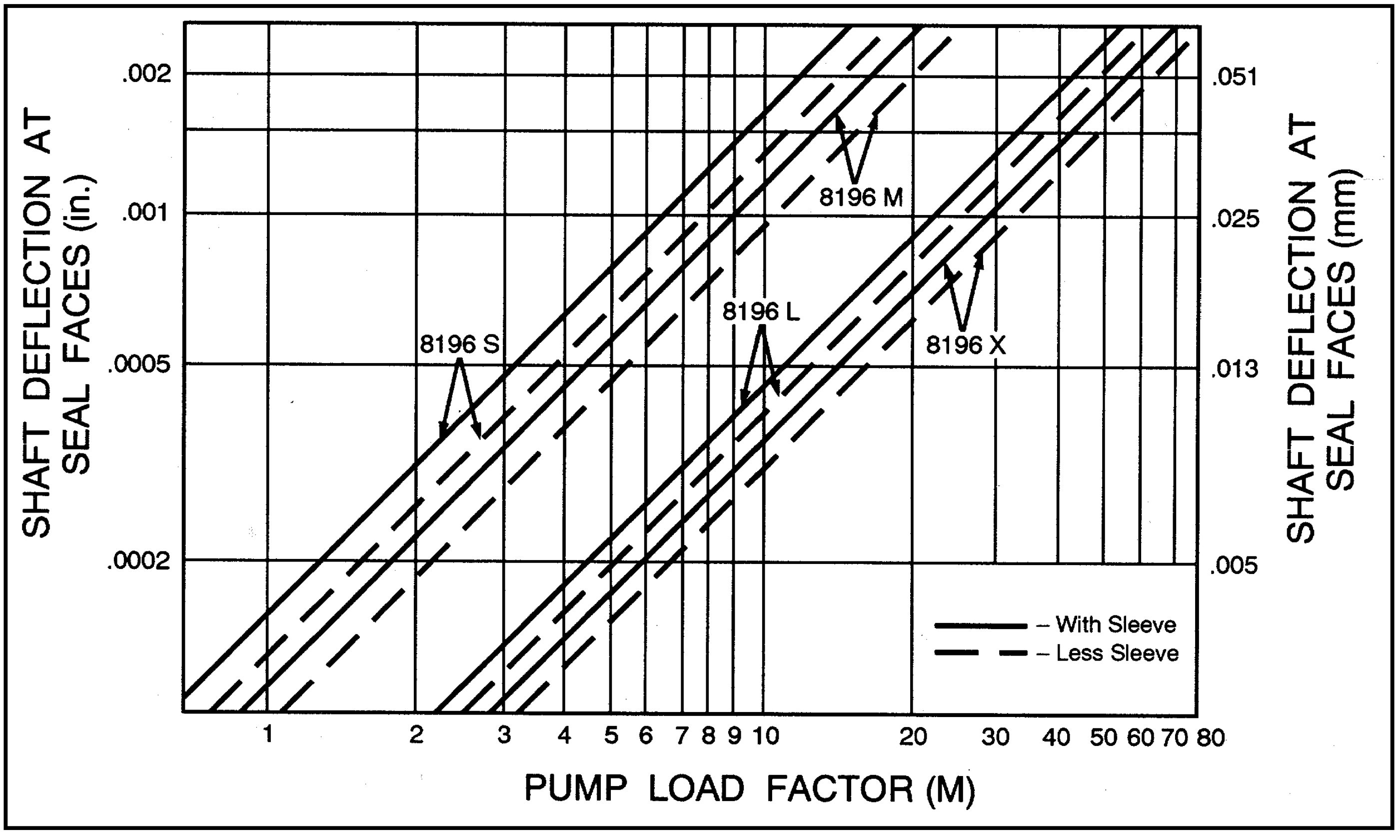
SHAFT DEFLECTION DATA							
FRAME	SIZE	3500RPM	2900RPM	1750RPM	1450RPM	1150RPM	960RPM
S	1 x 1½-6	3.0	2.1	.8	.5	.3	—
	1½ x 3-6	6.2	4.3	1.6	1.1	.7	—
	2 x 3-6	7.0	4.8	1.8	1.2	.8	—
	1 x 1½-8	6.0	4.2	1.5	1.1	.7	—
	1½ x 3-8	7.8	5.4	2.0	1.3	.9	—
M	2 x 3-6	6.2	4.3	1.6	1.1	.7	—
	2 x 3-8	8.6	5.9	2.2	1.5	1.0	—
	3 x 4-8	—	—	7.0	5.0	3.1	—
	3 x 4-8G	15.0	11.0	4.1	2.9	1.8	—
M / L	1 x 2-10	7.2	5.0	1.9	1.3	.8	—
	1½ x 3-10	8.6	5.9	2.2	1.5	1.0	—
	2 x 3-10	9.8	6.7	2.5	1.7	1.1	—
	3 x 4-10	15.0	11.0	4.1	2.9	1.7	—
	4 x 6-10	—	—	16.5	11.5	6.8	—
	1½ x 3-13	10.0	6.9	2.6	1.8	1.2	—
	2 x 3-13	15.7	11.0	4.6	3.0	1.9	—
	3 x 4-13	35.5	24.6	11.5	8.0	5.0	—
	4 x 6-13	—	—	16.5	11.5	6.8	—
X	6 x 8-13	—	—	8.0	5.3	3.6	2.4
	8 x 10-13	—	—	15.0	10.0	6.7	4.4
	6 x 8-15	—	—	10.0	6.6	4.5	3.0
	8 x 10-15	—	—	—	—	11.5	7.6
	8 x 10-15G	—	—	30.0	20.0	13.6	9.0

Shaft Deflection Load Factor (M)

To determine actual shaft deflection at rating:

1. Select proper shaft deflection load factor from chart above.
2. Multiply load factor by the specific gravity of the liquid.
3. To correct load factor for the actual impeller diameter being used, multiply by the ratio of the impeller diameter used to the maximum impeller available at that speed.
4. Enter curve on next page at corrected load factor. Intersection with selected shaft will give shaft deflection at seal faces.

Pump Load Factor and BHP Limits



Standard Shaft BHP Limits (Metric Equivalents kW) Threaded Impeller						
	RPM.					
Series/Frame	**3560**	**2900**	**1780**	**1450**	**1180**	**880**
8196 STP	40.0 (30.0)	32.7 (24.4)	20.0 (14.9)	16.3 (12.2)	13.3 (9.9)	9.9 (7.4)
8196 MTP	122.0 (91.0)	99.5 (74.2)	61.0 (45.5)	49.7 (37.1)	40.5 (30.2)	30.2 (22.5)
8196 LTP	200.0 (149.1)	165.0 (123.0)	100.0 (74.6)	81.5 (60.8)	66.4 (49.5)	49.5 (36.9)
8196 XLTP	N.A. N.A.	N.A. N.A.	250.0 (186.4)	204.0 (152.1)	166.0 (123.8)	124.0 (92.5)

Engineering Data

Key and Bolt Impeller Design
Bhp Limitations ①

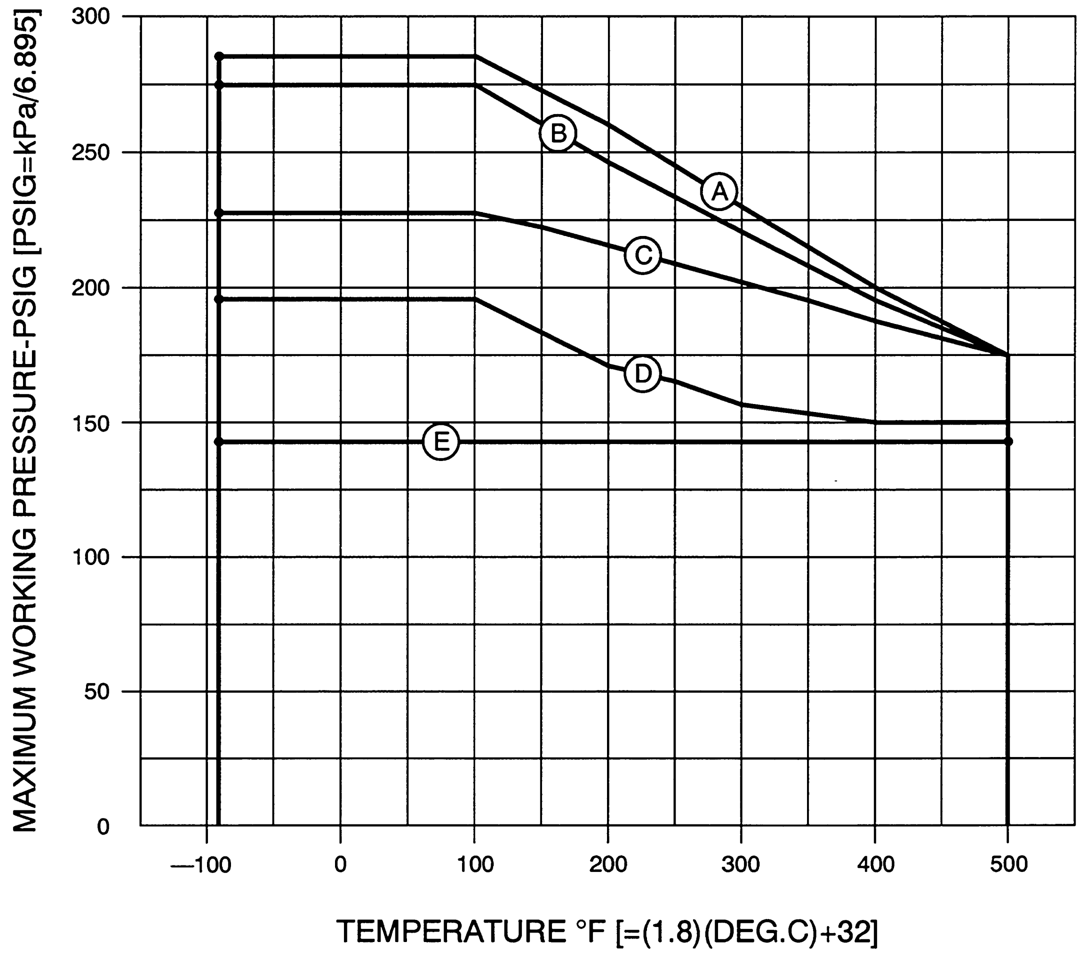
The following chart and notes are to be use for determining the maximum Bhp allowed when applying pumps with the key and bolt impeller design option. This feature is available on all 8196 series pumps and 8796 series pumps.

Frame Series ②	Shaft Style	Part	Shaft		Key			Impeller	
		Material Code	226	075	291	630	064	086	507
		Material	316 SS	4140 HT Steel	316 SS	304 SS	1018 Steel	CF8M	CD4MCu
		Yield Strength PSI	30,000	64,000	30,000	30,000	54,000	30,000	70,000
STP	Non-Sleeved	Max Bhp 1180 RPM	7	13	7	7	13	7	17
	Sleeved	Max Bhp 1180 RPM	10	13	10	10	13	10	23
MTP	Non-Sleeved	Max Bhp 1180 RPM	15	32	15	15	28	15	35
	Sleeved	Max Bhp 1180 RPM	21	40	21	21	38	21	48
LTP	Non-Sleeved	Max Bhp 1180 RPM	24	50	24	24	43	24	56
	Sleeved	Max Bhp 1180 RPM	32	66	32	32	58	32	76
XLTP	Non-Sleeved	Max Bhp 1180 RPM	74	154	74	74	133	74	173
	Sleeved	Max Bhp 1180 RPM	89	166	89	89	160	89	207
STP	Non-Sleeved	Max Bhp 1780 RPM	11	20	11	11	20	11	25
	Sleeved	Max Bhp 1780 RPM	15	20	15	15	20	15	35
MTP	Non-Sleeved	Max Bhp 1780 RPM	23	48	23	23	42	23	53
	Sleeved	Max Bhp 1780 RPM	31	61	31	31	57	31	72
LTP	Non-Sleeved	Max Bhp 1780 RPM	36	75	36	36	65	36	84
	Sleeved	Max Bhp 1780 RPM	49	100	49	49	88	49	114
XLTP	Non-Sleeved	Max Bhp 1780 RPM	112	232	112	112	201	112	261
	Sleeved	Max Bhp 1780 RPM	134	250	134	134	241	134	312
STP	Non-Sleeved	Max Bhp 3550 RPM	22	40	22	22	40	22	50
	Sleeved	Max Bhp 3550 RPM	30	40	30	30	40	30	70
MTP	Non-Sleeved	Max Bhp 3550 RPM	46	96	46	46	84	46	106
	Sleeved	Max Bhp 3550 RPM	62	122	62	62	114	62	144
LTP	Non-Sleeved	Max Bhp 3550 RPM	72	150	72	72	130	72	168
	Sleeved	Max Bhp 3550 RPM	98	199	98	98	176	98	227

Notes:
① The lowest value of any combination of shaft, key or impeller materials prevails.
② Considerations other then maximum brake horsepower may keep specific models from being used with a specific frame arrangement.

ANSI Process Pumps Engineering Data

150 LB. FLANGES PRESSURE / TEMPERATURE RATINGS

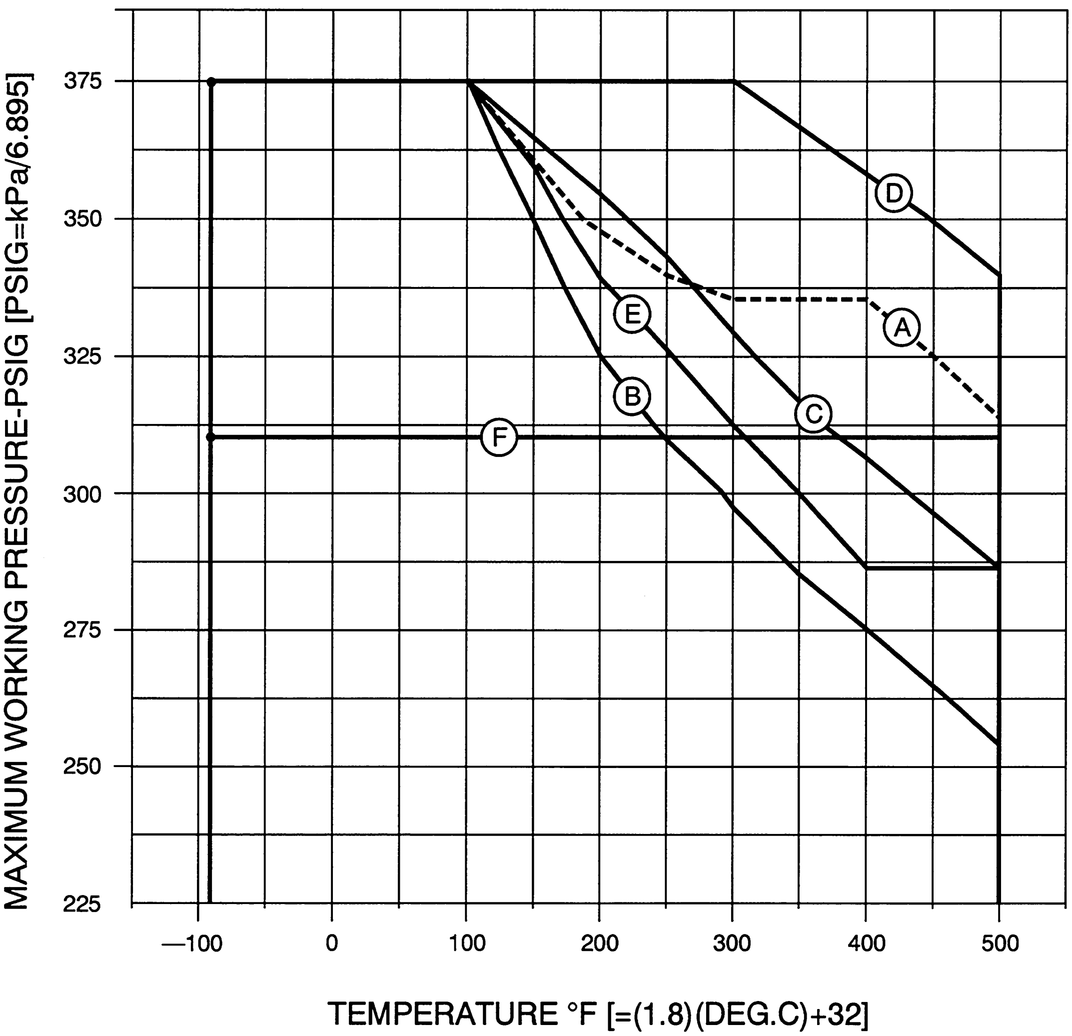


CURVE	MATERIAL	CURVE	MATERIAL
A	DUCT. IRON	B	316 S.S.
A	CAST STEEL	B	317 S.S.
A	CD4MCu	C	ALLOY 20
A	HAST. B	D	MONEL
A	HAST. C	E	NICKEL
A	TITANIUM		

CONTACT FACTORY FOR SUCTION PRESSURES OVER 160 PSIG.

ANSI Process Pumps
Engineering Data

300 LB. FLANGES
PRESSURE / TEMPERATURE RATINGS



CURVE	MATERIAL	CURVE	MATERIAL
A	DUCT. IRON	D	HAST. C
A	CAST STEEL	D	CD4MCu
B	316 S.S.	D	TITANIUM
B	317 S.S.	E	MONEL
C	ALLOY 20	F	NICKEL
D	HAST. B		

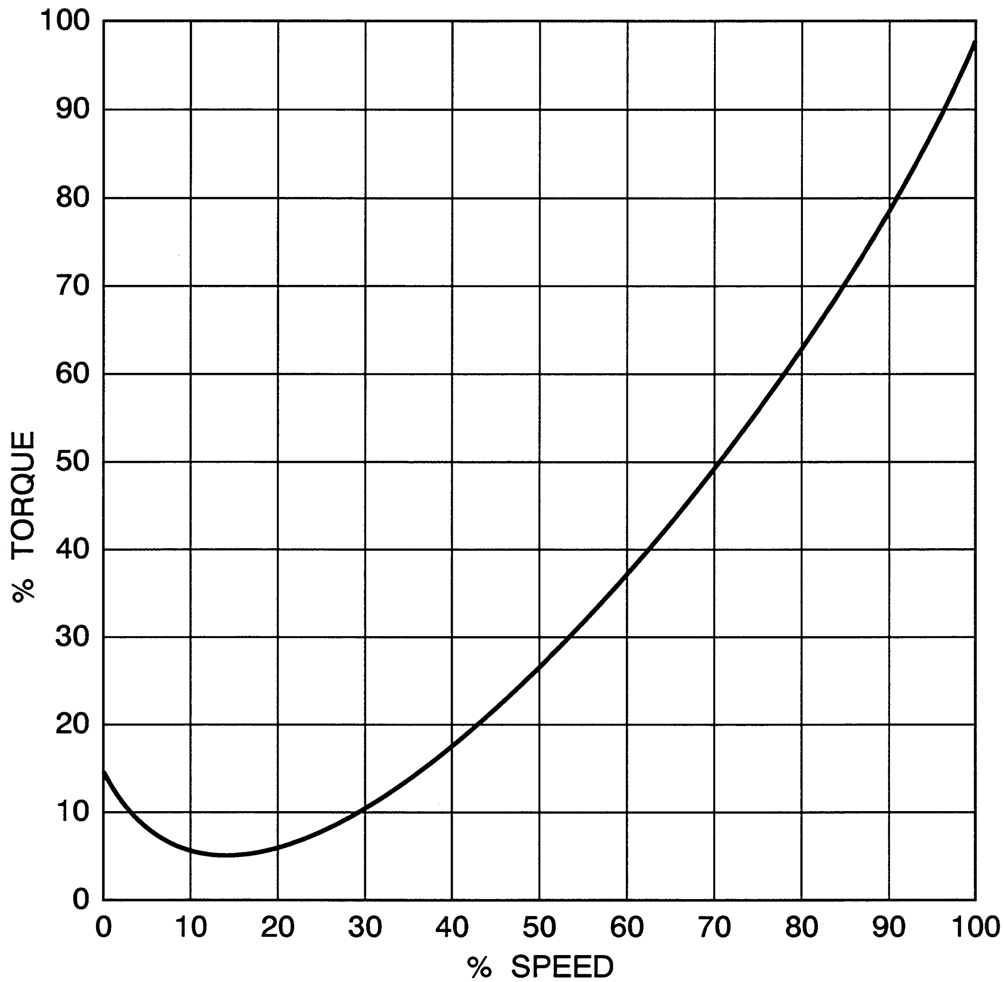
CONTACT FACTORY FOR SUCTION PRESSURES OVER 160 PSIG.

ANSI Process Pumps
Engineering Data

Horizontal Speed - Torque Curve

Pump Model/Size ____________

Pump No. ____________



Information Required To Use Speed-Torque Curve

1 – 100% of torque = ________ Ft. Lbs. @__________ GPM __________ FEET

2 – 100% of speed = ________ RPM (true running speed)

To determine 100% of torque in Ft.Lbs. – use the following formula:

$$100\% \text{ of torque (in Ft. Lbs.)} = \frac{(1)\ \text{BHP} \times 5250}{\text{RPM (true running speed)}}$$

(1) For open valve starting – use BHP at design point. ______________

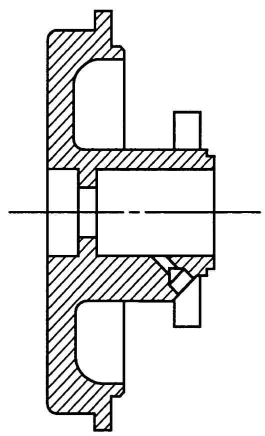
For close valve starting – use BHP at shut-off point. ______________

Peerless Pump Company
Indianapolis, IN 46207-7026

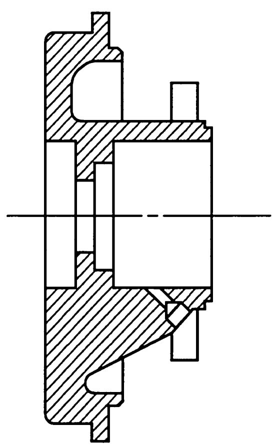
ANSI Process Pumps
Engineering Data

ANSI Box Cover/Seal Chambers

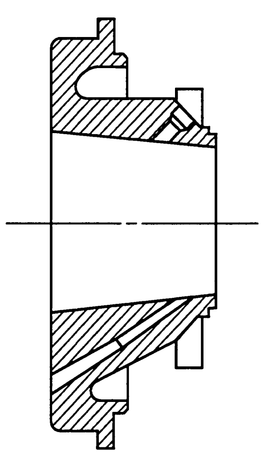
STANDARD BOX COVER



LARGE BORE SEAL CHAMBER



TAPER BORE SEAL CHAMBER



The Peerless Model 8196 ANSI pumps are available with three different box cover/seal chamber arrangements: STANDARD, LARGE BORE, AND TAPER BORE.

STANDARD BOX COVER – The standard box cover is primarily used with packing or non-troublesome mechanical seal applications.

LARGE BORE SEAL CHAMBER – The large bore seal chamber is used with mechanical seals only. The advantages of this box cover are:

1. It effectively lubricates and cools the seals.
2. The large bore will accommodate more seals, such as larger, more complex seals that can provide better sealing.
3. It helps keep solids away from components and provides more area for liquid circulation and heat dissipation.

The results are longer seal life and reduced maintenance.

FRAME	STANDARD BORE SIZE	LARGE BORE SIZE
ST	2.000	2.875
MT	2.500	3.500
LTC	2.875	3.875
XLT	3.375	4.500

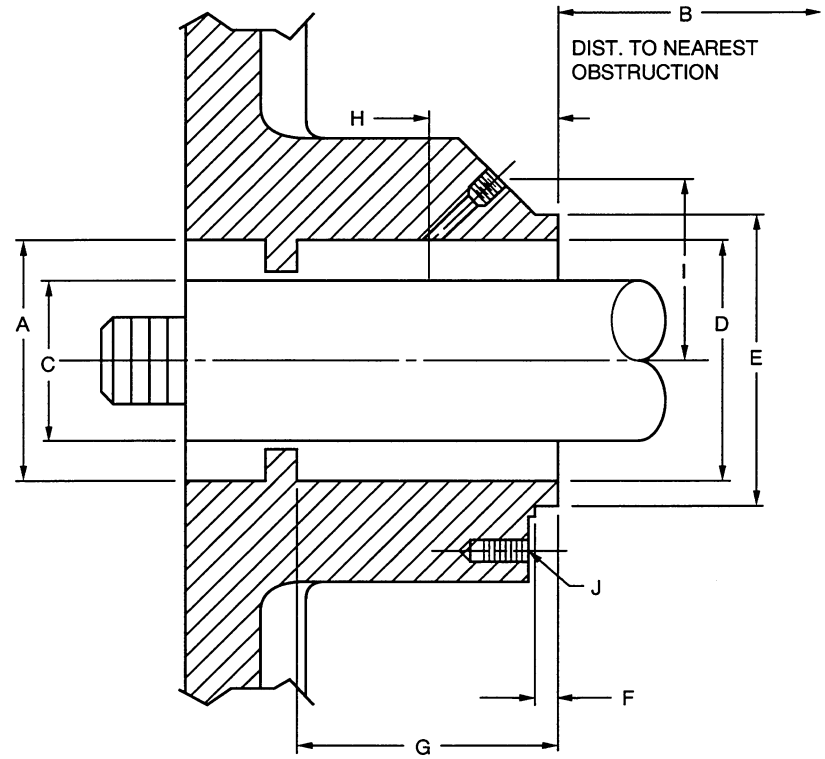
TAPER BORE SEAL CHAMBER – The taper bore seal chamber is used with mechanical seals where solid build-up is a problem. It has a large tapered bore and an internal bypass which circulates the pumping liquid. This lubricates, cools, and cleans the seal chamber. The results are longer seal life, no solid build-up, and less maintenance.

ALL THREE BOX COVERS:

- Are completely interchangeable.
- Can use standard mechanical seals.
- Are available in 316SS, 317SS, Alloy 20, CD4, and more.

ANSI Process Pumps
Engineering Data

Standard Stuffing Box Cover



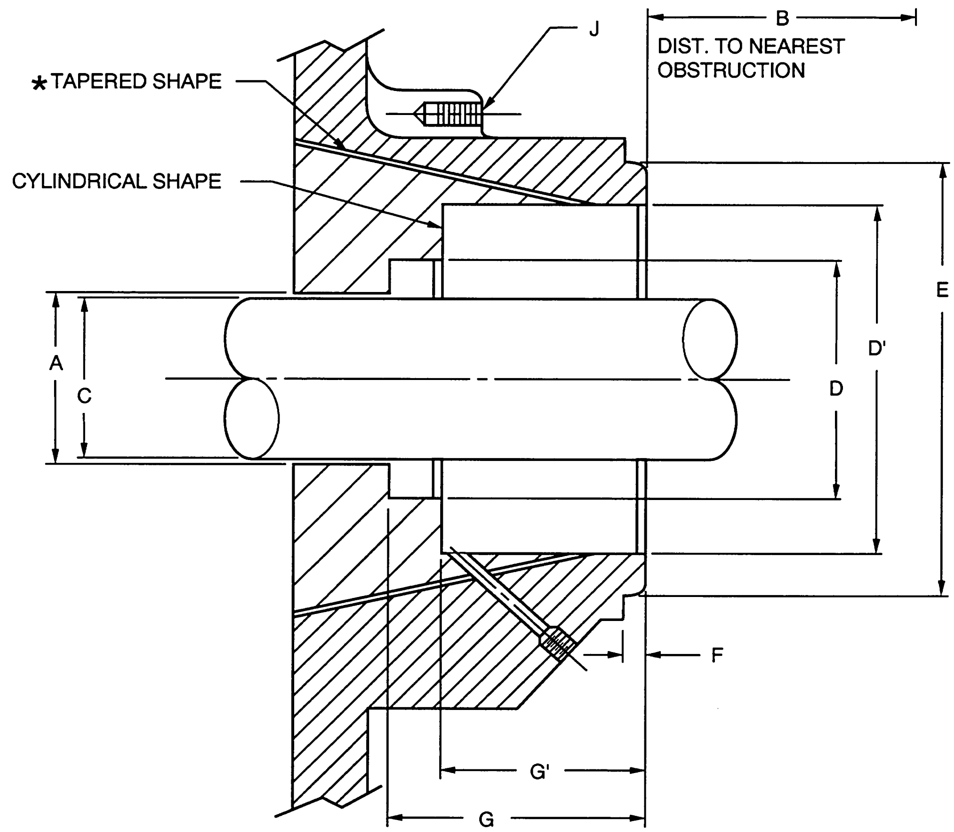
PUMP SIZE	BOX COVER									J			BOX CVR NPT	GLD NPT
	A	B	C	D	E	F	G	H	I	STUDS SIZE	STUDS NO.	BOLT HOLE CIR.		
8196 ST	1.400 1.405	2.19	1.373 1.375	1.999 2.003	2.392 2.395	.19	2.12	.97	1.81	.375	4	3.25	.25	.25
8196 MT	1.770 1.780	2.81	1.748 1.750	2.499 2.503	3.017 3.020	.25	2.62	1.56	2.50	.500	4	4.12	.38	.50
8196 LTC	2.145 2.155	2.81	2.123 2.125	2.874 2.878	3.517 3.520	.25	2.62	1.56	2.63	.500	4	4.50	.38	.50
8196 XLT	2.520 2.530	2.85	2.498 2.500	3.374 3.378	4.371 4.374	.25	3.00	1.81	3.50	.625	4	5.38	.38	.50

Drawing # 4852609 6/26/92

Peerless Pump Company
Indianapolis, IN 46207-7026

ANSI Process Pumps
Engineering Data

ANSI Seal Chamber Box Cover - Large/Taper Bore



PUMP SIZE	BOX COVER									J			BOX CVR NPT	GLD NPT
	A	B	C	D	D'	E	F	G	G'	STUDS SIZE	STUDS NO.	BOLT HOLE CIR.		
8196 ST	1.400 1.405	2.19	1.373 1.375	1.999 2.003	2.88	3.594 3.597	.19	2.12	1.69	.375	4	4.50	.25	.25
8196 MT	1.770 1.780	2.81	1.748 1.750	2.499 2.503	3.50	4.337 4.340	.25	2.62	2.12	.500	4	5.50	.38	.50
8196 LTC	2.145 2.155	2.81	2.123 2.125	2.874 2.878	3.88	4.708 4.711	.25	2.62	2.12	.500	4	6.00	.38	.50
8196 XLT	2.520 2.530	2.85	2.498 2.500	3.374 3.378	4.50	5.447 5.450	.25	3.00	2.50	.625	4	6.75	.38	.50

*TABLE DIMENSIONS: A, D, G AND G' ARE NOT APPLICABLE TO THE TAPERED DESIGN.

Drawing # 4853029 6/26/92

ANSI Process Pumps
Engineering Data

Stuffing Box Packing

Peerless pump generally supplies one of three different types of packing, although any specific type can be supplied upon request. The three types fall into the following categories:

1. General Service Packing - This is an Aramid - PTFE synthetic packing. It is best suited for cold water and general service applications. It has a PH range of 0 to 12 and a maximum operating temperature of 500 degrees F. This packing carries a material code of 679 and is similar to Crane type 1345 or equal.

2. Chemical and Solvent Packing - This is a PTFE - Synthetic packing. It is used for severe chemical and solvent applications. It has a PH range of 0 to 14 and a maximum operating temperature of 500 degrees F. This packing carries a material code of 676 and is similar to Crane type C1065 or equal.

3. High Pressure and Temperature Packing - This is a Metallic packing called Graphoil. It is used in high pressure and temperature applications. It has a PH range of 0 to 14 and a maximum operating temperature of 750 degrees F. This packing carries a material code of 670 and is similar to Crane 235 B or equal.

Packing Size

The following is a list of the standard packing size for all process pump models.

Model	Frame Size	Packing Size	Appox. Length	No.of Rings	Lantern Ring Width
8196	ST	5/16 x 5/16	4.75	5	7/16
8796	MT	3/8 x 3/8	5.75	5	5/8
5596	LTC	3/8 x 3/8	7.0	5	5/8
	XLT	7/16 x 7/16	8.0	5	5/8
	S	1/2 x 1/2	9.75	5	1
8175	M	1/2 x 1/2	12.00	5	1
	L	1/2 x 1/2	15.25	5	1

Packing Arrangements:

In order for packing to function properly, a liquid barrier must be present between the shaft and packing. This barrier lubricates the shaft and prevents air from entering the stuffing box, which would cause a loss of prime and possible seizing of rotating parts. This liquid barrier can be achieved in different ways depending on the application.

Peerless Pump Company
Indianapolis, IN 46207-7026

ANSI Process Pumps
Engineering Data

Model 8196 Mechanical Seals

We offer a full selection of mechanical seals for the Model 8196. Available seals may be mounted either on the pump shaft or on the sleeve. Note: On less sleeve ductile iron units, corrosion of the steel shaft under the shaft packing may cause premature seal failure. Use of a stainless steel shaft is required.

Typical Mechanical Seal Arrangements

The following common Crane and Dura mechanical seals are available on the Model 8196. Seals from other manufacturers such as Borg-Warner, Chesterton, Sealol, etc., are also available and can usually be used without modification.

1. Single Inside Unbalanced Seals
   A. Crane Type 1
   B. Crane Type 9T
   C. Dura RO & RO-TT
2. Single Inside Balanced Seals
   A. Crane Type 9BT
   B. Dura PT & PTO
3. Dbl. Inside Unbalanced Seals
   A. Crane Type 9T
   B. Dura RO & RO-TT
   C. Dura CRO
4. Outside Unbalanced Seals
   A. Crane Type 9T
   B. Dura RO & RO-TT
5. Outside Balanced Seals
   A. Crane Type 20
   B. Dura RA

Mechanical Seal Description

1. Single Inside Unbalanced Seals

A. Crane Type 1
The Type 1 seal available has an "O" ring-mounted stationary seat and is suitable for use on clear liquids which are not detrimental to the synthetic rubber bellows.

Buna and Viton bellows are stocked. Buna is satisfactory for use at temperatures to 212° F. Use of Viton allows utilization of seal at temperature to 400° F. and in liquids which could attack Buna. Type 1 seals are satisfactory for use at pressure to 200 PSIG, depending upon the face material.

A 316SS flush type gland is standard but other types and materials are available.

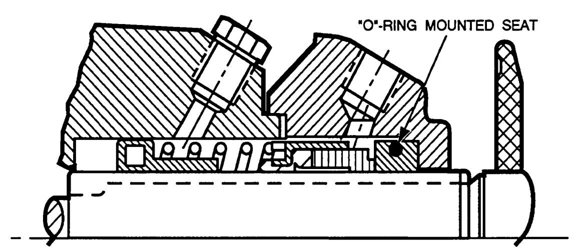


Fig. 1A
Type 1 seal with standard flush gland

B. Crane Type 9T
Type 9T seals are used when handling corrosive liquids at moderate temperatures. The shaft packing is a Teflon wedge ring.

This seal has a temperature range of –350° F. (with special shaft packing) to 500° F. It can operate satisfactorily at pressures to 200 PSIG. On high temperature applications (above 250° F.), use of a water cooled (jacketed) stuffing box and/or heat exchanger is generally recommended. See chart #2 on page xx.

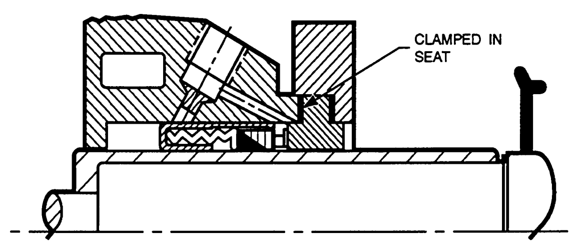


Fig. 1B
Type 9T seal with plain style gland, jacketed stuffing box, and backdrilled seal face flush

Vent and Drain Gland

This style gland is used when handling liquefied gases such as propane. Since any leakage past the seal faces will create a highly explosive gas, the vent and drain gland allows the vapor to be vented to a safe, external disposal. In addition, the drain connection also removes any liquid leakage that may occur while preventing spray which may be dangerous.

Probably the most important advantage of this style of gland is the safety feature it provides. In fact, petroleum refineries specify vent and drain glands as standard for all seals.

Vent and drain glands contain two tapped openings located behind the stationary seat. A throttle bushing or an auxiliary stuffing box is located behind the tapped openings. VENT AND DRAIN CONNECTIONS ARE LOCATED ON THE VERTICAL CENTERLINE FOR MAXIMUM EFFICIENCY IN VENTING AND DRAINING. NOTE THAT WITH THIS ARRANGEMENT, THE GLAND IS EXPOSED TO CORROSIVES; THE GLAND SHOULD MATCH THE PUMP METALLURGY.

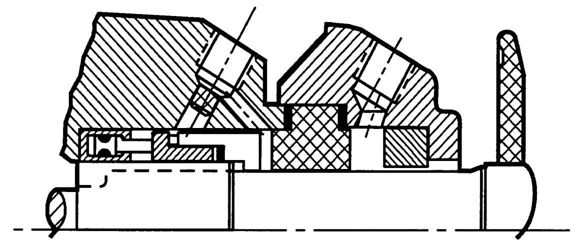


Fig. 8
Vent and drain gland with throttle bushing

Quench Gland

The vent and drain gland described above can be used as a quench gland. Quench glands have proven very effective as safeguards when handling corrosive liquids since any leakage past the seal faces will be diluted and washed away. They also provide an effective means of washing away any crystallization of the liquid upon contact with the atmosphere.

This arrangement also provides a method for cooling the seal faces on inside mounted seals. They are frequently used on high temperature applications as an additional cooling feature.

By careful regulation of the quenching liquid (usually water) at the top inlet, all the liquid will drain through the bottom outlet port. The bushing will contain only very low pressure. Where higher quench pressures are required, use an auxiliary stuffing box gland.

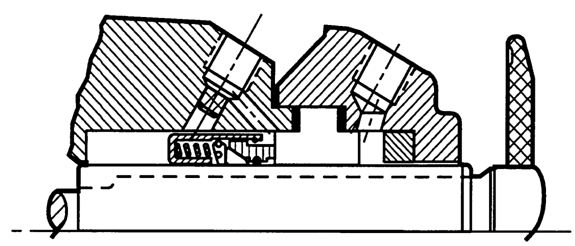


Fig. 9
Quench (vent and drain) gland

Flush Gland

A liquid flush directly at the seal faces can effectively improve seal life. A face flush on seals with a back-clamped-in seat is effectively accomplished with drilling of the stuffing box to direct the flush liquid at the seal and with use of the standard plain gland.

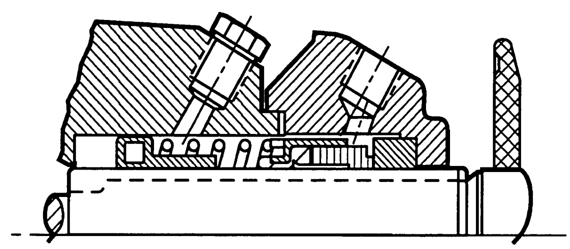


Fig. 10
Flush gland

ANSI Process Pumps
Engineering Data

A flush gland is furnished as standard on seals with "O" ring-mounted seats to provide a flush directly at the seal faces.

Flushing the seal faces accomplishes the following:

1. It Cools the Faces – As the seal faces rotate against each other, there is a temperature rise of as much as 60–80° F. On some applications, such as hot water, gasoline, propane, etc., this heat buildup can result in vaporization at the faces causing the faces to run dry. This results in considerably shortened seal life.

2. It Prevents Solids Buildup – Flushing prevents the accumulation of solids or abrasives within the stuffing box.

Mechanical Seal Cooling

When handling high temperature liquids, it is desirable to reduce the temperature in the stuffing box to improve the lubricating qualities of the liquid and to insure that the liquid is well below its vapor pressure. Flush liquid directed at the seal faces through a flush connection in the stuffing box or in the gland may provide adequate cooling. This flush may be a cooled liquid from an external source or recirculation from the pump casing. A heat exchanger can be used to cool the recirculated liquid if required.

A water-cooled (jacketed) stuffing box can be used to reduce liquid temperature in the seal chamber. The pumpage should be "dead-ended" in the stuffing box for effective cooling. This is accomplished with a restricting bushing in the bottom of the stuffing box. Chart #2 shows cooling water requirements for temperature reduction in a water-cooled (jacketed) stuffing box with a dead-ended seal chamber. Note: By-passing liquid from the casing reduces the efficiency of a water-cooled (jacketed) stuffing box and is generally required to lubricate seal faces.

Restricting Bushings and Lip Seals

If a flush into the stuffing box is utilized, a carbon restricting bushing or a Teflon lip seal with alloy expansion collars can be pressed into the bottom of the stuffing box to help control leakage of injected fluid into the pumpage.

TEMPERATURE OF LIQUID IN STUFFING BOX FOR VARIOUS PUMPING TEMPERATURES WITH DEAD-ENDED SEAL CHAMBER.
(These figures do not reflect actual seal face cooling. No face cooling will be obtained with this method.)

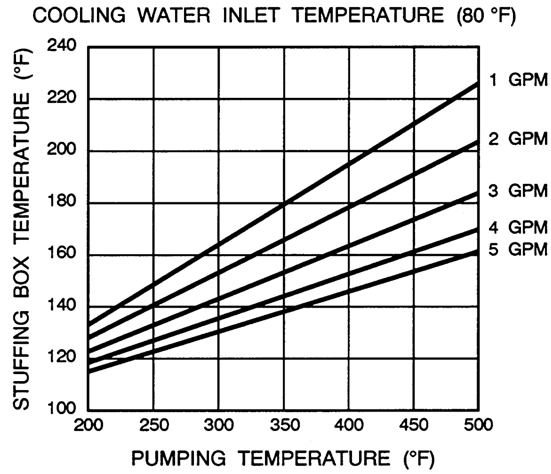


CHART #2

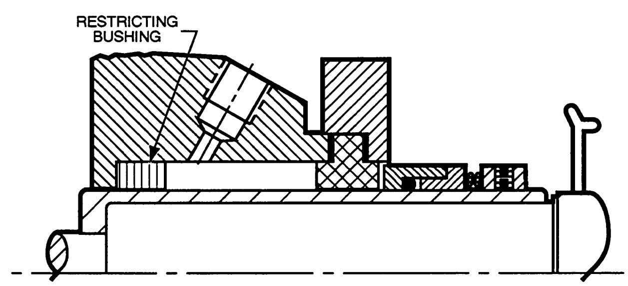


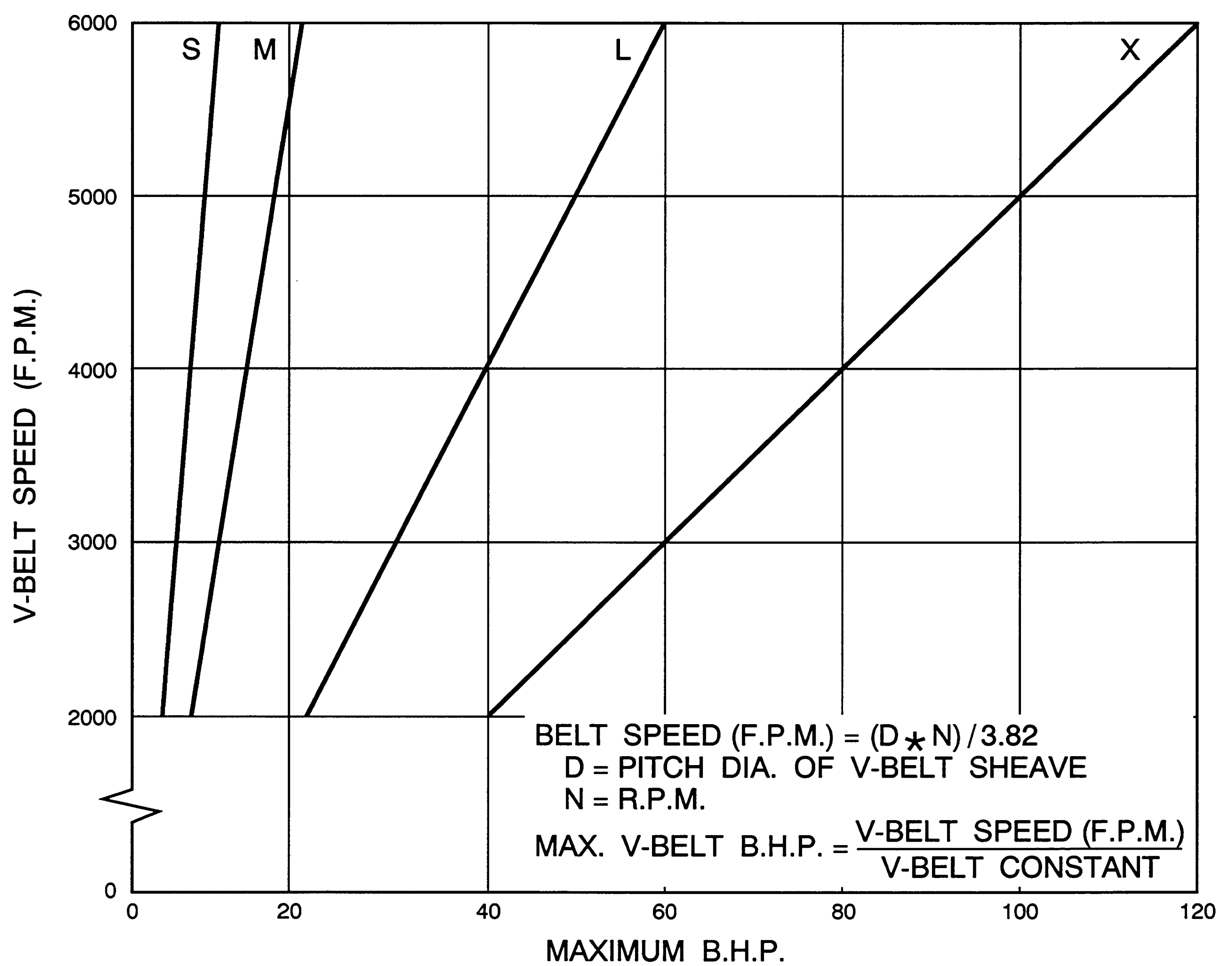
Fig. 11
Restricting bushing

ANSI Process Pumps
Engineering Data

V-Belt Drive Data

FRAME	SIZE	Shaft Dia. at Cplg.	Shaft Dia. at Imp.	V-Belt Constant	Maximum H.P. — Direct Drive At Various RPM					
					3560	2900	1780	1450	1180	880
S	Standard	7/8"	3/4"	580	40.0	32.7	20.0	16.3	13.3	9.9
M	Standard	1 1/8"	1"	300	122.0	99.5	61.0	49.7	40.5	30.2
L	Standard	1 7/8"	1 1/4"	100	200.0	163.0	100.0	81.5	66.4	49.5
X	Standard	2 3/8"	1 1/2"	50	—	—	250.0	204.0	166.0	124.0

Overhung V-Belt Limitations



ANSI Process Pumps
Engineering Data

Special Baseplates (Belt Driven)

Peerless offers a full range of specialized baseplates, such as: cast iron, fabricated steel, stainless steel, fiberglass, multi- drilled spring loaded, stilt mounted, belt driven, over head belt driven, and more. Often these special baseplates require extra engineering work, or need to be specially designed for each application, so standard dimension sheets are not available. Consult the factory for details and prices.

One of the most commonly requested special baseplates is the belt driven pump. A belt driven pump has several advantages over the standard direct coupled pump:

1. Because alignment is not as critical as with a standard coupling, some maintenance people prefer belt drive.

2. Because of space limitations a belt drive is often used. The motor can be located on either side of the pump or even above the pump.

3. A belt drive can be used to obtain speeds other than the common motor speeds.

4. A belt drive allows the user to use a maximum impeller diameter for maximum efficiency.

5. A belt drive allows the user to change the speed of the pump, therefore changing the head and flow, without changing the motor or impeller diameter.

6. Using a blelt drive can save money on the cost of a motor, since 1750 rpm motors are less expensive than 1150 rpm motors with the same horsepower. It allows the user to stock fewer motors.

The most common belt drives are the deep grove type. Timing belts can also be used. The advantage of timing belts are: a) there is no slippage or speed variation, b) no belt tension is needed, so there is less overhung load.

Overhung V-Belt Limitations

Once the proper sheaves and belts have been selected it is important to check that the maximum HP limitaion is not exceeded. This can be done by using the V-Belt drive data and the two overhung V-Belt limitation graphs. First determine the belt speed in feet per minute.

Belt speed = D*N/3.82

Where D= Pitch diameter of one of the sheaves
N= RPM of the same diameter sheave

Special Baseplates (Belt Driven)

Overhung V-Belt Limitations (con't):

Next determine the maximum V-Belt HP by either using one of the graphs, (enter the graph at the appropriate belt speed, go across to the frame size and down to the maximum HP), or by using the following equation.

Max. V-Belt HP = V-Belt speed (FPM) / V-Belt constant

The V-Belt constant can be found from the drive data. Note: For timing belts:
Max. Timing Belt HP = 1.5 * Belt speed (FPM) / V-Belt constant

The graphs are not to be used for timing Belts.

Once the maximum Hp has been found, it can be compared to the rated HP (Note: No overload applications. Use the maximum Hp of the pump only). If the pumps rated HP is less than the maximum V-Belt drive then direct V-Belt can be used. If it is greater, than either a timing belt or a jackshaft **MUST** be used. Also, be sure to check to see that the sheave width does not exceed the maximum sheave width.

Peerless Pump Company
Indianapolis, IN 46207-7026

ANSI/Heavy Duty Process Pumps
Types 8196/8175 Engineering Data

Subject: Spring Loaded Baseplates

Thermal expansion of suction and discharge piping often subjects pump flanges to excessive loads. Where excessive thermal expansion is present, expansion loops or joints are normally used. Frequently, high temperatures, high pressures, or corrosive or hazardous liquids are involved. Under these conditions, expansion loops are expensive. Expansion joints are both expensive and may constitute a potential safety hazard. There are, however, other methods available for preventing excessive pump flange loading. One method is to use a spring loaded baseplate, as shown in Figures 1 and 2.

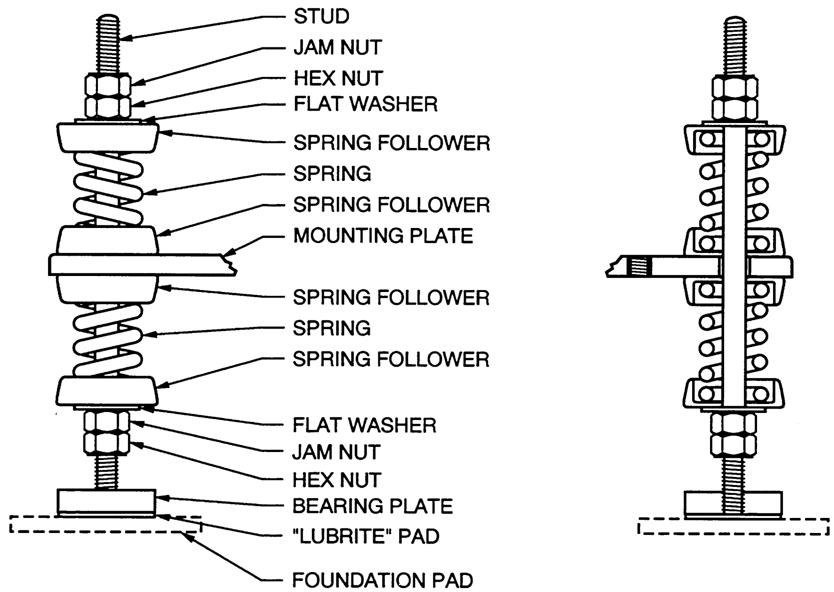


Fig. 1

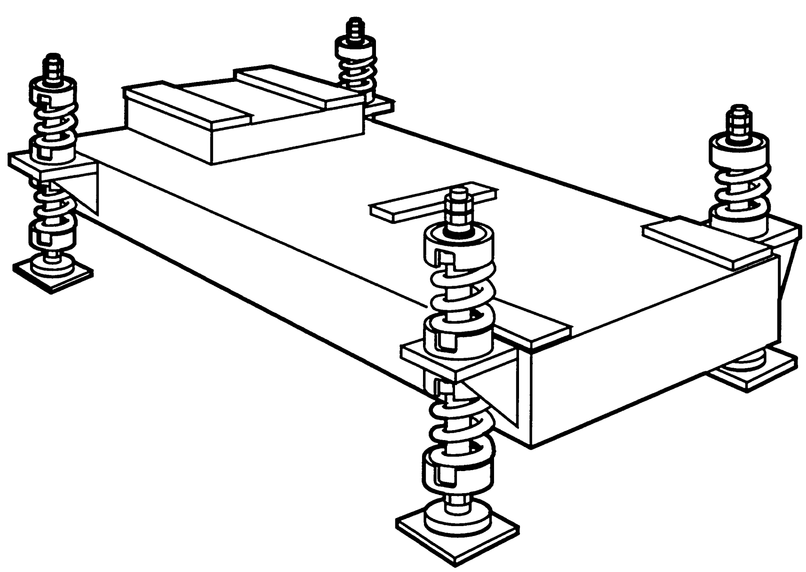


Fig. 2

Baseplate Design

Spring loaded baseplates are designed to allow movement in both the vertical and horizontal planes.

To allow movement in the vertical plane, a double set of coil springs is used; one spring below the baseplate to limit downward travel; one spring above the baseplate to limit upward movement. Every order is individually reviewed and calculations are performed to select the proper springs which will assure acceptable pump flange loading and allow for the thermal expansions of up to one inch maximum.

To allow movement in the horizontal plane, an anti-friction "Lubrite" pad is brazed onto the baseplate bearing plate. The "Lubrite" pad is impregnated with a graphite-type substance having a low coefficient of friction which permits the complete unit to move horizontally. Stainless steel foundation pads (furnished by customer) with a 16-20 micro-inch finish should be located in the foundation or floor.

Pump, driver and springs are assembled at the factory as a final check on the design. The springs are then disassembled for shipment. Each order is furnished with an assembly drawing which shows how the springs are to be reassembled in the field.

Spring loaded baseplates are designed so that the vibration frequency of the spring is several times the natural frequency of the motor–pump baseplate assembly.

Application of Spring Loaded Baseplates

Spring loaded baseplates are designed for use where excessive thermal expansion is present. They are not designed to compensate for inadequate piping design. Caution must be used to insure that the suction and discharge piping are properly supported and that the pump is not used to support any of the piping.

Please note that the baseplates are designed to accommodate a thermal expansion of up to one inch. Greater thermal expansions may be handled and must be reviewed prior to quoting. Contact the factory with complete details.

Installation

1. Assemble the springs on the baseplate as shown on the assembly drawing furnished with the order.

2. Level the bedplate by adjusting the lower hex and jam nuts.

3. Top hex and jam nuts should be tightened just enougn to insure that the top springs are not loose in their followers.

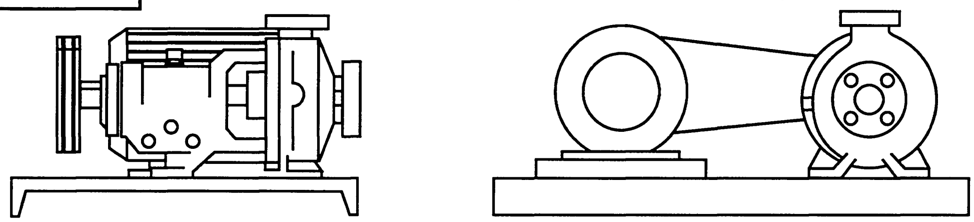
4. Align pump and driver as described in the instruction book.

5. Fabricate and connect piping. BE SURE THAT PIPING IS PROPERLY SUPPORTED INDEPENDENTLY OF PUMP, LINES UP WITH PUMP NOZZLES AND THAT THE PIPE FLANGES ARE PARALLEL TO THE PUMP FLANGES.

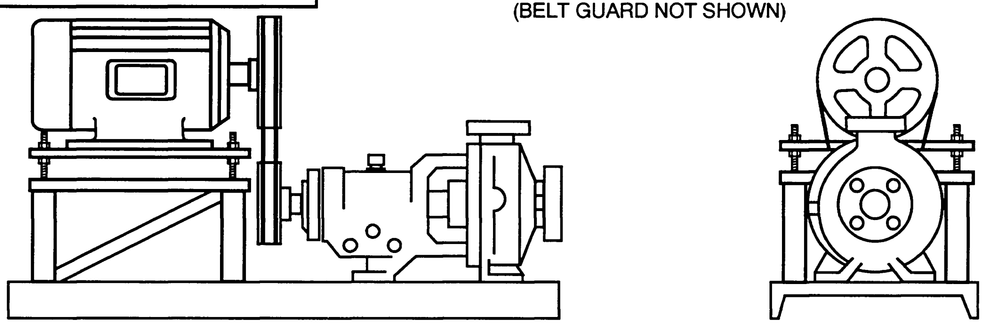
ANSI Process Pumps
Baseplate/Drive Options

BELT DRIVE

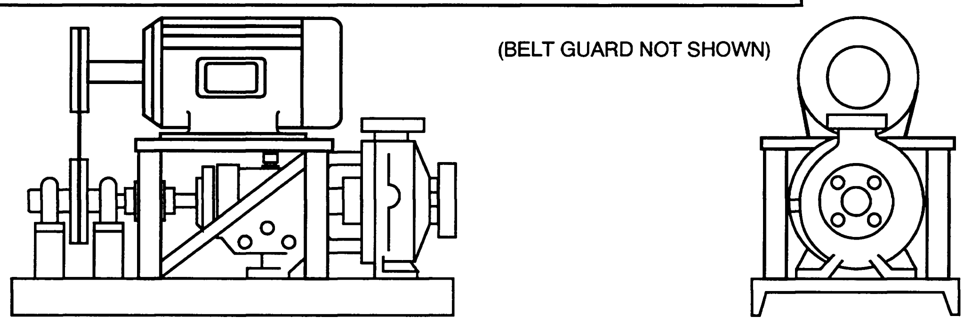
(BELT GUARD NOT SHOWN)



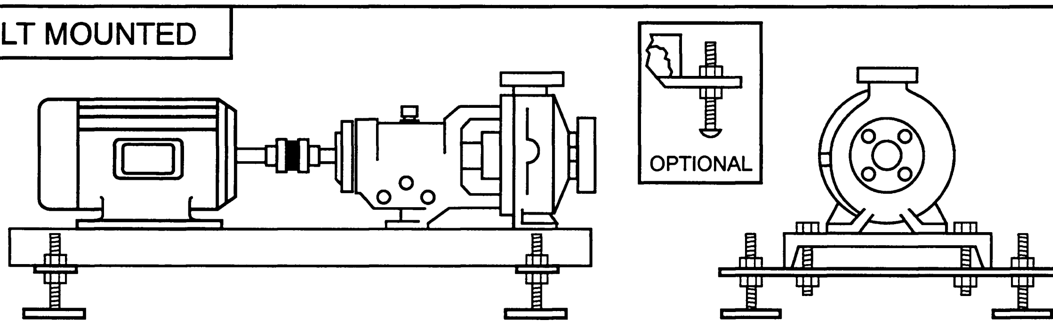
OVERHEAD BELT DRIVE



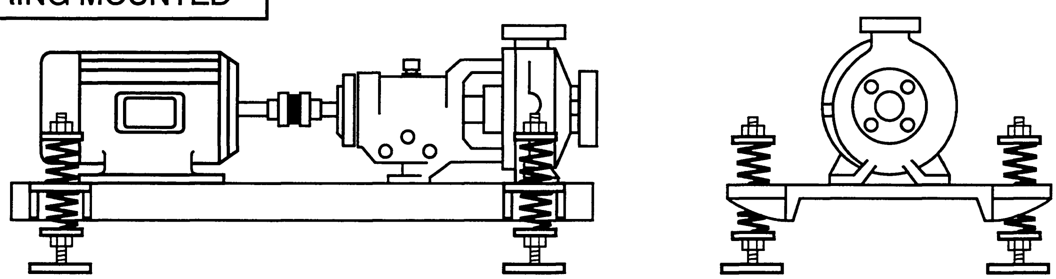
PIGGY BACK OVERHEAD BELT DRIVE (WITH JACK SHAFT)



STILT MOUNTED



SPRING MOUNTED



Recommended Lubricants

Standard Oils:

The recommended oil for general use in all Peerless process pumps is a high quality Turbine oil with rust and oxidation inhibitors. The oil should be non-detergent and have a viscosity of approximately ISO 68, 315SSU, or SAE20 at 100 Degrees F. In general, the maximum oil temperature should not exceed 170 degrees F. If temperatures exceed 170 degrees F, bearing cooling may be required along with using a heavier oil. For temperatures below 80 degrees F. a lighter oil is recommended. For extreme conditions consult the factory.

Specific recommendations are:

Atlantic Richfield	Duro S-315, Duro AW S-315
Chevron	Chevron OC Turbine Oil 68
Exxon	Teresstic 68
Gulf	Gulf Harmony 68
Mobil	Mobil DTE 26 300SSU
Phillips	Mangus Oil Grade 315 MM Motor Oil SAE 20-20W HDS
Shell	32 - 150 Degrees F Tellus Oil 68 20 to 32 Degrees F Tellus Oil 23 150 - 200 Degrees F Turbo Oil 150
Texaco	Below 80 Degrees F Regal Oil R&O-46 #10 Weight Above 80 Degrees F Regal Oil R&O-68 #20 Weight

Synthetic Oils:

Recently many customers have been inquiring about Diester Base Synthetic Oils. Using synthetic oil has many advantages:

1. Much longer service life (as much as 8 times longer.)

2. Bearing operating temperatures are from 5 to 15 degrees F cooler.

3. 1% to 5% energy reduction for operating equipment.

Recommended Lubricants

Synthetic Oils (con't):

4. Lower pouring point (-70 degrees F.), so equipment can be started and operated at a lower temperature.

5. Higher maximum operating temperature.

Synthetic oils are compatible with conventional non-detergent petroleum oils although mixing will reduce the performance of the synthetic lubricant. Also, neoprene rubber lip seals are not recommended for use with synthetic oils. Compatible seal materials are: viton, teflon, silicon rubber and buna N.

The recommended synthetic oil for general use in all Peerless process pumps is a non-detergent oil with an approximate viscosity of ISO68, 315SSU, or SAE20.

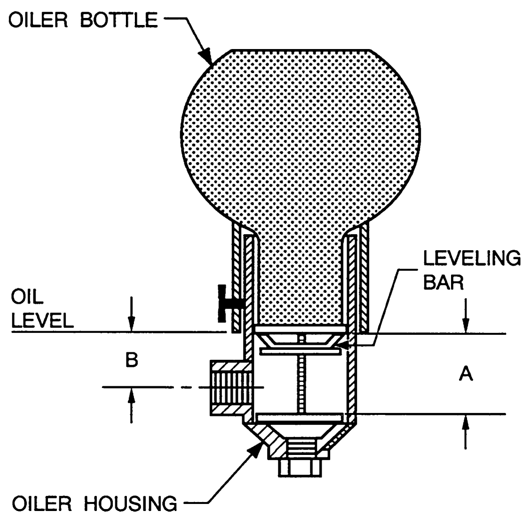
Specific recommendations are:

Exxon	Synestic 68
Mobil	SHC626
Texaco	Syn-Star DE68

*ISO68, 315SSU, and SAE20 are approximately the same viscosity but in different units.

ANSI Process Pumps
Engineering Data

Filling Bearing Frame



1. Remove adjustment assembly from oiler.
2. Adjust bars to dimension "A".
3. Lock in position.
4. Replace adjustment assembly in oiler.

A = 0.8125 inches

The approximate oil capacity of each bearing frame is as follows:

MODEL	SIZE	APPROX. CAPACITY
8196 8796	ST MT LTC XLT	1/2 qts. 3/4 qts. 1 qt. 2 1/2 qts.
8175	S M L	5 qts. 4 qts. 3 qts.
MARK II	Super 21 Super 22	1/2 qts. 3/4 qts.

Oil Type

The recommended oil for general use in all Peerless Pump Models is a high quality turbine type oil with rust and oxidation inhibitors. The oil should be non-detergent and have a viscosity of approximately ISO 68, 3155SSU, or SAE20 at 100° F. See section 8120, pages 21 and 22.

Oil Changes

As a general recommendation, the oil in a Peerless Pump should be changed every 3 months or every 2000 operating hours, whichever comes first.

ANSI Process Pumps
Engineering Data

pH Values
Their Meaning and Use in Pump Selection

The pH value of a liquid is a measure of the corrosive qualities either acidic or alkaline. It does not measure the amount or quantity of the acid or alkali, but, instead the hydrogen or hydroxide ion concentration in gram equivalents per liter of liquid. pH value is expressed as the logarithm to the base 10 of the reciprocal of the hydrogen ion concentration in gram equivalents per liter. The scale of pH values ranges from zero through 14. The neutral point is 7. From 7 decreasing to zero denotes increasing acidity. From 7 through 14 denotes increasing alkalinity. It may also be stated that from 7 to zero hydrogen ions predominate; and from 7 through 14 hydroxide ions predominate. At 7, the neutral point, the hydrogen and hydroxide ions are equal in quantity. The difference in pH numbers is 10 fold. For example a solution of 3 pH (.001 hydrogen ion concentration) in gram equivalents per liter has 10 times the hydrogen ion concentration of a 4 pH solution (.0001 hydrogen ion concentration in gram equivalents per liter). Likewise, a 10 pH solution has ten times the hydroxide ion concentration of a 9 pH solution. The pH value of a solution can be obtained by colorimetric methods using "universal indicator" or by electric meters designed especially for the purpose.

The following table outlines materials of construction usually recommended for pumps handling solutions where the pH value is known.

pH Value	Material of Construction
0 to 4	Corrosion Resistant Alloy Steels
4 to 6	All Bronze
6 to 8	Bronze Fitted or Standard Fitted
8 to 10	All Iron
10 to 14	Corrosion Resistant Alloy

Knowing the pH value of a solution does not answer all questions as to the corrosive qualities or characteristics of a solution. Aspects such astemperature of the solution also affects the corrosive characteristics. However, knowing the pH value of a liquid is a good starting point to determine the pumps materials of construction.

ANSI Process Pumps
Engineering Data

Corrosive Data

This guide is intended to match metal/alloy to the required corrosive service application. Actual rates of corrosion may vary significantly based upon temperature, trace elements, concentration or solid abrasives. A blank indicates no accurate data under those conditions for the specified metal and/or alloy.

This guide applies only to those metals/alloys readily available from Peerless Pump. Additional information can be obtained from the Indianapolis factory as needed.

Metal/Alloy Designation Index

316SS – Stainless steel. ASTM A296 Gr Cf-8M, Aisi 316
Alloy 20 – Carpenter stainless No. 20. ASTM A296 Gr CN-7M
CD4MCU – Stainless steel. ACICO-4MCU
MON – Monel Grade E. ASTM A296 Gr M-35
Ni – Nickel. ASTM A296 Gr CZ-100
H-B – Hastelloy Alloy-B. ASTM A494
H-C – Hastelloy Alloy-C. ASTM A494
Ti – Titanium Unalloyed. ASTM B367 Gr C-1
Zi – Zirconium

Use Index

A – Fully Satisfactory
B – Useful Resistance
C – Limited Use
X – Unsuitable
BLANK – Data Unavailable

Corrosive	Steel C. I. D.I.	Brz.	316SS	A-20	CD4-MCu	Mon	Ni	H-B	H-C	Ti	Zi
Acetaldehyde, 70° F.	B	A	A	A	A	A	A		A	A	A
Acetic Acid, 70° F.	X	A	A	A	A	B	B	A	A	A	A
Acetic Acid, <50%, To Boiling	X	B	A	A	B	B	B	C	A	A	A
Acetic Acid, >50%, To Boiling	X	X	B	A	C	B	B	X	A	A	A
Acetone, To Boiling	A	A	A	A	A	A	A	A	A	A	A
Aluminum Chloride, <10%, 70° F.	X	B	C	B	C	B	C	A		B	A
Aluminum Chloride, >10%, 70° F.	X	X	C	B	C	C	X	A		B	A
Aluminum Chloride, <10%, To Boiling	X	X	X	C	X	X	X	A		X	A
Aluminum Chloride, >10%, To Boiling	X	X	X	X	X	X	X	A	X	X	A
Aluminum Sulphate, 70° F.	X	B	A	A	A	B	B	B	B	A	A
Aluminum Sulphate, <10%, To Boiling	X	B	B	A	B	X	X	A	A	A	A
Aluminum Sulphate, >10%, To Boiling	X	C	C	B	C	X	X	B	B	C	B
Ammonium Chloride, 70° F.	X	X	B	B	B	B	B		A	A	A
Ammonium Chloride, <10%, To Boiling	X	X	B	B	C	B	B	B	A	A	A
Ammonium Chloride, >10%, To Boiling	X	X	X	C	X	C	C		C	C	C
Ammonium Fluosilicate, 70° F.	X	X	C	B	C	X	X		C	X	X
Ammonium Sulphate, <40%, To Boiling	X	X	B	B	C	B	B	X	B	A	A
Arsenic Acid, to 225° F.	X	X	C	B	C	X	X				
Barium Chloride, 70° F. < 30%	X	B	C	B	C	B	B	B	B	B	B
Barium Chloride, <5%, To Boiling	X	B	C	B	C	B	B	B	B	A	A
Barium Chloride, >5%, To Boiling	X	C	X	C	X	C	C	C	C	C	C
Barium Hydroxide, 70° F.	B	X	A	A	A	B	A	B	B	A	A
Barium Nitrate, To Boiling	C	X	B	B	B		B	B		B	B
Barium Sulphide, 70° F.	C	X	B	B	B	X	X			A	A
Benzoic Acid	X	C	B	B	B	B	B	A	A	A	A
Boric Acid, To Boiling	X	C	B	B	B	C	C	A	A	B	B
Boron Trichloride, 70° F. Dry	B	B	B	B	B	B	B	B	B		
Boron Trifluoride, 70° F. 10% Dry	B	B	B	A	B	A	A		A		
Brine (acid), 70° F.	X	X	X	X	X				B	B	
Bromine (dry), 70° F.	X	X	X	X	X	X	C	B	B	X	X
Bromine (wet), 70° F.	X	X	X	X	X	X	C		B	X	X
Calcium Bisulphite, 70° F.	X	X	B	B	B	X	X		B	A	A
Calcium Bisulphite, To Hot	X	X	C	B	C	X	X		C	A	A
Calcium Chloride, 70° F.	B	C	B	B	B	B	B	A	A	A	A

ANSI Process Pumps
Engineering Data

Corrosive	Steel C.I. D.I.	Brz.	316SS	A-20	CD4-MCu	Mon	Ni	H-B	H-C	Ti	Zi
Calcium Chloride, <5%, To Boiling	C	C	B	B	B	A	A	A	A	A	A
Calcium Chloride, >5%, To Boiling	X	C	C	B	C	C	C	A	A	B	B
Calcium Hydroxide, 70° F.	B	B	B	B	B	B	B		A	A	
Calcium Hydroxide, <30%, To Boiling	C	B	B	B	B	B	B		A	A	
Calcium Hydroxide, >30%, To Boiling	X	X	C	C	C	C	C		B	A	
Calcium Hypochlorite, <2%, 70° F.	X	X	X	C	X	X	X		A	A	A
Calcium Hypochlorite, >2%, 70° F.	X	X	X	C	X	X	X		B	A	B
Carbolic Acid, 70° F. (phenol)	C	B	A	A	A	A	A	A	A	A	A
Carbon Bisulphide, 70° F.	B	B	A	A	A	B	B			A	
Carbonic Acid, 70° F.	B	C	A	A	A	C	B	A	A	A	A
Carbon Tetrachloride, Dry to Boiling	B	B	A	A	A	A	A	B	B	A	A
Chloric Acid, 70° F.	X	X	X	B	C	X	X	X	C		
Chlorinated Water, 70° F.	C	C	B	B	B				A	A	A
Chloracetic Acid, 70° F.	X		X	X						A	B
Chlorsulphonic Acid, 70° F.	X	X	X	C	X	X	X	A	A	B	X
Chromic Acid, <30%	X	X	C	B	C	X	X		B	A	A
Citric Acid	X	C	A	A	A	C	C	A	A	A	A
Copper Nitrate, to 175° F.	X	X	B	B	B	X	X	X	X	B	
Copper Sulphate, To Boiling	X	C	C	B	C	X	X		A	A	A
Cresylic Acid	C	C	B	B	B	C	C	B	B		
Cupric Chloride	X	C	X	X	X	C	X		C	B	X
Cyanohydrin, 70° F.	C		B	B	B						
Dichloroethane	C	B	B	B	B	C	B	B	B	A	B
Diethylene Glycol, 70° F.	A	B	A	A	A	B	B	B	B	A	A
Dinitrochlorobenzene, 70° F. (dry)	C	B	A	A	A	A	A	A	A	A	A
Ethanolamine, 70° F.	B	X	B	B	B	C	X			A	A
Ethers, 70° F.	B	B	B	A	B	B	B	B	B	A	A
Ethyl Alcohol, To Boiling	A	A	A	A	A	A	A	A	A	A	A
Ethyl Cellulose, 70° F.	A	B	B	B	B	B	B	B	B	A	A
Ethyl Chloride, 70° F.	C	B	B	A	B	B	B	B	B	A	A
Ethyl Mercaptan, 70° F.	C	X	B	A	B			B	B		
Ethyl Sulphate, 70° F.	C	B	B	A	B	B					
Ethylene Chlorohydrin, 70° F.	C	B	B	B	B	B	B	B	B	A	A
Ethylene Dichloride, 70° F.	C	B	B	B	B	B	B	B	C	A	A
Ethylene Glycol, 70° F.	B	B	B	B	B	B	B	A	A	A	A
Ethylene Oxide, 70° F.	C	X	B	B	B	B	B	A	A	A	A
Ferric Chloride, <5%, 70° F.	X	X	X	X	X	X	X	X	A	A	B
Ferric Chloride, >5%, 70° F.	X	X	X	X	X	X	X	X	B	B	X
Ferric Nitrate, 70° F.	X	X	B	A	B	X	X		B		
Ferric Sulphate, 70° F.	X	X	C	B	C	C	C		B	B	B
Ferrous Sulphate, 70° F.	X	C	C	B	C	C	C	B	B	A	A
Formaldehyde, To Boiling	B	B	A	A	A	B	B	B	B	A	A
Formic Acid, to 212° F.	X	C	X	A	B	C	C	A	A	C	A
Freon, 70° F.	A	A	A	A	A	A	A	A	A	A	A
Hydrochloric Acid, <1%, 70° F.	X	X	C	B	C	B	B	B	A	B	A
Hydrochloric Acid, 1-20%, 70° F.	X	X	X	X	X	X	X	C	B	X	A
Hydrochloric Acid, >20%, 70° F.	X	X	X	X		X	X	C	B	X	B
Hydrochloric Acid, <1/2%, 175° F.	X	X	C	C	C	X	X	B	A	X	A
Hydrochloric Acid, 1/2-2%, 175° F.	X	X	X		X	X	X	B	B	X	A
Hydrocyanic Acid, 70° F.	X	X	C	B	C	C	C	C	C		
Hydrogen Peroxide, <30% <150° F.	C	X	B	B	B	B	B	B	B	A	A
Hydrofluoric Acid, <20%, 70° F.	X	B	X	B	C	C	C	C	B	X	X
Hydrofluoric Acid, >20%, 50° F.	X	C	X	C	X	C	C	C	B	X	X
Hydrofluoric Acid, To Boiling	X	X	X	X	X	C	X		C	X	X
Hydrofluorsilicic Acid, 70° F.	X		C	B	C				B		

ANSI Process Pumps
Engineering Data

Corrosive	Steel C.I. D.I.	Brz.	316SS	A-20	CD4-MCu	Mon	Ni	H-B	H-C	Ti	Zi
Lactic Acid, <50%, 70° F.	X	B	A	A	A	X	C	B	B	A	A
Lactic Acid, >50%, 70° F.	X	B	B	B	B	C	C	B	B	A	A
Lactic Acid, <5%, To Boiling	X	X	C	B	C	X	X	B	B	A	A
Lime Slurries, 70° F.	B	B	B	B	A	B	B	B	B	B	B
Magnesium Chloride, 70° F.	C	C	B	A	B	C	C	A	A	A	A
Magnesium Chloride, <5%, To Boiling	X	C	C	B	C	C	C	A	A	A	A
Magnesium Chloride, >5%, To Boiling	X	C	X	C	X	C	C	B	B	B	B
Magnesium Hydroxide, 70° F.	B	A	B	B	A	B	A	B	B	A	
Magnesium Sulphate	C	C	B	A	B	B	B	C	C	B	B
Maleic Acid	C	C	B	B	B	C	C	B	B	A	
Mercaptans	A	X	A	A	A	X	X				
Mercuric Chloride, <2%, 70° F.	X	X	X	X	X	X	C		B	A	A
Mercurous Nitrate, 70° F.	C	X	B	B	B	C			C		
Methyl Alcohol, 70° F.	A	A	A	A	A	A	A	A	A	A	A
Naphthalene Sulphonic Acid, 70° F.	X	C	B	B	B	C	C	B	B		
Naphthalenic Acid, To Hot	C	C	B	B	B	C	C	B	B		
Nickel Chloride, 70° F.	X	X	C	B	C	C	X	A		B	B
Nickel Sulphate	X	C	B	B	B	C	C		B		A
Nitric Acid	X	X	B	B	B	X	X			B	B
Nitrobenzene, 70° F.	A	C	A	A	A	B	B	B	B	A	
Nitroethane, 70° F.	A	A	A	A	A	A	A	A	A	A	A
Nitropropane, 70° F.	A	A	A	A	A	A	A	A	A	A	A
Nitrous Acid, 70° F.	X	X	X	C	X	X	X				
Nitrous Oxide, 70° F.	C	C	C	C	C	X	X		C		
Oleic Acid	C	C	B	B	B	C	C	C	C	C	C
Oleum, 70° F.	B	X	B	B	B	X	X	B	B	B	
Oxalic Acid	X	C	C	B	C	C	C	B	B	X	A
Palmitic Acid	B	B	B	A	B	B	B				
Phenol (see carbolic acid)											
Phosgene, 70° F.	C	C	B	B	B	C	C	B	B		
Phosphoric Acid, <10%, 70° F.	X	C	A	A	A	C	C	A	A	A	A
Phosphoric Acid, >10-70%, 70° F.	X	C	A	A	A	C	C	B	C	B	B
Phosphoric Acid, <20%, 175° F.	X	C	B	B	B	C	C	A	A	C	B
Phosphoric Acid, >20%, 175° F. <85%	X	C	C	B	C	C	C	B	C	C	C
Phosphoric Acid, >10%, Boil, <85%	X	C	X	C	C	C	C	C	C	C	C
Phthalic Acid, 70° F.	C	B	B	A	B	B	B	B	B	A	A
Phthalic Anhydride, 70° F.	B	C	A	A	A	A	A	A	A		
Picric Acid, 70° F.	X	X	C	B	C	C	X		B		
Potassium Carbonate	B	B	A	A	A	B	B	B	B	A	A
Potassium Chlorate	B	C	A	A	A	C	C		B	A	A
Potassium Chloride, 70° F.	C	C	B	A	B	B	B	B	B	A	A
Potassium Cyanide, 70° F.	B	X	B	B	B	C	C	B	B		
Potassium Dichromate	B	B	A	A	A	B	B		B	A	A
Potassium Ferrocyanide	C	B	B	B	B	B	B	B	B	A	A
Potassium Ferrocyanide, 70° F.	X	B	B	B	B	B	B	B	B		B
Potassium Hydroxide, 70° F.	C	C	B	A	B	A	A	B	C	B	A
Potassium Hypochlorite	X	C	C	B	C	X	X		B	A	
Potassium Iodide, 70° F.	C	B	B	B	B	B	B	B	B	A	A
Potassium Permanganate	B	B	B	B	B	C	B		B		
Potassium Phosphate	C	C	B	B	B					B	B
Sea Water, 70° F.	C	B	B	A	B	A	A	A	A	A	A
Sodium Bisulphate, 70° F.	X	C	C	B	C	C	C	B	B	B	A
Sodium Bromide, 70° F.	B	C	B	B	B	B	B	B	B		
Sodium Carbonate	B	B	B	A	B	B	B	B	B	A	A
Sodium Chloride, 70° F.	C	B	B	B	B	A	A	B	B	A	A

Peerless Pump Company
Indianapolis, IN 46207-7026

ANSI Process Pumps
Engineering Data

Corrosive	Steel C.I. D.I.	Brz.	316SS	A-20	CD4-MCu	Mon	Ni	H-B	H-C	Ti	Zi
Sodium Cyanide	B	X	B	B	B	X	X			B	
Sodium Dichromate	B	X	B	B	B					B	
Sodium Ethylate	B	A	A	A	A	A	A				
Sodium Fluoride	C	C	B	B	B	B	B	C	C	B	B
Sodium Hydroxide, 70° F.	B	B	B	A	B	A	A	A	A	A	A
Sodium Hypochlorite	X	X	C	C	C	X	X		B	A	B
Sodium Lactate, 70° F.	B	C	C	C	C	C		C	C		
Stannic Chloride, <5%, 70° F.	X	C	X	C	X	C	C	B	B	A	A
Stannic Chloride, >5%, 70° F.	X	X	X	X	X	X	X	B	C	B	B
Sulphite Liquors, To 175° F.	X	C	B	B	B	C	C		B	A	
Sulphur (molten)	B	X	A	A	A	C	C	C	A	A	
Sulphur Dioxide (spray), 70° F.	C	C	B	B	B	C	C		B	C	
Sulphuric Acid, <2%, 70° F.	X	C	B	A	B	C	C	A	A	B	A
Sulphuric Acid, 2-40%, 70° F.	X	C	C	B	C	C	C	A	A	X	A
Sulphuric Acid, 40%, <90%, 70° F.	X	X	X	B	X	X	X	A	A	X	C
Sulphuric Acid, 93-96%, 70° F.	B	X	B	B	B	X	X	B	B	X	C
Sulphuric Acid, <10%, 175° F.	X	C	X	B	X	X	X	A	C	X	B
Sulphuric Acid, 10-60% & >80%, 175° F.	X	X	X	B	X	X	X	B	C	X	C
Sulphuric Acid, 60-80%, 175° F.	X	X	X	X	X	X	X	B	C	X	C
Sulphuric Acid, <3/4%, Boiling	X	X	C	B	C	X	X	B	B	X	B
Sulphuric Acid, 3/4-40%, Boiling	X	X	X	C	X	X	X	B	C	X	B
Sulphuric Acid, 40-65% & >85%, Boil	X	X	X	X	X	X	X	X	X	X	X
Sulphuric Acid, 65-85%, Boiling	X	X	X	X	X	X	X	X	X	X	X
Sulphurous Acid, 70° F.	X	C	C	B	C	X	X	B	B	A	B
Titanium Tetrachloride, 70° F.	C		C	B	C	C			C		
Tirchlorethylene, To Boiling	B	C	B	B	B	B	B	B	B	A	A
Urea, 70° F.	C	C	B	B	B	C	C	C	C	B	B
Vinyl Acetate	B	B	B	B	B				B		
Vinyl Chloride	B	C	B	B	B	C	C	C	B	A	
Water, To Boiling	B	A	A	A	A	A	A	A	A	A	A
Zinc Chloride	C	C	B	A	B	B	B	B		A	A
Zinc Cyanide, 70° F.	X	B	B	B	B	B	B	B	B	B	B
Zinc Sulphate	X	C	A	A	A	C	C	C	C	A	

PROCESS PUMPS SINGLE STAGE END SUCTION ANSI
Standard Dimensions Performer® Series 8196
Materials of Construction

Item No.	Description	Standard Construction									
		Ductile Iron W/316 SS Imp	All 316 SS	CD4MCu	Alloy 20	317 SS	Monel	Nickel	Hast. B	Hast. C	TI
100	Casing	Ductile Iron.	316SS	CD4MCu	Alloy 20	317 SS	Monel	Nickel	Hast. B	Hast. C	TI
101	Impeller	316 SS		CD4MCu	Alloy 20	317 SS	Monel	Nickel	Hast. B	Hast. C	TI
101	Shaft	4140 Steel		316SS							
105	Ring, Lantern	TFE									
106	Packing	Aramid - PTFE Synthetic Fiber									
107	Gland, Packing	316ss	316SS	Alloy 20		317 SS	Monel	Nickel	Hast. B	Hast. C	TI
108	Adapter	Ductile Iron									
109C	Cover, Bearing, Outboard	Cast Iron									
112	Bearing, Outboard	Steel Assembly -Double Row Ball (Duplex Angular Contact for LTP)									
113A	Plug, Oil Fill	Steel									
126	Sleeve, Shaft	316ss	316SS	Alloy 20		317 SS	Monel	Nickel	Hast. B	Hast. C	TI
134	Housing: Bearing, Outboard	Cast Iron									
136	Locknut, Bearing	Steel									
143	Gauge; Sight, Oil	Steel/Glass									
168A	Bearing, Inboard	Steel Assembly-Single Row Ball									
184	Cover, Stuffing Box	Ductile Iron.	316SS	CD4MCu	Alloy 20	317 SS	Monel	Nickel	Hast. B	Hast. C	TI
228	Frame STP	Ductile Iron.									
228	Frame, MTP, LTP, XLTP	Cast Iron									
241	Foot, Frame	Cast Iron									
248A	Ring, Oil - LTP Frame Only	Steel									
250	Gland, Mechanical Seal	As Specified									
332A	Labyrinth, Outboard Frame	Bronze Viton® Rubber									
333A	Labyrinth, Inboard Frame	Bronze Viton® Rubber									
351	Gasket, Case	Aramid Fiber w/ EPDM Binder									
353	Stud, Gland (Mechanical Seal)	18-8 SS									
353	Stud, Gland (Packing)	18-8 SS									
353A	Nut, Gland Stud (Mechanical Seal)	18-8 SS									
353A	Nut, Gland Stud (Packing)	18-8 SS									
358A	Plug, Casing Drain	Steel	316 SS	Alloy 20		317 SS	Monel	Nickel	Hast. B	Hast. C	TI
360C	"O" Ring - XLTP Only	Viton® Rubber									
360D	Frame/Adapter - O-Ring	Buna N Rubber									
360Q	Gasket; Gland, Mechanical Seal	Varies									
361A	Snap Ring, Bearing	Steel									
365	Seal, Mechanical Stationary Element	As Specified									
370	Bolt, Casing	Steel	18-8 SS								
370	Bolt, Casing 6 Inch Pumps	Steel									
370	Bolt, Casing 8 Inch Pumps	Steel									
370	Bolt, Casing 10 Inch Pumps	Steel									
370	Bolt, Casing 13 Inch Pumps	Steel									
370	Bolt, Casing 15 Inch Pumps	Steel									
370B	Bolt, Frame/Adapter	Steel									
370C	Bolt, Bearing Housing STP, MTP, LTP	Steel									
370C	Bolt, Bearing Housing XLTP	Steel									
370D	Jack Bolt, Bearing Housing STP, MTP, LTP	Steel	18-8 SS								
370D	Jack Bolt, Bearing Housing XLTP	Steel									
370F	Bolt, Frame Foot To Frame	Steel									
370G	Bolt, Bearing Cover	Steel									
370H	Box Cover/Adapter Stud	18-8 SS									
382	Lock Washer, Bearing	Steel									
383	Sea], Mechanical Rotating Element	Varies									
400	Key. Coupling	Steel									
408A	Plug, Frame Drain	Steel									
408H	Plug, Frame Lubrication Port	Steel									
408H	Plug, Bearing Housing Lubrication - XLTP Only	Steel									
408L	Plug, Oil Cooler Inlet	Steel									
408M	Plug, Oil Cooler Outlet (Not Shown)	Steel									
423	Jam Nut, Bearing Housing Jack Bolt	Steel									
423B	Nut, Box Cover/Adapter Stud	18-8 SS									
469B	Dowel Pin, Frame/Adapter	Steel									
496	Bearing Housing/Frame - O-Ring	Buna N Rubber									
496A	Gasket, Shaft Sleeve	TFE									
529	Washer, Frame Foot	Steel									
NA	Foot, Casing	Cast Iron									
NA	Pin, Sleeve	420 Stainless Steel									

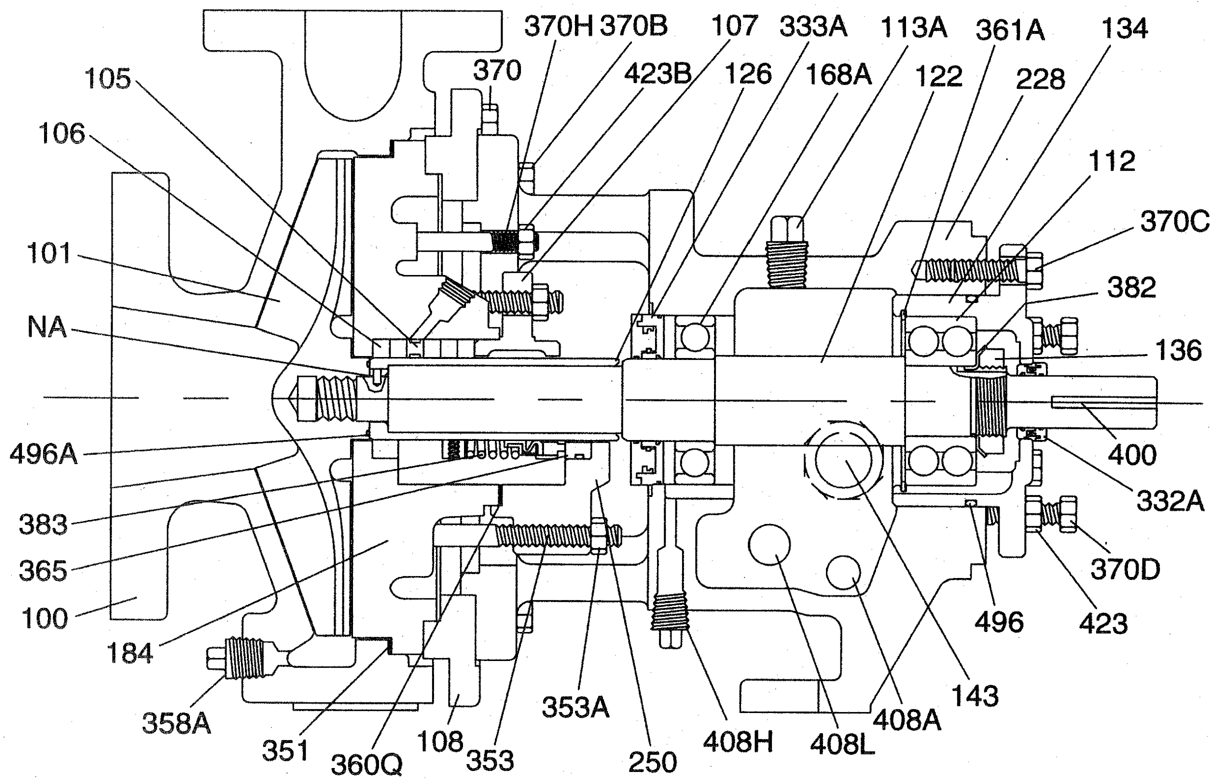
Materials Of Construction

Material	Code	Specification	Material	Code	Specification
316 Stainless Steel	086	Cast, ASTM A743, Grade CF-8M	Ductile Iron	680	ASTM A536, Grade 65-45-12
317 Stainless Steel	653	Cast, ASTM A743, Grade CG-8M	Hastelloy B	101	ASTM A494, Grade N - 12MV, Class I
Alloy 20	654	Cast, ASTM A743, Grade CN-7M	Hastelloy. C	102	ASTM A494, Grade CW-2M
Cast Iron	040	ASTM A48, Class 30	Monel	651	Cast, ASTM A494 M-35
Cast Iron	650	ASTM A48, Class 25	Nickel	485	ASTM A494, Grade C2100
CD4MCu	507	ASTM A743, Grade CD4MCu	Steel	075	4140 Steel, ASTM A331-64
Ductile Iron	596	ASTM A395, Grade 60-40-18	Titanium	652	Cast, ASTM B367, Grade C-3

Subject to change without notice

PROCESS PUMPS SINGLE STAGE END SUCTION
ANSI Standard Dimensions
Performer® Series 8196

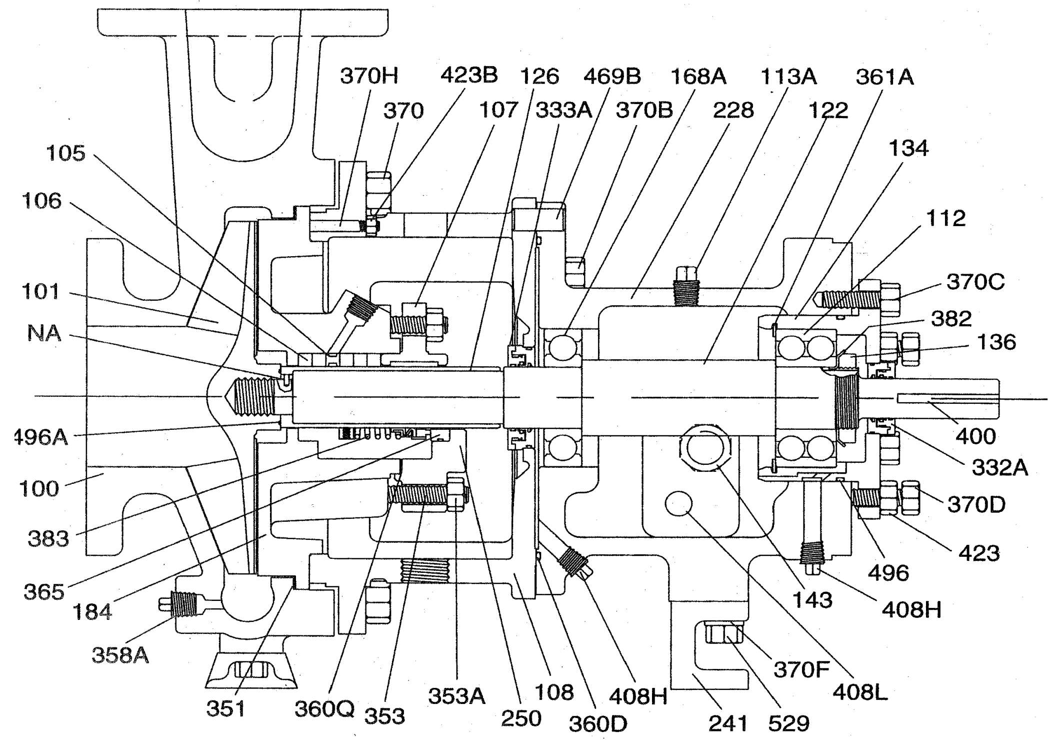
STP Frame Cross Sectional Drawing



Parts List

Item Number	Quantity	Description	Item Number	Quantity	Description
100	1	Casing	353A	2	Nut, Gland Stud (Packed)
101	1	Impeller	358A	1	Plug, Casing Drain
105	1	Ring, Lantern	360Q	1	Gasket; Gland, Mechanical Seal
106	5	Packing	361A	1	Snap Ring, Bearing
107	1	Gland, Packing	365	1	Seal, Mechanical Stationary Element
108	1	Adapter 8 Inch Pumps Only	370	4	Bolt, Casing 6 Inch Pumps
112	1	Bearing, Outboard	370	8	Bolt, Casing 8 Inch Pumps
113A	1	Plug, Oil Fill	370B	4	Bolt, Frame/Adapter
122	1	Shaft	370C	3	Bolt , Bearing Housing
126	1	Sleeve, Shaft	370D	3	Jack Bolt, Bearing Housing
134	1	Housing; Bearing, Outboard	370H	2	Box Cover/Adapter Stud
136	1	Locknut, Bearing	382	1	Lock Washer, Bearing
143	1	Gauge; Sight, Oil	383	1	Seal, Mechanical Rotating Element
168A	1	Bearing, Inboard	400	1	Key, Coupling
184	1	Cover, Stuffing Box	408A	1	Plug, Frame Drain
228	1	Frame	408H	4	Plug, Frame Lubrication Port
250	1	Gland, Mechanical Seal	408L	1	Plug, Oil Cooler Inlet
332A	1	Labyrinth, Outboard Frame	408M	1	Plug, Oil Cooler Outlet (Not Shown)
333A	1	Labyrinth, Inboard Frame	423	3	Jam Nut, Bearing Housing Jack Bolt
351	1	Gasket, Case	423B	2	Nut, Box Cover/Adapter Stud
353	4	Stud, Gland (Mechanical Seal)	496	1	"O"Ring, Bearing Housing/Frame
353	2	Stud, Gland (Packed)	496A	1	"O"Ring, Shaft Sleeve
353A	4	Nut, Gland Stud (Mechanical Seal)	NA	1	Pin, Sleeve

MTP Frame Cross Sectional Drawing



Parts List

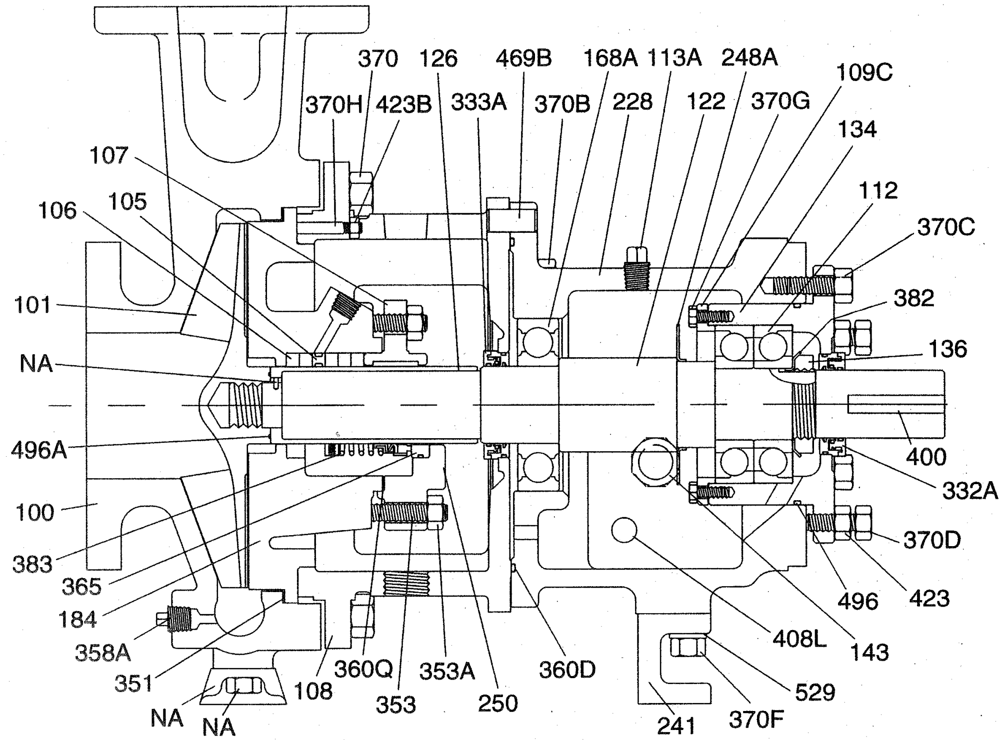
Item Number	Quantity	Description	Item Number	Quantity	Description
100	1	Casing	361A	1	Snap Ring, Bearing
101	1	Impeller	365	1	Seal, Mechanical Stationary Element
105	1	Ring, Lantern	370	4	Bolt, Casing 6 Inch Pumps
106	5	Packing	370	8	Bolt, Casing 8 Inch Pumps
107	1	Gland, Packing	370	12	Bolt, Casing 10 Inch Pumps
108	1	Adapter	370	16	Bolt, Casing 13 Inch Pumps
112	1	Bearing, Outboard	370B	4	Bolt, Frame/Adapter
113A	1	Plug, Oil Fill	370C	3	Bolt, Bearing Housing
122	1	Shaft	370D	3	Jack Bolt, Bearing Housing
126	1	Sleeve, Shaft	370F	1	Washer, Frame Foot
134	1	Housing; Bearing, Outboard	370H	2	Box Cover/Adapter Stud
136	1	Locknut, Bearing	382	1	Lock Washer, Bearing
143	1	Gauge; Sight, Oil	383	1	Seal, Mechanical Rotating Element
168A	1	Bearing, Inboard	400	1	Key, Coupling
184	1	Cover, Stuffing. Box	408A	1	Plug, Frame Drain (Not Shown)
228	1	Frame	408H	4	Plug, Frame Lubrication Port
241	1	Foot, Frame	408L	1	Plug, Oil Cooler Inlet
250	1	Gland, Mechanical Seal	408M	1	Plug, Oil Cooler Outlet (Not Shown)
332A	1	Labyrinth, Outboard Frame	423	3	Jam Nut, Bearing Housing Jack Bolt
333A	1	Labyrinth, Inboard Frame	423B	2	Nut, Box Cover/Adapter Stud
351	1	Gasket, Case	469B	2	Dowel Pin, Frame/Adapter
353	4	Stud, Gland (Mechanical Seal)	496	1	"O" Ring, Bearing Housing/Frame
353	2	Stud, Gland (Packing)	496A	1	"O" Ring,, Shaft Sleeve
353A	4	Nut, Gland Stud (Mechanical Seal)	529	2	Bolt, Frame Foot to Frame
353A	2	Nut, Gland Stud (Packing)	NA	1	Foot, Casing
358A	1	Plug, Casing Drain	NA	2	Bolt, Casing Foot
360D	1	Gasket, Frame/Adapter	NA	1	Pin, Sleeve
360Q	1	Gasket; Gland, Mechanical Seal			

Subject to change without notice

PROCESS PUMPS SINGLE STAGE END SUCTION
ANSI Standard Dimensions
Performer® Series 8196

Peerless Pump Company
Indianapolis, IN 46207-7026

LTP Cross Sectional Drawing

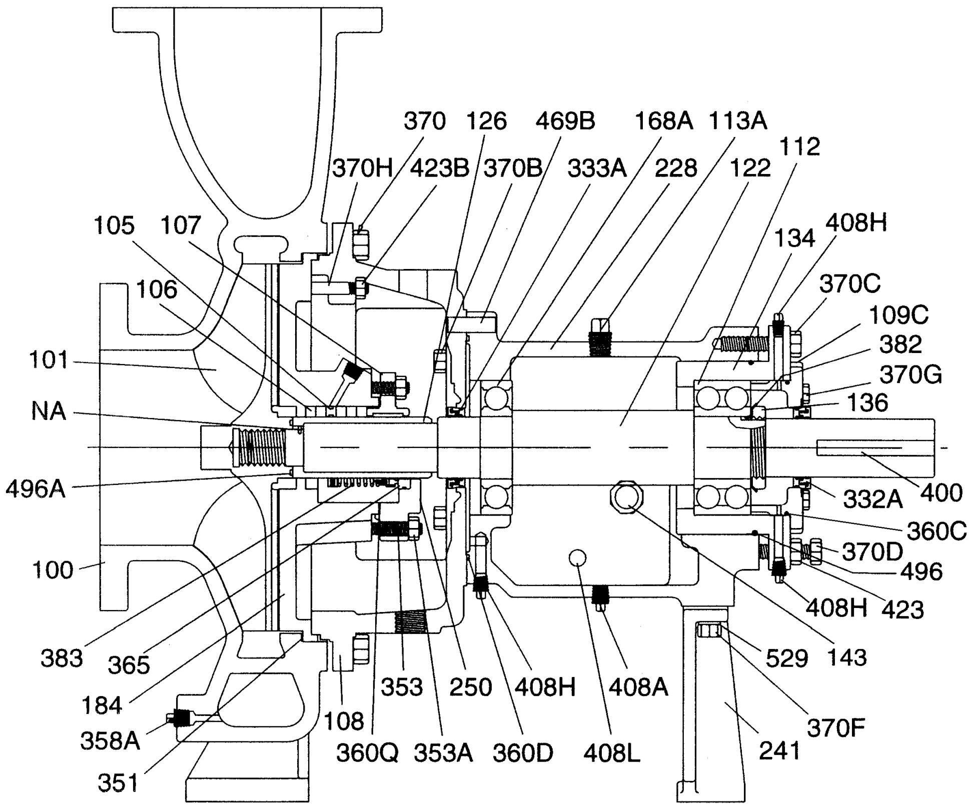


Parts List

Item Number	Quantity	Description	Item Number	Quantity	Description
100	1	Casing	358A	1	Plug, Casing Drain
101	1	Impeller	360D	1	Gasket, Frame/Adapter
105	1	Ring, Lantern	360Q	1	Gasket; Gland, Mechanical Seal
106	5	Packing	365	1	Seal, Mechanical Stationary Element
107	1	Gland, Packing	370	12	Bolt, Casing 10 Inch Pumps
108	1	Adapter	370	16	Bolt, Casing 13 Inch Pumps
109C	1	Cover; Bearing, Outboard	370B	4	Bolt, Frame/Adapter
112	1	Bearing, Outboard	370C	3	Bolt, Bearing Housing
113A	1	Plug, Oil Fill	370D	3	Jack Bolt, Bearing Housing
122	1	Shaft	370F	2	Bolt, Frame Foot to Frame
126	1	Sleeve, Shaft	370G	6	Bolt, Bearing Cover
134	1	Housing; Bearing, Outboard	370H	2	Box Cover/Adapter Stud
136	1	Locknut, Bearing	382	1	Lock Washer, Bearing
143	1	Gauge; Sight, Oil	383	1	Seal, Mechanical Rotating Element
168A	1	Bearing, Inboard	400	1	Key, Coupling
184	1	Cover, Stuffing Box	408A	1	Plug, Frame Drain (Not Shown)
228	1	Frame	408H	4	Plug, Frame Lubrication Port (Not Shown)
241	1	Foot, Frame	408L	1	Plug, Oil Cooler Inlet
248A	1	Ring, Oil	408M	1	Plug, Oil Cooler Outlet (Not Shown)
250	1	Gland, Mechanical Seal	423	3	Jam Nut, Bearing Housing Jack Bolt
332A	1	Labyrinth, Outboard Frame	4238	2	Nut, Box Cover/Adapter Stud
333A	1	Labyrinth, Inboard Frame	469B	2	Dowel Pin, Frame/Adapter
351	1	Gasket, Case	496	1	“O” Ring, Bearing Housing/Frame
353	2	Stud, Gland (Packing)	496A	1	“O” Ring, Shaft Sleeve
353	4	Stud, Gland (Mechanical Seal)	529	1	Washer, Frame Foot
353A	2	Nut, Gland Stud (Packing)	NA	2	Bolt, Casing Foot
353A	4	Nut, Gland Stud (Mechanical Seal)	NA	1	Pin, Sleeve

Subject to change without notice

XLTP Frame Cross Sectional Drawing



Part List

Item Number	Quantity	Description	Item Number	Quantity	Description
100	1	Casing	360C	1	"O" Ring; Bearing Cover
101	1	Impeller	360D	11	Gasket; Frame/Adapter
105	1	Ring, Lantern	360Q	11	Gasket; Gland, Mechanical Seal
106	5	Packing	370	16	Bolt, Casing 13 Inch Pumps
107	1	Gland, Packing	370	24	Bolt, Casing 15 Inch Pumps
108	1	Adapter	370B	4	Bolt, Frame/Adapter
109C	1	Cover; Bearing, Outboard	370C	3	Bolt, Bearing Housing
112	1	Bearing, Outboard	370D	3	Jack Bolt, Bearing Housing
122	1	Shaft	370F	2	Bolt, Frame Foot to Frame
126	1	Sleeve, Shaft	370G	6	Bolt, Bearing Cover
134	1	Housing; Bearing, Outboard	370H	2	Box Cover/Adapter Stud
136	1	Locknut, Bearing	382	1	Lock Washer, Bearing
143	1	Gauge, Sight Oil	383	1	Seal, Mechanical Rotating Element
168A	1	Bearing, Inboard	400	1	Key, Coupling
184	1	Cover, Stuffing Box	408A	1	Plug, Frame Drain
228	1	Frame	408H	4	Plug, Frame Lubrication Port
241	1	Foot, Frame	408H	2	Plug, Bearing Housing Lubrication
250	1	Gland, Mechanical Seal	408L	1	Plug, Oil Cooler Inlet
332A	1	Labyrinth, Outboard Frame	408M	4	Plug, Oil Cooler Outlet (Not Shown)
333A	1	Labyrinth, Inboard Frame	423	3	Jam Nut, Bearing Housing Jack Bolt
351	1	Gasket, Case	423B	2	Nut, Box Cover/Adapter Stud
353	4	Stud, Gland (Mechanical Seal)	469B	2	Dowel Pin, Frame/Adapter
353	2	Stud, Gland (Packing)	496	1	"O" Ring, Bearing Housing/Frame
353A	4	Nut, Gland Stud (Mechanical Seal)	496A	1	"O" Ring, Shaft Sleeve
353A	2	Nut, Gland Stud (Packing)	529	1	Washer, Frame Foot
358A	1	Plug, Casing Drain	NA	1	Pin, Sleeve

Subject to change without notice