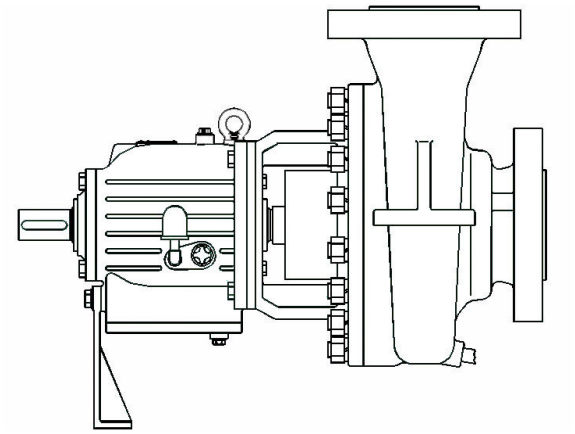
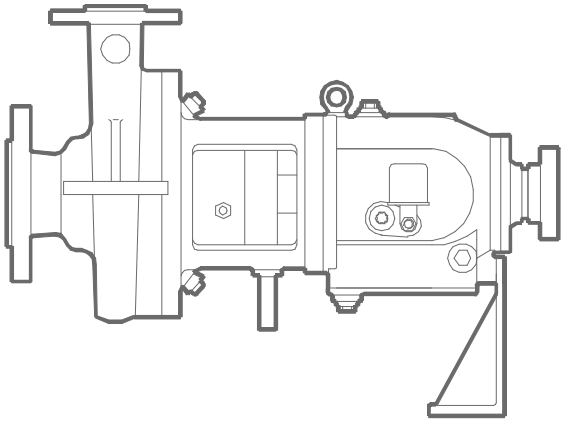
APIFLO-P, APIFLO-PG Series

Petrochemical Process Pump

According to API610 10th

(Patent No: ZL 01 2 40861.1)





Capacity: 2~2600m^3/h (50Hz) 2.4~3120m^3/h (60Hz)

Head: up to 280m (50Hz) up to 403m (60Hz)

Pressure: APIFLO-P: 5.0MPa,APIFLO-PG: 10.0MPa

Temperature: -80~+450 °C

Application:

For pumping liquids in refineries, petrochemical plants, power plants, general process, offshore industry, seawater, Etc.

1 General

APILFO-P (G) centrifugal pumps are of single stage, single suction, radially split, centerline-support and volute casing type.

APILFO-P (G) pumps comply with the requirements of the American Petroleum Institute (API610/10th) and API682. The design of APILFO-P (G) pumps has obtained the national patent letter.

Excellent interchangeability because of only 7 sizes bearing assembly parts for 56 sizes of APILFO-P pumps, and only 6 sizes of bearing assembly parts for 48 sizes of APILFO-PG pumps.

Avoid the shortcomings of pumps per the seventh edition of API 610 by the comprehensive considerations on the connecting method of casing and bearing housing, on the design of seal assembly, on the cooling method and auxiliary system.

With high reliability and the characteristics of the resistance to high temperature and high pressure, APILFO-P (G) pumps proved to be the new generation of heavy-duty process pump; they are now being widely applied in various industries.

2. Piping system

All piping system is per the eighth edition of API610. Depending on pumps' operating conditions, casing cover, bearing housing or casing support can be cooled; the gland cover can be quenched.

Optional heating jackets on casing and casing cover can be provided when handled liquids tend to crystal or solidify.

3 Designation

APILFO-P(G) 50 K3-250 B

- Impeller Trim Code
- Impeller Nominal Diameter
- Bearing Housing Size Code
- Discharge Nozzle Diameter
- Pump Series Code

4 Rotation direction

Clockwise viewed from drive-end.

5. Operating parameters

Nozzle:	DN	25 ~ 350	mm
Capacity:	Q	2 ~ 2600	m^3/h
Head:	H	~ 280	m
Temperature:	T	-80~+450	°C
Pressure:	P	APILFO-P：	~5.0MPa
		APILFO-PG：	~10.0MPa

6. Application

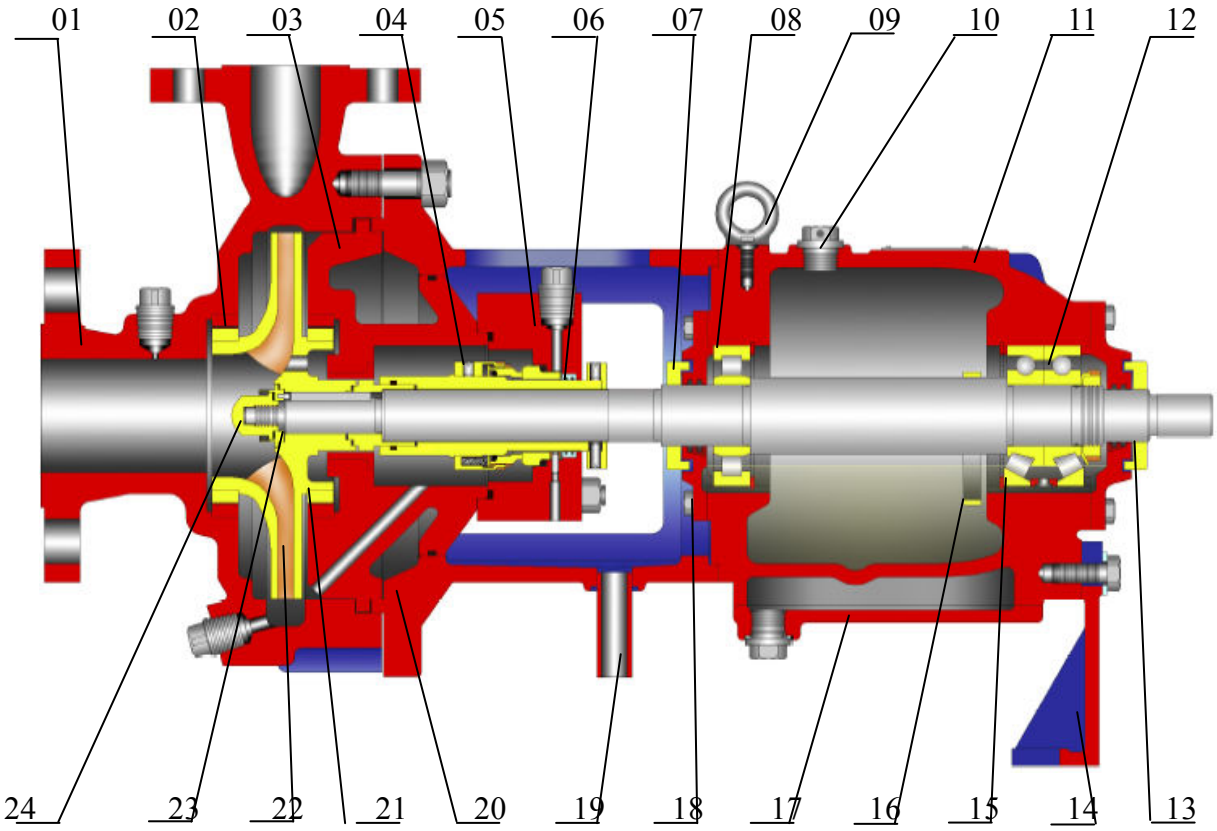
This series of pumps are mainly applied in refinery, petrochemicals, cryogenics, coal industry, chemical fiber industry, general industrial process, power plant, large/medium scale heating equipment, air-conditioning equipment, environment protection, off-shore industry and sea water desalt plant.

APILFO-P pumps are suitable for handling various mild or aggressive liquids.

APILFO-PG pumps are suitable for handling various low or high temperature, medium or high pressure, mild or aggressive liquids. Especially along with the more and more applications of coal, they are widely applied in the synthetic ammonia unit and urea unit.

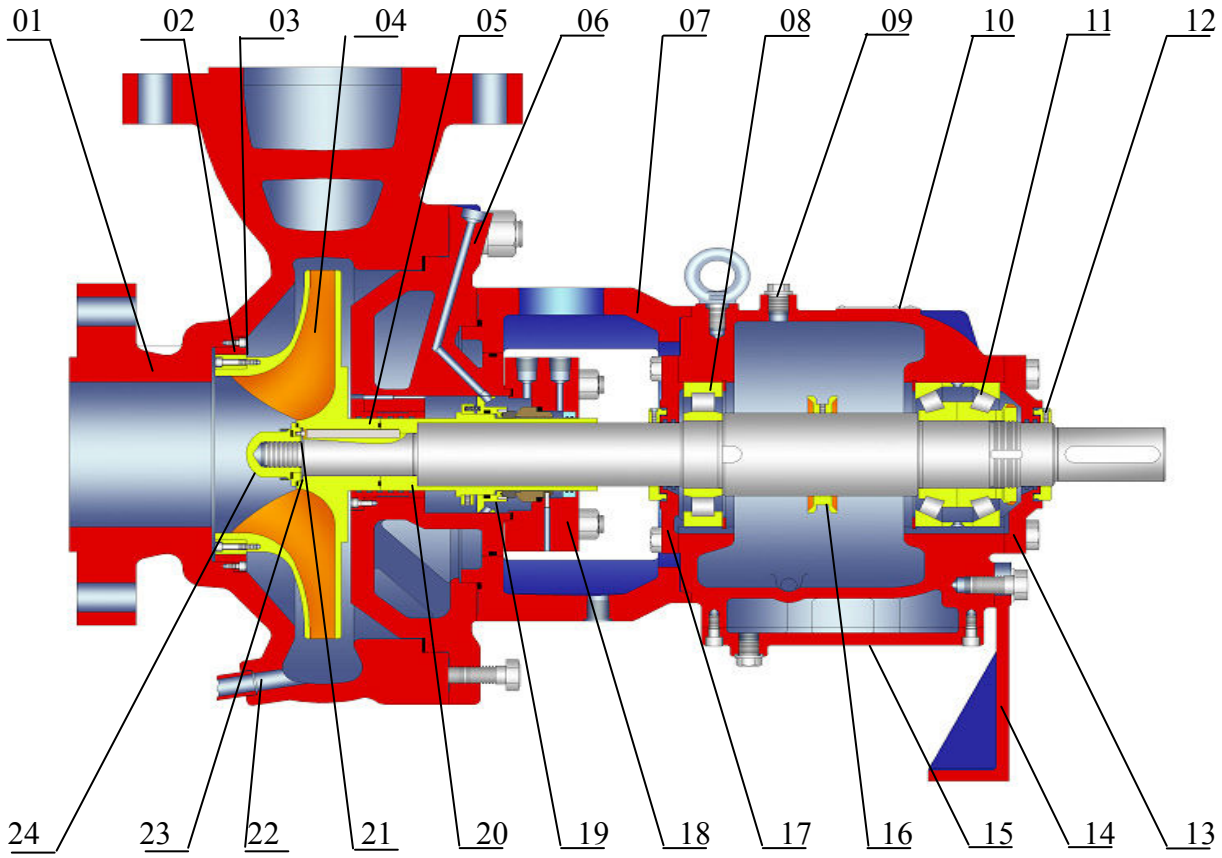
7. Sectional drawing

APILFO-P



01 Casing	07 Deflector	13 Deflector	19 Draining pipe
02 Casing wearing ring	08 Cylindrical roller bearing	14 Support foot	20 Adaptor
03 Casing Cover	09 Lifting ring	15 Taper roller bearing(optional) for higher suction pressure	21 Impeller waring ring
04 Mechanical seal	10 Vent plug	16 Oring ring	22 Impeller
05 Gland cover	11 Bearing housing	17 Cooling cover	23 Lock ferrule
06 Shaft sleeve	12 Augular contact ball bearing	18 Beaing cover	24 Impeller nut

APILFO-PG



01 Casing
02 Casing wearing ring
03 Impeller wearing ring
04 Impeller
05 Throat bushing
06 Casing cover
07 Adaptor
08 Cylindrical roller bearing
09 Vent plug
10 Bearing housing
11 Taper roller bearing
12 Deflector
13 Bearing cover
14 Support foot
15 Cooling cover
16 Oil slinger
17 Bearing cover
18 Gland cover
19 Mechinal seal
20 Shaft sleeve
21 Pin
22 Draining pipe
23 Lock ferrule
24 Impeller nut

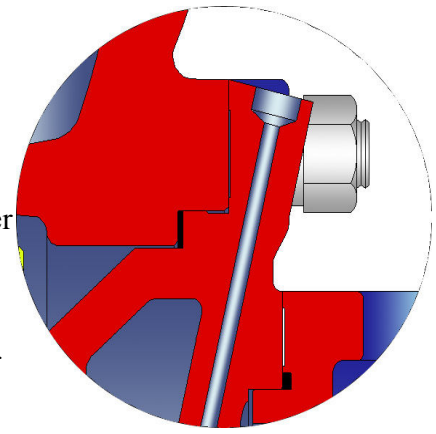
8 Construction features

APILFO-P Pressure Casing

APILFO-P pump's casing cover and gasket are held against the casing by the bearing frame adaptor, which is most frequently supplied in cast iron and carbon steel if necessary. This kind of compact design allows facilities for the maintenance and repair.

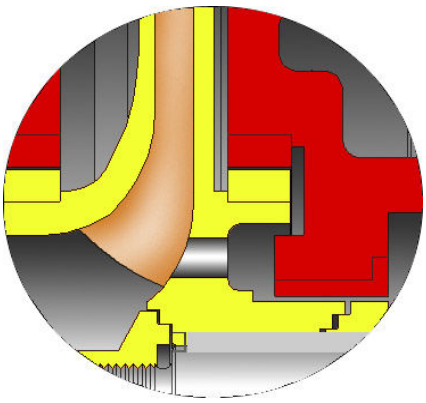
APILFO-PG pump bolts the casing cover directly to the casing and users a confined controlled compression gasket with metal-to-metal fits. The adaptor is bolted independently to the casing cover and does not play a part in the pressure boundary of the pump casing. Thus the MAWP can be up to 10 MPa.

APILFO-PG Pressure Casing



Construction features

APILFO-P impeller

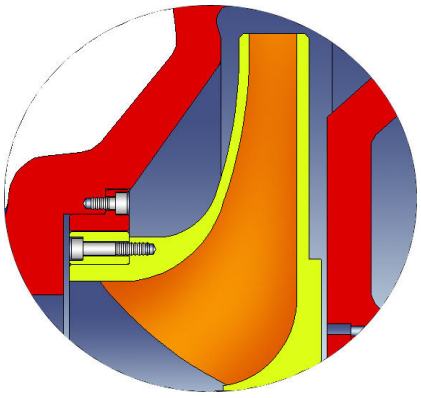


For APILFO-P pump, the axial thrust is balanced by fitting impeller front and back wearing rings with balance holes. The residual thrust is absorbed by antifriction bearings.

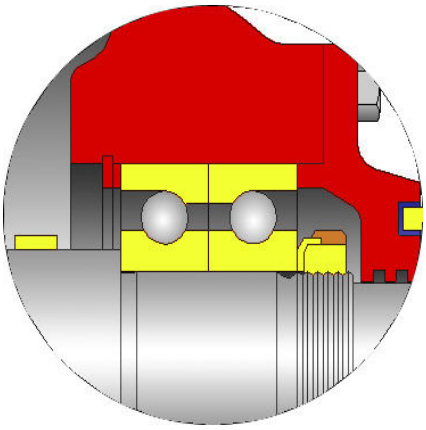
Besides operates under high working pressure, APILFO-PG pump normally has high suction pressure. In this case, pressure imposing on the hub area, which is opposite to the direction of hydraulic thrust of impeller, plays much greater part in the combination of axial thrust.

Without front/back wearing rings or balance holes, APILFO-PG pump applies different method of balancing axial thrust.

APILFO-PG impeller



APILFO-P bearing

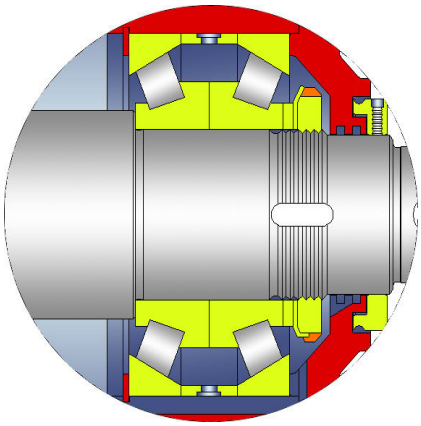


Normally one matched angular contact ball bearings are applied to APILFO-P pump, which affords facilities for maintenance and repair.

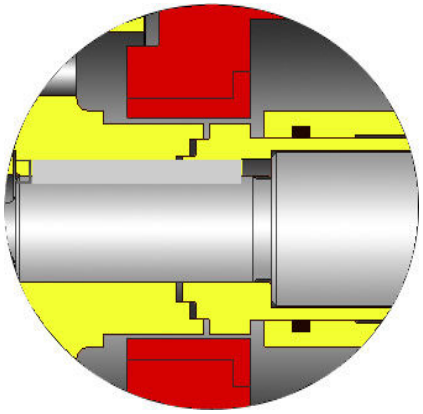
If suction pressure greater than 2.5 MPa, one matched taper roller bearings will be applied.

APILFO-PG pump applies one matched taper roller bearing that can stand more heavy duty.

APILFO-PG bearing



APILFO-P throat bushing

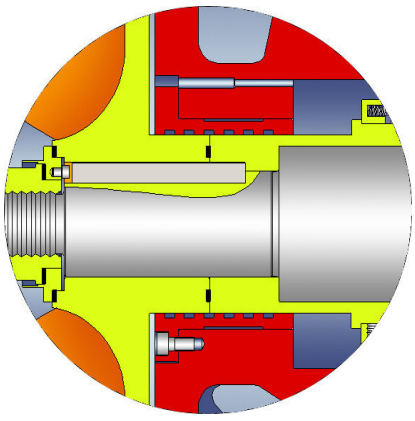


APILFO-P and APILFO-PG pumps all applied enlarged seal chamber that meets the requirements of API610 and API682.

APILFO-P pump applies throat bushing with common design.

APILFO-PG pump applies throat bushing with the design of pumping screw or labyrinth type. Thus the effects of heating barrier, pressure control or auxiliary hydraulic supporting are obtained.

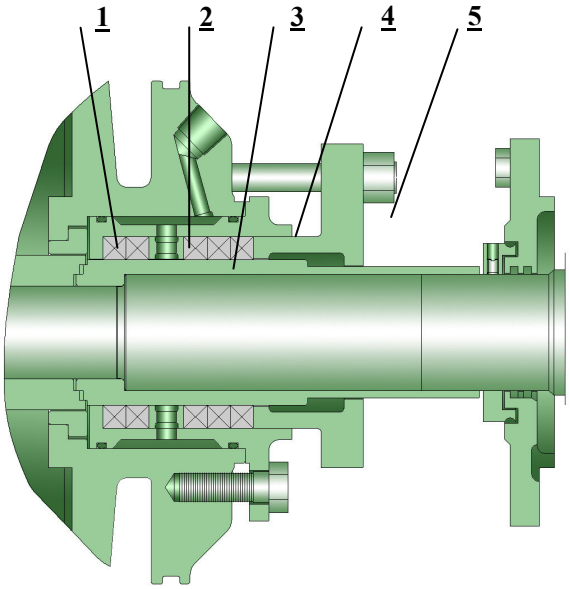
APILFO-PG throat bushing



9 Shaft sealing

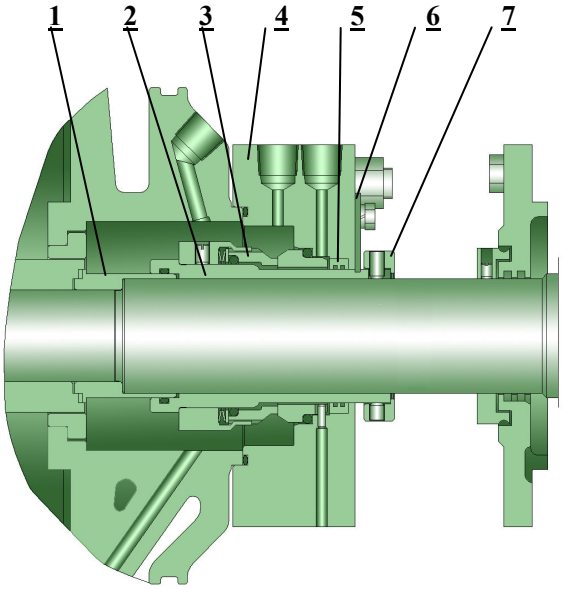
APILFO-P and APILFO-PG seal system are designed according to the requirements of API610 and API682. With enlarged seal chamber, standard mechanical seal is cartridge type. Depending on the requirements of users, optional types of packing or non-cartridge are also available.

Gland packing



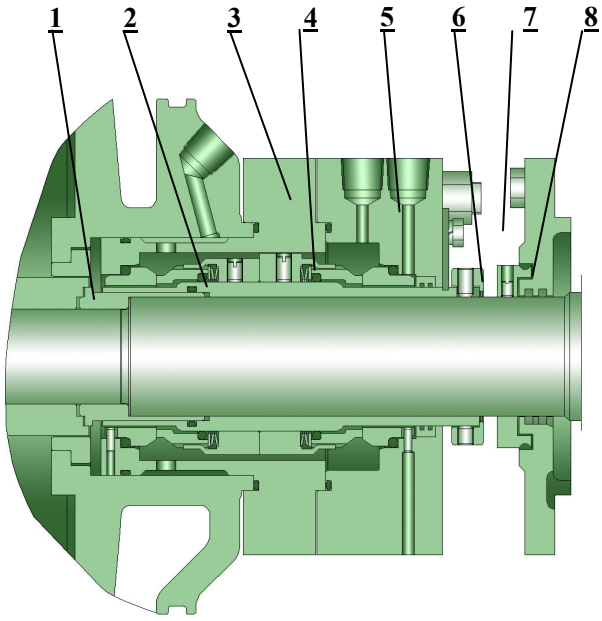
1 Gland Packing 2 Lantern ring 3Shaft sleeve
4. Packing cage 5 Gland cover

Single mechanical seal



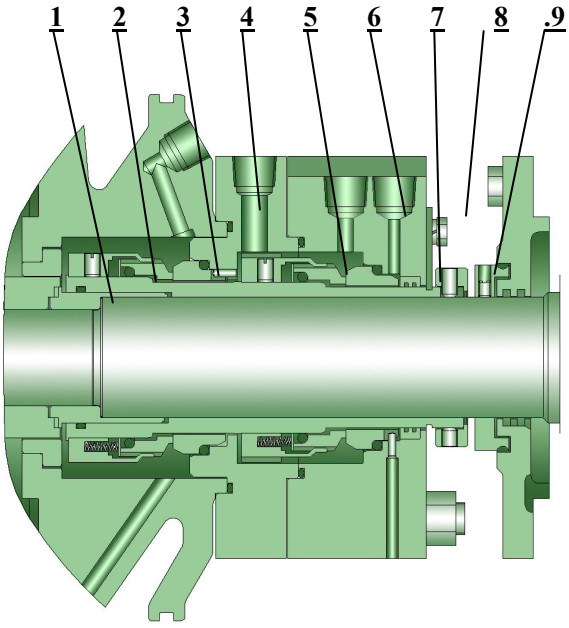
1 Guard sleeve 2 Shaft sleeve 3 Mech. seal 4 Seal cover
5 Throat bushing 6 Assembly fixture 7 Drive collar

Double mechanical seal (back-to-back)



1 Guard sleeve 2 Shaft sleeve 3 Insert 4 Mech. seal
5 Seal cover 6 Throttle bushing 7 Assembly fixture 8 Drive collar

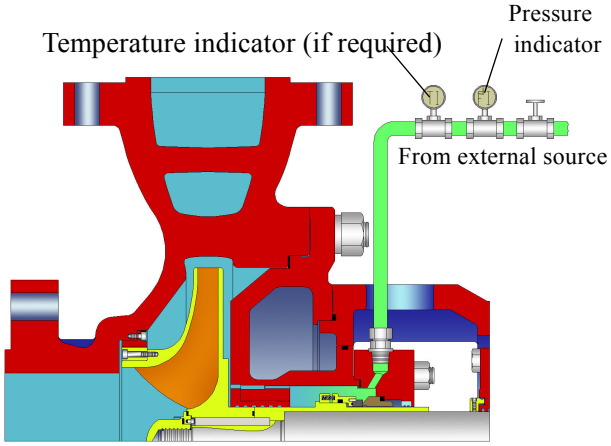
Tandem mechanical seal



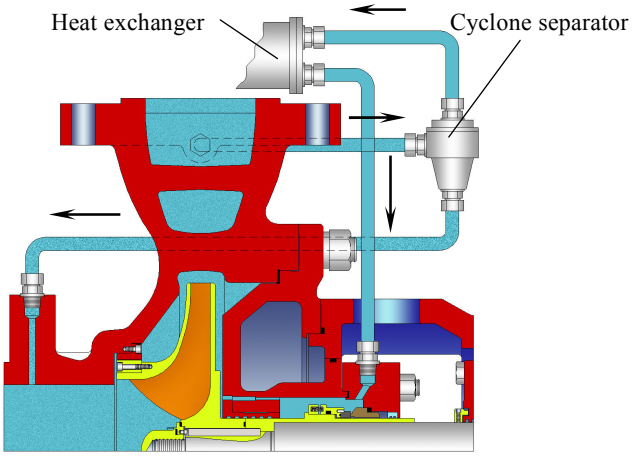
1 Guard sleeve 2 Shaft sleeve 3 Mech. seal 4 Insert
5 Mech. seal 6 Seal cover 7Throttle bushing 8Assembly fixture
9 Drive collar

Standard flush plans and auxiliary hardware

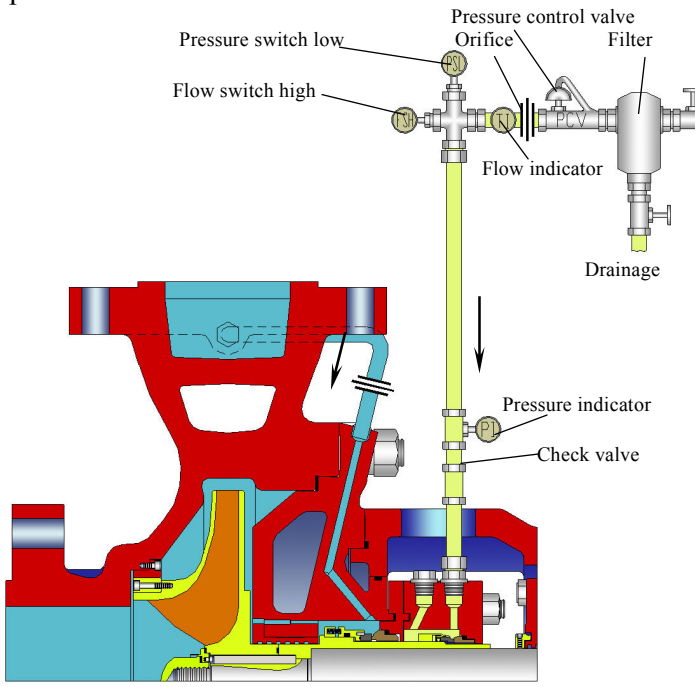
PLAN 32
Flush is injected into the seal chamber from an external source. Care must be exercised in choosing a proper source of seal flush to eliminate potential for vaporization of the injected fluid and to avoid contamination of the fluid being pumped with the injected flush.



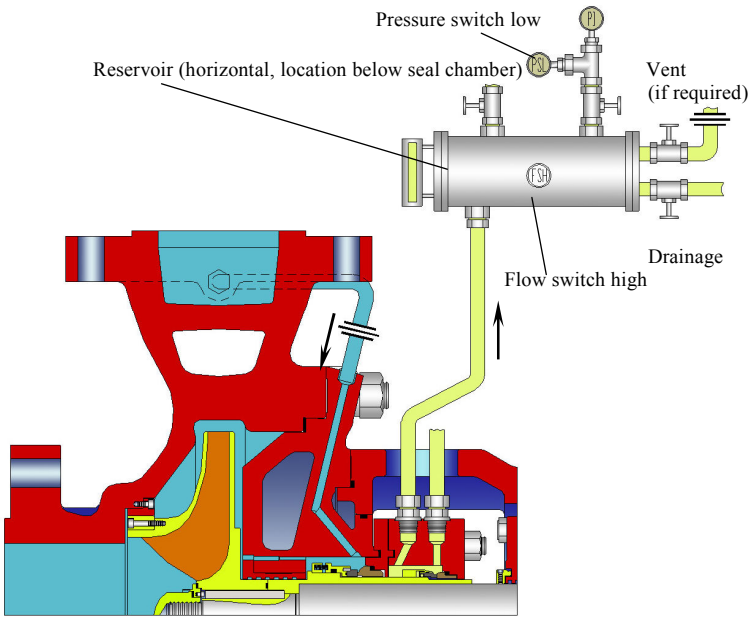
PLAN 41
Recirculation from pump discharge through a cyclone separator delivering the clean fluid to a seal cooler and then to the seal chamber. The solids are delivered to the pump suction line. Plan 41 is specified for hot services containing solids. Contained solids should have a specific gravity twice or more that of the process fluid.



PLAN 11+72
Externally supplied gas buffer for Arrangement 2 seals. Buffer gas may be used alone to dilute seal leakage or in conjunction with Plan 75 or 76 to help sweep leakage into a closed collection system. Pressure of buffer gas is lower than process side pressure of inner seal.



PIAN 11+74
Externally supplied barrier gas used to positively prevent process fluid from leaking to atmosphere. Pressure of barrier gas is higher than process side of inner seal. Venting of the seal chamber may be required prior to start-up and operation to avoid the collection of gas in the pump.



11. APIFLO-P(G) Performance Coverage (50Hz)