AESSEAL®

ENVIRONMENTAL TECHNOLOGY

API PIPING PLANS

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"To check out mechanical seal flushing arrangements and piping plans, I have consistently found this to be the most useful and permanent pocket-sized document. This high-quality booklet comprehensively describes both configurational parameters and application criteria".

Heinz P. Bloch P.E.
Independent Professional Engineer

AESSEAL®
www.aesseal.com

The API Plans elaborated in this section are as defined by API 682 3rd edition / API 610 10th edition. These are standardized flushing piping arrangements that are widely used in the industry. Customer specific variants of these plans are possible.

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PRIMARY FLUSH PLANS

API PLAN 01 · API PLAN 02 · API PLAN 11 · API PLAN 12 · API PLAN 13 · API PLAN 14 · API PLAN 21
API PLAN 22 · API PLAN 23 · API PLAN 31 · API PLAN 32 · API PLAN 41

SECONDARY FLUSH PLANS

API PLAN 51 · API PLAN 52 · API PLAN 53A · API PLAN 53B · API PLAN 53C · API PLAN 54 · API PLAN 61 · API PLAN 62

CONTAINMENT SEAL PLANS

API PLAN 65 · API PLAN 71 · API PLAN 75 · API PLAN 76

GAS SEAL PLANS

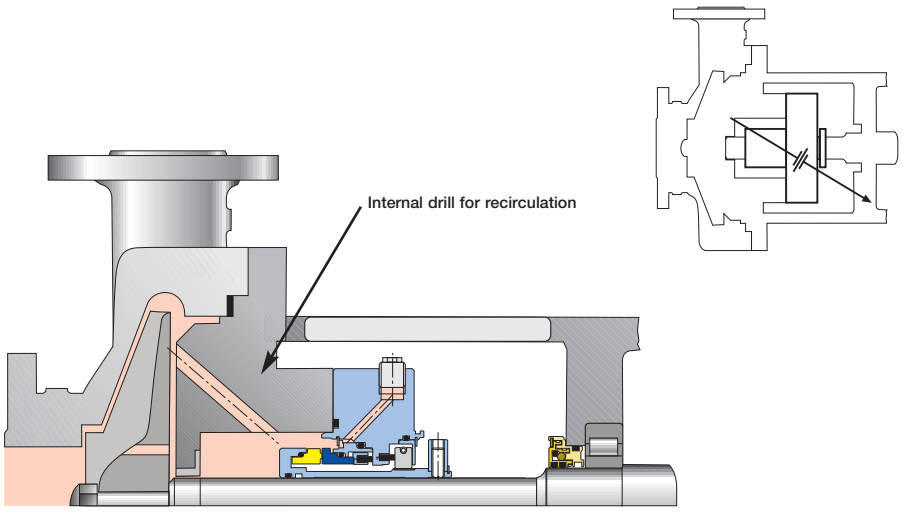
API PLAN 72 · API PLAN 74

Conserve Water

0.6%

"Of **all** the worlds water **97.4%** is salt water, **2%** is solid in ice caps and only **0.6%** is suitable for industrial use and human consumption."

API PLAN 01



Description

Integrated (internal) product recirculation from pump discharge to seal chamber.

Features

1. Minimizes risk of freezing / polymerizing of fluid in flush piping plans exposed to atmosphere.
2. Removes heat from the seal chamber as well as acting as a vent connection in horizontal pumps.

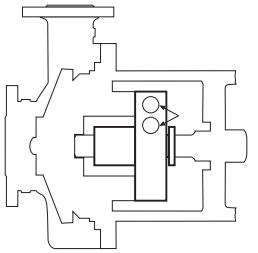
Use

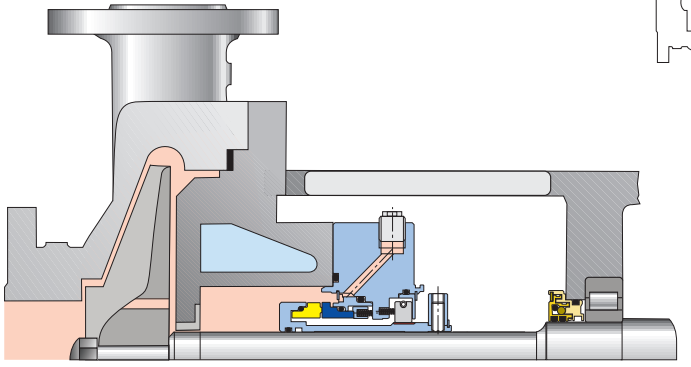
1. Recommended in clean fluids.
2. Recommended for fluids which thicken at ambient temperature.

Caution

1. Ensure that the recirculation is sufficient for seal heat removal.

API PLAN 02





Description

Dead ended seal chamber with no flush fluid circulation.

Features

1. Applicable to low seal chamber pressure and process temperature.
2. Can be used with tapered seal chambers, especially for slurries.
3. Normally is used along with a jacketed seal chamber.

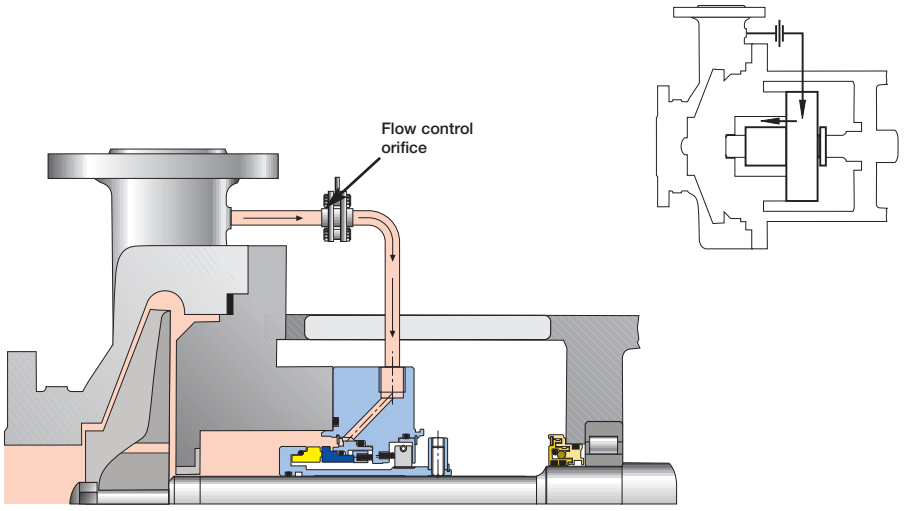
Use

1. In cool clean fluids with high specific heat, such as water, in relatively low speed pumps.

Caution

1. To avoid flashing, process fluid temperature must be taken into consideration.
2. Avoid use without cooling / heating jacket (for cylindrical chambers).
3. Ensure top point vent in throat bush (for cylindrical chambers in horizontal pumps).

API PLAN 11



Description

Product recirculation from pump discharge to seal through a flow control orifice.

Features

1. Prevents product from vaporizing by maintaining positive pressure above vapor pressure.
2. Becomes a self-venting plan for horizontal pumps.
3. Default API Plan for most single seals.

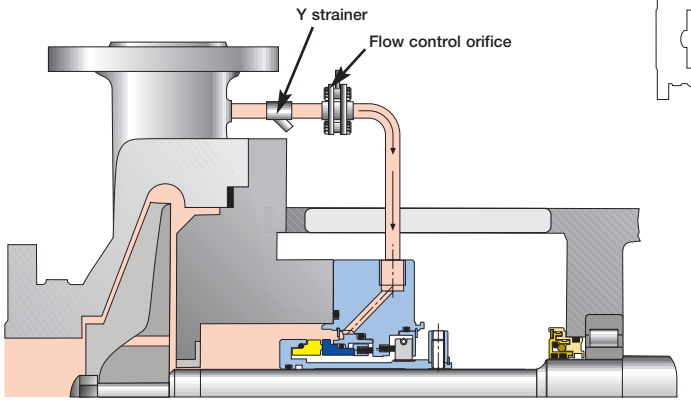
Use

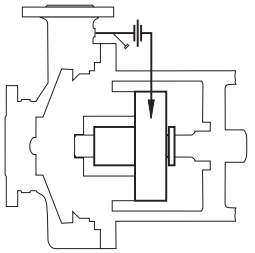
1. In general, applications with clean non-polymerizing fluids with moderate temperatures.

Caution

1. Calculation of recirculation flow rate, heat removal and orifice size are required.
2. Orifice size should be at least 1/8” (3.2mm).
3. Check the margin between discharge pressure & seal chamber pressure to ensure proper flow of fluid.
4. Do not use with media containing solids & abrasives.

API PLAN 12





Description

Product recirculation from pump discharge through a Y strainer and a flow control orifice to seal chamber.

Features

1. Becomes a self-venting plan for horizontal pumps.
2. Can handle dirty liquids to some extent.

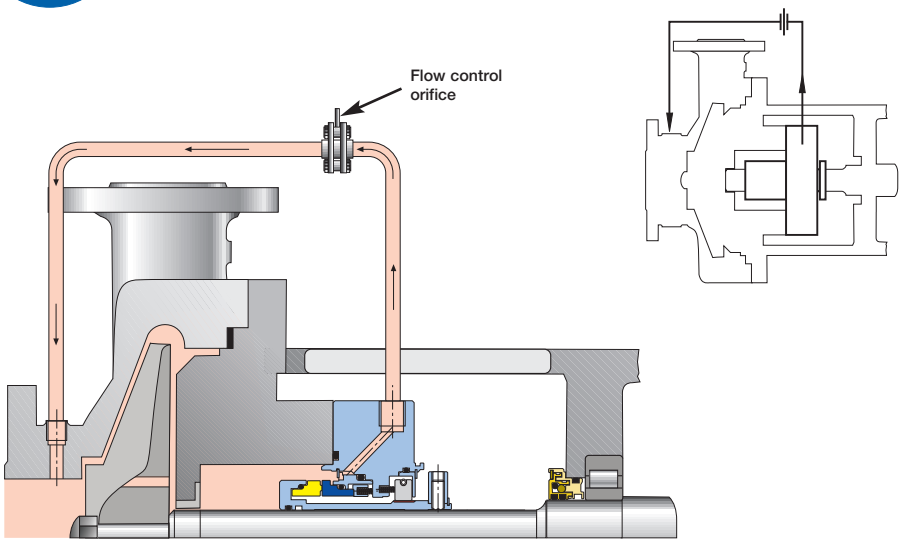
Use

1. In general used in slightly dirty and non-polymerizing fluids.

Caution

1. Always ensure that orifice is placed after the Y strainer.
2. This plan is normally discouraged due to non-reliability of Y strainer.
3. Calculation of recirculation.

API PLAN 13



Description

Product recirculation from seal chamber to pump suction via a flow control orifice.

Features

1. Provides continuous vent for vertical pumps.

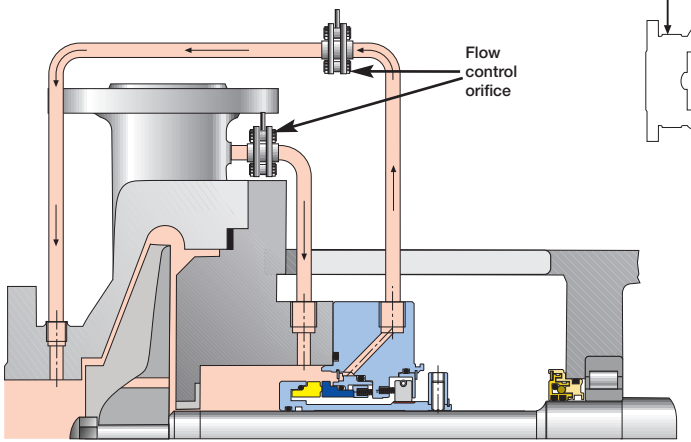
Use

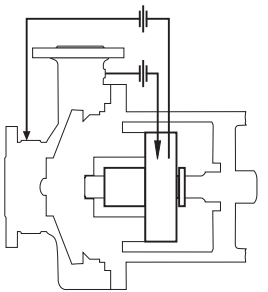
1. Wherever Plan 11 is not usable due to low-pressure margin between discharge & seal chamber pressure.
2. Used in vertical pumps.

Caution

1. Check margin between seal chamber pressure & suction pressure.
2. Orifice size should be at least 1/8” (3.2mm).

API PLAN 14





Description

Product recirculation from pump discharge to seal chamber through a flow control orifice and seal chamber back to suction through another flow control orifice.

Features

1. Ensures product recirculation as well as venting.
2. Reduces seal chamber pressure.

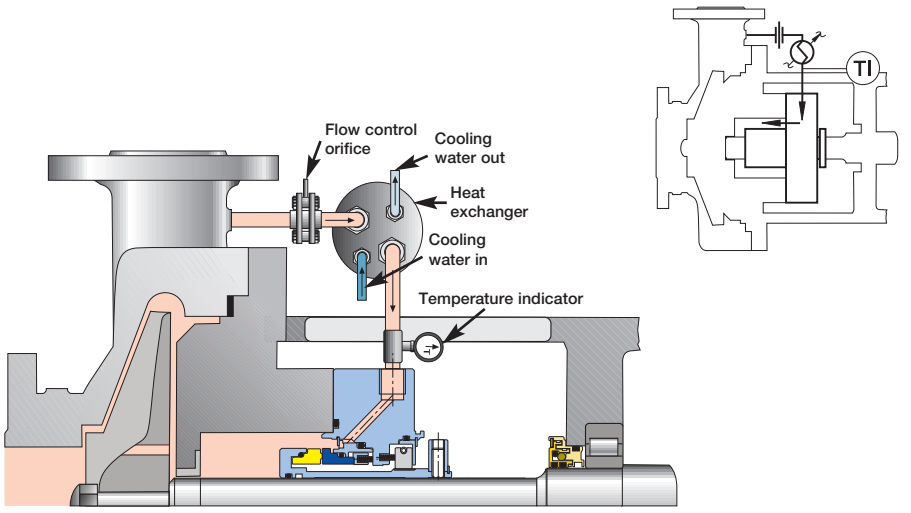
Use

1. Used in vertical pumps.
2. Used in light hydrocarbon services.

Caution

1. Check for pressure margin between discharge to seal chamber pressure and seal chamber to suction pressure.

API PLAN 21



Description

Product recirculation from discharge through flow control orifice and heat exchanger to seal chamber.

Features

1. Improves pressure margin over vapor pressure.
2. Improves temperature margin to meet secondary sealing element limits, to reduce coking or polymerizing & to improve lubricity.
3. Self venting plan.
4. Provides sufficient pressure difference to allow proper flow rate.

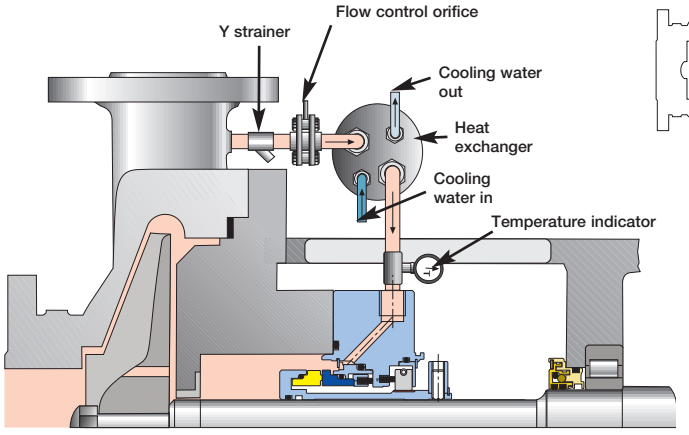
Use

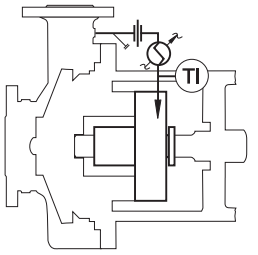
1. For high temperature applications e.g. hot water application (temperature > 80°C), hot hydrocarbons etc.
2. In hot non-polymerizing fluids.

Caution

1. Always ensure that cooler is placed after the orifice.
2. Check pressure difference between discharge and seal chamber.
3. Cooler duty is high leading to fouling on waterside.
4. Potential plugging on process side if fluid viscosity gets high quickly.

API PLAN 22





Description

Product recirculation from pump discharge through a Y strainer, a flow control orifice and a heat exchanger to seal chamber.

Features

1. Improves pressure margin over vapor pressure.
2. Improves temperature margin to meet secondary sealing element limits, to reduce coking or polymerizing & to improve lubricity.
3. Self venting plan.
4. Provides sufficient pressure difference to allow proper flow rate.

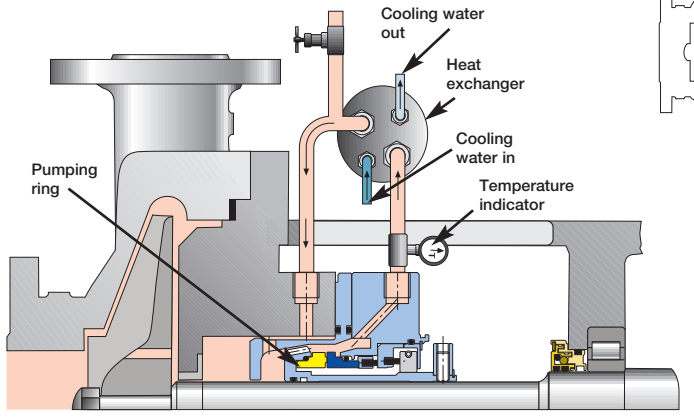
Use

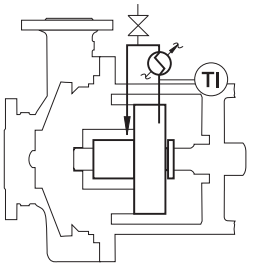
1. For high temperature applications with slightly dirty liquid.

Caution

1. Always ensure that cooler is placed after the orifice.
2. Check pressure difference between discharge and seal chamber.
3. Cooler duty is high leading to fouling on waterside.
4. This plan is normally discouraged due to non-reliability of Y strainer.

API PLAN 23





Description

Product recirculation from seal chamber to heat exchanger and back to seal chamber.

Features

1. Circulation is maintained by pumping ring.
2. In idle condition heat transfer is maintained by thermosyphon effect and in running condition by a pumping ring.
3. Lower product stabilization temperature is achieved.
4. Establishes required margin between fluid vapor pressure and seal chamber pressure.

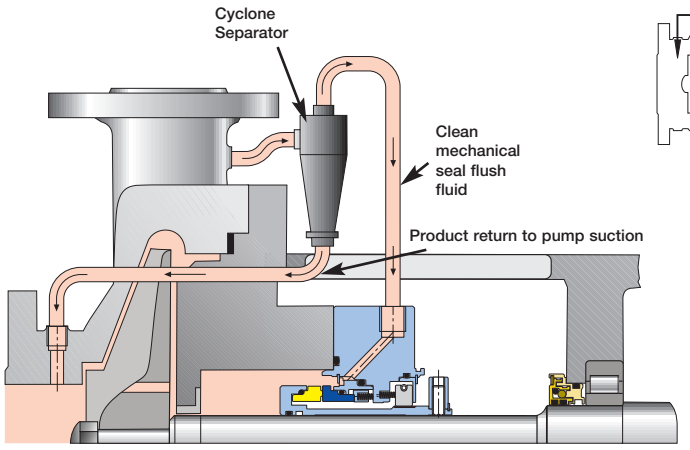
Use

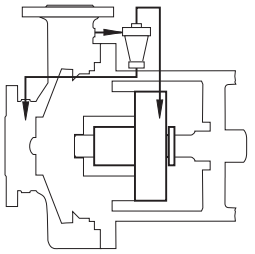
1. In hot and clean services e.g. in boiler feed water and hot hydrocarbon services.

Caution

1. Maintain maximum 0.5m horizontal distance from seal chamber to heat exchanger.
2. Vent valve required at highest point of piping system.
3. Ensure that pump has a close clearance throat bush.
4. Ensure that the seal outlet connection is in the top half of the gland.
5. Ensure that the cooler is mounted above the pump centre line.
6. Vent the system fully before start up.

API PLAN 31





Description

Product recirculation from discharge through a cyclone separator, which directs clean fluid to the seal and solids back to pump suction.

Features

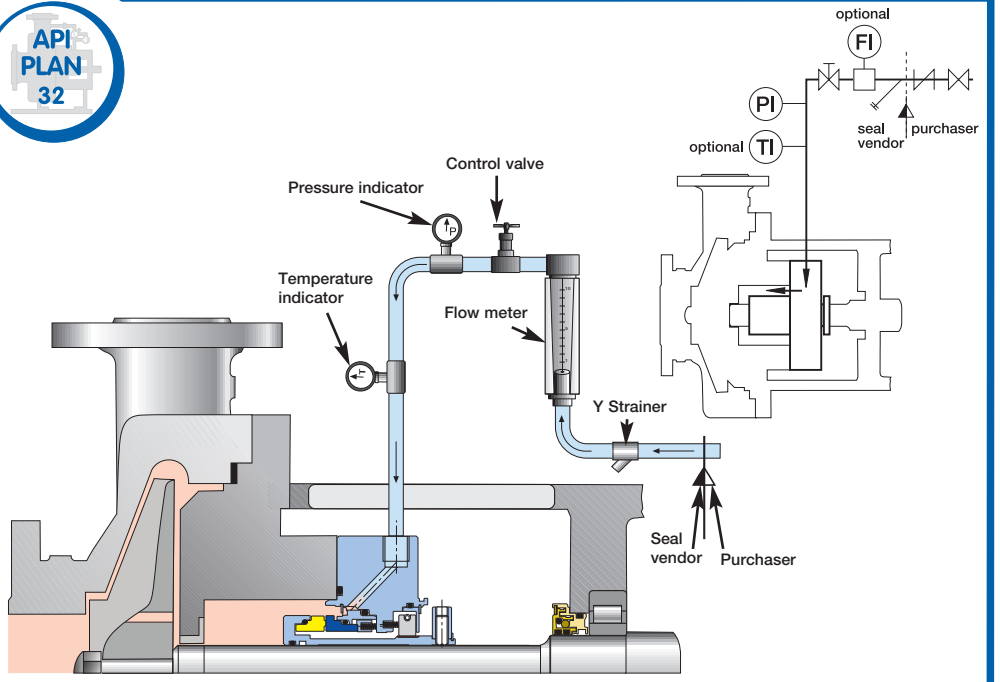
1. Removes entrained solids from the process fluid.
2. Particles from cyclone separator are returned to suction.

Use

1. Used in media with suspended solids.

Caution

1. Pump throat bushing is recommended.
2. Ensure use for services containing solids with specific gravity twice or more than that of process fluid.
3. Efficiency of a cyclone separator is proportional to the diameter. A larger cyclone diameter leads to less efficient separation, a smaller cyclone diameter provides more efficient separation.



API PLAN 32

Description

Injection of clean or cool liquid from external source into the seal chamber.

Features

1. Reduces flashing or air intrusion across seal faces by providing a positive flush.
2. Maintains vapor pressure margin.
3. Always provided at a pressure greater than seal chamber pressure.
4. If maintained properly the best of all single seal plans (subject to acceptance of contamination).

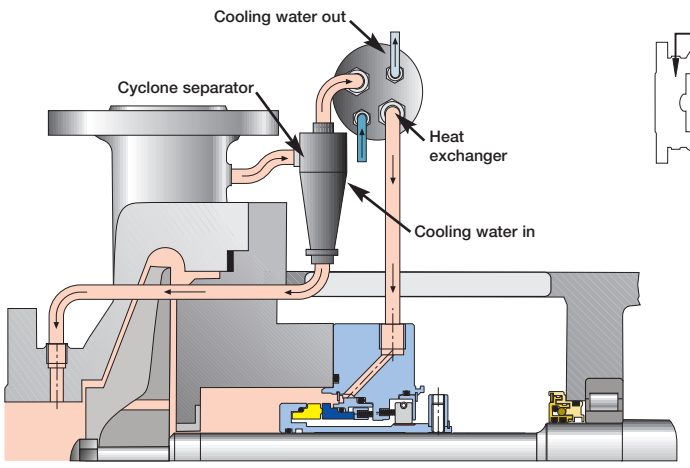
Use

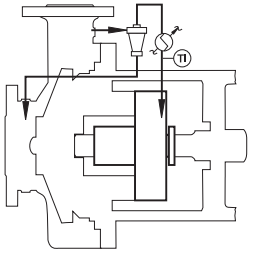
1. Dirty or contaminated fluids.
2. High temperature applications.
3. Polymerizing and oxidizing fluids.
4. Media with poor lubrication properties.

Caution

1. External source should be continuous and reliable at all times, even during start up & shut down.
2. Flush fluid must be compatible with process fluid due to product contamination.
3. Product degradation can occur.
4. Ensure use with close clearance throat bushing to maintain pressure in stuffing box & control the rate of contamination of pumped media.
5. Careful selection of flush fluid required to ensure that it does not vaporize on entering the seal chamber.
6. Fluid expenditure of Plan 32 may be as expensive as one or more seals per year.

API PLAN 41





Description

Product recirculation from discharge through a cyclone separator and a heat exchanger to seal chamber.

Features

1. Improves pressure margin to vapor pressure.
2. Improves temperature margin to meet secondary sealing element limits, to reduce coking or polymerizing & to improve lubricity.
3. Removes entrained solids from the process fluid.
4. Particles from cyclone separator are returned to suction.

Use

1. In hot services containing suspended solids.

Caution

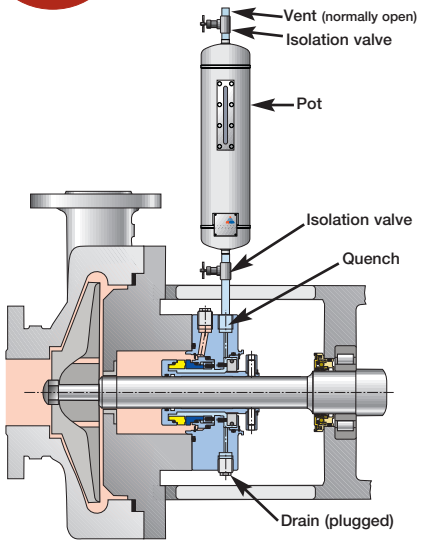
1. Pump throat bushing is recommended.
2. Ensure use for services containing solids with specific gravity twice or more than that of process fluid.
3. Cooler duty is high leading to fouling on waterside.

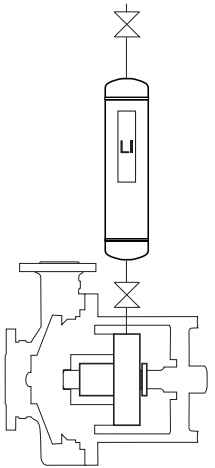
Water Savings

19 billion liters

"**AESSEAL®** Seal Support Systems currently save **global industry** in excess of **5 billion** gal (US) / **19 billion** liters of water **per year**."

API PLAN 51





Description

External reservoir providing a dead-ended blanket for fluid to the quench connection of the gland.

Features

1. No direct process leakage to atmosphere.
2. No need to maintain pressure system as in Plan 53A.

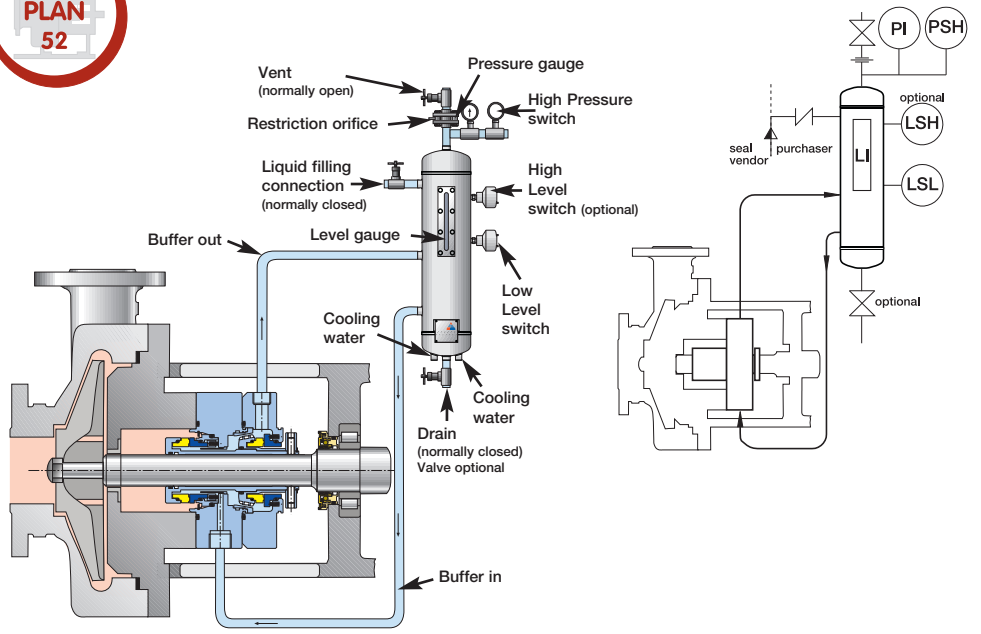
Use

1. Preferred for clean, non-polymerizing media with vapor pressure higher than buffer fluid pressure.

Caution

1. Keep pot vent continuously open, which is necessary to maintain buffer fluid pressure close to atmospheric pressure & vent the vapors to flare.
2. Should not be used in dirty of polymerizing products.
3. Never run the system with level in the sealant vessel being at low level as marked on the level gauge.
4. Vent the system properly before start up.

API PLAN 52



Description

Depressurized buffer fluid circulation in outboard seal of a dual seal configuration through a seal support system. Circulation is maintained by using pumping ring in running condition and by thermosyphon effect in stand still condition.

Features

1. No process contamination.
2. No direct process leakage to atmosphere.
3. No need to maintain pressure system as in Plan 53A.

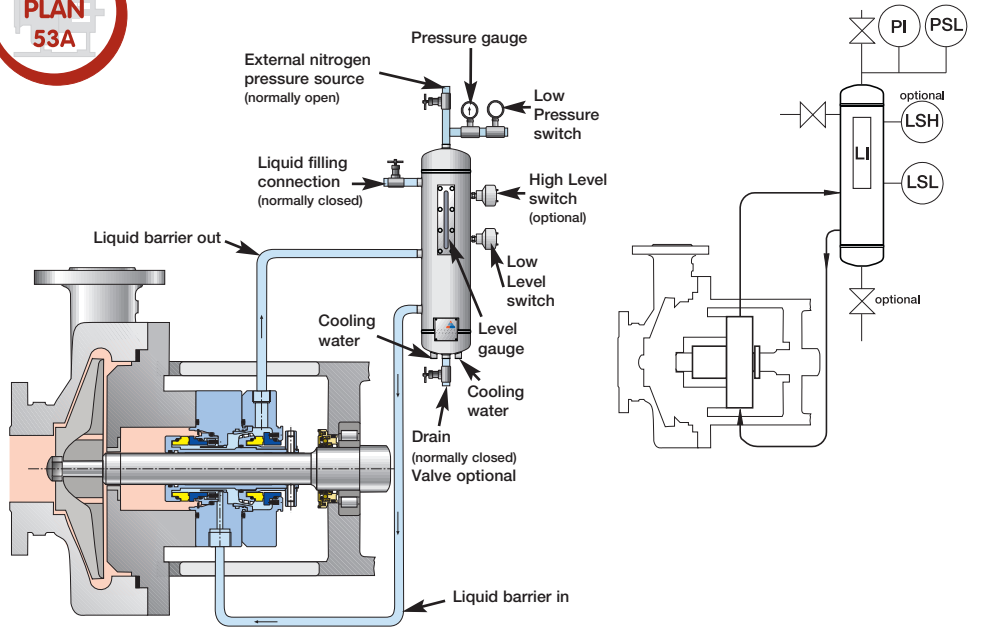
Use

1. For media where product dilution is not allowed but leakage to atmosphere in diluted form may be allowed.
2. Preferred for clean, non-polymerizing media with vapor pressure higher than buffer fluid pressure (Is also used for lower vapor pressure media).

Caution

1. Keep the sealant vessel vent continuously open, which is necessary to maintain buffer fluid pressure close to atmospheric pressure & vent the vapors to flare.
2. Should not be used in dirty or polymerizing products.
3. A restriction orifice is necessary in vent line to maintain back pressure in pot and facilitate quick release of vapors to flare.
4. Pressure switch setting should be done above minimum flare back pressure in order to avoid false alarms.
5. Never run the system with level in the sealant vessel being at low level as marked on the level gauge.
6. Check for temperature difference in inlet and outlet lines to ensure that circulation is on.
7. Vent the system properly before start up.

API PLAN 53A



Description

Pressurized barrier fluid circulation in outboard seal of dual seal configuration through a seal support system. Circulation is maintained by using pumping ring in running condition and with thermosyphon effect in stand still condition.

Features

1. In no case media leakage to atmosphere (Provided the seal support system pressure is not lost).
2. Clean fluid film formation between the inboard seal faces gives better seal life.
3. Works as a Plan 52 arrangement if barrier fluid pressure is lost.

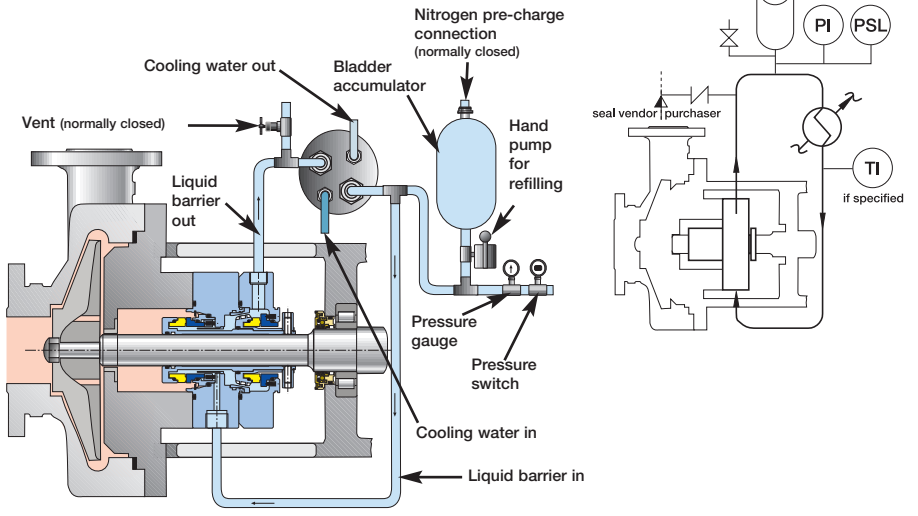
Use

1. Applications where no leakage to atmosphere can be tolerated e.g. hazardous, toxic, inflammable media.
2. For dirty, abrasive or polymerizing products where media is unsuitable as a lubricant for inboard seal faces.

Caution

1. There will always be some leakage of barrier fluid into the product. Check compatibility of barrier fluid with product.
2. Always ensure that the pressure source maintains higher pressure at the seal support system so that process does not dilute the barrier fluid.
3. Vent the system properly before start up.
4. In certain cases the inert gas can dissolve in the barrier media.
5. Product quality can deteriorate due to barrier fluid contamination.

API PLAN 53B



Description

Pressurized barrier fluid circulation in outboard seal of dual seal configuration. Circulation is maintained by using pumping ring in running condition and with thermosyphon effect in stand still condition. The pressure is maintained in the seal circuit by a bladder accumulator.

Features

1. Keeps barrier fluid and pressurized gas (inert gas) separate by using a bladder.
2. Heat is removed from the circulation system by an air-cooled or water-cooled heat exchanger.
3. Being a stand-alone system does not rely upon a central pressure source. Hence much more reliable than a Plan 53A.
4. In no case media leakage to atmosphere.
5. Clean fluid film formation between the inboard seal faces gives better seal life.

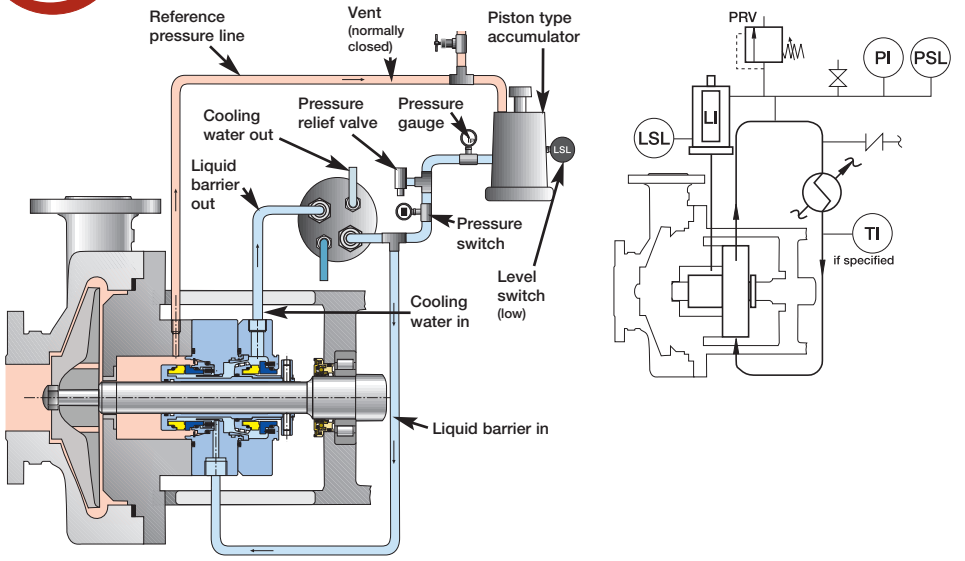
Use

1. Applications where no leakage to atmosphere can be tolerated e.g. hazardous, toxic, inflammable media.
2. For dirty, abrasive or polymerizing products where media is unsuitable as a lubricant for inboard seal faces.

Caution

1. There will always be some leakage of barrier fluid into the product. Check compatibility of barrier fluid with product.
2. Low volume of barrier fluid in system, hence heat dissipation is totally dependent on cooler efficiency.
3. Always recharge bladder to 0.9 times the working pressure.
4. Vent the system properly before start up.
5. Product quality can deteriorate due to barrier fluid contamination.
6. Can not be used where seal chamber pressure varies. Use Plan 53C for such applications.

API PLAN 53C



Description

The core feature of Plan 53C is that it maintains a constant ratio between barrier fluid pressure and seal chamber pressure. When barrier fluid pressure is not constant the device adjusts to maintain a constant ratio relative to seal chamber pressure. This allows successful operation of dual seals lacking reverse balance feature at inboard seal, when having highly variable seal chamber pressure.

Features

1. There will always be some leakage of barrier fluid into the product. Check compatibility of barrier fluid with product.
2. Vent system properly before start up.
3. Heat is removed from the circulation system by an air-cooled or water-cooled heat exchanger.
4. In no case will the medial leak to the atmosphere.
5. Clean fluid film formation between the inboard seal faces gives better seal life.
6. This allows successful operation of dual seals lacking reverse balance feature at inboard seal, when having highly variable seal chamber pressure.

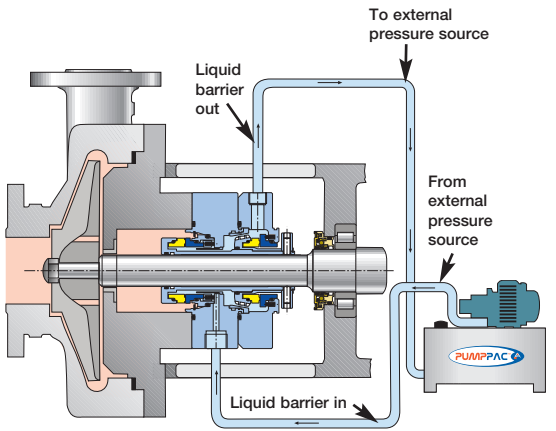
Use

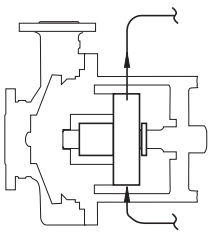
1. Applications where no leakage to atmosphere can be tolerated e.g. hazardous, toxic, inflammable media.
2. For dirty, abrasive or polymerizing products where media is unsuitable as a lubricant for inboard seal faces.
3. Where pump pressure varies during operation needing an auto setting of barrier fluid pressure, thus maintaining the same differential throughout.

Caution

1. Always connect reference pressure line from seal chamber to accumulator and keep it open.
2. There will always be some leakage of barrier fluid into the product. Check compatibility of barrier fluid with product.
3. Vent the system properly before start up.
4. Product quality can deteriorate due to barrier fluid contamination.

API PLAN 54





Description:

API plan 54 improves efficiency of heat exchangers by allowing higher barrier fluid velocity. This significantly increases barrier fluid side film coefficient, relative to what we can achieve when a seal pumping device is driving the barrier fluid through the heat exchanger.

Features:

1. Ensures higher flow rate, better heat dissipation & positive circulation of barrier fluid.
2. If maintained properly, is the most reliable pressurized plan for dual seals as compared to Plan 53 A/B/C.
3. Can also be given as a stand alone unit per pump.
4. Increases greater efficency due to higher flow rate through the heat exchanger.

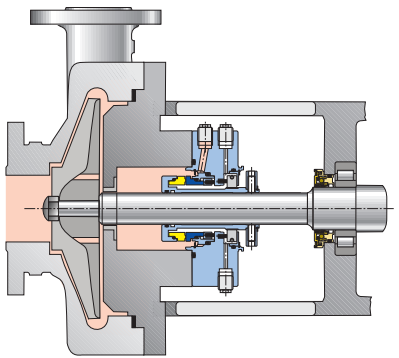
Uses:

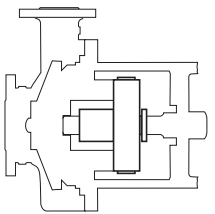
1. Applications where no leakage to atmosphere can be tolerated e.g. hazardous, toxic, inflammable.
2. For dirty, abrasives or polymerizing products where media is unsuitable as a lubricant for inboard seal faces.
3. For media with high pressure and / or high temperature and / or high heat generation between faces.
4. Wherever Plan 53 A/B/C circulation is insufficient to dissipate heat.

Caution:

1. Carefully consider the reliability of barrier fluid source, if a central source is used.
2. Expensive system, proper engineering required.
3. Circulating system must be pressurized at least 1.5 bar greater that the pressure in the seal chamber.
4. Product contamination does occur. Barrier fluid selected should be compatible with the process fluid.
5. Always check filter / strainer in the system for any possible blockages.
6. Loss of pressure in system can lead to entire barrier liquid contamination.
7. Product quality can deteriorate due to barrier fluid contamination.

API PLAN 61





Description

Plugged connections for future use for Plan 62 or Plan 65.

Features

1. The drain connection can be piped in order to collect leakage and use as Plan 65.
2. Both quench & drain can be piped and used as quench in and out connection as Plan 62.

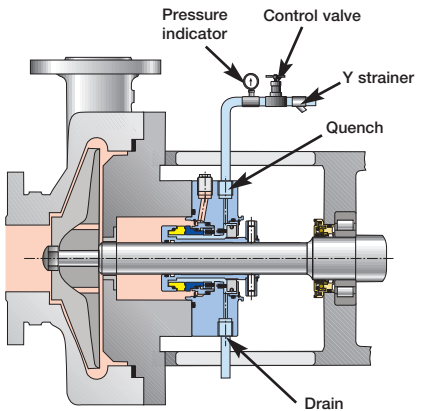
Use

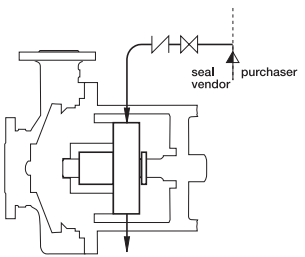
1. For future provision.

Caution

1. Always keep ports plugged.

API PLAN 62





Description

An external fluid stream is brought to atmospheric side of the seal faces using quench and drain connections.

Features

1. The quench fluid acts as barrier in between atmosphere and process fluid.
2. The quench fluid reduces oxidation and coking of product & also cools seal faces.
3. Flushes away undesirable material build up under seal faces.
4. Can be used with water, steam or an inert gas.

Use

1. In caustic or crystallising fluids.
2. In oxidising fluids or hot hydrocarbons.
3. Can be used to purge steam in hot applications especially for stationary bellows to avoid coking.

Caution

1. Ensure availability of continuous supply of low-pressure quench fluid limited to maximum 1 bar.
2. Use of throttle bushing on atmosphere side is mandatory.
3. Use proper bearing isolators to ensure that the quench fluid does not enter the bearings.

Environmental Benefit

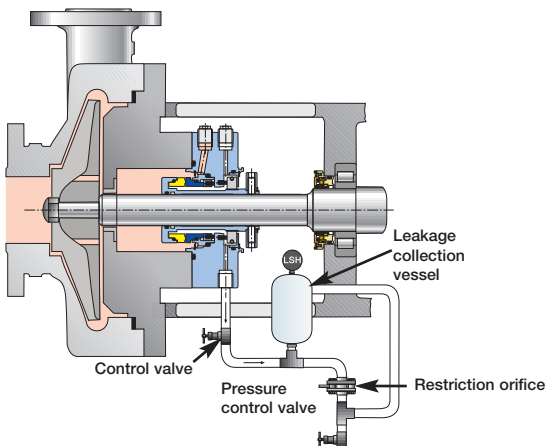
WaterAid

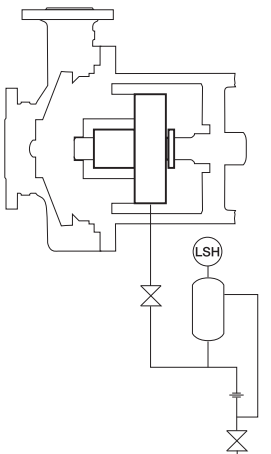
Charity registration number 288701

www.wateraid.org

AESSEAL® feel that the **environmental impact** of global water concern is too big an issue to ignore. WaterAid is an international charity **dedicated** to their vision of helping people all over the globe escape the stronghold of **poverty** & **disease** caused by living without water and sanitation. **AESSEAL®** share in this vision and as a result we have entered into an **agreement with WaterAid**, where we **donate** a percentage of our profits from Seal Support Systems to the **charity**. This means that when you install a Seal Support System **you are helping** WaterAid to provide clean water and sanitation to those who really need it.

API PLAN 65





Description

Leakage from seal faces is collected via the drain port & directed to a liquid collection system via a vessel equipped with a high-level alarm.

Features

1. The quench fluid acts as barrier in between atmosphere and process fluid.
2. The quench fluid reduces oxidation and coking of product & also cools seal faces.
3. Flushes away undesirable material build up under seal faces.
4. Can be used with water, steam or an inert gas.

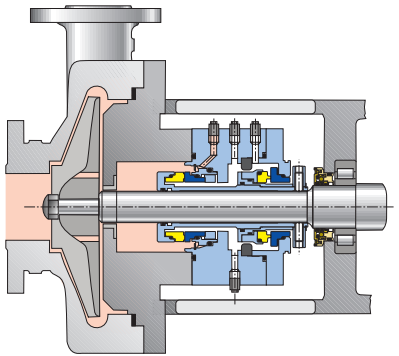
Use

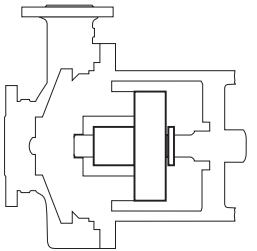
1. In services where seal leakage is condensing.
2. Used for single seals.

Caution

1. Vent connection should always be plugged.
2. Orifice downstream of the level switch should be located in vertical piping leg to avoid accumulation of fluid in drain piping.
3. Shut down the pump as soon as high-level alarm is activated & attend the seal.

API PLAN 71





Description

Plugged connections for future provision to supply a buffer gas to a dual containment seal.

Features

1. Vent port can be piped to use as ‘CSV’ in Plan 76.
2. Drain port can be piped to use as ‘CSD’ in Plan 75.
3. GBI port can be piped to use as in Plan 72.

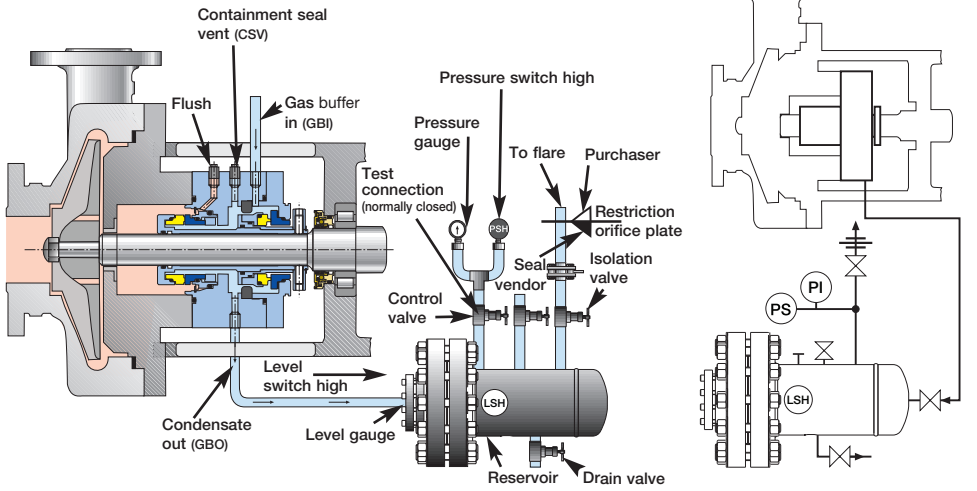
Use

1. For future provisions for API Plans 72, 75 and 76.

Caution

1. Always keep the ports plugged.
   Used for: 2CW-CS.

API PLAN 75



Description

Leakage of condensate from inboard seal of a dual containment seal is directed to a liquid collector.

Features

1. Can be used with Plan 72 with buffer gas or with Plan 71 without buffer gas systems.
2. Collection can be redirected to process fluid by using separate pumping device.
3. Can be used in single containment seal also.
4. Test connection is provided to check the inner seal by closing the block isolation valve while pump is in operation and noting the time / pressure build-up relationship in the collector.

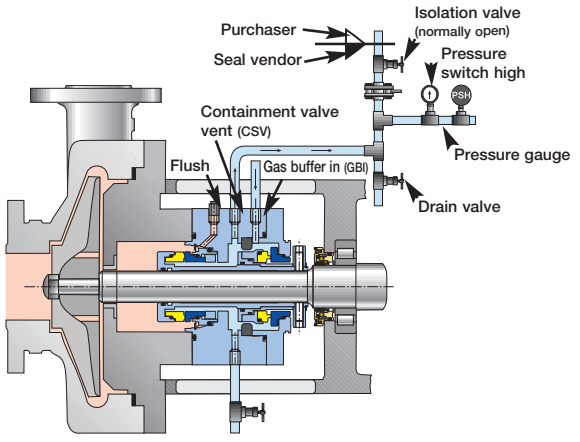
Use

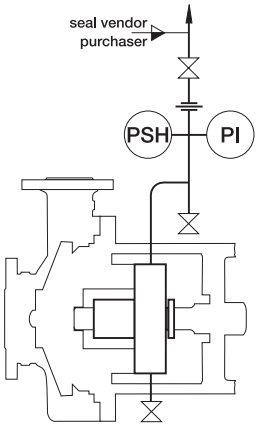
1. Duties with condensing leakages.
2. Hazardous, toxic fluids.
3. May also be used for non-condensing leakages. In such cases, the collector can help in collecting condensate from the vapor recovery system.

Caution

1. Ensure that collection system is located below the seal drain with sloping pipelines.
2. Drain port should be at bottom of containment seal to allow the leakage to flow to the collection system.
3. Collection system should always be vented releasing vapors of process liquid to vapor recovery system.
4. Valves that are installed should be accessible to operator relative to ground clearance and other obstructions.
5. A flow control orifice is required to create back pressure on collection system and to have effective condensation of vapors.
6. Pressure switch should be set at a gauge pressure of 0.7 bar.

API PLAN 76





Description

Vapor leakages from inboard seal of dual containment seal are directed to a vapor recovery system via a vent connection.

Features

1. Can be used with Plan 72 with buffer gas or with Plan 71 without buffer gas system.
2. Vapor leakage collection ensures zero to very low process emissions from out boardcontainment seal.

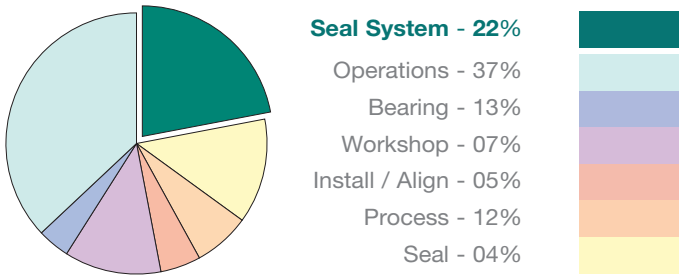
Use

1. For high vapor pressure fluids, light hydrocarbons.
2. In hazardous or toxic media.

Caution

1. Do not use for condensing media.
2. Ensure continuous vent to low pressure vapor recovery or flare system.
3. Tubing shall be 13mm (1/2”) minimum diameter and shall rise continuously from the CSV connection to the piping / instrumentation harness.
4. A flow control orifice is required to generate back pressure.
5. Ensure proper support to harness piping.
6. Ensure a low point drain in the piping loop.

Reliability Enhancement

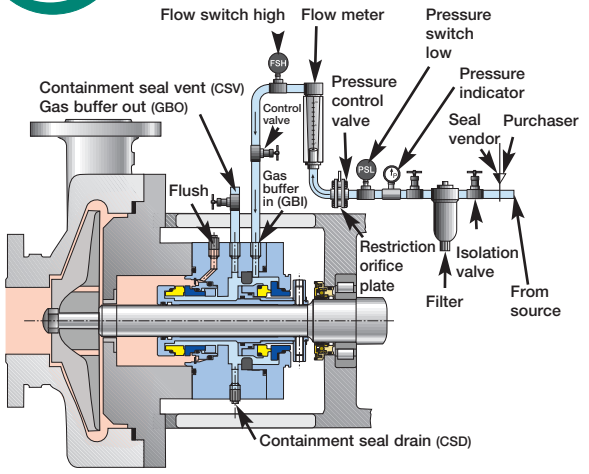


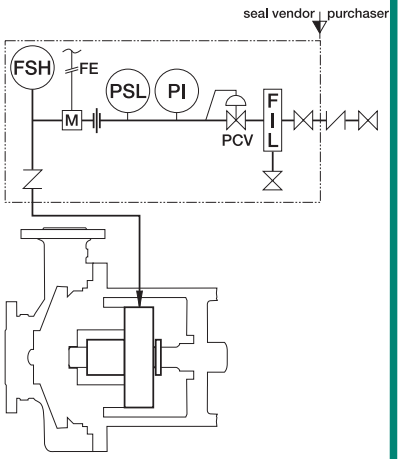
Research has **proven** that the biggest mechanical preventative of mechanical seal failure is the use of **effective Seal Support Systems** (please see the pie chart). This means that no matter how well designed your mechanical seal or bearing systems are, without a reliable Seal Support System there is still the possibility of your mechanical seal failing. **AESSEAL's innovative** & **reliable** Seal Support System Range gives our customers the **confidence** to remove this root cause of mechanical seal failure.

Source: Stephen Flood, Performance Plus Ltd - "*Mechanical Seal Reliability - What Realistically Can Be Achieved?*" presented at The Mechanical Sealing Technology Seminar, I Mech E, London, April 07

GAS SEAL PLANS

API PLAN 72





Description

Buffer gas is circulated in the containment seal chamber to sweep inner seal leakage away from outer seal to a collection system and / or dilute the leakage so that the emissions from the containment seal are reduced.

Features

1. Used in conjunction with API Plan 75 and / or 76.
2. Nitrogen provides cooling to seal faces.
3. Nitrogen blanket reduces the explosion hazard in high vapor pressure liquids.
4. This plan is used in conjunction with Plan 75 and 76.

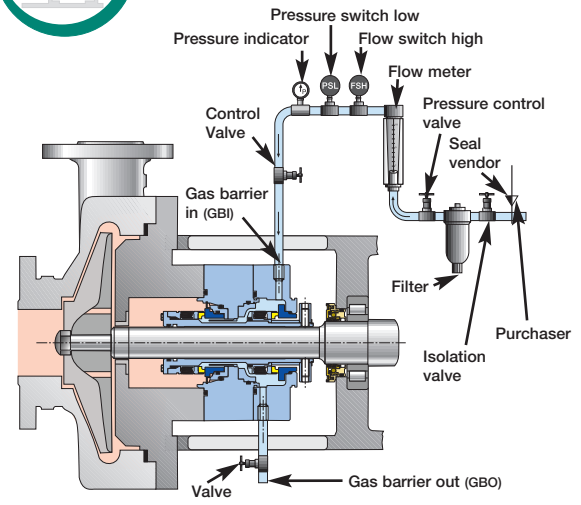
Use

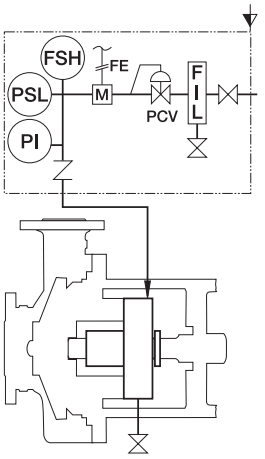
1. For flashing hydrocarbons.

Caution

1. Always ensure that buffer gas pressure is less than seal chamber pressure.
2. Set the forward pressure regulator at minimum 0.4 bar above flare back pressure.

API PLAN 74





Description

Externally pressurized barrier gas through gas control system to a dual seal arrangement. An inert gas is used as a barrier gas.

Features

1. Media leakage to atmosphere is eliminated.
2. Obtain very high reliability, as solids or other materials, which can lead to premature seal failure cannot enter the seal faces.

Use

This plan is intended to be used for dual pressurized non-contacting gas seals.

1. Used in services which are not hot (within elastomer temperature limit) but which may contain toxic or hazardous material whose leakage to atmosphere can not be tolerated.
2. In case of solids or other material present in sealing media.
3. Where process contamination is allowed but process liquid leakage to atmosphere is not allowed.

Caution

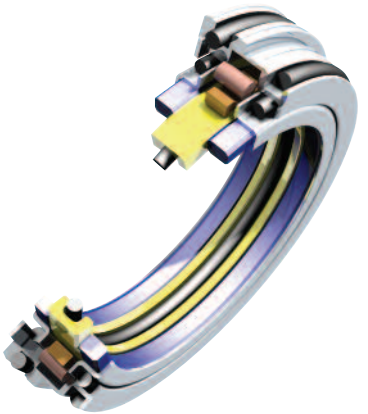
1. Always ensure barrier gas pressure is higher than seal chamber pressure.
2. Causes media contamination due to high-pressure nitrogen entering the pump.
3. Back pressure regulator should be set at least 1.7 bar greater than the seal chamber pressure.
4. Carefully consider the reliability of barrier pressure source, if central pressure issued.
5. Always check filter for any possible blockage.
6. Do not use for sticking or polymerizing media.

API PLANS & SYSTEMS PRODUCT GRID

	CYCL™	Seal Cooler	FLOWTRUE®	SWC™	SP Range	AES-15™	AES-FV™
Plan 21		•••••					
Plan 22		•••••					
Plan 23		•••••					
Plan 31	•••••						
Plan 32			•••••				
Plan 41	•••••						
Plan 51						•••••	•••••
Plan 52					•••••	•••••	•••••
Plan 53A				•••••	•••••	•••••	•••••
Plan 53B							
Plan 54			•••••				
Plan 62			•••••				
Plan 65							
Plan 72							
Plan 74							

	AES-28™	PP/SOU™	PP/01™	Plan 53B	Plan 65	Plan 75	Gas Panel
Plan 21							
Plan 22							
Plan 23							
Plan 31							
Plan 32							
Plan 41							
Plan 51	•••••						
Plan 52	•••••						
Plan 53A	•••••						
Plan 53B				•••••			
Plan 54		•••••	•••••				
Plan 62							
Plan 65					•••••		
Plan 72							•••••
Plan 74							•••••
Plan 75						•••••	

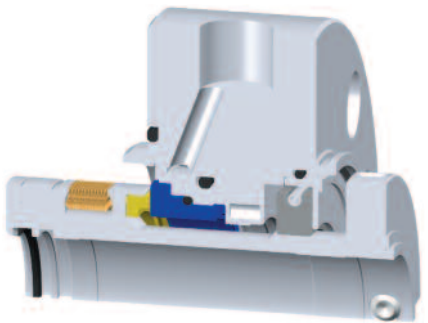
MagTecta™



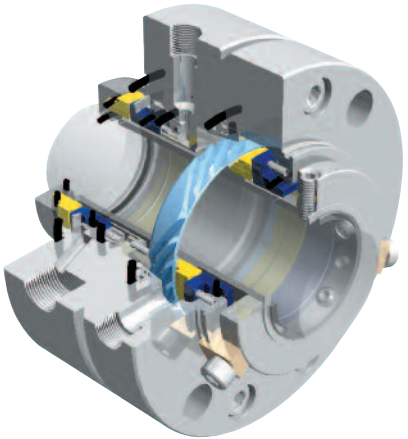
LabTecta™

BEARING PROTECTION

CAPI Single Type B



CAPI Double Type A



aesseal api

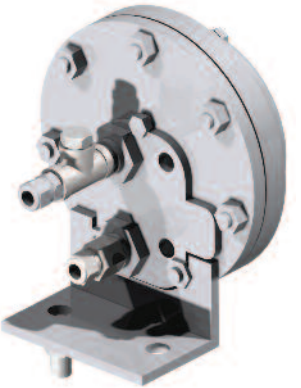
API SEALS

CYCL™

API PLAN 31

API PLAN 41

SEAL COOLER



API PLAN 21

API PLAN 22

API PLAN 23

WATER MANAGEMENT SYSTEMS

WATER MANAGEMENT SYSTEMS

FLOWTRUE®

API PLAN 32 · API PLAN 54 · API PLAN 62

SWC™ CONDENSATE SYSTEM

API PLAN 53A

OIL SYSTEMS

SP2™

API PLAN 52 · API PLAN 53A

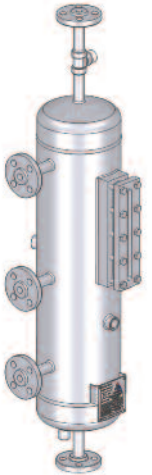
AES-15™

API PLAN 51 · API PLAN 52 · API PLAN 53A

AES-FV™

API PLAN 51 · API PLAN 52 · API PLAN 53A

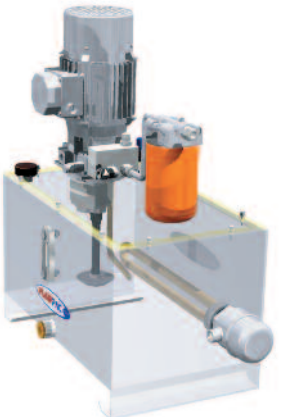
AES-28™



API PLAN 51 · API PLAN 52 · API PLAN 53A

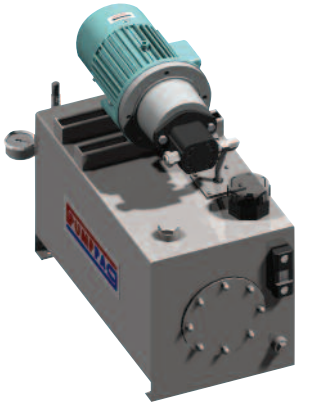
OIL SYSTEMS

PUMPPAC-SOU™



API PLAN 54

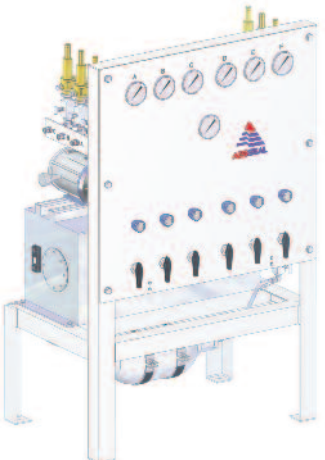
PUMPPAC™ O1



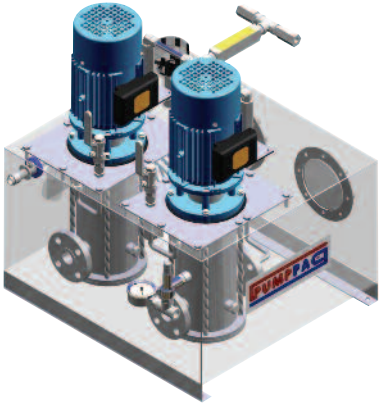
API PLAN 54

OIL SYSTEMS

COMPACT 107



BESPOKE PUMPPAC™ SYSTEM



API PLAN 54

API PLAN SYSTEMS

PLAN 53B SYSTEM

API PLAN 53B

API PLAN 65 - LEAKAGE DETECTION VESSEL (LDV)

API PLAN 65

API PLAN SYSTEMS

PLAN 75 SYSTEM

API PLAN 75

API PLAN SYSTEMS

GAS16-P1™

API PLAN 72

API PLAN 74

GAS SYSTEMS

Our Purpose:

'To give our customers such exceptional service that they need never consider alternative sources of supply.'

AESSEAL®

www.aesseal.com