



PLAN API 682 4A ED

CODE



CATEGORY: designated as 1, 2 or 3

ARRANGEMENT: designated as 1, 2 or 3

TYPE: designated as A, B or C

CONTAINMENT DEVICE:

- P plain gland with no bushing;
- L floating throttle bushing;
- F fixed throttle bushing;
- C containment seal;
- S floating, segmented carbon bushing;
- X unspecified (to be specified separately).

GASKET MATERIAL:

- F fluoroelastomer (FKM);
- G polyfluorotetraethylene (PTFE);
- H nitrile;
- I perfluoroelastomer (FFKM);
- R flexible graphite;
- X unspecified (to be specified separately).

SEAL			DESIGN OPTIONS			SHAFT SIZE mm	PLAN
CATEGORY	ARRANGEMENT	TYPE	CONTAINMENT DEVICE	GASKET MATERIAL	FACE MATERIAL		
1	2	A	P	F	O	050	11/52

FACE - M carbon vs nickel bound WC;

MATERIALS:

- N carbon vs reaction bonded SiC;
- O reaction bonded SiC vs nickel bound WC;
- P reaction bonded SiC vs reaction bonded SiC;
- Q sintered SiC vs sintered SiC;
- R carbon vs sintered SiC;
- S graphite loaded, reaction bonded SiC vs reaction bonded SiC;
- T graphite loaded, sintered SiC vs sintered SiC;
- X unspecified (to be specified separately).

SHAFT SIZE: - size in mm

PLAN: - plan number; multiple plans separated by "/".

INTRODUCTION



This Standard specifies requirements and gives recommendations for sealing system for centrifugal and rotary pumps used in petroleum, natural gas and chemical industries. These specifications based on the knowledge and experiences of customers, equipment manufacturer and representative of mechanical seals industry are used by the customer to guide their product selection and application for hazardous, flammable and/or toxic services where a greater degree of reliability is required.

CATEGORIES	TYPES	ARRANGEMENTS
I Chemical and Petrochemical Industry pumps	A Rotary pusher seal	1. Single seal
II Oil and Gas Industry pumps	B Rotary bellows seal (o-ring type)	2. Unpressurized dual (tandem)
III Oil and Gas Industry API pumps	C Stationary bellows seal (flexible graphite type)	3. Pressurized dual (double)

CATEGORIES

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CATEGORY I

Seal for not API 610 pump

CATEGORY II

Seal for API 610 dimensioned pump

CATEGORY III

Seal tested and certified for
API 610 pump

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Temperature
range

Pressure

Cross section

Flush

Building

Documentation

Fixed

Normal

Floating

Normal

Floating

Extensive

TYPES

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TYPE A

TYPE B

TYPE C

Standard

Rotary seal and seal

Rotary seal and seal (seal)

Rotary seal and (flexible graphite type)

stationary
graphite

Option

dry sealing
the

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All of these types are used in single or dual arrangement, wet or gas lubricated

TYPES

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		P (bar)	Temperature Type	Application Type	Flow	Pressure	Notes
Non-Regenerative	Water	<100	<120	A	5-10		
	Water	<100	20-40	A	5-10		
	Water	<100	<100	A	10-15	Flow is with air cooling	
	Dist. water	<100	<120	A	5-10 (P = 10 bar)	1000	1000-1200 is high flow for fluting
Regenerative in Fluting (Super pressure <1 bar)							Flow with many wells
Regenerative Fluting (Super pressure <1 bar)							Flow with many wells
	10-15	<100	A	Not engineered		10-15 (P = 1000) A device for maintaining an overpressure compensated in the super pressure	It is always preferable to decrease the super pressure by cooling the fluid rather than pressure it
	10-15-400	<100	C	Engineered			
	10-15-400	20-40	Engineered for high temperature & pressure version				

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ARRANGEMENTS

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ARRANGEMENT1

ARRANGEMENT2

ARRANGEMENT3

LIQUID BUFFER
FLUID

GAS OR NO
BUFFER FLUID

LIQUID BARRIER
FLUID

GAS BARRIER
FLUID

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CB: contacting well; NC: non-contacting well or dry; CS: containment seals contacting or non-contacting.
FF: face to face; BB: back to back; FB: face to back.

THE VAPOR PRESSURE

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The vapor
given tem
changes 1
kilopascal

The vapor
is determi
procedure

Required v

- NOT LET

- or a min

chamber

and the process.

REF: API 682 4th ed Point 6.1.2.14.2

LEAKAGE

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ALL MECHANICAL SEALS PRODUCE LEAKAGE
REF. API 682 4th ed Point 10.3.2.3



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(≤ 2 drops/min)

(> 2 drops/min)

(> 2 drops/min)

DOCUMENTATION

EFLUITEN

Details	Category			Document (for detailed Data refer to Annex E)	User	Pump Vendor	Seal Vendor
	1	2	3				
Inquiry	R	R	R	Inquiry Letter	R	R	
Proposal	 Would you like to receive our complete technical manual? Fill in the fields in the format above, you will receive them via e-mail within 48 hours of the request.						R
							R
							R
							R
							R
							R
							R
							R
							R
							R
	R	R	R	Detached Bill of Material of Assembly System			R
	R	R	R	Relief valve list			R

R: Required

S: If Specified

DOCUMENTATION



Details	Category				Document (for detailed data refer to Annex E)		User	Pump Vendor	Seal Vendor
	1	2	3	4	5	6			
Contract					Purchase Order Letter				
						completed by purchaser			
						completed by purchaser/vendor			
	Would you like to receive our complete technical manual? Fill in the fields in the format above, you will receive them via e-mail within 48 hours of the request.								
					Accessory system maintenance systems				
					Hydraulic Test Certification				
				Material Safety Data Sheet(s)					
S	S	S		Inspector Checklist (see Annex H)					

R: Required

S: If Specified

PLAN 01

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- 1) Inlet
- 2) Flush (F), plugged for circulation or venting on vertical pumps
- 3) Quench (Q)
- 4) Drain (D)

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In PLAN 01 the pump pressure seal chamber is guaranteed that can chamber machine.

FEATURES provide a but it is

fluids only. PLAN 01 may be useful with liquids that thicken or solidify at normal ambient temperature.

recommended for vertical pumps because it's very hard to vent the seal chamber.



PLAN 02

PLAN 02 has a dead-ended seal chamber with no recirculation of the flushed fluid. It is more common in the chemical industry for applications with low viscosity process fluids.

FEATURES
the heat
fluids. It a
of any sol

WARNING
by the seal
must be
margin of

also be taken into consideration to avoid flashing conditions in the seal chamber or at the seal faces.

Cooling jackets are prone to fouling in high-temperature applications and shall be used only with great care.



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- 1) Flush (F), plugged for circulation or venting on vertical pumps
- 2) Vent (V), if required
- 3) Heating-cooling inlet (H or C).

ing outlet
if required

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PLAN 03

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- 1) Flush (F), plugged for circulation or venting on vertical pumps
- 2) Quench (Q)
- 3) Drain (D)
- 4) Seal chamber

In PLAN 1, the seal chamber is located between the pump and the motor. This is a common seal.

FEATURES: The seal chamber has a throat in its geometry, which allows for

circulation that provides cooling for the seal and vents air or vapors from the seal chamber.

significant seal generated heat or where there are solids that could pack in a traditional seal chamber.

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PLAN 11

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In PLAN 11 there is recirculation from a high-pressure region of the pump to the seal. the flow needed to flow rate. are usual

FEATURE

routed from the seal c for the se from the flows from

into the process stream. It is the most commonly used flush plan for clean general service equipment.

be taken when using this plan with polymerizing fluid that may plug the orifice and connecting piping.



- 1) From high-pressure region of pump
- 2) Flush (F)
- 3) Quench (Q)
- 4) Drain (D)
- 5) Seal chamber

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PLAN 12

In PLAN 12 there is recirculation from a high-pressure region of the pump the control Purchaser control or achieve the

FEATURES

routed from the seal c for the se from the remove e then flow

back into the process stream. It is the most commonly used flush plan for clean general service equipment.

strainer will cause a seal failure. This plan has not proven to achieve a three year (3-yr) operating life.



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- 1) From high-pressure region of the pump
- 2) Strainer
- 3) Flush (F)
- 4) Quench (Q)
- 5) Drain (D)

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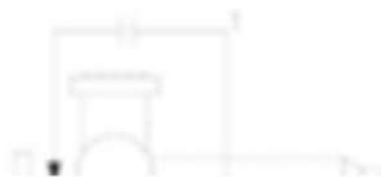


PLAN 13

In PLAN 13 the process fluid flows from the seal chamber through a flow control orifice and back to the pump suction piping. Pump flow controls the flow rate to achieve the desired rate.

FEATURES: flush glass pumps the bleed to chamber, on vertical a bleed operate at full discharge pressure without pressure differential to allow a PLAN 11 to work.

WARNING: a distributed flush injection is not recommended with a PLAN 13.



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- 1) To pump suction
- 2) Flush (F)
- 3) Quench (Q)
- 4) Drain (D)
- 5) Seal chamber

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PLAN 14

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- 1) From pump discharge
- 2) To pump suction
- 3) Flush inlet (PI)
- 4) Flush outlet (PO)
- 5) Quench (Q)
- 6) Drain (D)

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WARNING: a distributed flush injection is not recommended with a PLAN 14.



PLAN 21

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In PLAN 21 there is recirculation from a high-pressure region of the pump through a flow control orifice and cooler, then into the seal chamber. Product isolated area of bushing, the flow needed to maintain flow rate.

provides sufficient pressure differential to allow good flow rates.

WARNINGS: the disadvantages of

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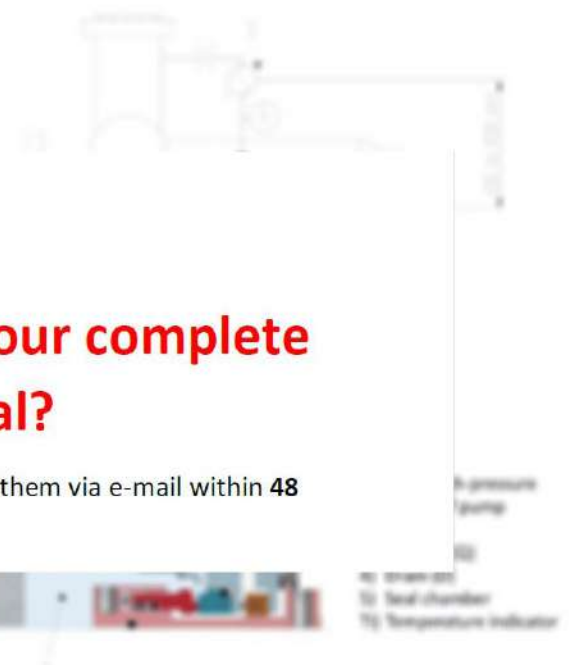
Fill in the fields in the **format above**, you will receive them via e-mail within **48 hours** of the request.

FEATURE

flush to the to improve formation

sealing element temperature limits, to reduce coking or polymerizing, or to improve lubricity. PLAN 21

plan with polymerizing fluid that may plug the orifice and connecting piping.



PLAN 22

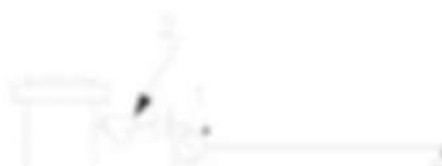
EFLUITEN

In PLAN 22 there is recirculation from a high-pressure region of pump to control of seal chamber.

FEATURE
PLAN 22 strainer particles.

WARNING
the heat fouling a formed on both the water that the process side where the fluid viscosity increases.

commonly recommended in piping plans because blockage of the strainer will cause a seal failure.



- 1) From high-pressure region of pump
- 2) Strainer
- 3) Flush (F)
- 4) Quench (Q)
- 5) Drain (D)

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