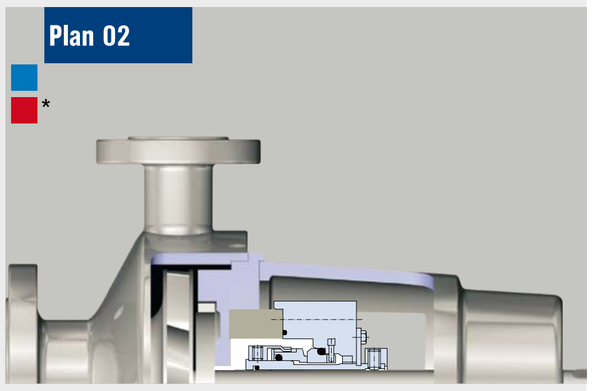
EagleBurgmann®

API 682 Most common Plans and Sealing Systems

Process side

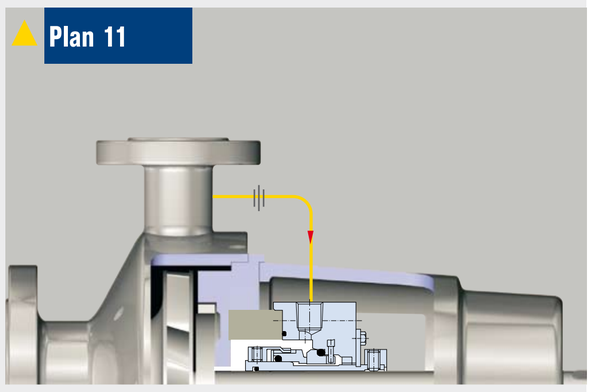
Plan 02

Seal chamber cooling or heating and neck bush are necessary, unless otherwise specified. Dead end seal chamber with no circulation. Plugged connections for possible future circulation and quench.



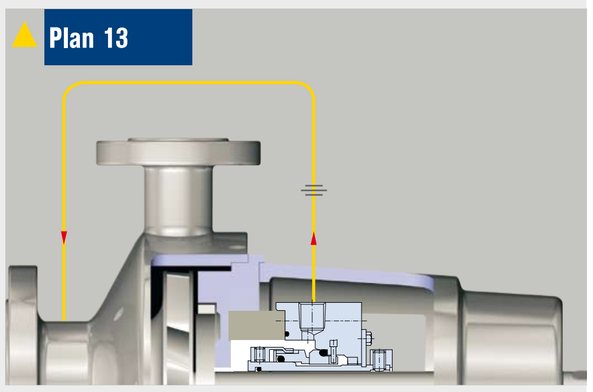
Plan 11

For general applications. Product pumped clean, good lubricating properties and heat removal from the mechanical seal. Recirculation from pump discharge through flow control orifice to the seal.



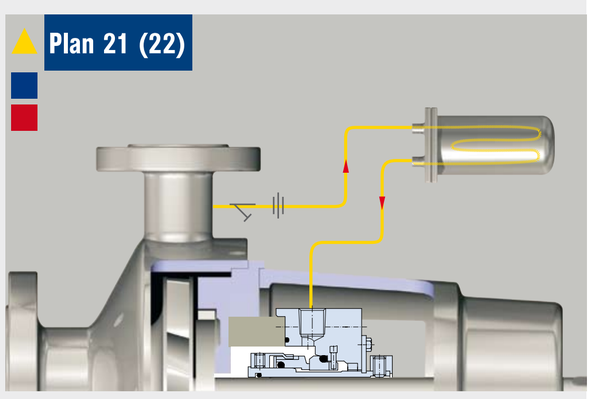
Plan 13

Used where the seal chamber pressure is at discharge pressure (mainly vertical pumps). Recirculation from pump seal chamber through a flow control orifice and back to the seal.



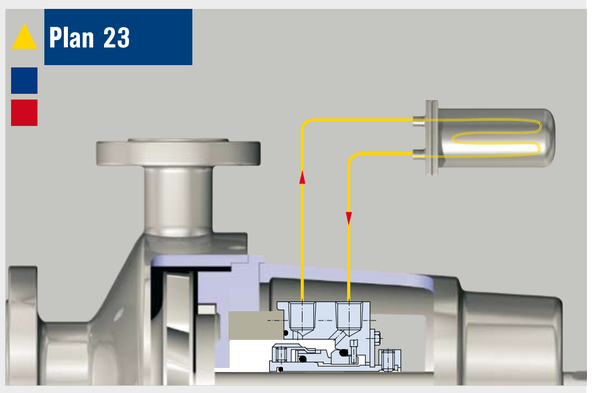
Plan 21 (22)

Used for hot applications or where the temperature and pressure in the seal chamber is close to the vapour curve of the product. Recirculation from pump discharge through a flow control orifice and cooler into the seal chamber.



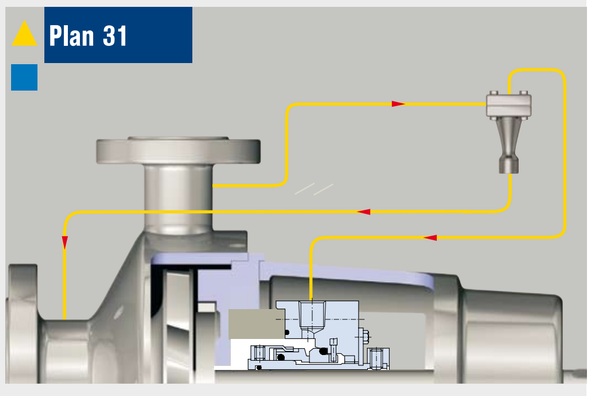
Plan 23

Used for hot liquid applications or where the temperature and pressure in the seal chamber is close to the vapour curve of the product. Recirculation by means of a pumping ring in seal chamber through a cooler and back to seal chamber.



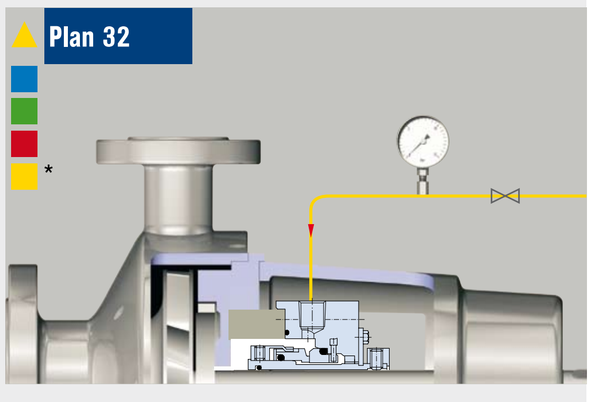
Plan 31

Used in applications with suspended solids where the SG of the particles are 2x that of the liquid. Recirculation from pump discharge through a cyclone separator, clean fluid to seal chamber, contaminated fluid to suction.



Plan 32

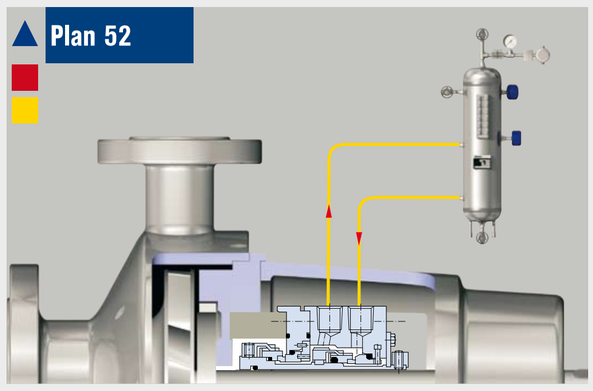
Used when the product being pumped does not have good lubrication properties, is dirty or hazardous. Flush injecton of clean fluid into the seal chamber from an external source.



Between seals

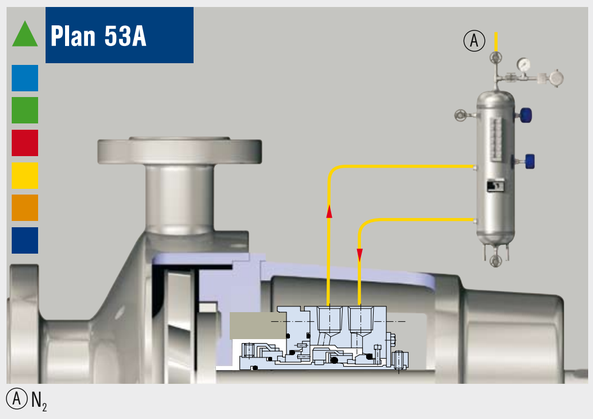
Plan 52

Used where the pumped product is harmful / hazardous and / or buffer fluid may not contaminate the product. External reservoir at pressure below seal chamber pressure providing buffer liquid forced circulation.



Plan 53A

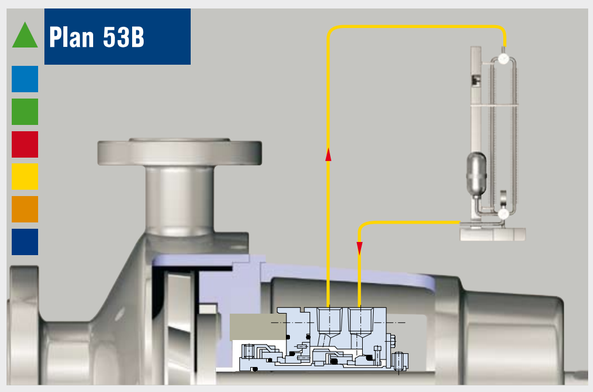
Used for hot applications or where products have low pressure and are harmful/hazardous. External reservoir pressurized above seal chamber pressure providing barrier fluid to mechanical seals. Forced circulation.



Ⓐ N_2

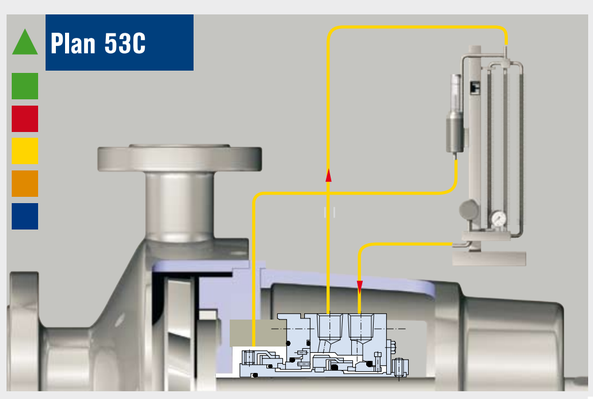
Plan 53B

Used for applications where products have high pressure and are harmful/hazardous. Pre-pressurized bladder accumulator provides pressure to circulation system. Heat removed by air/water heat exchanger. Forced circulation.



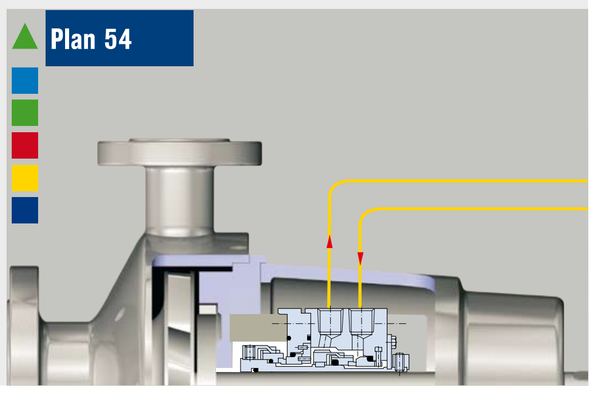
Plan 53C

Used for applications where products have high pressure and are harmful/hazardous. Pressurization by reference line from seal chamber to a piston pressure booster provides pressurized barrier fluid to circulation system. Forced circulation.



Plan 54

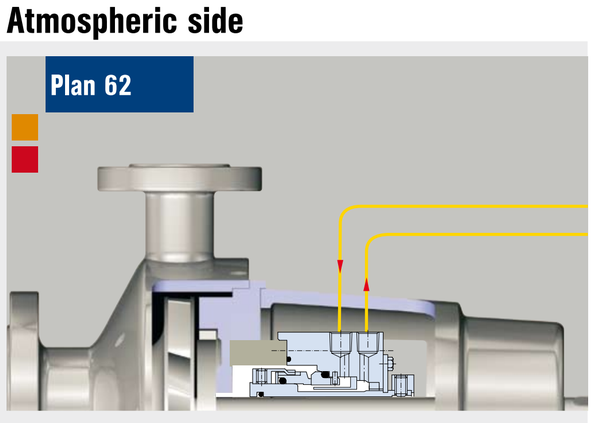
Used in harmful/hazardous applications. Pressurized clean barrier fluid from an external system. Fluid circulation by an external pump or pressure system.



Atmospheric side

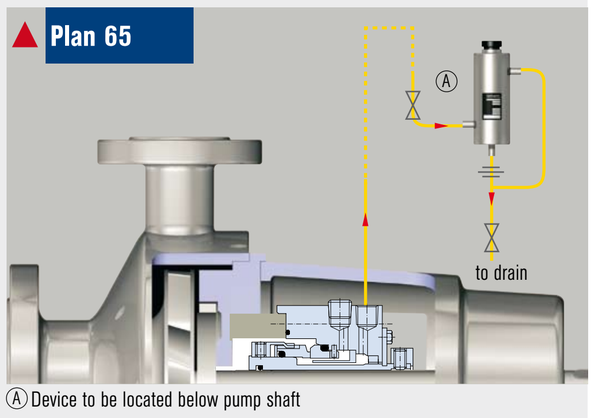
Plan 62

Used to keep atmospheric side of seal clean. External source providing a flow-through quench to atmospheric side.



Plan 65

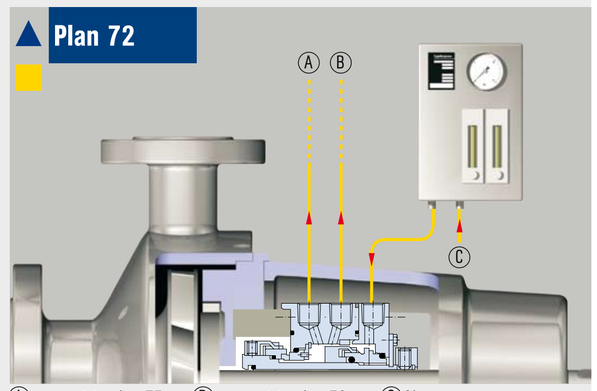
Used for leakage detection on single seal. Atmospheric side leakage collection and monitoring in external vessel.



Ⓐ Device to be located below pump shaft

Plan 72

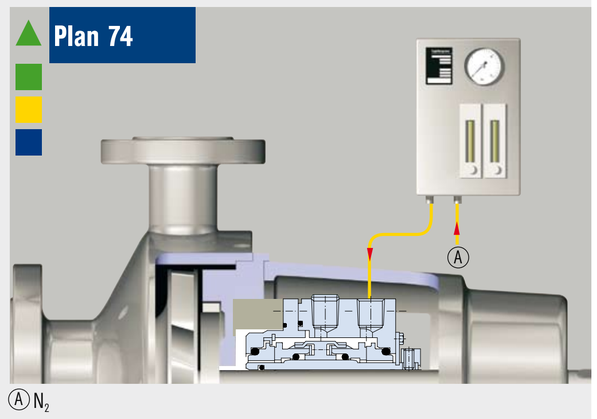
Applicable with hydrocarbons, normally used in conjunction with plan 75 or plan 76. Externally supplied gas buffer (pressure lower than seal pressure). Buffer gas used to dilute seal leakage.



Ⓐ connect to plan 75 Ⓑ connect to plan 76 Ⓒ N_2

Plan 74

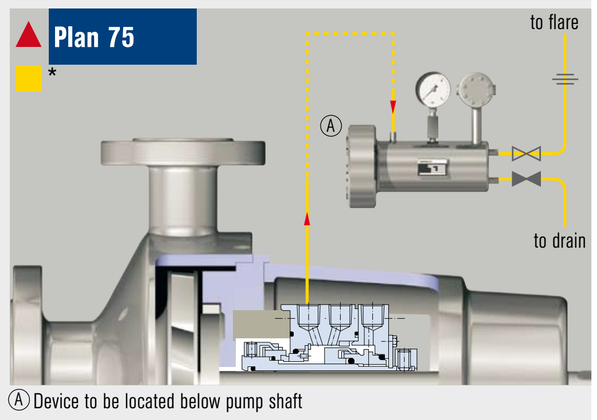
Used in applications where the product is harmful/hazardous. Externally supplied barrier gas used to positively prevent process fluid from leaking to atmosphere.



Ⓐ N_2

Plan 75

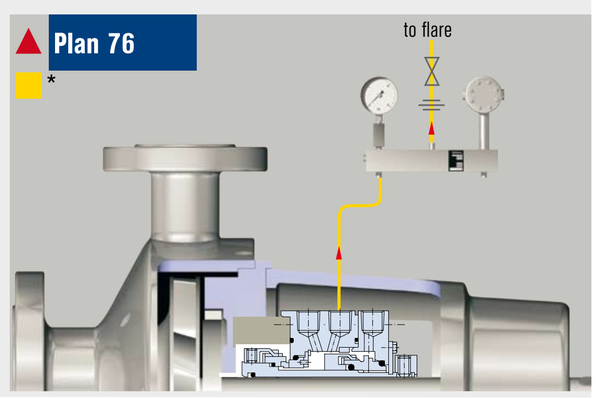
Application when pump fluid condenses at ambient temperatures. Containment seal chamber drain for condensing leakage.



Ⓐ Device to be located below pump shaft

Plan 76

Application where pump fluid does not condense at ambient temperature. Containment seal chamber drain for non-condensing leakage.



API plan functions

- Leakage alarm and collection
- Buffer systems ($p_{sealchamb} > p_{betweenseals}$)
- Barrier systems ($p_{sealchamb} < p_{betweenseals}$)
- Flushing and cooling

Media characteristics

- Suspended solids
- Poor lubrication
- High temperature
- Hazardous / harmful
- Leakage may form solids
- Close to vapourisation point

* Only in combination with additional API plan

The API 682 has emerged to become a worldwide accepted standard in today`s refinery and hydrocarbon related applications. EagleBurgmann offers a wide range of high quality mechanical seals and supply systems which fully comply with API 682.

From expert consulting and engineering up to modular TotalSealCare® service solutions for entire plants – EagleBurgmann is your reliable partner for sealing technology. Please ask also for our detailed brochure 58E, our API 682 seal selection software on CD or find your nearest contact at **www.eagleburgmann.com/world**

See reverse side of this poster for API seal classification.

API/STE / E1 / 1000 / 08.07 / 9.7 © EagleBurgmann Marketing Communications Germany

EagleBurgmann®

API 682 Seal Classification

Category		
Category 1	Category 2	Category 3
ISO 3069 type C, ASME B73.1, ASME B73.2	ISO 13709 / API 610 10th edition	
-40 °C … 260 °C, 21 bar g *(-40 °F … 500 °F, 300 PSI)*	-40 °C … 400 °C, 41 bar g *(-40 °F … 750 °F, 600 PSI)*	
Minimal data requirements		Rigorous data requirements

Arrangements	Configurations
Arrangement 1	1CW-FX
Single seal cartridge	**C**ontacting **W**et - **FiX**ed throttle bushing
	1CW-FL
	Contacting **W**et - **FL**oating throttle bushing
Arrangement 2	2CW-CW
Dual seal cartridge - pressure between seals **less than** seal chamber pressure - internal reverse balance feature	**C**ontacting **W**et - **C**ontacting **W**et
	2CW-CS
	Contacting **W**et - **C**ontainment **S**eal
	2NC-CS
	Non-**C**ontacting - **C**ontainment **S**eal
Arrangement 3	3CW-FB
Dual seal cartridge - pressure between seals **higher than** seal chamber pressure - internal reverse balance feature	**C**ontacting **W**et - **F**ace-to-**B**ack
	3CW-BB
	Contacting **W**et - **B**ack-to-**B**ack
	3CW-FF
	Contacting **W**et - **F**ace-to-**F**ace
	3NC-BB
	Non-**C**ontacting - **B**ack-to-**B**ack
	3NC-FF
	Non-**C**ontacting - **F**ace-to-**F**ace
	3NC-FB
	Non-**C**ontacting - **F**ace-to-**B**ack

Types

Type A

Pusher seal
Temperature: -40 … 176 °C *(-40 … 350 °F)*, pressure: 41 bar g *(600 PSI)*

Type B

Metal bellows seal with O-rings
Temperature: -40 … 176 °C *(-40 … 350 °F)*, pressure: 21 bar g *(300 PSI)*

Type C

Metal bellows seal with flexible graphite
Temperature: -40 … 400 °C *(-40 … 750 °F)*, pressure: 21 bar g *(300 PSI)*

Type ES

Totally **E**ngineered **S**ealing system for service conditions outside the operating limits of type A, B and C

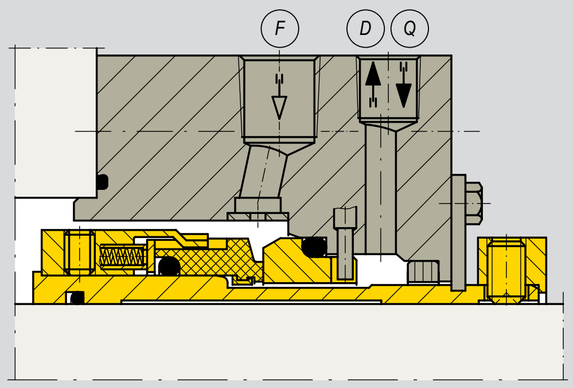
Seal Code according to API 682 3rd edition

Example	Category	Arrangement	Type	API plan(s)
	C2	**A3**	**A**	**1153A**
Category 1 = C1 Category 2 = **C2** Category 3 = C3				
Arrangement 1 = A1 Arrangement 2 = A2 Arrangement 3 = **A3**				
Type A = **A** Type B = B Type C = C				
API plans: 02, **11**, 13, 21(22), 23, 31, 32, 52, **53A**, 53B, 53C, 54, 62, 65, 72, 74, 75, 76				
Explanation of example C2A3A1153A	> Category 2 seal chamber, operating conditions and data requirements > Double seal with barrier fluid pressure higher than seal chamber pressure > Pusher type seal > API plans 11 + 53A			

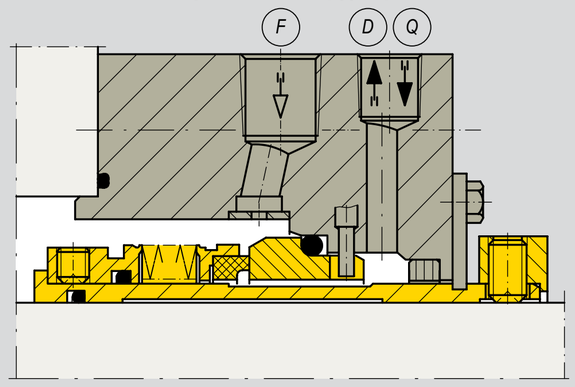
Default configurations
Optional configurations

Examples

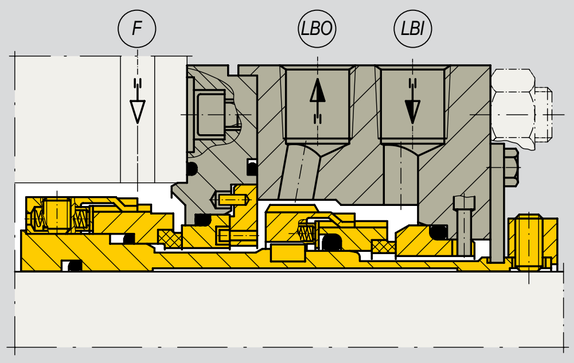
1CW-FX — **C**ontacting **W**et - **FiX**ed throttle bushing
Burgmann H75VN (Type A)



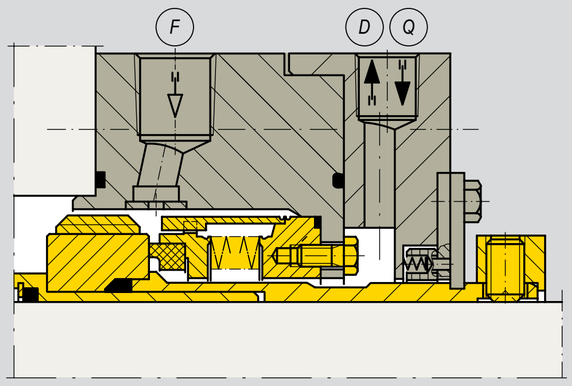
1CW-FX — **C**ontacting **W**et - **FiX**ed throttle bushing
Burgmann MFL85N (Type B)



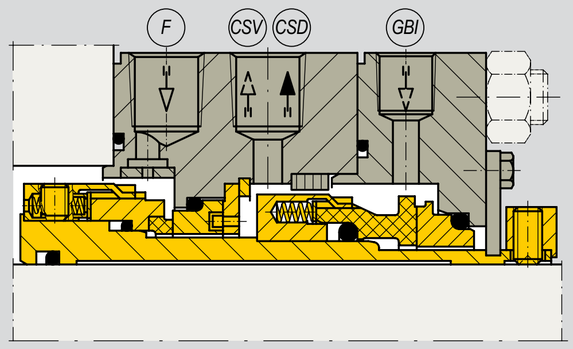
2CW-CW — **C**ontacting **W**et – **C**ontacting **W**et
Burgmann H75VK-H75P (Type A)



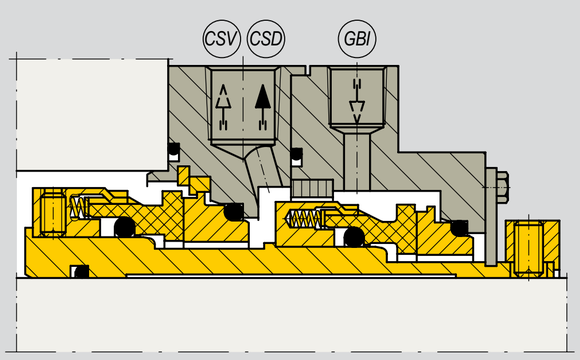
1CW-FL — **C**ontacting **W**et - **FL**oating throttle bushing
Burgmann MFL65 (Type C)



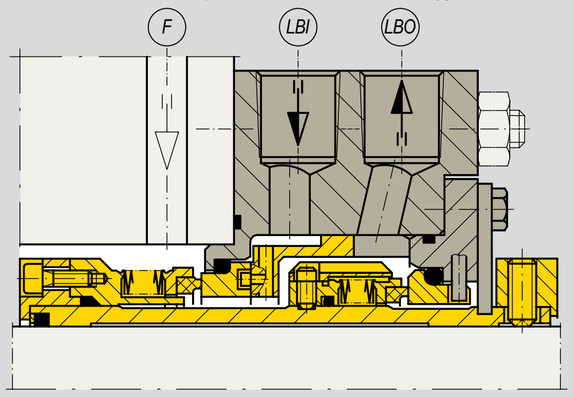
2CW-CS — **C**ontacting **W**et – **C**ontainment **S**eal
Burgmann H75VK-CGSH (Type A)



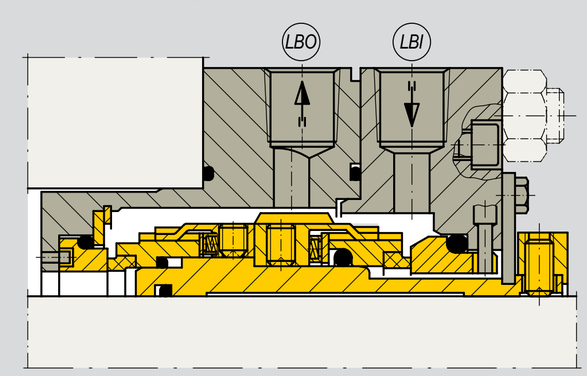
2NC-CS — **N**on-**C**ontacting – **C**ontainment-**S**eal
Burgmann CGSH-CGSH (Type A)



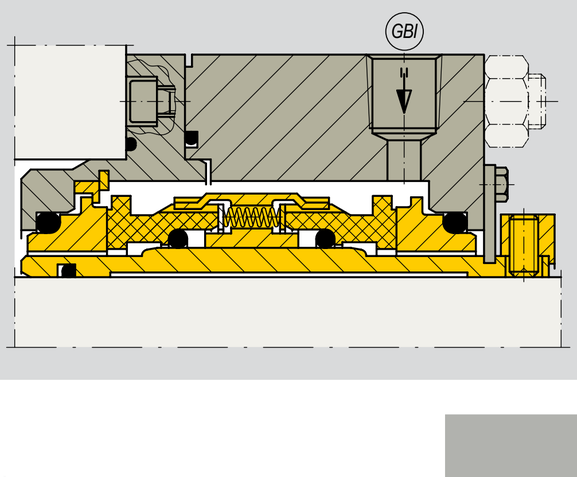
3CW-FB — **C**ontacting **W**et – **F**ace-to-**B**ack
Burgmann MFLWT90/MFL85P (Type C)



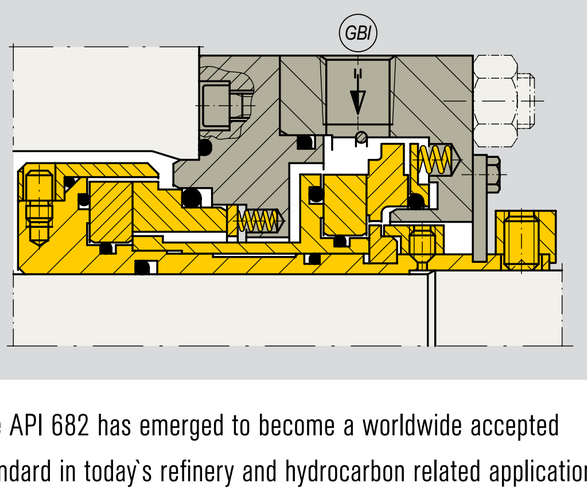
3CW-BB — **C**ontacting **W**et – **B**ack-to-**B**ack
Burgmann H75VKP-D (Type A)



3NC-BB — **N**on-**C**ontacting – **B**ack-to-**B**ack
Burgmann CGSH-KD (Type A)



3NC-FB — **N**on-**C**ontacting – **F**ace-to-**B**ack
Burgmann HRGS-DD (Type A)



Burgmann MFL WT80
Mechanical Seal

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See reverse side for most common API plans and sealing systems.

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