



DUAL METAL BELLOWS “O-RINGS FREE” MECHANICAL SEAL (API 682, TYPE C)

Description

Cartridge dual welded metal bellows mechanical seals of SD family are mainly designed for sealing hot hydrocarbons at oil refineries and petrochemical plants. Both tandem and double seals are available, with stationary or rotary metal bellows.

SD family seals correspond to API682, type C seal.

SD family seals are used for the same applications as the followings seals:

MFLWT 80 by Burgmann Germany

BXRH/BXHH by Flowserve, USA

604/606/609/3609/ECS by John Crane, USA

34 family by EKK Eagle, Japan

Advantages

- SD seals utilize welded metal bellows design **without a single o-ring** which ensures a broad temperature range of from -70°C and up to +425°C - ideal for sealing hot hydrocarbons at oil refineries and petrochemical plants.
- Due to the fact that many fluids at oil refineries and petrochemical plants like hydrogen sulfide or MEA attack viton o_rings, SD seals are widely used instead of o-ring seals.
- Metal bellows is highly resistant to cocking as compared to mechanical seals with o-rings.
- Metal bellows mechanical seals are balanced which reduces heat buildup.
- Both stationary and rotary metal bellows are available.
- Almost the only stationary bellows tandem seal on the market fitting API 610 standard seal chambers.

Materials	
Metal bellows	Inconel 718 Alloy 276 AM350
Seal faces	Tungsten carbide, Silicon carbide, Carbon, Trembide 85, Trembide 50
Secondary seals	Flexible graphite
Metal parts	SS304 SS316 SS321H, Special alloys

Technical data	
Temperature	From -70 up to +425°C
Dynamic Pressure	Up to 65 bar (with reinforced metal bellows)
Static pressure	Up to 90bar.
Velocity	Up to 50 m/sec (with standard metal bellows)

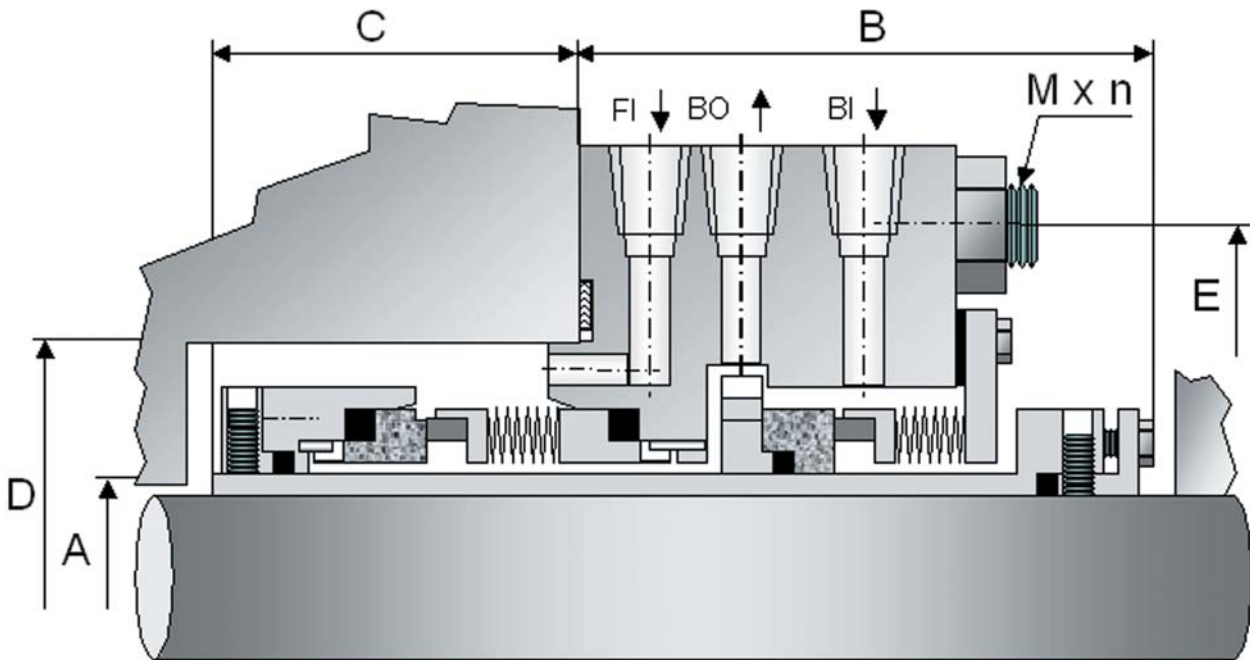
Recommended API Plans for SD seals

API Plan (per API 682)	Description	Application guidelines	Auxiliary units
52	Non-pressurized external fluid reservoir with forced circulation	Most of light and heavy hydrocarbons, alcohols, solvents, etc	Barrier fluid tank with heat exchanger SO-1 (high temperature applications) or SO-3, SO-4, SO-5 with ball valves and instrumentation
53	Pressurized external fluid reservoir with forced circulation	Fluids with high content of mechanical impurities, hazardous fluids, crystallizing fluids	
54	Circulation of clean fluid from external system	Fluids with solids, crystallizing fluids	-
11, 13	Recirculation from pump case through orifice to seal	VOCs	-
62	Steam or nitrogen quench supplied after the inboard seal	Coking and solidifying fluids (mostly hydrocarbons)	Supply system for the dry-running outboard seal

All of the above systems can be supplied with:

- level sensors/indicators
- pressure switch, temperature sensor
- safety valve
- ball valves
- and other C&I devices and valves

SD mechanical seal diagram (stationary inner seal shown)



SD seal for Russian hot oil pump NK560/335-180.



SD seals were successfully designed for the pumps of many famous manufacturers:

- Sulzer
- Flowserve
- Worthington
- KSB
- Byron Jackson
- RuhrPumpen
- EBARA
- Nigata
- Ingersoll Dresser Pumps



"... In 2003 the SD TREM Engineering "o-ring free" seals were installed (API plan 52) at hot heavy hydrocarbon and residue pumps of tar cracking unit. The seals were installed without any additional heat exchangers or injection of cooled fluids into stuffing box. After 20months of operation all seals are still running well without any problems."

Sibneft-Omsk refinery

"...Tandem SD seals work well (API plan 62) at hot residue pumps without barrier fluid and additional cooling and show the same good durability as previously installed seals by Sealol(UK)"

LUKOIL-Volgograd refinery

