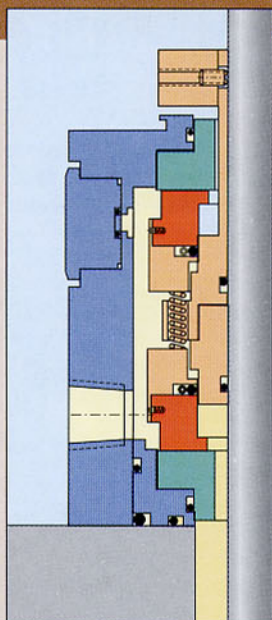


ML-200



PHARMACEUTICAL



MINERAL & ORE



CARTRIDGE



APGS



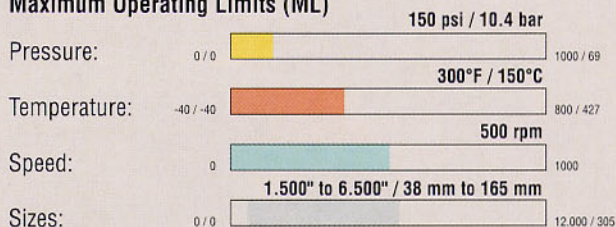
Dry
contacting

Flowserve FSD M-series are specifically engineered for mixer applications and can be configured to operate wet, dry or with the latest non-contacting gas barrier technology by changing out the faces. The type ML-200 uses the non-contacting technology to provide zero emissions performance.

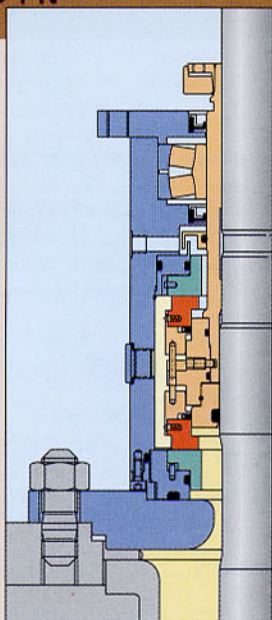
MW-200 As above, but liquid lubricated, option for internal cooling coil, Pressure: To 500 psi / 35.4 bar, Temperature: To 500°F / 260°C, Speed: To 250 rpm

MD-200 As above, but contacting gas barrier, self-lubricating faces providing an alternative to liquid seals and packing, Pressure: To 125 psi / 8.5 bar (speed dependant), Speed: To 250 rpm.

Maximum Operating Limits (ML)



ML-200 DIN



PHARMACEUTICAL



MINERAL & ORE



CARTRIDGE



APGS



Dry
contacting



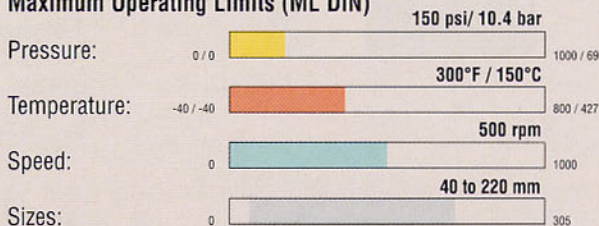
DIN
28138

The modular ML DIN series is based on the DIN standard, and uses the M-series basic seals to be configured to operate wet, dry or with the latest non-contacting gas barrier technology by changing out the faces. The ML-200 DIN EB uses the non-contacting gas barrier faces, incorporates a bearing (B) and is designed for glass-lined vessels (E). The ML-200 DIN SB is designed for steel vessels (S), and incorporates a bearing (B), where the ML-200 DIN S is without bearing.

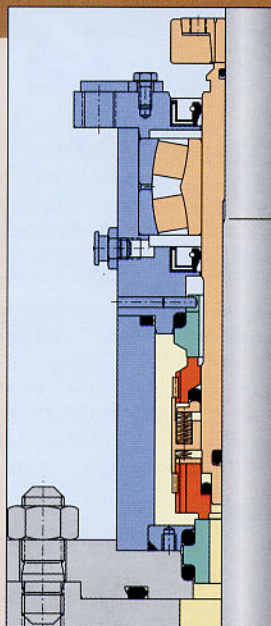
MW-200 DIN: As above, liquid lubricated, Pressure: To 230 psi / 16 bar, Temperature: To 500°F / 260°C.

MD-200 DIN: As above, contacting gas barrier, self-lubricating faces providing an alternative to liquid seals and packing, Pressure in vessel: To 90 psi / 6 bar (speed dependant), Speed: To 250 rpm.

Maximum Operating Limits (ML DIN)



2564



PHARMACEUTICAL



MINERAL & ORE



CARTRIDGE

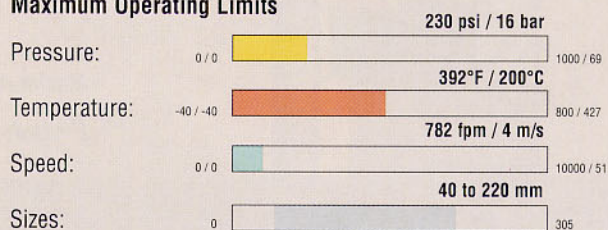


DIN
28138

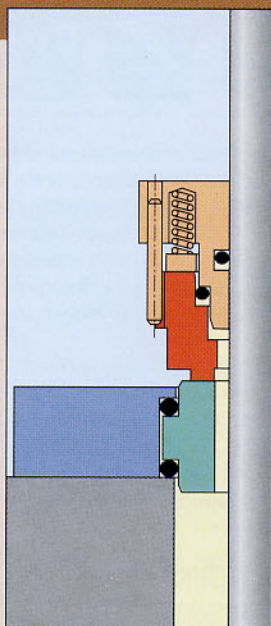
The modular 2560 series is based on the DIN standard, and uses the standard liquid seal components. The 2564 contains a double liquid seal, incorporates a bearing and is designed for steel vessels.

2561-2566 As above, single/double executions, with/without bearing and easy to clean design (double seal). Single and cleanable seals have reduced pressure, speed and temperature limits.

Maximum Operating Limits



VRA



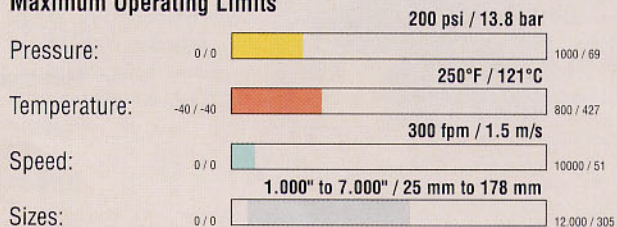
PHARMACEUTICAL



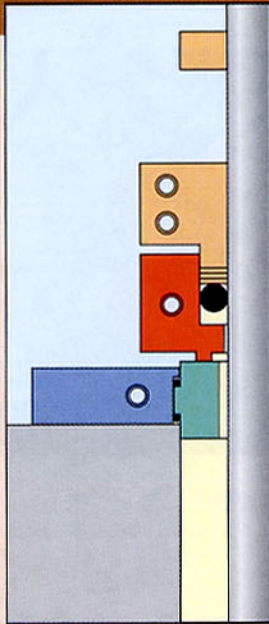
Single, outside, dry-running pusher seal designed specifically for use in top-entry agitator/mixer services. This seal's heavy-duty construction accommodates a combined out-of-concentricity and eccentricity of 0.150" TIR (3.8 mm). The contacting dry-running design eliminates need for buffer fluid system. Milled slots and mating pins in the drive collar evenly distribute torque to the faces to eliminate stress areas.

VRA-C As above, no wetted metal parts, with a sanitary gland for steam cleaning.

Maximum Operating Limits



MSS

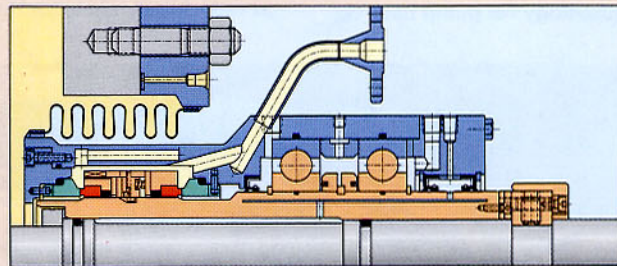
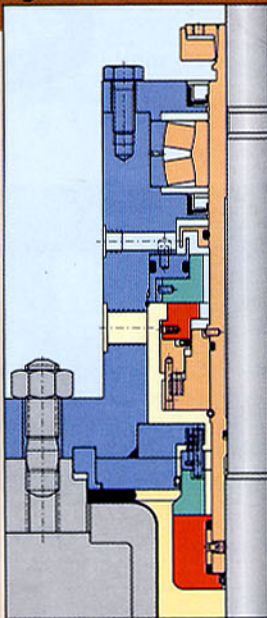


Split, single outside seal designed for use on large, heavy or inaccessible equipment where seal changeout is costly or prohibitive. Split design facilitates installation without dismantling the equipment. Self-lubricating faces dissipate heat and can be run dry. Also, withstands pressure reversals common to agitator services. Very easy to install & maintain. Runouts to 0.150" TIR (3.8 mm). Non-metallic wetted parts.

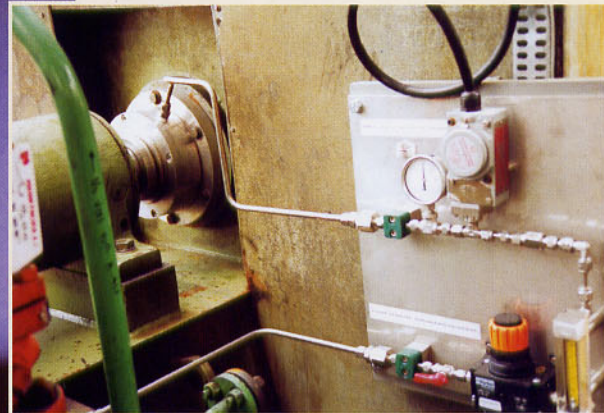
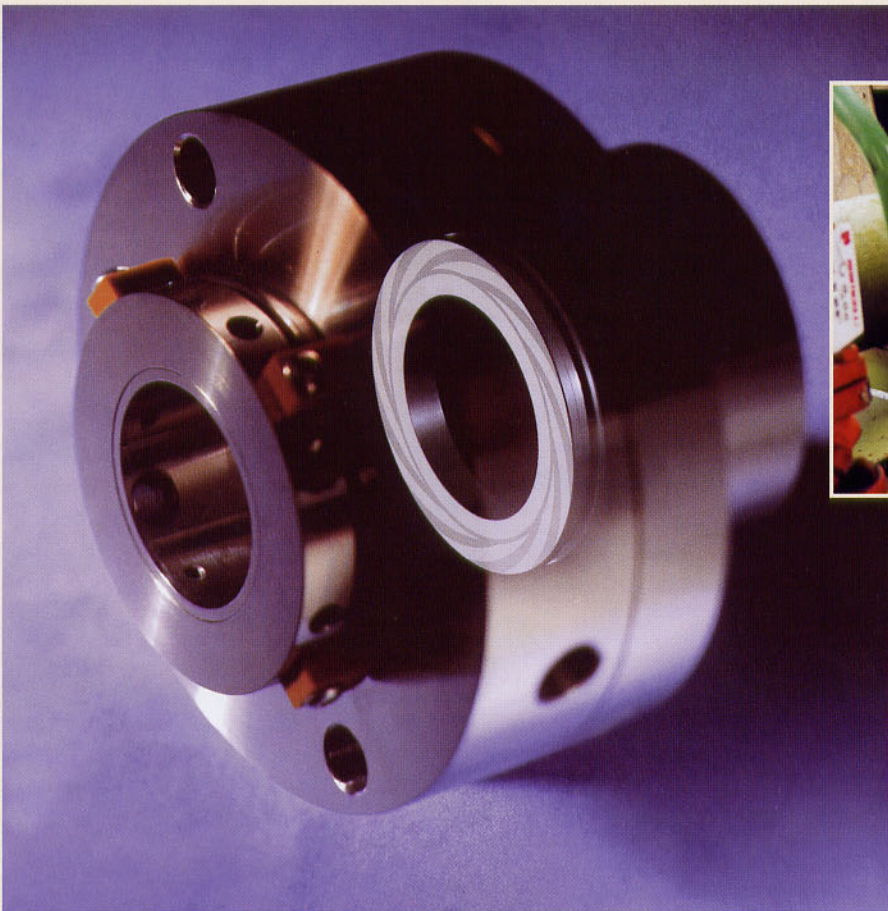
Maximum Operating Limits

	wet 100 psi / 6.9 bar - dry 75 psi / 5.2 bar	
Pressure:	0 / 0	1000 / 69
	250°F / 121°C	
Temperature:	-40 / -40	800 / 427
	2200 fpm / 11 m/s	
Speed:	0 / 0	10000 / 51
	1.000" to 12.000" / 25 mm to 305 mm	
Sizes:	0 / 0	12,000 / 305

Custom Engineered



In many cases the equipment to be sealed is custom engineered, which requires special sealing solutions. Flowserve FSD has a dedicated team of mixer seal engineers who are able to design a mixer seal to handle special requirements, such as large axial and radial movements, large sizes, high pressures, high temperatures. Use of existing basic seal parts is made as much as possible, but if necessary new designs can be made.



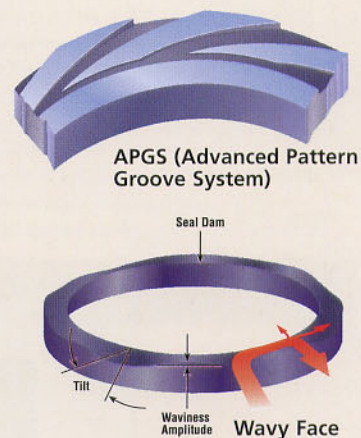
Gas seal technology and gas seal operation depends on aerostatic and aerodynamic forces. Careful design keeps the two faces separated by a gas film of 40-80 μin / 1-2 μm . Aerodynamic forces are created by the presence of a 'pattern' on one of the faces. Flowserve uses:

- APGS technology for compressor, pump and mixer seals, unidirectional
- wavy face technology for pump back-up,

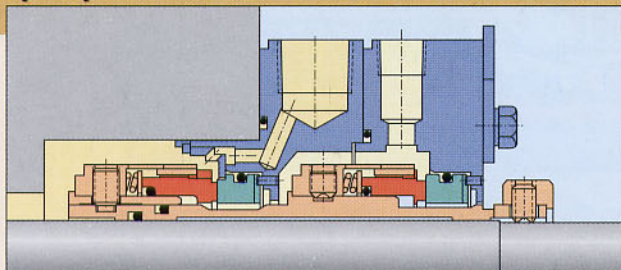
steam turbine and special OEM seals, bi-directional

- contacting dry face technology for back-up seals.

Each pattern has its specific advantages and is carefully matched to the seal and its application. The force equilibrium is more delicate than with a liquid seal. It is essential to control face pressure deformation, as well as reducing dynamic gasket axial friction.



Q B Q / G S D



REF. & PETROCHEM.



Dry running contacting, balanced, multi spring back-up seal for reliable, long life containment performance in hydrocarbon services. Offers longer life than conventional dry running plain face continuous contact technology. No barrier fluid required, simplifies operation in tandem configurations. Shares many parts with the QB seal.

Maximum Operating Limits

dry to normal flare pressure - wet 300 psi / 20.7 bar

Pressure: 0 / 0 1000 / 69

400°F / 204°C

Temperature: -40 / -40 800 / 427

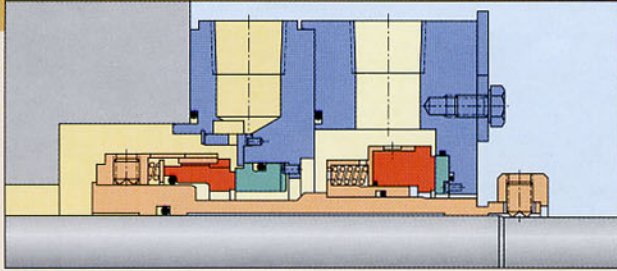
4500 fpm / 23 m/s

Speed: 0 / 0 10000 / 51

1.000" to 3.500" / 25 mm to 89 mm

Sizes: 0 / 0 12.000 / 305

Q B Q / G S L



REF. & PETROCHEM.



PIPELINE



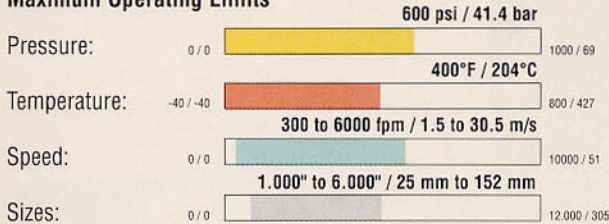
WAVY



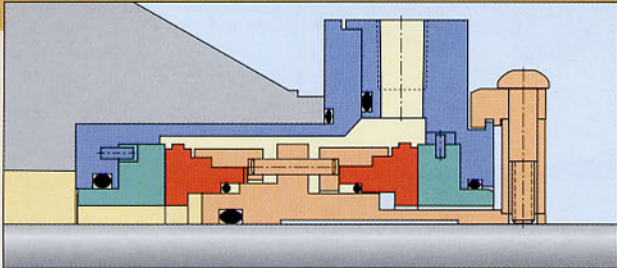
LHC

Non-contacting bi-directional, balanced, multi spring seal provides full back-up containment with no wear for light hydrocarbons, crude oil and other applications. Features patented Wavy Face seal technology as part of the stationary face which provides lift-off in gaseous environments and extremely low torque under liquid conditions.

Maximum Operating Limits



G F - 2 0 0



REF. & PETROCHEM.



CHEMICAL



CARTRIDGE



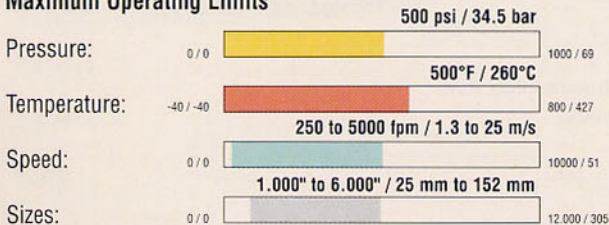
APGS



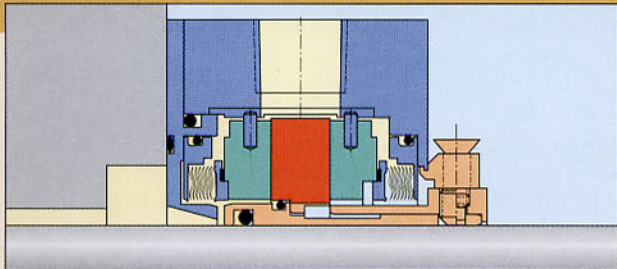
ANSI
ENLARGED

Dual pressurized, non-contacting design used in applications where no emissions of hazardous pumped product can be tolerated. Seal uses inert gas barrier, such as nitrogen for lift-off, which eliminates contamination of pumped product by a buffer fluid. Provides total containment, even if outer seal fails. Uses Advanced Pattern Groove System faces, which insures low speed lift-off, low gas leakage and no face contact. Standard designs for ANSI enlarged bore pumps.

Maximum Operating Limits



G X - 2 0 0



CHEMICAL



CARTRIDGE



APGS



ANSI
ISO
DIN

Dual pressurized, non-contacting externally mounted bellows seal, cartridge for standard bore ANSI and DIN pumps. Designed to upgrade any standard bore ANSI or DIN pump to reliable gas barrier performance. Provides total containment, even if outer seal fails. Uses Advanced Pattern Groove System faces, which insures low speed lift-off, low gas leakage and no face contact.

Maximum Operating Limits

