

World's most comprehensive laboratory devoted to the applied research of mixer seals

As a leader in mixer seal technology for over 30 years, Flowserve has made a major investment in equipment and engineering talent to outfit a complete research and development center. Our primary objective is to study and test mixer seals...it's just what you'd expect from a leader.

The Flowserve Mixer Seal Laboratory is where the unique design parameters of mixer seal technology are thoroughly analyzed and understood. Slow speed lift-off, O-ring drag through various temperatures and pressures, and the need to optimize spiral groove designs under different conditions for low-speed rotating equipment are among the many engineering challenges addressed in the laboratory.

Proprietary Flowserve-designed instrumentation and automated bench-testing devices are used around the clock to not only discover the hidden factors that influence mixer seal performance, but also to thoroughly test the design prototypes to real-world performance standards. The final inspections include conventional checks on all parts and detailed audits through analytical models to predict leakage.

Every mixer seal you buy from Flowserve is totally engineered, from concept through final production, to meet the operating requirements of mixer applications. The body of knowledge that is discovered in the Flowserve Mixer Seal Laboratory, and the products that grow out of our continued research, assure state-of-the-art performance.



Flow Solutions Division

BW Seals
 Durametallic Seals
 Pacific Wietz Seals
 Pac-Seal

Specifications for M-Series Mixer Seals

General Specifications

| Seal Type | MW-200 | | MD-200 | | ML-200 | |
|-------------------------------|-------------------------|---------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Maximum Barrier Pressure | 500 psig | 35 bar | 125 psig | 8.5 bar | 150 psig | 10 bar |
| Minimum Pressure Differential | 25 psi (1.8 bar) | | 25 psi (1.8 bar) | | 50 psi (3.5 bar) | |
| Leakage | <10 cc/day max. | | <1 SCFH/in shaft size* | <1.1 LPH/mm shaft size* | <1 SCFH/in shaft size* | <1.1 LPH/mm shaft size* |
| Run-out | .125"/3mm radial F.I.M. | | .125"/3mm radial F.I.M. | | .125"/3mm radial F.I.M. | |
| Vessel Temperature Range | -40° to 500°F | -40° to 260°C | -40° to 300°F | -40° to 150°C | -40° to 300°F | -40° to 150°C |
| Speed Range | 0-225 rpm | | 0-225 rpm** | | 0-500 rpm | |

Standard Materials for Platform Seal by Seal Type

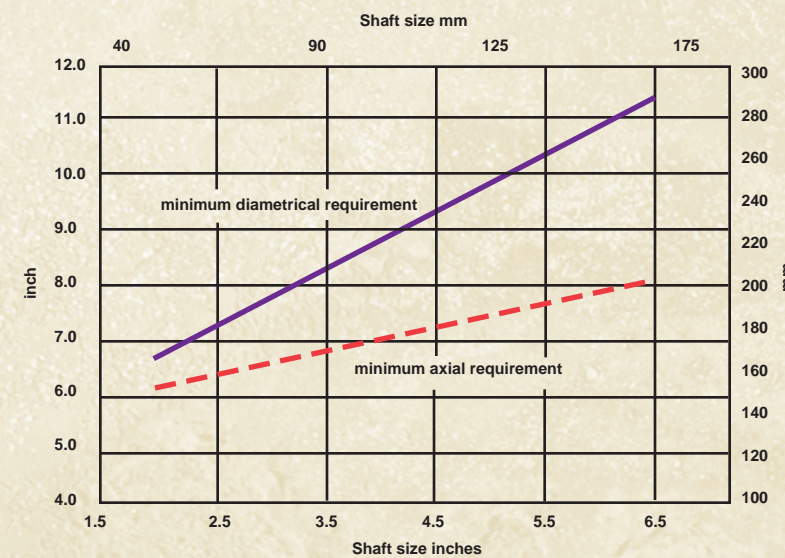
| Seal Type | Housing, Sleeve and Insert Holder | Rotor | Stator |
|-----------|-----------------------------------|--------|---------------------|
| MD-200 | 316 Stainless Steel | Carbon | High Purity Ceramic |
| MW-200 | 316 Stainless Steel | Carbon | Silicon Carbide |
| ML-200 | 316 Stainless Steel | Carbon | Silicon Carbide |

High alloy options are available for the insert holder and sleeve. Food grade materials are also available. Please contact your local Flowserve representative or distributor for further information.

* At minimum differential pressure.

** Actual speeds and pressures dictated by material characteristics.

Minimum Seal Envelope Requirements



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Primary Worldwide Flow Solutions Division Locations

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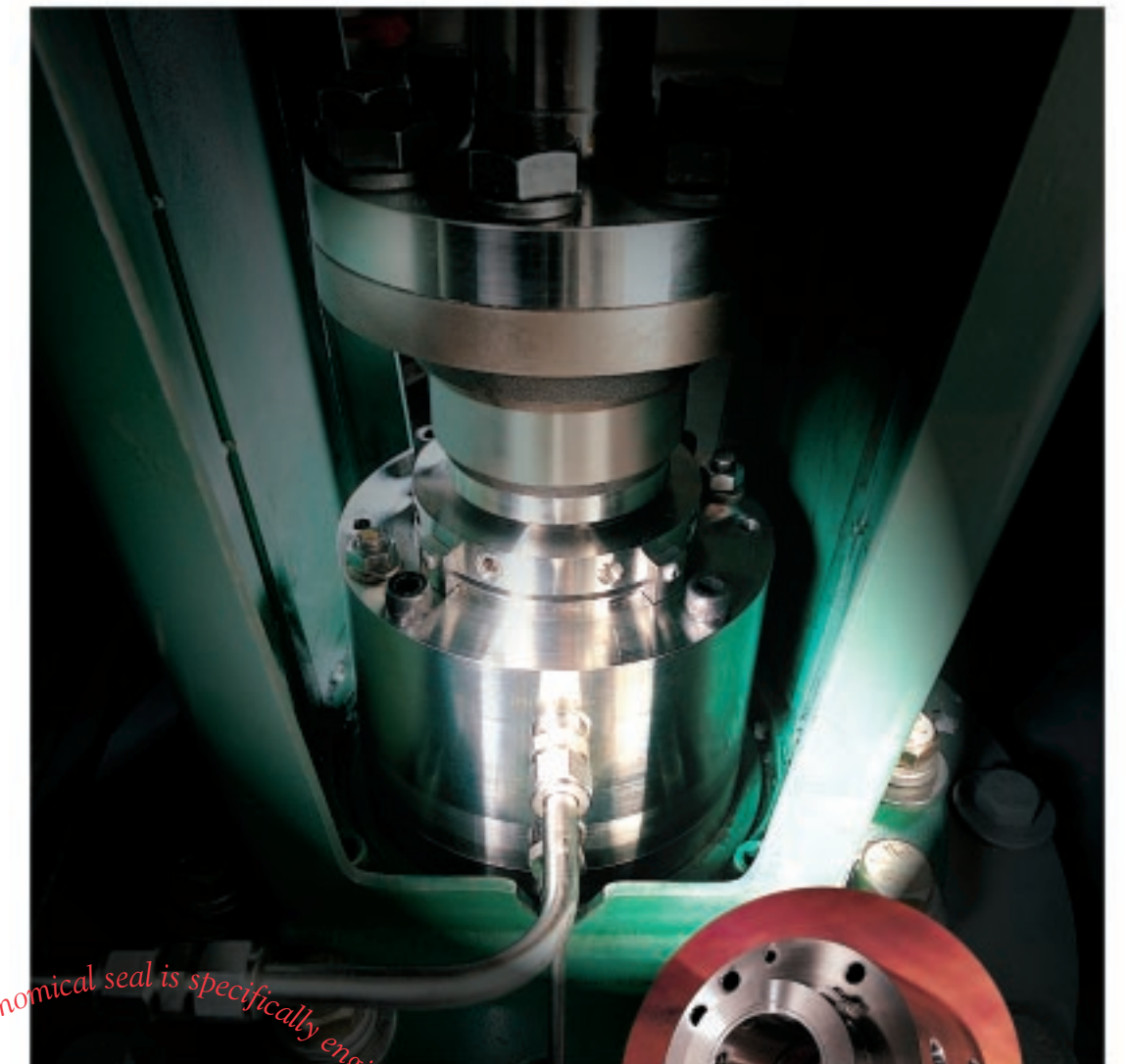
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Flow Solutions Division

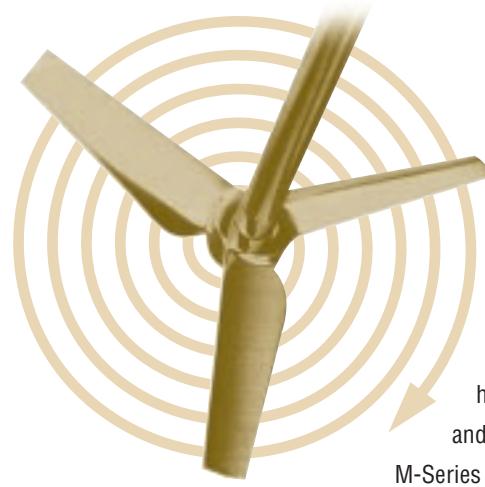
The new M-Series Seal



This economical seal is specifically engineered for today's most demanding mixer platform applications

The M-Series Seal is a genuine engineering breakthrough...

it can be configured to operate wet, dry, or with the latest non-contacting gas barrier technology for the utmost in performance, application flexibility, and economy.



If you produce equipment to blend or mix pharmaceuticals, food, polymers, thermoplastics, adhesives, silicones, or any other batching mixture, there's only one mixer platform seal you need: the new M-Series seal. It's the only dual pressurized cartridge canister seal line specifically engineered to meet the lower rpm's, higher pressures, and increased temperatures of today's mixer, dryer, and low-speed agitating equipment designs. In addition, the unique M-Series platform allows you to adapt the mixer seal to changing production requirements without investing in an entirely different seal. That's because you can run this revolutionary seal wet, dry, or with the latest non-contacting gas barrier technology by changing out the seal faces. With unprecedented application flexibility within one cartridge unit seal housing, the M-Series design reduces the number of different component parts in inventory and provides interchangeable parts across the product line for true component standardization.

Handles shaft run-out up to .125" (3 mm) F.I.M.

While many mechanical mixer seals on the market today are merely modified pump seals that do not fully address your mixer seal problems, the M-Series seal takes an entirely different approach. Since mixer service frequently involves shaft run-out, bore run-out, and O.D. run-out which can exceed the capabilities of seals designed for centrifugal pumps, the M-Series seal features radial clearances which permit the seal to handle shaft run-out up to .125" (3 mm) Full Indicator Movement (F.I.M.), and makes the M-Series ideal for use where shaft wobble and eccentricities are most severe. Moreover, the seal's shaft-centered cartridge design permits centering on the shaft instead of the vessel pilot, thus making mixer shaft to flange concentricity less critical.



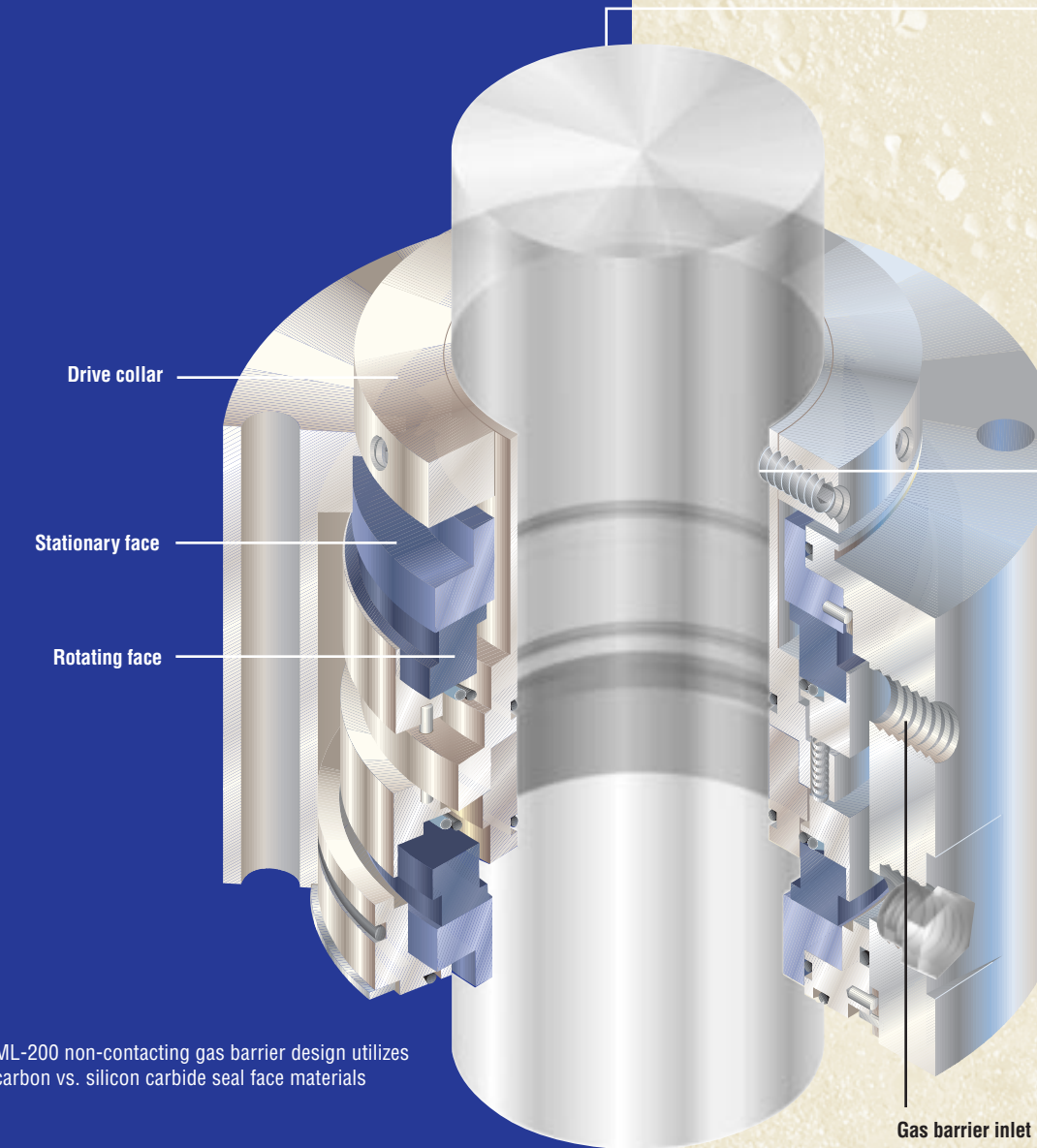
This economical seal is specifically engineered for today's most demanding mixer platform applications

Available in three seal types engineered to fit in a standardized seal envelope

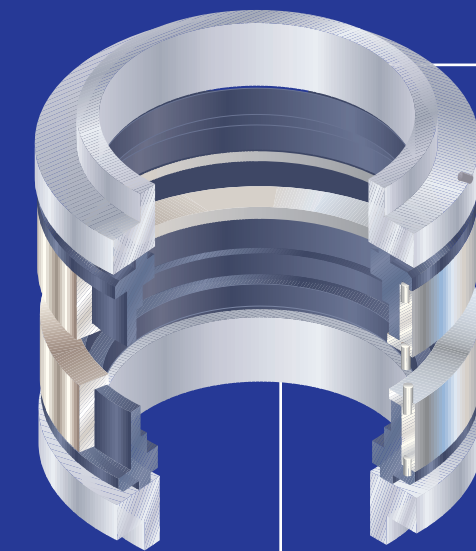
FLOWSERVE offers three different M-Series styles to meet the performance characteristics of your particular application. And because they are engineered for maximum application flexibility, you may select and then economically modify any of these seals in the future as your production needs change.

Key features and benefits for the M-Series platform include:

- Pre-engineered seal package design permits interchangeability of seal housing, sleeves, and glands for application in liquid-lubricated, dry-running or full fluid film face technology.
- Non-contacting gas barrier technology allows operation down to ZERO rpm.
- Provides simplified changing from a liquid lubricated to a contacting gas, or to a non-contacting gas seal, by merely changing both seal faces.
- Tolerates up to .125" (3 mm) F.I.M. (Full Indicator Movement) run-out. Eliminates bearing from the housing, permits reduced shaft diameters for lower cost.
- Available in sizes from 2.000" to 6.500" (50 mm to 160 mm).
- Preplanned configuration offers the greatest design flexibility.
 - Standard shaft-centered seal housings reduce the need for critical shaft to flange bore radial alignment (concentricity).
 - Standard eye bolts and jack screws provide greater ease of installation and removal.
 - Economical high alloy option for superior performance in harsh, corrosive environments.
 - Accommodates sanitary gland / debris catcher for applications requiring steam cleaning.
 - Cooling coil inside seal housing for efficient heat removal in the seal area.
 - MD and MW designs feature pressure reversal capabilities for greater seal integrity under off-design operation.
 - Hydraulically balanced stators to reduce high pressure loading, minimizing seal face distortion and leakage.

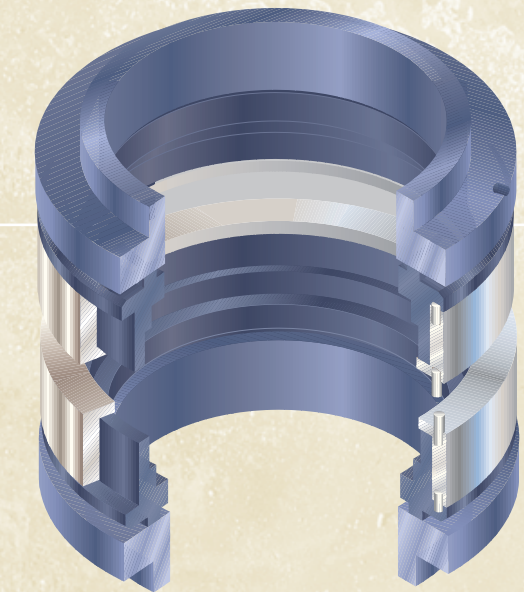


ML-200 non-contacting gas barrier design utilizes carbon vs. silicon carbide seal face materials



MD-200 contacting gas barrier dry-running design.

- Dry-running for minimized product contamination from barrier fluid.
- Requires no cooling.
- Features self-lubricating faces.
- Utilizes carbon vs. peramic face materials.

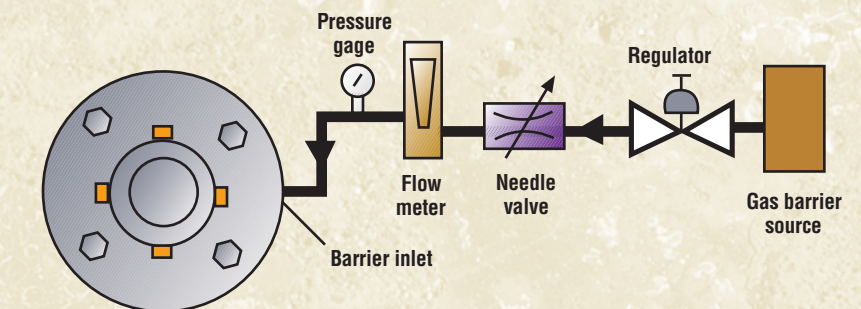


MW-200 liquid lubricated design.

- Cooling coil options available.
- Maximum operating vessel temperature 500°F (260°C).
- Utilizes carbon vs. silicon carbide face materials.

ML-200 today's most advanced non-contacting gas barrier technology.

- A true zero emissions seal—there's no product contamination.
- Ideal for today's most demanding pharmaceutical and chemical processing applications.
- Operates with a simple gas barrier auxiliary system.
- Easy to install and maintain.
- Exclusive face pattern provides both hydrostatic and hydrodynamic lift.
- Seal faces lift off and separate under static pressure regardless of peripheral speed.
- Face groove pattern optimizes lift capabilities, ensures maximum gas film stiffness.
- Completely eliminates seal face contact and wear.
- Utilizes carbon vs. silicon carbide face materials.



Simple installation and piping for the M-Series Type ML-200 gas barrier seal