Improving Dual Mechanical Seal Reliability in Oil, Gas & Petrochemical Service

Pumps, mixers and other process equipment in oil, gas and petrochemical operations often handle hazardous, volatile or difficult fluids where seal reliability is essential to uptime, safety and cost control. Royal Purple® Industrial synthetic barrier fluids help support stable dual mechanical seal performance by providing lubrication, cooling, thermal stability, fluid cleanliness and broad application coverage across demanding process environments.

WHY DUAL MECHANICAL SEAL RELIABILITY IS DEMANDING

- Process equipment may handle hydrocarbon gases, aqueous acids, bases or other difficult fluids that require a nonreactive barrier fluid.
- Elevated temperatures can increase the risk of deposit formation and carbon seal face distress.
- Moisture, impurities and particulates can contribute to seal erosion, abrasion, poor performance and shortened seal life.
- Cold-weather service can require dependable low-temperature fluidity.
- Maintenance and procurement teams often need to reduce fluid complexity without compromising performance in critical applications.
- Seal failures can create unplanned downtime, increased maintenance costs and process interruptions.

CRITICAL DUAL SEAL APPLICATIONS

Pumps & Process Transfer Equipment

Dual mechanical seals in pumps handling hazardous or volatile fluids need a barrier fluid that provides stable lubrication, cooling and compatibility across a wide operating range.

Mixers & Agitators

Mixing equipment can expose seals to variable loads, temperature swings and process-fluid challenges. A stable synthetic barrier fluid helps support seal face protection and heat management.

Hydrocarbon & Chemical Process Systems

In refinery, petrochemical and industrial gas operations, seal systems may require nonreactive fluids that do not react with most hydrocarbon gases, aqueous acids or bases.

High-Temperature Seal Service

Applications with elevated temperatures benefit from thermal stability and deposit control to help protect carbon seal faces and maintain reliable operation.

CLEANLINESS IS CRITICAL

In dual mechanical seal systems, the barrier fluid is not just a lubricant; it is part of the seal environment. Clean barrier fluid helps maintain a stable lubricating film between seal faces, supports heat transfer, and reduces the risk that hard particles or contamination will disrupt the interface where the seal must remain controlled and consistent.

Even small amounts of particulate, moisture or process contamination can contribute to abrasion, erosion, deposit formation, seal face distress and shortened seal life. In critical pumps and mixers, cleaner barrier fluid also supports more predictable performance after installation, during changeouts and throughout routine maintenance.

Royal Purple Industrial Barrier Fluid GT® and Barrier Fluid FDA® are manufactured to meet or exceed a typical ISO 4406 cleanliness code of 14/13/11. That cleanliness level helps plants start with a cleaner fluid in the reservoir, reducing one avoidable source of seal-system risk before the equipment goes into service.

RECOMMENDED RPI PRODUCTS

Barrier Fluid GT

Recommended fit: Dual mechanical seals, including tandem and double configurations; especially elevated-temperature service where nitrogen purge is not an option and food-grade purity is not required.
Why it fits: Designed for lubrication and cooling, with excellent heat transfer properties, very low moisture content, thermal stability and broad elastomer compatibility. Manufactured to meet or exceed a typical ISO 4406 cleanliness code of 14/13/11.

Barrier Fluid FDA

Recommended fit: Dual mechanical seals used in pumps, mixers and equipment handling hazardous or volatile fluids where incidental food-contact requirements may apply.
Why it fits: Provides lubrication, cooling, thermal stability and wide-temperature performance, while offering NSF H1 registration, and Kosher and Halal certifications. Manufactured to meet or exceed a typical ISO 4406 cleanliness code of 14/13/11.

BEST PRACTICES FOR BARRIER FLUID SELECTION

- Match the barrier fluid to seal type, operating temperature, process-fluid exposure and elastomer compatibility.
- Confirm whether food-grade requirements apply before selecting a barrier fluid.
- Use low-moisture, clean barrier fluids to help reduce seal erosion risks.
- Verify barrier fluid cleanliness before installation and keep transfer containers, reservoirs and handling equipment clean to preserve the fluid cleanliness delivered in the package.
- Avoid mixing incompatible fluid chemistries, including glycol or silicone synthetics where not recommended.
- Review elevated-temperature applications separately because heat transfer, thermal stability and deposit control become more critical.
- Standardize fluids where possible, but only when the selected product fits the seal system and process conditions.

RELIABILITY SUPPORT

Assess	Control	Sustain
Royal Purple Industrial technical consultants can review seal applications, process conditions and current barrier fluid practices.	Product-specific guidance can help plants select the right barrier fluid, improve storage and handling practices, and reduce avoidable contamination.	Ongoing support helps maintenance teams preserve seal reliability, consolidate products where appropriate and strengthen lubrication practices across process systems.

BENEFITS FOR PLANT TEAMS

- **Maintenance teams** gain a clearer path to improved seal performance and fewer avoidable seal-related issues.
- **Reliability leaders** get application-specific support for pumps, mixers and critical process assets.
- **Procurement teams** can evaluate consolidation opportunities with barrier fluids available across multiple viscosities.
- **Plant leaders** benefit from a lubrication approach focused on uptime, production continuity and long-term profitability.

GET EXPERT APPLICATION SUPPORT

Royal Purple Industrial technical consultants can help evaluate dual mechanical seal applications, identify the right barrier fluid for operating conditions, and support lubrication reliability programs across oil, gas and petrochemical operations.

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