Royal Purple® • Barrier Fluids

Barrier Fluid FDA®

Barrier Fluid FDA® is a pure, nonreactive, synthetic fluid that provides superior lubrication and cooling for double and tandem mechanical seals.

Barrier Fluid FDA® provides extremely stable seal performance over a wide temperature range, satisfying most seal service requirements. It also is extremely clean and has excellent low temperature fluidity and heat transfer properties.

Barrier Fluid FDA® is sanctioned under FDA CFR Title 21 Sections 178.3620(a)(b); 172.878; 175.105; 176.200; 176.210; 177.2260, 2600 and 2800; 178.3570 and 3910. It is approved by the USDA for both H-1 and H-2 service.

Beats the Competition

Barrier Fluid FDA® outperformed eighteen leading competitive fluids in extensive seal performance tests, which were performed by a major seal manufacturer. In these tests, Barrier Fluid FDA® excelled with:

- A very low seal face ΔT, which is an accurate measure of seal performance.
- An extremely low STD (Standard Temperature Deviation), which indicates maximum seal stability during operation.
- A minimal R_a value, resulting in smoother seal faces with less wear.

Superior Cooling

In tests performed by another leading seal manufacturer, Barrier Fluid FDA® 22 had 400 percent greater flow rates and removed 2 1/2 times more heat than a competitive fluid.

Barrier Fluid® is chemically inert, allowing it to be used with most non-oxidizing gases and liquids.

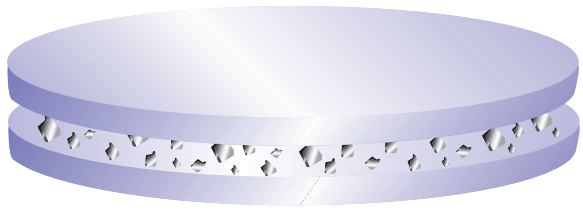
Extremely Clean

Tandem and double mechanical seals utilize opposing seal faces (one stationary and one rotating) to seal the pump from the outside environment. The seal is cooled and lubricated by a barrier fluid circulating between the seal pot and the seal. Part of this fluid is trapped between the opposing seal faces, forming an extremely thin fluid film that both seals and lubricates.

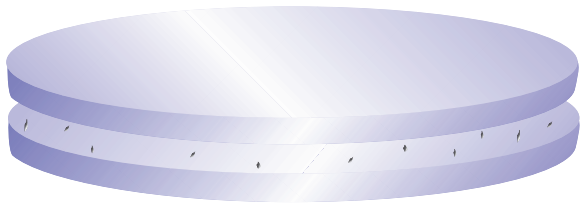
Most fluids are relatively dirty, having an ISO cleanliness level of 20/18/14 or greater. Royal Purple's Barrier fluids are extremely clean, having a typical ISO cleanliness level of 14/13/11 (64 times cleaner).

Dirt trapped between opposing seal faces causes abrasive wear. This pitting and etching of the seal faces can disrupt the fluid seal between the faces, causing lubricant starvation, hot spots and premature seal failures.

Typical Fluid Cleanliness
Dirty abrasive fluid film



Royal Purple® Barrier Fluid Cleanliness
Clean fluid film



Note: To avoid contamination and retain fluid cleanliness, Royal Purple® Barrier fluids should be used only from their original container, and pumps and seal pots should be flushed with Royal Purple® Barrier Fluid immediately prior to filling.

Barrier Fluid GT®

Barrier Fluid GT® is available in the same grades and meets the same physical specifications as Barrier Fluid FDA®. It is recommended for use at elevated temperatures where a nitrogen purge is not an option, when FDA purity is not required and greater oxidation stability is desired. Royal Purple can develop custom Barrier fluids for customers who have special needs regarding solubility, reactivity, etc.

Exclusive Performance Advantages:

- **Environmentally Safe**
  Royal Purple® Barrier Fluids are not listed on the EPA's VHAP (volatile hazardous air pollutants) or VOC (volatile organic compounds) lists.
- **Sanctioned by the EPA, USDA**
  Barrier Fluid FDA® is the first synthetic white oil sanctioned under the FDA's CFR Title 21 Sections 178.3620(a) & (b); 172.878; 175.105; 176.200. It also is sanctioned under 210; 177.2260 and 2800; and 178.3570 and 3910. It is approved by USDA for both H-1 and H-2 service.
- **Minimal Disposal Problems**
  Royal Purple® Barrier fluids can be recycled, burned or disposed the same as mineral oil.
- **Very Low Moisture Content**
  Royal Purple® Barrier fluids have a low moisture content to prevent seal problems or catalyst poisoning where applicable.
- **Highest Purity**
  Barrier Fluid FDA® contains no impurities such as sulfur, vanadium, amines, etc., that can be harmful or reactive to process fluids or poison the catalyst if it enters a process stream.
- **Extremely Clean**
  Barrier Fluid FDA® has a typical ISO Cleanliness Level of 14/13/11, which minimizes abrasive wear to seal faces and extends seal life.
- **Excellent Heat Transfer Properties**
  Royal Purple® Barrier Fluids are 25 to 30 percent better than mineral oils at keeping seals cool.
- **Excellent Low Temperature Fluidity**
  Royal Purple® Barrier Fluids have excellent low temperature fluidity for cryogenic and cold weather service.
- **Uniform Molecular Size**
  The excellent thermal stability of Royal Purple® Barrier Fluids provides maximum protection against blistering of carbon seal faces caused by fluid volatility.
- **High Flash Point**
  Royal Purple® Barrier Fluids have a high flash point for maximum safety.
- **Compatible with Most Fluids**
  Royal Purple® Barrier Fluids can be mixed with mineral oils, PAOs and diester fluids but should not be mixed with glycol or silicone synthetics.
- **Wide Seal Compatibility Range**
  Royal Purple® Barrier Fluids are compatible with Viton®, neoprene, Buna N (except high ACN), Teflon®, silicone, polyurethane ester, epichlorahydrin, polysulfide, ethlene / acrylic, polycrylate, flourosilicone, propylene oxide, chlorosulfonated polyethylene, chlorinated polyethylene, Kalrez®, Nordel®, fluroelastomer, nitrile and others. It is not for use with EPDM or EPR elastomers. Viton®, Teflon®, Kalrez® and Nordel® are registered trademarks of E.I. DuPont.

Barrier Fluid FDA® and Barrier Fluid GT®

Typical Properties*	Barrier Fluid Grade				
	22**	34	56	78	910
Vapor Pressure mmHG @ 100˚F	0.0060	0.0001	0.0005	0.0003	0.0001
Pour Point ˚F	-65	-85	-75	-58	-50
Flash Point ˚F	335	445	462	482	505
Fire Point ˚F	350	485	510	542	555
Boiling Point ˚F	538	655	718	760	755
Autoignition ˚F	>420	>600	>600	>600	>600
Specific Gravity	0.799	0.816	0.824	0.833	0.838

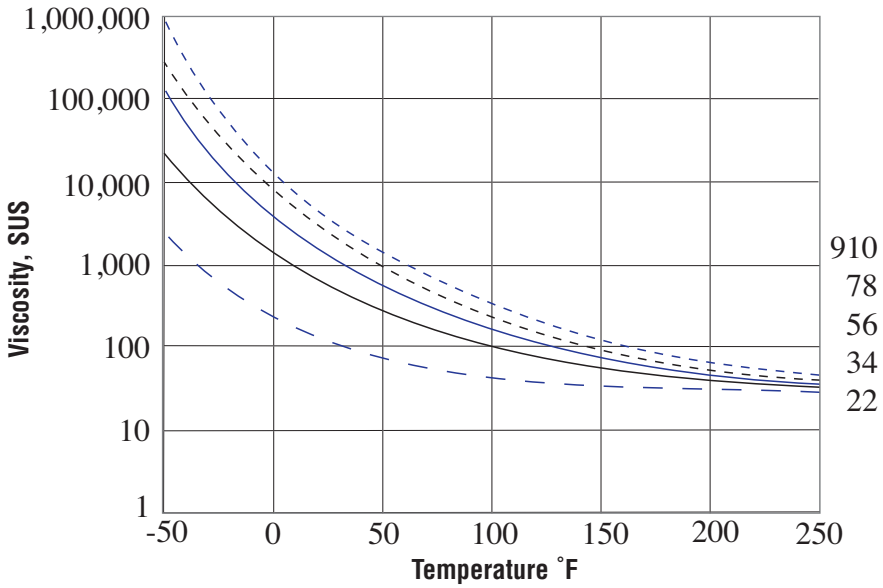
*Properties are typical and may vary.

**Barrier Fluid 22 is 80 percent biodegradable within 28 days per industry standard CEC L33-A-94.

Viscosity Data

Temperature	Barrier Fluid Grade				
	22	34	56	78	910
60˚F	7.1 cP	39.0 cP	78.0 cP	130.0 cP	185.0 cP
50˚F	60.1 SUS	294.4 SUS	599.6 SUS	1013.6 SUS	1478.3 SUS
100˚F	43.0 SUS	94.0 SUS	159.0 SUS	240.0 SUS	320.0 SUS
150˚F	36.7 SUS	54.2 SUS	71.1 SUS	92.4 SUS	119.9 SUS
175˚F	34.5 SUS	47.2 SUS	56.7 SUS	69.0 SUS	84.0 SUS
200˚F	33.0 SUS	42.1 SUS	48.5 SUS	56.1 SUS	64.6 SUS
210˚F	33.0 SUS	40.0 SUS	46.0 SUS	53.0 SUS	59.0 SUS
225˚F	31.8 SUS	39.0 SUS	43.4 SUS	48.7 SUS	54.0 SUS
250˚F	31.1 SUS	36.7 SUS	40.0 SUS	43.8 SUS	47.4 SUS
300˚F	30.6 SUS	33.2 SUS	35.8 SUS	38.1 SUS	39.8 SUS

Temperature / Viscosity Curves



Standard Packaging:

All grades available in clean, 5-gallon poly pails and 55-gallon poly drums.

Barrier Fluid FDA® 22 also is available in cases of 4 1-gallon bottles and 12 1-quart bottles.

Royal Purple's barrier fluids are designed to take the heat

Introduction

This brochure gives detailed information on Royal Purple's barrier fluids — Barrier Fluid® FDA and Barrier Fluid® GT. For further questions, please contact Royal Purple's Industrial Technical Support Department at 888-382-6300.

Note: All physical properties contained in this brochure pertain to both Barrier Fluid FDA® and Barrier Fluid GT®. All values are typical and may vary.

Specific Heat as BTU/lb. ˚F

Temperature ˚F	Barrier Fluid Grade				
	22	34	56	78	910
0	0.474	0.474	0.474	0.474	0.474
50	0.499	0.498	0.498	0.498	0.498
100	0.524	0.523	0.523	0.523	0.522
150	0.549	0.548	0.547	0.547	0.546
200	0.574	0.573	0.572	0.571	0.571
250	0.599	0.597	0.597	0.596	0.595
300	0.624	0.622	0.621	0.620	0.619
350	0.649	0.647	0.646	0.644	0.643
400	0.674	0.672	0.670	0.669	0.667

Thermal Conductivity