



Ultra-Clean Multipurpose R&O Oil

Phillips 66® Ultra-Clean Multipurpose R&O Oil is a rust and oxidation (R&O)-inhibited, anti-wear circulating oil specially developed for use in industrial equipment that requires an ultra-clean fluid. It provides the same performance features as Multipurpose R&O Oil plus the added benefit of fine filtration to a typical ISO Cleanliness Code of 17/15/11, for use in circulating systems with tight tolerances where particle contamination can cause operational problems.

Ultra-Clean Multipurpose R&O Oil is formulated to provide protection against rust, corrosion, and deposit formation, plus mild wear protection. It has good oxidation resistance at high temperatures to minimize sludge and varnish formation, resulting in long service life. It protects system components against rust and corrosion. It has excellent water-separating properties to minimize the formation of emulsions, and is resistant to excessive foam buildup that can interfere with proper lubrication. An ashless (zinc-free) anti-wear additive provides mild wear protection to help increase equipment life.

Applications

- Circulating systems where fluid cleanliness is critical
- Centrifugal air compressors
- Steam turbines and hydroelectric turbines, both direct-drive and those with gear drives
- Lightly loaded enclosed industrial gear drives where the OEM specifies a R&O-type oil (ISO VG 68, 100)
- Electric motor bearings
- Vacuum pumps and machine tools

Ultra-Clean Multipurpose R&O oil meets the requirements of the following industry and OEM specifications:

- ABB G12106
- Alstom Power HTGD 90 117 for geared turbines
- ASTM D4304 Type I Turbine Oil
- British Standard 489
- Denison Hydraulics HF-1
- DIN 51517 Part 2, Lubricating Oils, Type CL
- DIN 51524 Part 1, Hydraulic Oils, Type HL
- General Electric GEK 101941A, GEK 46506e, GEK 27070 (obsolete), GEK 28143b (obsolete)
- Solar Turbines ES 9-224 Class II Turbine Oil
- U.S. Military MIL-L-17672D
- U.S. Steel 126

**Rust &
Oxidation-
Inhibited, Anti-
Wear Circulating
Oil; Meets ISO
Cleanliness
Code 17/15/11**





Features/Benefits

- Good oxidation resistance to minimize sludge and varnish formation
- Mild wear protection
- Protects against rust and corrosion
- Excellent water-separating properties
- Low carbon-forming tendency for use in centrifugal air compressors
- Good foam resistance
- Meets ISO Cleanliness Code rating of 17/15/11⁽¹⁾

⁽¹⁾Note: Applies only to unopened packaged containers as delivered from Phillips 66® manufacturing plants. Particle counts may vary from lab to lab.

Ultra-Clean Multipurpose R&O Oil

Typical Properties			
ISO Grade	32	68	100
AGMA Grade	0	2	3
Specific Gravity @ 60°F	0.862	0.873	0.877
Density, lbs/gal @ 60°F	7.18	7.27	7.30
Color, ASTM D1500	0.5	0.5	0.5
Flash Point (COC), °C (°F)	232 (450)	243 (469)	268 (514)
Pour Point, °C (°F)	-40 (-40)	-34 (-30)	-34 (-30)
Viscosity			
cSt @ 40°C	32.5	68.2	101
cSt @ 100°C	5.4	8.8	11.3
SUS @ 100°F	168	353	527
SUS @ 210°F	44.4	55.9	65.0
Viscosity Index	99	101	98
Acid Number, ASTM D974, mg KOH/g	0.14	0.14	0.14
Copper Corrosion, ASTM D130, 48 hrs @ 80°C	1a	1a	1a
Demulsibility, ASTM D1401, minutes to pass	20	20	20
Foam Test, ASTM D892, Seq. I, mL	0/0	0/0	0/0
Four-Ball Wear, ASTM D4172, Scar Diameter, mm	0.54	0.45	0.45
FZG Scuffing Test, ASTM D5182, Failure Load Stage	10	10	10
Oxidation Stability			
TOST, ASTM D943-04a, hours	4,500	4,500	4,500
RPVOT, ASTM D2272, minutes	750	750	750
Rust Test, ASTM D665 A&B	Pass	Pass	Pass
Cleanliness Code, ISO 4406:1999	17/15/11	17/15/11	17/15/11

Health & Safety Information

For recommendations on safe handling and use of this product, please refer to the Safety Data Sheet via <http://www.phillips66.com/EN/products/Pages/MSDS.aspx>.