PHILLIPS 66 LUBRICANTS

Extra Duty Gear Oil

Premium Extreme-Pressure Industrial Gear Oil; Formulated with "Clean Gear" Additive Technology

Phillips 66® Extra Duty Gear Oil is a premium quality, heavy-duty, extreme pressure (EP) industrial gear oil developed for the lubrication of heavily loaded enclosed gear drives operating under moderate to severe service conditions. It is specially formulated with "clean gear" additive technology to minimize deposit formation and provide excellent gearbox cleanliness. It is recommended for use in all applications where the equipment manufacturer specifies an AGMA EP gear oil.

Extra Duty Gear Oil is formulated to provide extreme-pressure and antiwear properties, excellent deposit control, protection against rust and corrosion, and resistance to foaming. It has high load-carrying capacity for protection against scuffing and wear. It has excellent oxidation resistance and thermal stability at high temperatures to minimize sludge and varnish formation, and provide long service life. It protects gears and bearings 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.

Extra Duty Gear Oil "M" is specially formulated for use in enclosed gearboxes equipped with mist lubrication systems. It contains a mist suppressant to reduce fogging and stray mist.

Applications

- Enclosed industrial gear drives operating under heavy loads, high peak loads or intermittent shock loads
- Enclosed spur, bevel, helical, herringbone and planetary gear drives where the equipment manufacturer specifies an AGMA EP gear oil
- Heavily loaded plain and rolling-element bearings

Extra Duty Gear Oil meets the requirements of the following industry specifications:

- ANSI/AGMA Standard 9005-E02, Anti-Scuff/Anti-Wear (EP) Oils
- DIN 51517 Part 3, Lubricating Oils, Type CLP
- Fives Cincinnati P-77 (ISO VG 150), P-74 (ISO VG 220), P-59 (ISO VG 320), P-35 (ISO VG 460) (approved)
- German Steel Industry SEB 181226, Type CLP
- ISO 12925-1, Type L-CKC
- U.S. Steel 224

KEEPING THE WORLD RUNNING SMOOTHLY

Features/Benefits

- High load-carrying capacity for protection against scuffing and wear
- Excellent oxidation resistance and thermal stability
- Excellent deposit control for gearbox cleanliness
- Protects against rust and corrosion
- Fast water separation
- Quick foam release
- Effective mist suppression (“M” grades)

Extra Duty Gear Oil

Typical Properties						
ISO Grade	**68**	**100**	**150**	**220**	**220M**	**320**
AGMA Grade	2 EP	3 EP	4 EP	5 EP	5 EP	6 EP
Specific Gravity @ 60°F	0.876	0.880	0.884	0.888	0.888	0.892
Density, lbs/gal @ 60°F	7.29	7.33	7.36	7.40	7.39	7.42
Color, ASTM D1500	3.0	3.5	4.0	4.5	4.0	5.0
Flash Point (COC), °C (°F)	235 (455)	235 (455)	243 (469)	252 (486)	243 (469)	254 (489)
Pour Point, °C (°F)	-33 (-27)	-33 (-27)	-33 (-27)	-27 (-17)	-21(-6)	-18 (0)
Viscosity						
cSt @ 40°C	68.0	100	150	220	220	320
cSt @ 100°C	8.7	11.3	14.4	18.4	19.0	23.7
SUS @ 100°F	353	522	789	1,166	1,163	1,706
SUS @ 210°F	55.5	65.0	77.3	94.2	96.8	118
Viscosity Index	99	99	93	92	97	94
Acid Number, ASTM D974, mg KOH/g	0.73	0.73	0.73	0.73	0.73	0.73
Copper Corrosion, ASTM D130	1a	1a	1a	1a	1a	1a
Foam Test, ASTM D892, Seq. I, mL	0/0	0/0	0/0	0/0	0/0	0/0
Four-Ball EP, ASTM D2783, Weld Load, kgf	---	---	250	250	250	250
Four-Ball Wear, ASTM D4172						
Scar Diameter, mm	0.30	0.30	0.30	0.30	0.30	0.30
FZG Scuffing Test, ASTM D5182						
Failure Load Stage	12	12	>12	>12	>12	>12
Timken OK Load, ASTM D2782, lb		---	---	60	60	60

Typical properties are average values only and do not constitute a specification. Minor variations that do not affect product performance are to be expected during normal manufacture, and at different blending locations. Product formulations are subject to change without notification.

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Typical Properties						
ISO Grade	**320M**	**460**	**460M**	**680**	**800**	**1000**
AGMA Grade	6 EP	7 EP	7 EP	8 EP		8A EP
Specific Gravity @ 60°F	0.888	0.895	0.894	0.910	0.896	0.924
Density, lbs/gal @ 60°F	7.39	7.46	7.44	7.57	7.46	7.69
Color, ASTM D1500	5.0	5.5	5.5	8.0	6.0	8.0
Flash Point (COC), °C (°F)	243 (469)	254 (489)	246 (276)	>300 (>572)	>300 (>572)	>300 (>572)
Pour Point, °C (°F)	-18 (0)	-18 (0)	-15 (5)	-3 (27)	-12 (10)	0 (32)
Viscosity						
cSt @ 40°C	320	460	460	680	800	1000
cSt @ 100°C	23.7	30.5	30.4	32.2	50.1	39.5
SUS @ 100°F	1,706	2,466	2,466	3,725	4,596	5,535
SUS @ 210°F	118	150	149	158	243	193
Viscosity Index	94	96	95	70	110	66
Acid Number, ASTM D974, mg KOH/g	0.73	0.73	0.73	0.73	0.73	0.73
Copper Corrosion, ASTM D130	1a	1a	1a	1b	1b	1b
Foam Test, ASTM D892, Seq. I, mL	0/0	0/0	0/0	10/0	10/0	10/0
Four-Ball EP, ASTM D2783, Weld Load, kgf	250	250	250	250	250	250
Four-Ball Wear, ASTM D4172						
Scar Diameter, mm	0.30	0.38	0.38	0.38	0.38	0.38
FZG Scuffing Test, ASTM D5182						
Failure Load Stage	>12	>12	>12	>12	>12	>12
Timken OK Load, ASTM D2782, lb	60	60	60	60	60	60

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.

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