

# Product Information



## Duolec® Industrial Gear Oil

(1601-1610, 1302, 1304)

### *High-Performance Oil Delivers Superior Lubrication in High-Temperature, High-Load Applications*

Duolec Industrial Gear Oil (1601-1610, 1302, 1304) is a high-performance industrial gear oil with ISO grades ranging from ISO VG 46 to 1500. Designed for use in any industrial gear or bearing application that requires a thermally stable, extreme pressure/antiscuff lubricant, it maintains performance even after filtration.

Duolec Industrial Gear Oil contains Duolec, LE's dual-acting additive that provides both wear-reducing and EP protection, and is fortified with a shear stable tackifier to provide adhesion to metal during use.



### Beneficial Qualities

#### *Maintains Performance in Extreme Conditions*

- Possesses high film strength
- Remains stable despite high temps
- Resists oxidation and sludge formation
- Provides wear-reducing and EP/antiscuff protection

#### *Adheres to Metal*

- Contains shear-stable tackifier that allows oil to adhere to metal components
- Remains tacky during high shear use

#### *Resists Moisture*

- Separates readily from water, continuing to provide effective lubrication
  - ◆ Ordinary gear oils will emulsify and foam, causing increased friction and poor lubrication

#### *Filterable*

- Contains no solids that can be removed during filtration
- Remains within viscosity grade after filtration

### Proprietary Additive

LE's proprietary additives are used exclusively in LE lubricants. Duolec® Industrial Gear Oil contains Duolec.

**Duolec®** dual-acting additive imparts synergistic properties to lubricants, providing both wear-reducing and extreme pressure protection. The result of revolutionary technology designed specifically for use in LE gear lubricants, Duolec increases oil film strength and is temperature-activated to provide a protective layer that smooths metal surfaces and minimizes the effects of any contact, thereby reducing friction and preventing surface wear.





# Technical Data

## Duolec® Industrial Gear Oil

	1601	1602/1302*	1603	1604/1304*	1605	1606	1607	1608	1609	1610
<b>Color</b>	Purple	Purple/Amber	Purple	Purple/Amber	Purple	Purple	Purple	Purple	Purple	Purple
<b>ISO VG</b>	46	68	100	150	220	320	460	680	1000	1500
<b>AGMA Grade</b>	1 EP	2 EP	3 EP	4 EP	5 EP	6 EP	7 EP	8 EP	8A EP	9 EP
<b>Relative Density</b> ASTM D1298	0.864	0.874	0.881	0.882	0.884	0.886	0.887	0.889	0.892	0.893
<b>Viscosity @ 100°C, cSt,</b> ASTM D445	7.35	9.25	11.8	15.8	20.8	27.0	35.0	46.4	61.6	84.0
<b>Viscosity @ 40°C, cSt,</b> ASTM D445	48.30	71.40	105.0	157.5	231.0	336.0	483.0	714.0	1,050	1,575
<b>Viscosity Index</b> ASTM D2270	113	105	101	103	105	107	109	112	116	122
<b>Flash Point °C (°F),</b> (COC), ASTM D92	210 (410)	210 (410)	210 (410)	210 (410)	210 (410)	210 (410)	210 (410)	210 (410)	210 (410)	210 (410)
<b>Pour Point °C (°F),</b> ASTM D97	-30 (-22)	-27 (-17)	-24 (-11)	-21 (-6)	-18 (0)	-18 (0)	-15 (-5)	-12 (10)	-12 (10)	-9 (16)
<b>Rust Test 4 hrs @ 60°C,</b> Sea H <sub>2</sub> O, ASTM D665B	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
<b>Copper Corrosion 3 hrs</b> @ 100°C, ASTM D130	1a	1a	1a	1a	1a	1a	1a	1a	1a	1a
<b>FE-8 Bearing Wear D-7.5/80-80,</b> roller loss, mg, DIN ISO 51819-3	-	-	-	<10	<10	<10	<10	<10	<10	<10
<b>FZG Scuffing Load Capacity</b> Fail Stage A/8.3/90, ISO 14635-1	12+	12+	12+	12+	14+	14+	14+	14+	14+	14+
<b>Timken OK Load lb (kg),</b> ASTM D2782	-	-	-	75 (34)	75 (34)	75 (34)	75 (34)	75 (34)	75 (34)	75 (34)
<b>Four-Ball Wear @ 75°C,</b> 1200 rpm, 40 kgf, 60 minutes, mm wear, ASTM D4172	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
<b>Emulsion Characteristics @54°C or</b> 82°C**, mL oil/mL water/mL emulsion-minutes, ASTM D1401	40/40/0-10	40/40/0-10	40/40/0-10	40/40/0-10	40/40/0-15	40/40/0-15	40/40/0-15	40/40/0-20	40/40/0-20	40/40/0-25
<b>Foaming Characteristics</b> @ 24°C/93.5°C/24°C, 3 sequences, ml of foam/time to break, ASTM D892	0/0,0/0,0/0	0/0,0/0,0/0	0/0,0/0,0/0	0/0,0/0,0/0	0/0,0/0,0/0	0/0,0/0,0/0	0/0,0/0,0/0	0/0,0/0,0/0	0/0,0/0,0/0	0/0,0/0,0/0

\*\*ISO 46 and 68 oils tested at 54°C; all others at 82°C.

### Performance Requirements Met or Exceeded

- ANSI/AGMA 9005-F16
- AIST 224 (US Steel 224)
- DIN 51517-3 CLP
- ISO 12925-1 CKD
- USDA H2

### Typical Applications

- Enclosed gearboxes
- Bowl mills / pulverizers
- Homogenizers
- Planetary gears
- Oil lubricated bearings

\* 1302 & 1304 are undyed. All other ISO grades can be made available as undyed versions, contingent on a 10-drum minimum order.