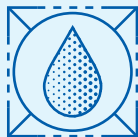




CITGO® Pacemaker® T Oils

OVERVIEW



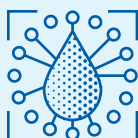
- Extra-inhibited, high-quality lubricants designed specifically as turbine oils.

FEATURES & BENEFITS



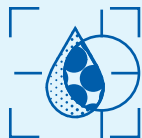
- Made from high viscosity index paraffinic base stocks processed by modern hydrotreating methods.
- High viscosity index imparts superior temperature-viscosity characteristics.
- High flash point and excellent resistance to oxidation, rusting, and foaming promote long service life in closed circulating systems.
- Pass both procedures of the ASTM D665 Rust Test and provide extended oxidation life as measured in the ASTM D943 Oxidation Test.

APPLICATIONS



- Recommended for pressure-circulation systems of direct-connected steam turbines and for the bearings of turbo-generators.
- Recommended for the lubrication of steam turbines with single-reduction gear units, as found in marine service.
- Highly recommended for use in compressor equipment, air lines, circulating oil systems, and gears where an R&O (rust- and oxidation-inhibited) type oil is specified.
- Suitable for the lubrication of industrial gas turbines and gear units.
- Pacemaker T-68 passes the Alemite test and is thus suitable for mist applications.
- Recommended for use in equipment requiring the following specifications:
 - General Electric GEK 32568 K
 - Fives Cincinnati P-38 (Grade T-32)
 - ALSTOM HTGD 90117
 - ASTM D4304 Type I, II, III
 - British Standard BS 489
 - DIN 51515 Part 1, 2
 - DIN 51524 Part 1
 - ISO 8068 TSA TGA, TGE TSE
 - ISO 11158 HH, HL
 - SIEMENS AG TLV 9013 04 Standard Thermal Stability
 - SIEMENS AG TLV 9013 05 High Thermal Stability
 - Solar ES9-224Y Grades C32 (S150), C46 (S215) (Grades T-32 and T-46, respectively)

PROPERTIES



Typical Properties for CITGO Pacemaker T Oils:

Grade	T-32	T-46	T-68	T-115
Material Code	633715001	633720001	633730001	633745001
Gravity, ASTM D4052, °API	32.7	31.4	30.9	29.0
Pounds Per Gallon	7.18	7.24	7.26	7.34
Flash Point, COC, ASTM D92, °F (°C)	442 (228)	446 (230)	489 (254)	536 (280)
Viscosity, ASTM D445				
cSt at 40°C	32.0	44.7	66.7	100
cSt at 100°C	5.5	6.8	8.8	11.6
Viscosity Index, ASTM D2270	107	104	105	105
Pour Point, ASTM D97, °F (°C)	-38 (-39)	-38 (-39)	-38 (-39)	0 (-18)
Color, ASTM D1500	L1.0	L1.0	L1.5	L1.5
Foam Test, ASTM D892 ⁽¹⁾ , Seq. I, II, III	Pass	Pass	Pass	Pass
Aniline Point, ASTM D611, °F (°C)	219 (104)	223 (106)	230 (110)	244 (118)
Neutralization No., ASTM D664	0.1	0.1	0.1	0.1
Corrosion, ASTM D130, 3 hours at 212°F	1B	1B	1B	1B
Oxidation, ASTM D943 ⁽²⁾ , hours	10,000+	10,000+	—	—
Water Separation, Dist. Water, ASTM D1401				
130°F (54°C)	40-40-0 (15)	40-40-0 (15)	40-40-0 (20)	—
180°F (82°C)	—	—	—	40-40-0 (20)
Rust Test, ASTM D665 ⁽³⁾ A,B	Pass	Pass	Pass	Pass
RPVOT, ASTM D2272, minutes	2780	2500	1160	780
ISO VG No.	32	46	68	100
AGMA Grade	0	1	2	3

Note:

- (1) 50 ml. max. at end of blowing period. No foam after 10 minutes setting.
- (2) Hours to reach acid number of 2.0 mg of KOH per gram of oil.
- (3) Procedures A (distilled water) and B (synthetic sea water).

CITGO and Pacemaker are registered trademarks of CITGO Petroleum Corporation. All other registered trademarks or trademarks are the property of their respective owners. Values shown are typical values only and do not constitute a specification. The information contained herein is subject to change without notice.