

AEROSHELL TURBINE OIL 500

AeroShell Turbine Oil 500 is a 5 mm²/s synthetic hindered ester oil incorporating a carefully selected and balanced combination of additives to improve thermal and oxidation stability and metal passivation.

APPLICATIONS

AeroShell Turbine Oil 500 was developed essentially to meet the requirements of Pratt & Whitney 521 Type II and MIL-L-23699 specifications and is entirely suitable for most civil and military engines requiring this class of lubricant. AeroShell Turbine Oil 500 is approved for use in a wide range of turbine engines as well as the majority of accessories.

AeroShell Turbine Oil 500 contains a synthetic ester oil and should not be used in contact with incompatible seal materials and it also affects some paints and plastics. Refer to the General Notes at the front of this section for further information.

SPECIFICATIONS

U.S.	Approved MIL-PRF-23699F Grade STD
British	Approved DEF STAN 91-101 Grade OX-27
French	Equivalent DCSEA 299/A
Russian	–
NATO Code	O-156
Joint Service Designation	OX-27
Pratt & Whitney	Approved 521C Type II
General Electric	Approved D-50 TF 1
Allison	Approved EMS-53 (Obsolete)

EQUIPMENT MANUFACTURER'S APPROVALS

AeroShell Turbine Oil 500 is approved for use in all models of the following engines:

Honeywell	TFE 731, TPE 331, GTCP 30, 36, 85, 331, 660 and 700 series APUs. ALF 502, LF507, LTS101, LTP101, T53, T55, AL5512
Allison (Rolls-Royce)	250 Series, 501 D13, T56, GMA 2100, GMA 3007
BMW-Rolls Royce	BR710, BR715
CFM International	CFM 56 cleared for flight evaluation
GE	GE 90, CF6, CT58, CF700, CJ610, CJ805, CF34, CT7, CT64
IAE	V2500 Series, all marques
Motorlet	M601D, E and Z
Pratt & Whitney	JT3, JT4, JT8, JT9, JT12, PW4000, PW6000
Pratt & Whitney Canada	JT15, PT6A, PT6T, ST6, PW100, PW200, PW300, PW500
Rolls-Royce	RB211-22B, -524, -535, Trent, Tay, Gnome, Spey, RB183, Adour, M45H, Viper (Series MK 301, 521, 522, 526, 535, 540, 601, 623 and 632)

Full details of the approval status of AeroShell Turbine Oil 500 in APUs and other engines/accessories is available.

PROPERTIES	MIL-PRF-23699F Grade STD	TYPICAL
Oil Type	Synthetic ester	Synthetic ester
Kinematic Viscosity mm ² /s @ 100°C @ 40°C @ -40°C	4.90 to 5.40 23.0 min 13000 max	5.17 25.26 8996
Flashpoint, Cleveland Open Cup °C	246 min	256
Pourpoint °C	-54 max	<-54
Total Acidity mgKOH/g	1 max	0.01
Evaporation Loss 6.5 hrs @ 204°C % m	10.0 max	2.52
Foaming	Must pass	Passes
Swelling of Standard Synthetic Rubber		
SAE-AMS 3217/1, 72 hrs @ 70°C swell %	5 to 25	Within Limits
SAE-AMS 3217/4, 72 hrs @ 204°C swell %	5 to 25	Within Limits
standard silicone rubber 96 hrs @ 121°C	5 to 25	Within Limits
Thermal Stability/Corrosivity 96 hrs @ 274°C		
- metal weight change mg/cm ²	4 max	0.5
- viscosity change %	5 max	2.69
- Total Acid Number Change mgKOH/g	6 max	2.03

PROPERTIES	MIL-PRF-23699F Grade STD	TYPICAL
Corrosion & Oxidation Stability 72 hrs @ 175°C 72 hrs @ 204°C 72 hrs @ 218°C	Must pass Must pass Must pass	Passes Passes Passes
Ryder Gear Test, Relative Rating Hercolube A %	102	117
Bearing Test Rig Type 1½ conditions - Overall deposit demerit rating - viscosity change @ 40°C % - Total Acid Number change mgKOH/g	80.0 max -5 to +30 2 max	47 19 1.1
- filter deposits g	3 max	0.4
Sonic shear stability - viscosity change @ 40°C %	4 max	NIL
Trace metal content	Must pass	Passes
Sediment mg/l	10 max	2.6
Ash mg/l	1 max	0.05

AeroShell Turbine Oil 500 is also approved for use in the industrial and marine versions of the Rolls Royce Trent, Avon, Allison 501K and 570K, Honeywell TF35, Pratt & Whitney GG3/FT3, GG4/FT4, GG12/FT12, all General Electric LM Series of units, Turbomeca industrial engines and certain Solar gas turbine engines.

A viscosity/temperature chart is shown at the end of this section.

AEROSHELL TURBINE OIL 560

AeroShell Turbine Oil 560 is a third generation, high performance, low coking 5 mm²/s synthetic hindered ester oil incorporating a carefully selected and finely balanced combination of additives to improve thermal and oxidation stability.

APPLICATIONS

Changes which have taken place over the last twenty years in engine performance (in terms of improved fuel consumption, higher operating temperatures and pressures) and maintenance practices have resulted in increased severity in lubricant operating conditions.

AeroShell Turbine Oil 560 was developed to withstand the hostile environments of today's high powered, high compression engines in which the older generation of oils can be stressed up to and beyond their thermal limits, as evidenced by oil coking in the high temperature bearing areas.

By overcoming the problems associated with using old technology oils in new technology engines, AeroShell Turbine Oil 560:

- * maintains a cleaner engine
- * provides improved load carrying capacity
- * reduces maintenance costs
- * prolongs bearing life

in both new and existing engines.

In order for military authorities to take advantage of this better performance in military engines the specification MIL-PRF-23699 was re-written to include a "High Thermal Stability" (HTS) grade as well as the Standard (STD) and Corrosion Inhibited (C/I) grades. AeroShell Turbine Oil 560 is fully approved as an HTS oil.

With effect from January 1st 2002, AeroShell Turbine Oil 560 has been manufactured with an improved formulation to further enhance its anti-coking performance.

AeroShell Turbine Oil 560 contains a synthetic ester oil and should not be used in contact with incompatible seal materials and it also affects some paints and plastics. Refer to the General Notes at the front of this section for further information.

SPECIFICATIONS

U.S.	Approved MIL-PRF-23699F Grade HTS
British	Equivalent DEF STAN 91-101
French	Equivalent DCSEA 299/A
Russian	Analogue to VNII NP 50-1-4F, B3V, LZ-240, VNII NP 50-1-4U and 36/Ku-A
NATO Code	O-154
Joint Service Designation	Equivalent OX-27
Pratt & Whitney	Approved 521C Type II
General Electric	Approved D-50 TF1
Allison	Approved EMS-53 (Obsolete)

EQUIPMENT MANUFACTURER'S APPROVALS

AeroShell Turbine Oil 560 is approved for use in all models of the following engines:

Honeywell	TFE 731, TPE 331, APUs (majority of models), LTS 101, LTP 101, ALF 502, LF 507, AS907, AS977
Allison (Rolls-Royce)	250 Series
BMW/Rolls-Royce	BR710, BR715
CFM International	CFM-56 (all models)
CFE	CFE 738
GE	GE 90, CF6 (all models), CJ610, CF700, CT58, CF34

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EQUIPMENT MANUFACTURER'S APPROVALS

IAE	V2500 Series
IHI	FJR 710
Pratt & Whitney	JT3D, JT8D, JT9D, PW4000 Series (cleared for flight evaluation in PW2000 engines)
Pratt & Whitney Canada	PT6T, PT6A (some models only), PW100 Series, JT15D, PW200 Series, PW300 Series, PW500 Series, PW901A APU
Rolls-Royce	RB211-22B, -524, -535, Spey, Tay, RB183, Adour
Turbomeca	Arriel, Makila, RTM 322, TM 319, TM 333, TP 319, various models of Astazou and Artouste engines

PROPERTIES	MIL-PRF-23699F Grade HTS	TYPICAL
Oil Type	Synthetic ester	Synthetic ester
Kinematic Viscosity @ 100°C @ 40°C @ -40°C	mm ² /s 4.90 to 5.40 23.0 min 13000 max	5.24 26.71 11000
Flashpoint, Cleveland Open Cup	°C 246 min	268
Pourpoint	°C -54 max	-60
Total Acidity	mgKOH/g 1 max	0.14
Evaporation Loss 6.5 hrs @ 204°C	% m 10.0 max	2.0
Foaming	Must pass	Passes
Swelling of Standard Synthetic Rubber SAE-AMS 3217/1, 72 hrs @ 70°C	swell % 5 to 25	12.9
SAE-AMS 3217/4, 72 hrs @ 204°C	swell % 5 to 25	12.9
standard silicone rubber 90 hrs @ 121°C	5 to 25	8.9
Thermal Stability/Corrosivity 96 hrs @ 274°C - metal weight change - viscosity change @ 37.8°C - Total Acid Number Change	mg/cm ² % mgKOH/g 4 max 5 max 6 max	0.23 0.3 1.5

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NOTES

Table continued

PROPERTIES	MIL-PRF-23699F Grade HTS	TYPICAL
Corrosion & Oxidation Stability 72 hrs @ 175°C 72 hrs @ 204°C 72 hrs @ 218°C	Must pass Must pass Must pass	Passes Passes Passes
Ryder Gear Test, Relative Rating Hercolube A %	102	126
Bearing Test Rig (200 hrs) Type 1½ conditions – Overall deposit demerit rating – viscosity change @ 40°C % – Total Acid Number change mgKOH/g – filter deposits g	35 max 0 to +35 1.5 max 3 max	26 30.8 0.98 0.55
Sonic shear stability – viscosity change @ 40°C %	4 max	NIL
Trace metal content	Must pass	Passes

AeroShell Turbine Oil 560 is also approved for use in the industrial and marine versions of the Rolls-Royce RB211-22, Avon, Spey, Olympus and Tyne engines, Pratt & Whitney GG3/FT3, GG4/FT4, GG12/FT12, GG8/FT8 engines, all General Electric LM Series of units, some Honeywell and Turbomeca industrial engines and certain Solar gas turbine engines.

A viscosity/temperature chart is shown at the end of this section.