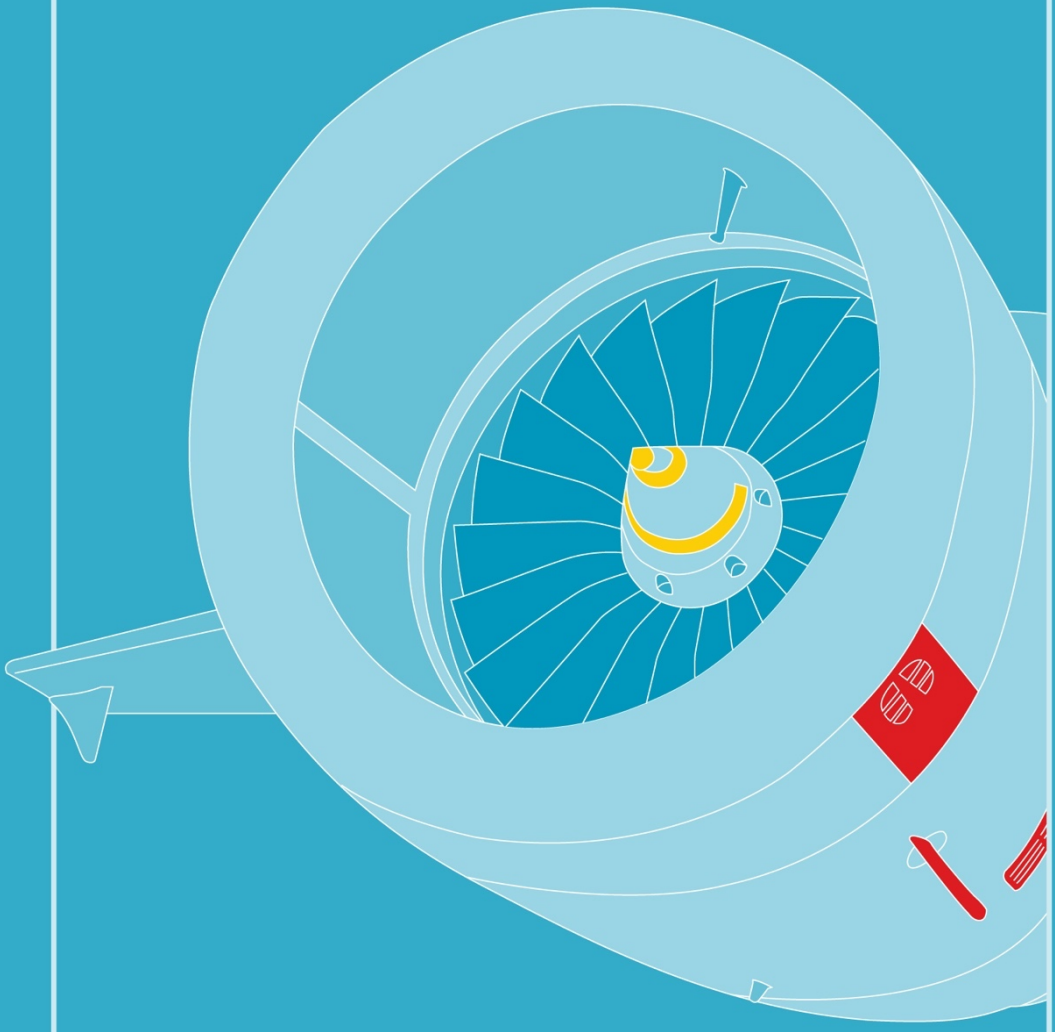
AEROSHELL TURBINE ENGINE OILS



AEROSHELL TURBINE OIL 390

AeroShell Turbine Oil 390 is a 3 mm^2/s synthetic diester oil incorporating a carefully selected and balanced combination of additives to improve thermal and oxidation stability and to increase the load carrying ability of the base oil.

APPLICATIONS

AeroShell Turbine Oil 390 was developed primarily as an improved 3 mm^2/s oil for British turbo-jet engines. AeroShell Turbine Oil 390 is fully approved for a wide range of turbine engines.

More recently, because of the low temperature characteristics of AeroShell Turbine Oil 390, there is interest in using this oil in auxiliary power units (APU) in order to overcome the effects of cold soak. Normal practice is to shut down the APU during cruise, the APU then experiences cold soak, often prolonged, and when the unit is started there is considerable difficulty resulting in the unit not coming up to speed in the given time, thus causing a hung start.

In such cases where the APU is subject to a long cold soak the viscosity of standard 5 mm^2/s oils used in the APU will increase from 5 mm^2/s at 100 °C (212 °F) to typically 10,000 mm^2/s at –40 °C (–40 °F). At this much higher viscosity the oil cannot flow easily leading to a large viscous drag within the APU, thereby contributing to the difficulty in starting. AeroShell Turbine Oil 390 on the other hand experiences a much smaller viscosity increase (typically 2000 mm^2/s at –40 °C) with a reduction in viscous drag which is often sufficient to overcome hung start problems.

All experience to date shows a considerable improvement in cold reliability of the APU when AeroShell Turbine Oil 390 is used.

SPECIFICATIONS

U.S.	-
British	Approved DEF STAN 91-094
French	-
Russian	Analogue to IPM-10, VNII NP 50-1 4f and 4u, and 36Ku-A
NATO Code	-
Joint Service Designation	OX-7

EQUIPMENT MANUFACTURERS' APPROVALS

AeroShell Turbine Oil 390 is approved for use in all models of the following engines:

Honeywell	APU Series: 131, GTCP 30, 36, 85, 331 and 660; RE100, 220; HGT 400, 750 and 1700
Pratt & Whitney AeroPower (formerly Hamilton Sundstrand)	APS 500, 1000, 2000, 3000, 5000
Pratt & Whitney Canada	PW901A/C and PW980 APUs
Rolls-Royce	Conway, Spey, Tay, M45H
Safran Helicopter Engines (formerly Turbomeca)	Artouste III, Bastan, Turmo, AST 950. Approved with restrictions*: Ardiden, Arriel, Arrius, Artouste, TM333, AST 600, Astazou, Makila, Marbore 6

*Please refer to Safran Helicopter Engines manual for details.

AEROSHELL TURBINE OIL 500

AeroShell Turbine Oil 500 is a 5 mm^2/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.

With the advent of the new civil turbine oil specification, SAE AS5780, which has more stringent requirements than the military specification MIL-PRF-23699, AeroShell Turbine Oil 500 was approved as a SPC (Standard Performance Capability) oil.

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-23699G Grade STD Approved SAE AS5780D Grade SPC
British	Approved DEF STAN 91-101 Grade OX-27
French	Meet 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 MANUFACTURERS' APPROVALS

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

Honeywell	APU series: 131, GTCP 30, 36, 85 (except -99), 331 and 660; RE100, 220; HGT 400, 750 and 1700; TSCP 700. Engine series: TPE 331, TSE 331, ALF 502, LF507, LTS101, LTP101, T53, T5508D, AL5512, CTS800
Engine Alliance	GP7200
Eurojet	EJ200
General Electric	CF34, CF6, CF700, CJ Series, CT7, CT64, Catalyst, H Series
Motorlet	M601D, E and Z
Pratt & Whitney	JT3, JT4A, JT8D, JT9D, JT12A, PW4000, PW6000, F117-PW-100
Pratt & Whitney AeroPower (formerly Hamilton Sundstrand)	APS 500, 100, 2000, 3000
Pratt & Whitney Canada	Engine series: JT15, PT6 Series, ST6, PW100 (except PW150), PW200, PW300, PW500 & PW600 Series APU series: PW901A/C, PW980
Rolls-Royce	250 Series, 501, AE2100 & 3007 Series, BR700 Series, RB211-22/524/535, Tay, Gem, Gnome, Spey, Adour, M45H, Viper (Series MK 301, 521, 522, 526, 535, 540, 601, 623 and 632)
Safran Helicopter Engines (formerly Turbomeca)	Ardiden, Arriel, Arrius, Arrius 1D, AST 600, Astazou XVI, Larzac, Makila, MTR390, RTM322, TM333, 526, 535, 540, 601, 623 and 632. Approved with restrictions*: Artouste, AST 950, Astazou, Turmo, Bastan

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

*Please refer to Safran Helicopter Engines manual for details.

AEROSHELL TURBINE OIL 555

AeroShell Turbine Oil *555* is an advanced 5 mm^2/s synthetic hindered ester oil incorporating a finely balanced blend of additives to improve thermal and oxidation stability and to increase the load carrying ability of the base oil.

APPLICATIONS

AeroShell Turbine Oil *555* was specifically developed to meet the high temperatures and load carrying requirements of SST engines and the DEF STAN 91-100 (formerly DERD 2497) and XAS-2354 specifications. AeroShell Turbine Oil *555* was also designed to give enhanced performance in current engines.

More recently with the need to transmit more power and higher loads through helicopter transmission and gearbox systems (many helicopters use a synthetic turbine engine oil in the transmission/gearbox system) it has become apparent that the use of a very good load carrying oil, such as AeroShell Turbine Oil *555* is necessary. This in turn has led to the development of a U.S. Military Specification, DOD-L-85734 (now DOD-PRF-85734A), which covers a helicopter transmission oil against which AeroShell Turbine Oil *555* is fully approved.

AeroShell Turbine Oil *555* 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 DOD-PRF-85734A
British	Equivalent DEF STAN 91-100
French	-
Russian	-
NATO Code	O-160
Joint Service Designation	OX-26
Pratt & Whitney	Approved 521C Type II
General Electric	Approved D-50 TF 1
Allison	Approved EMS-53 (Obsolete)

EQUIPMENT MANUFACTURERS' APPROVALS

AeroShell Turbine Oil *555* is approved for use in all models of the following engines:

Honeywell	APU series: 131, GTCP 30, 36, 85 (except -99), 331 and 660; RE100, 220; HGT 400, 750 and 1700; TSCP 700. Engine series: T53, AL5512, ALF502, LF507, TPE331, CTS800.
General Electric	CT58, CT64, CF700, CJ610
Motorlet	M601D, E and Z
Pratt & Whitney	JT3, JT4A, JT8D, JT9D, JT12A, PW4000
Pratt & Whitney Canada	ST6
Rolls-Royce	Adour, Gem, LiftFan, M45H, Olympus, RB199, Tyne
Safran Helicopter Engines (formerly Turbomeca)	MTR390, RTM322. Approved with restrictions*: Artouste (some models) Astazou, AST 950, Bastan

*Please refer to Safran Helicopter Engines manual for details.

AeroShell Turbine Oil *555* is also approved for use in the industrial and marine versions of the Siemens (formerly Rolls-Royce) RB211-22 and Olympus engines, General Electric LM 100, 250, 350, 1500 and 2500 engines.

EQUIPMENT MANUFACTURERS' APPROVALS – HELICOPTER TRANSMISSIONS

AeroShell Turbine Oil 555 is approved for an increasing number of helicopter transmissions, whilst details are listed below, it is important that operators check latest status with the helicopter manufacturer. In all cases it is important to check compatibility with seals used in the transmission/gearbox.

U.S. Military	Approved for helicopter transmission specification DOD-PRF-85734A
Eurocopter	Approved for Super Puma, for other helicopters check with Eurocopter
Agusta	Approved for A109 and A129 models, for other models check with Agusta
Bell Helicopter Textron	Approved for all Bell turbine engine powered helicopters
Boeing Vertol	Approved for Chinook
McDonnell Douglas	Approved
MBB	Approved
Sikorsky	Approved for S-61N (note other types such as the S-70 and S-76 do not use synthetic turbine oils in the transmission)
Leonardo Helicopters (formerly Westland Helicopters)	Approved for some models

AEROSHELL TURBINE OIL 560

AeroShell Turbine Oil 560 is a third generation, high performance, low coking 5 mm^2/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 the advent of the new civil turbine oil specification, SAE AS5780, which has more stringent requirements than the military specification, AeroShell Turbine Oil 560 was approved as a SPC (Standard Performance Capability) 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-23699G Grade HTS Approved SAE AS5780D Grade SPC
British	Equivalent DEF STAN 91-101 Grade OX-27
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	OX-27
COMAC	Approved QPL-CMS-OL-202
Pratt & Whitney	Approved 521C Type II
General Electric	Approved D-50 TF 1
Allison	Approved EMS-53 (Obsolete)

EQUIPMENT MANUFACTURERS' APPROVALS

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

Honeywell	APU series: 131, GTCP 30, 36, 85 (except -99), 331 and 660; RE100, 220; HGT 400, 750 and 1700 Engine series: TPE 331, LTS 101, LTP 101, ALF 502, LF 507, AS907, AS977
CFM International	CFM 56 and LEAP series
Collins Aerospace	All IDGs and VSFGs
Engine Alliance	GP7200
General Electric	CF34, CF6, CJ610, CF700, GE90, GEnx, Passport
IAE	V2500
Pratt and Whitney AeroPower (formerly Hamilton Sundstrand)	APS 500, 1000, 2000, 3000
Pratt & Whitney	JT3D, JT8D, JT9D, PW4000 Series (cleared for flight evaluation in PW2000 engines), F117-PW-100
Pratt & Whitney Canada	Engine series: JT15D, PT6 Series, PW100 Series (except PW150), PW200 Series, PW300 Series, PW500 Series, PW600 Series APU series: PW901A/C, PW980
Rolls-Royce	250 Series, Avon, BR700 Series, Spey, Tay, Tyne, RB199, RB211 Series
Safran Helicopter Engines (formerly Turbomeca)	Ardiden, Arriel, Arrius, Arrius 1D, AST 600, Astazou XVI, Makila, TM333. Approved with restrictions*: Artouste, AST 950, Bastan, Turmo

*Please refer to Safran Helicopter Engines manual for details

AEROSHELL TURBINE OIL 750

AeroShell Turbine Oil 750 is a 7½ mm^2/s synthetic mixed ester oil containing a thickener and additives which provide excellent load carrying, thermal and oxidation stability.

APPLICATIONS

AeroShell Turbine Oil 750 was developed to meet the requirements of DERD 2487 (now DEF STAN 91-098) and to provide a high standard of lubrication in British civil gas turbines, particularly turbo-prop engines where a good load carrying oil was required for the propeller reduction gearbox.

AeroShell Turbine Oil 750 is also approved by the Russian authorities as an analogue to MN-7.5u and for those Russian turbo-prop applications which require the use of mixtures of mineral turbine oil and aircraft piston engine oil.

AeroShell Turbine Oil 750 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.	-
British	Approved DEF STAN 91-098 (replaces DERD 2487)
French	Equivalent to AIR 3517/A
Russian	Analogue to TU 38.1011722-85 Grade MN-7.5u
NATO Code	O-149 (equivalent O-159)
Joint Service Designation	OX-38

EQUIPMENT MANUFACTURERS' APPROVALS

AeroShell Turbine Oil 750 is approved for use in all models of the following engines:

Honeywell	Auxiliary Power Units (some models)
Pratt & Whitney Canada	PT6 (some models)
BMW-Rolls-Royce	Dart, Tyne, Avon (some early models only), Gnome, Pegasus, Palouste, Nimbus, Proteus, Orpheus, Olympus 200 and 300
Sikorsky	S-61N transmissions
Soloviev	D30 engine
Safran Helicopter Engines (formerly Turbomeca)	Turmo. Approved with restrictions*: Arriel, Artouste, Astazou, Bastan, Malika

*Please refer to Safran Helicopter Engines manual for details

AEROSHELL ASCENDER

AeroShell Ascender is a "fourth generation" turbine engine oil developed with a high performance, low coking, 5 mm^2/s synthetic hindered ester basestock combined with a state of the art additive system, to both improve thermal and oxidation stability and provide superior elastomer compatibility.

FEATURES & BENEFITS

The value of AeroShell Ascender lies in its ability to deliver both low coking and elastomer compatibility/seal integrity. Until recently, it had been commonly accepted that the two are mutually exclusive, so that improving the oil's properties in one regard meant compromising the other.

For airline operators, this problem can be expensive in terms of prematurely degraded seals. With AeroShell Ascender, Shell Aviation has developed a product that now deals with this problem so operators no longer have to choose between coking performance and elastomer compatibility.

FEATURES	BENEFITS
Excellent elastomer seal compatibility	Reduced chance of seal swell or degradation leading to high oil consumption and cost of changing the seals
Low coking performance	Less chance of oil coke build-up in bearing chambers and service pipes resulting in lower maintenance and cleaning costs
Improved oxidation and thermal stability	Extended oil life during arduous engine conditions
Excellent compatibility with other approved oils	No issues or concerns when changing from one approved oil to AeroShell Ascender
A 'High Performance Capability' grade oil	Improved performance over traditional 'standard' grade oils can help reduce maintenance costs and extend engine life

APPLICATIONS

AeroShell Ascender was developed for the latest generation of gas turbine engines as a low-coking, high compatibility product. Its improved thermal and oxidative stability will ensure negligible coke formation in engines, so any traditional engine problems associated with coke should never occur. It has also been tested extensively for elastomer compatibility, which is a known service problem. AeroShell Ascender therefore offers the customer the balance of low coking performance with excellent elastomer compatibility.

AeroShell Ascender will also deliver performance benefits in today's existing 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.

SPECIFICATIONS

U.S.	Approved SAE AS5780D Grade HPC Approved MIL-PRF-23699G Grade HTS
British	Equivalent DEF STAN 91-101 Grade OX-27
French	Equivalent DCSEA 299/A
Russian	-
NATO Code	O-154
Joint Service Designation	OX-27
Pratt & Whitney	Approved 521C Type II
General Electric	Approved D-50 TF 1

EQUIPMENT MANUFACTURERS' APPROVALS

AeroShell Ascender is approved for use in all models of the following engines:

General Electric	GEnx, Passport, Catalyst
GE Honda	HF120 series
Pratt & Whitney AeroPower	APS 500, 1000, 2000, 3000
Pratt & Whitney Canada	PW307A/D
Rolls-Royce	Trent series, RB211 series, BR700 series
Siemens (Industrial Gas Turbines)	SGT-A05 (501K), SGT-A65 (Trent 60)

For latest engine approval status, please contact your Shell Aviation representative.

PROPERTIES		**SAE AS5780D Grade HPC MIL-PRF-23699G Grade HTS**	**TYPICAL**
Oil type		Synthetic ester	Synthetic ester
Kinematic viscosity	mm^2/s		
@ 100°C (212°F)		4.90 to 5.40	5.02
@ 40°C (104°F)		23.0 min	25.77
@ –40°C (–40°F)		13000 max	< 12000
Flashpoint Cleveland Open Cup	°C (°F)	246 (475) min	266 (511)
Pourpoint	°C (°F)	–54 (–65) max	< –54 (–65)
Total acidity	mgKOH/g	1.0 max	0.26
Evaporation loss			
6.5 hrs @ 204°C (399°F)	%m	10.0 max	2.0
Swelling of standard synthetic rubber SAE AMS3217/4			
72 hrs @ 204°C (399°F)	swell %	5 to 25	16.24
Foaming tendency		Must pass	Passes

Table continued