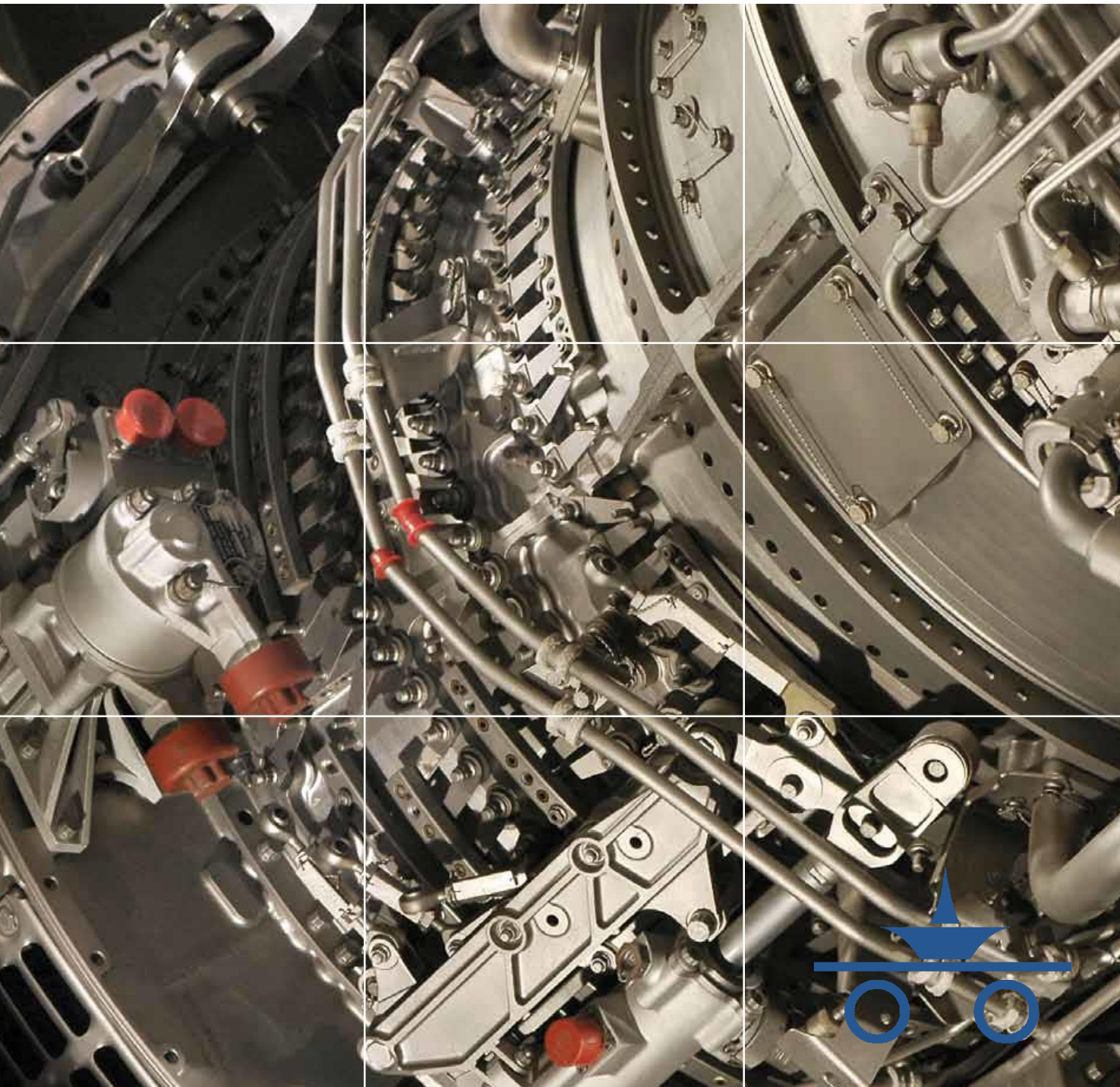


# **AeroShell Turbine Oil 560**





# RELIABLE PERFORMANCE FOR CONFIDENT OPERATIONS

## ASTO 560: Features and Benefits

Features	Key Benefits
Reduced coke formation	Coke formation and shedding can be disruptive to airline operations. Reduced coke deposits can lower maintenance costs and increase on-wing life.
Fully compatible with other approved oils	No engine problems such as coke shedding and oil filters blocking is experienced when changing from one approved oil to ASTO 560, in accordance with the procedure outlined in the relevant engine service bulletin.
No adverse effect on elastomer seals	ASTO 560's full compatibility with all elastomer seal materials reduces the possibility of oil leaks, which could lead to expensive engine overhauls or even an in-flight engine shutdown.
Good oxidative and thermal stability	The use of ASTO 560 reduces the occurrence of oxidative and thermal degradation of the oil at high operating temperatures, which could result in high overhaul and maintenance costs due to: <ol style="list-style-type: none"> <li>1. An increase in oil viscosity, which may result in the need for oil change</li> <li>2. An increase in acidity, which could lead to the corrosion of gears and bearings</li> <li>3. Sludge formation in the oil system, causing the blockage of oil jets and filters</li> </ol>



**For more than 100 Years, Shell has played a crucial role in many landmark events in the aviation industry**

### AeroShell Turbine Oil 560

(ASTO 560) is a third generation 5-centistoke synthetic hindered ester lubricating oil, designed to provide commercially viable performance and benefits such as reduced coking and improved wear resistance for modern jet engines.

Formulated to cope with demanding operating conditions, ASTO 560 has consistently delivered the right balance of performance and cost efficiency to the global aviation industry over the past 25 years.

## ASTO 560 Technical Specifications

MIL-PRF-23699F	Spec	Competitor STD	ASTO 560 (HTS)
Oil Type	Synthetic Ester	Synthetic Ester	Synthetic Ester
Kinematic Viscosity mm <sup>2</sup> /s			
	100 °C 4.90 to 5.40	5.00	5.24
	40 °C 23	25.30	26.71
	-40 °C 13000 max	11000	11000
Flash Point			
	°C 246 min	252	252
Pour Point			
	°C -54 max	-60	-60
TAN			
	mg KOH/g 1 max	0.06	0.22
Evaporation Loss 6.5 hrs/204°C			
	%m 10.0 max	4.20	2.00
Foaming		Pass	Pass
Corrosive and Oxidative Stability 72 hrs /204°C			
Viscosity Change %		24.96	19.3
Acid Number Change %		1.54	1.02
Contamination mg/100ml		7.0	0.55

*Whatever you fly, Aviocom can provide a full range of AeroShell oils, greases and fluids for your aircraft.*

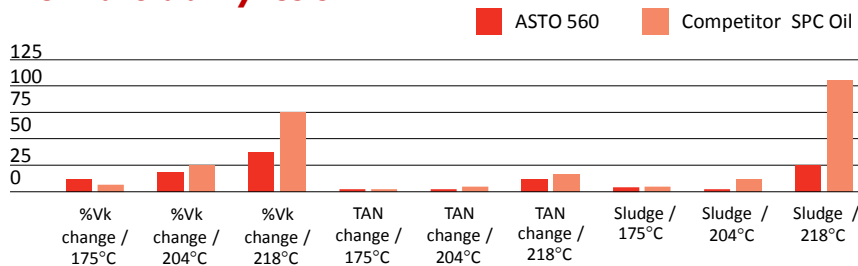
**ASTO 560 is developed based on a deep understanding of commercial aviation requirements. The result is a versatile lubricating oil proven to deliver cleaner engines, more reliable operational performance and longer maintenance cycles.**

### Good elastomer seal compatibility with ASTO 560

	Mil-PRF-23699 Limits (% Swell)	Competitor Oil	ASTO 560
SAE-AMS 3217/1 72 hours, at 70°C	5-25	13.8	13.1
SAE-AMS 3217/4 72 hours, at 204°C	5-25	12.0	13.1

ASTO 560 gave similar results as compared to a competitive oil when tested with fluorocarbon elastomers.

### ASTO 560 outperforms competitor oils in oxidation / thermal stability tests



ASTO 560 performs better in oxidation/corrosion tests as compared to competitor oils.

### Proven compatibility with other qualified oils

When changing from one approved oil to another, the recommended method is to 'top off' during normal servicing of the engines – this is the method preferred by the majority of engine manufacturers. ASTO 560 is proven to be compatible with qualified oils, making oil changeover uncomplicated and easy to accomplish. Shell Aviation's tests also show that by topping up from competitive oils to ASTO 560, the potential for coke shedding is significantly reduced.

- Note: Operators should always refer to the engine maintenance manuals or service bulletins to confirm that the 'top-off' method is acceptable for their specific engine type.

### Exceptional oxidative and thermal stability

The outstanding high temperature and oxidation stability of ASTO 560 is due to a high quality combination of the synthetic hindered ester base fluid and additive system. These additives help protect the oil from thermal and oxidative degradation especially at high operating temperatures, which can result in an increase in viscosity, high acid values and the formation of sludge within the oil system, bringing significant improvements to overall engine performance.

**Shell Aviation works closely with OEMs, engine specialists and airline engineers to ensure ASTO 560 delivers reliable lubricant performance.**

Whatever you fly, Aviocom can provide a full range of AeroShell oils, greases and fluids for your aircraft.

To ensure that all Shell lubricants are able to handle high operating temperatures and meet demanding engine requirements, ASTO 560 has been subjected to detailed laboratory and in-the-field application tests.

The result: **ASTO 560 has met or exceeded** all performance expectations for jet engine lubricants. In the field, ASTO 560 has **consistently demonstrated** its ability to **deliver cleaner oil systems, longer life for critical engine components** as well as **reduced engine maintenance** – at cost-effective price-points.

### Low coking

Keeping coke deposits under control is one of the main priorities in the maintenance of commercial jet engines. ASTO 560 incorporates a fine balance of additives to withstand high temperatures generated by turbine engines, greatly reducing the deposits typically caused by high temperature conditions.

### Good elastomer compatibility

ASTO 560 has been tested extensively for elastomer seal compatibility. In the industry's benchmark elastomer compatibility test, ASTO 560 gave similar results as compared to competitor products when tested with fluorocarbon elastomers, confirming that no oil leaks should occur when changing from standard oil to ASTO 560.

## Delivering value to your operations

ASTO 560 provides you the confidence you need to operate successfully in an increasingly challenging business environment. Reliable and versatile, ASTO 560 meets or exceeds the most exacting requirements of turbine oil technology standards as outlined in SAE AS 5780A. Shell Aviation's global distribution network ensures that ASTO 560 is more widely available than ever before. By delivering the right balance of costcompetitive performance and operational benefits, you can count on ASTO 560 to deliver value to your operations – always and everywhere around the world.

**As the performance requirements of modern jet engines broaden, ASTO 560 represents the vanguard of the next generation of turbine oils.**

Which provide a wide range of performance enhancements over conventional Type II oils. At Shell, we work closely with OEMs, engine specialists and airline engineers to ensure ASTO 560 delivers reliable lubricant performance at economical levels. ASTO 560 has been fully approved for application across the majority of commercial aircraft gas turbine engines, and is compatible for use with a variety of other similarly qualified jet engine oils.

### ASTO 560 OEM Approval/Certification

Manufacturer	Engine	Approval Reference
IAE	V2500 (all models)	SIL 235
CFMI	CFM-56 (all models)	CFM
GE	GE90 CF-6 (all models)	SB79-000 SB79-001
Pratt & Whitney	PW JT8D PW JT9D PW 4000	SB 238
Pratt & Whitney Canada	PW200 Series PW300 Series PW500 Series	MM 72-00-00
Engine Alliance	GP7000 (all models)	EAGP7 79-1
Rolls Royce	RB 211-524 (all models) RB 211-535 (all models) Tay Spey	RB211-12-F139
Honeywell	APU (all models)	34-GT-7800T
Hamilton Sundstrand	CSD (all models) IDG (all models) Pneumatic starters	HS 24-10-00

Aircraft	Engine Options	Aircraft	Engine Options
Airbus A340	CFMI CFM 56-5	Boeing 747-400	P&W PW 4000 GE CF6-80C2
Airbus A300/A310	GE CF-6 P&W PW 4000	Boeing 777	RR RB211-524 G/H P&W PW 4000 GE 90
Airbus A330	GE CF-6 P&W PW 4000	Boeing 737-300/400/500	CFMI CFM56-3
Airbus A319	CFMI CFM 56-5 IAE V2500	Boeing 737-600/700/800/900	CFMI CFM56-7
Airbus A320	CFMI CFM 56-5 IAE V2500	Boeing 757	RR RB211-535
Airbus A321	CFMI CFM 56-5 IAE V2500	Boeing 767	P&W PW 4000 P&W JT9-D GE CF6-80C2
Airbus A318	CFMI CFM 56-5		
Airbus A380	EA GP7000		



**ASTO 560 is fully approved to:**

**MIL-PRF-23699 HTS Grade,  
SAE AS 5780A Standard Grade**



**Shell Aviation**

ASTO 560 is fully approved to: Mil-PRF-23699 HTS Grade, SAE AS 5780A Standard Grade

**ASTO 560 is an industry-proven synthetic lubricant that has gained wide commercial acceptance and is approved for use by major aircraft gas turbine engine manufacturers.**

*Whatever you fly, Aviocom can provide a full range of AeroShell oils, greases and fluids for your aircraft.*