



AEROSHELL TURBINE OIL 560 (ASTO 560)

- Maintenance saving
- Longer life of engine components
- Lower oil consumption



Shell Aviation

Shell has been supporting aviation's pioneers for over a century and has been involved in jet-powered flight since helping Sir Frank Whittle to develop the first jet engine. We continue to provide high-quality fuels, lubricants and associated services to the aviation community. We remain committed to working with turbine engine manufacturers and airlines to create innovative high-performance oils for increasingly demanding engines.

PERFORMANCE AT A GLANCE

	Load-carrying capacity	Thermal stability	Low coking propensity	Elastomer seal compatibility
AeroShell Ascender Fourth-generation TEO High-performance capability (HPC)	✓✓✓✓	✓✓✓✓✓	✓✓✓✓✓	✓✓✓✓✓
ASTO 560 Third-generation TEO High thermal stability (HTS)	✓✓✓✓	✓✓✓✓✓	✓✓✓✓	✓✓✓✓✓
ASTO 555 High load-carrying capacity TEO	✓✓✓✓✓✓	✓✓✓✓	✓✓✓	✓✓✓✓
ASTO 500 Second-generation TEO Standard class (STD)	✓✓✓✓	✓✓✓	✓✓✓	✓✓✓✓✓

A TURBINE ENGINE OIL (TEO) WITH PROVEN PERFORMANCE

ASTO 560 helps to reduce maintenance costs by combining low coking propensity with excellent wear resistance and elastomer seal compatibility. It is designed to keep your engine performing as its designers intended by resisting viscosity changes and sludge and acid formation at extreme engine operating temperatures. ASTO 560 is a third-generation, 5-cSt hindered-ester synthetic lubricating oil with proven performance across the world's airlines. It meets the MIL-PRF-23699G HTS (high thermal stability) standard.

REDUCED COKE FORMATION, LOWER MAINTENANCE COSTS

Oils that fail to cope with the higher operating temperatures and pressures of modern turbine engines may be prone to producing coke. These deposits need to be removed to prevent oil service pipes from blocking, which could starve critical parts of lubrication. Removing coke deposits during engine overhauls and replacing worn components is expensive and can reduce aircraft availability.

ASTO 560 may help to reduce maintenance time and costs by resisting coke formation, thereby keeping engine components clean.



SUPERIOR CLEANLINESS: The bearing housing on the left is from a CFM56 engine that used ASTO 560. It is visibly cleaner than the housing on the right, which operated with a competitor's oil for a similar number of hours.

In intensive laboratory tests simulating the oil feed-pipe environment,¹ ASTO 560 produced up to

- **70% less deposition** than an equivalent-specification competitor's STD oil
- **40% less deposition** than the minimum requirement for a high-performance capability (HPC) grade oil.²

¹Hot liquid process simulation with oil heated to 375°C, flowing at 1 ml/min and loaded to 200 psi for 20 h

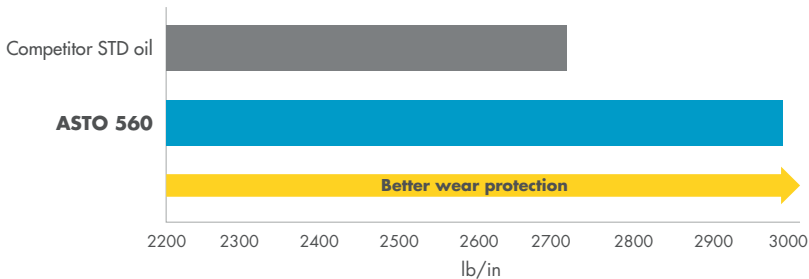
²Coking propensity is not specified by the MIL-PRF-23699G HTS standard. Nevertheless, ASTO 560 is well below the maximum coking limit of 0.4 mg for the AS 5780B specification with a value of 0.23 mg.

LESS WEAR, LONGER ENGINE LIFE

Wear under conditions of marginal lubrication can lead to increased maintenance costs. ASTO 560 helps to reduce maintenance costs by offering superior load-carrying capacity.

In the Ryder gear test,³ ASTO 560's load-carrying capacity

- **was more than 7% better** than a competitor's standard grade oil
- **exceeded engine manufacturers' requirements**, including those of Allison, GE and Pratt & Whitney.



SPECIFICATIONS AND APPROVALS

ASTO 560 is fully approved to

- MIL-PRF-23699G HTS grade
- SAE AS 5780B SPC grade.

ASTO 560 is approved by almost all engine and accessory manufacturers, including the following major engine manufacturers:

MANUFACTURER	ENGINES	APPROVAL REFERENCE
IAE	V2500 (all models)	SIL 235
CFMI	CFM56 (all models)	SB79-0001
GE	GE90, CF-6 (all models), GEnx (all models)	SB79-000, SB79-001, SB79-0001
Pratt & Whitney	PW JT8D, PW JT9D and PW 4000	SB 238
Engine Alliance	GP7000 (all models)	EAGP7 79-1
Rolls-Royce	RB 211-524 (all models) and RB 211-535 (all models)	RB211-12-F139

WHAT OUR CUSTOMERS SAY

"THE COMPLETE CONVERSION OF SAUDI ARABIAN AIRLINES TO ASTO 560 AND ASTO 500 HAS BEEN VERY SATISFACTORY. WE ARE DELIGHTED WITH THE LEVEL OF SERVICE AND TECHNICAL SUPPORT. WE HAVE A TRUE PARTNER IN SHELL AVIATION AND ITS DISTRIBUTOR SOOM OIL AND LOOK FORWARD TO NEW OPPORTUNITIES INCLUDING THE POTENTIAL TO USE AEROSHELL ASCENDER."

Ghassan Al-sadeg, Director, Aircraft Engineering, Saudi Aerospace Engineering Industries, Saudi Arabia

LOWER OIL CONSUMPTION

Elastomer seals that degrade or expand too much or too little can cause oil leaks, which lead to excessive oil use. ASTO 560 is fully compatible with all elastomer seal materials and has helped companies to reduce maintenance costs and increase fleet availability.

For example, Corendon Airlines recorded reduced oil consumption across its CFM56-7-powered fleet by switching to ASTO 560.⁴ Oil consumption in just one engine was reduced by 10 L for every 1,000 h of flight time, which is a significant saving when multiplied across all the engines in its fleet. For each aircraft flying 3,500 h a year, this can translate to an annual oil saving of 35 L per engine.

⁴In practice, long-term data suggests that oil consumption is governed more by mechanical factors than by differences between oils of a similar type.

UPGRADE FOR ULTIMATE PERFORMANCE

The extreme severity of the latest high-efficiency engines has driven the development of AeroShell Ascender – our ultimate turbine engine oil. If you operate these engines, you may be able to further reduce maintenance costs and extend on-wing engine lives by trading up to AeroShell Ascender.

A COMPREHENSIVE RANGE

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

- **AeroShell Grease 33**, the universal airframe grease used as a first-fill product by both Boeing and Airbus
- **AeroShell Fluid 41** "super-clean", mineral hydraulic oil.



CONTACT US

If you want any further information, please contact your AeroShell representative or visit:

www.shell.com/aviation

³Ryder gear tests measure the load required to produce a wear scar of a certain diameter compared with the load required to create the same wear scar diameter when using a reference oil.