AEROSHELL ASCENDER

- Shell's ultimate turbine engine oil
- Maintenance-saving formula
- Low coking propensity/high thermal stability
- Excellent seal compatibility

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)	✓✓✓✓	✓✓✓	✓✓✓	✓✓✓✓✓

SHELL'S ULTIMATE TURBINE ENGINE OIL (TEO)

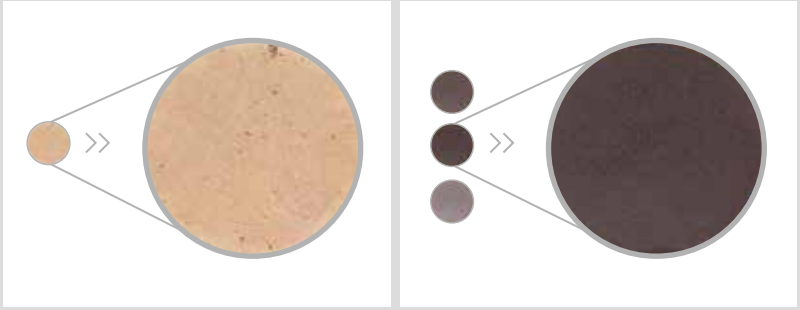
AeroShell Ascender is Shell's ultimate turbine engine oil. It is a fourth-generation oil designed to reduce maintenance costs in the latest high-temperature engines by resisting coke formation and to extend engine life by reducing wear. It can also help to lower oil consumption through its excellent elastomer seal compatibility. AeroShell Ascender was specifically formulated to meet the SAE AS 5780 specification in 2007 and, today, meets the SAE AS 5780B high performance capability (HPC) specification and the demands of the latest generation of engines.

STRONG PERFORMANCE CUTS COSTS

Extreme engine operating temperatures can break down oils to form carbon deposits such as coke and sludge, which, if not removed, may block oil tubes and may lead to engine fires and other in-service problems. Cleaning up carbon deposits and replacing parts is expensive. A build-up of carbon deposits can lead to an increased maintenance burden for airlines and higher engine repair and overhaul costs.

AeroShell Ascender helps to reduce maintenance costs by resisting coke and sludge formation. In laboratory tests[1] that are designed to simulate engine operating conditions, AeroShell Ascender produced

- up to **98% less sludge** than a competitor's STD oil, thereby demonstrating the major performance benefits of changing from an STD- to an HPC-specification oil.



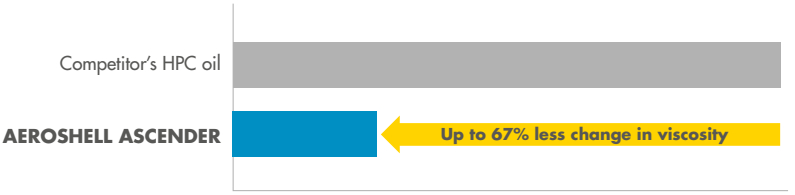
AEROSHELL ASCENDER produced less than 2 mg of sludge (left filter) compared with the 110 mg of sludge from a competitor's STD oil, which had to be collected using three filters.

[1]FTM-791C Method 5308 (modified), 72 h at 218°C

Oxidation can also cause oils to thicken and form acids, which may lead to a drop in engine performance, the corrosion of gears and bearings, and the degradation of elastomer (O-ring) seals.

AeroShell Ascender can go on performing in modern engines when other oils may fall out of specification. In tests comparing it with a competitor's HPC oil, it has

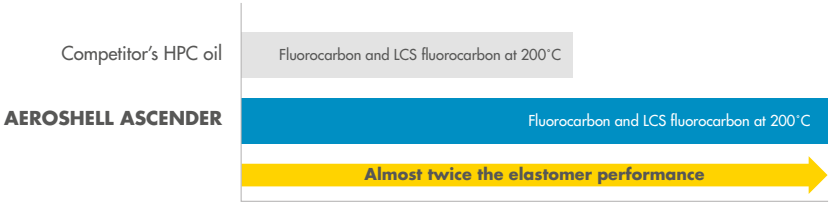
- up to **67% less** change in viscosity[2]
- up to **56% less** change in total acid number (TAN).[2]



LOWER OIL CONSUMPTION

If elastomer seals fail or swell too much or too little, oil can leak past them, which leads to higher oil consumption. Traditionally, a low-coking oil meant compromising elastomer seal compatibility, but AeroShell Ascender now offers both outstanding engine cleanliness and elastomer seal compatibility. In industry embrittlement tests[3], elastomers in contact with AeroShell Ascender

- **lasted almost twice as long** as a competitor's HPC oil.



WHAT OUR CUSTOMERS SAY

"WE HAD BEEN USING STANDARD GRADE OILS SINCE THE 1970S, BUT RECOGNISED THE NEED FOR IMPROVED PERFORMANCE. WE STARTED USING AEROSHELL ASCENDER IN 2010. THE CHANGEOVER WAS SMOOTH AND WE HAVE NOT EXPERIENCED LEAKAGE OR PERFORMANCE DEGRADATION FROM THE ENGINES."

Paulo Meneghel, Power Plant Engineering Manager, TAM Airlines, Brazil

[2]Def Stan 05-50 Part 61 Method 9, 25 h at 220°C
[3]Five types of elastomer O-rings in heated oil examined after 120 h and every 24 h thereafter

SPECIFICATIONS AND APPROVALS

AeroShell Ascender is fully approved to

- MIL-PRF-23699G
- SAE AS 5780B HPC.

AeroShell Ascender is approved for use in Rolls-Royce Trent 1000 powered Boeing 787 engines, the APS family of auxiliary power units and Honda HF120 engines, and successfully tested for use in IAE V2500 and BR725 engines. Other major approvals are pending, so please check the latest status online or with your AeroShell representative.

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