AeroShell TURBINE ENGINE OILS

AEROSHELL TURBINE OIL 390 (ASTO 390)

- Reliable cold-soak starting

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.

BETTER COLD-START RELIABILITY

ASTO 390 can help to improve auxiliary power unit (APU) starting reliability, particularly cold-soak starting. It is a 3-cSt synthetic diester oil incorporating a carefully selected and balanced combination of additives to improve thermal and oxidation stability and to increase the load-carrying capacity of the base oil.

PERFORMANCE AT A GLANCE			
	Cold-soak start-up	Engine cleanliness[1]	Wear protection[1]
ASTO 390 Synthetic turbine engine oil	✓✓✓	✓✓	✓✓

[1]Compared with other 3-cSt oils

RELIABLE COLD-SOAK STARTING

Products such as ASTO 390 are commonly used in the APUs of four-engine intercontinental aircraft, but are now being considered for use in twin-engine aircraft.

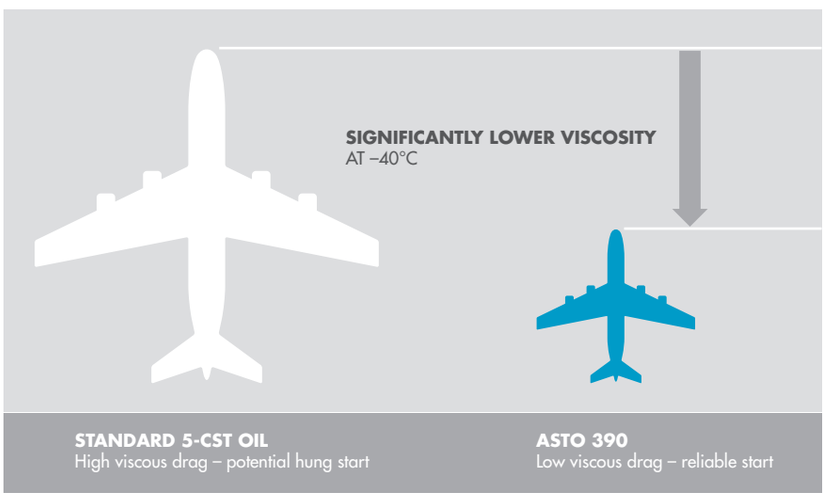
If a main engine fails, you need to have confidence that your APU will start reliably. An aircraft's extended range twin operations (ETOPS) certification[2] is partly based on the reliability of back-up systems such as the APU. In the event of engine failure, the APU must make up for any reduction in electrical power.

APUs are typically shut down when cruising. During this time, the oil can be cooled to less than –40°C. At this temperature, the viscosity of standard 5-cSt oil increases to about 10,000 cSt. This causes a large viscous drag that may result in a hung start.

ASTO 390, with its much smaller viscosity increase of typically 2,000 cSt at –40°C, can help to improve cold-soak start-up reliability and thus maximise ETOPS times, as it has

- **significantly lower viscosity** at cold-soak start-up temperatures (–40°C) than a standard 5-cSt oil.

[2]The time a fully loaded twin-engined aircraft requires for single-engine flight to the nearest suitable airport.



SPECIFICATIONS AND APPROVALS

ASTO 390 is fully approved to

- Def Stan 91-94 (British)
- IPM-10, VNII NP 50-1 4f and 4u, and 36Ku-A (Russian analogue)
- Joint Service Designation OX-7.

ASTO 390 is approved for use in all models of the following engines:

- Honeywell GTCP 30, 36, 70, 85, 331 and 660 APUs, starters and turbocompressors
- Turbomeca Astazou, Artouste, Bastan VII, Marboré 6, Makila and Turmo
- Rolls-Royce Conway, Spey, Tay and M45H
- Pratt & Whitney Canada PW901A APU
- Hamilton Sundstrand APS 500, 1000, 2000 and 3000.

A COMPREHENSIVE RANGE

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

- **AeroShell Ascender** for the latest energy-efficient turbine engines
- **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

PRI-016-14