



# AeroShell Turbine Oil 390

AeroShell Turbine Oil 390 is a 3 mm<sup>2</sup>/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.

## DESIGNED TO MEET CHALLENGES

### Main Applications

- AeroShell Turbine Oil 390 was developed primarily as an improved 3 mm<sup>2</sup>/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<sup>2</sup>/s oils used in the APU will increase from 5 mm<sup>2</sup>/s at 100°C to typically 10,000 mm<sup>2</sup>/s at -40°C. 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<sup>2</sup>/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, Approvals & Recommendations

- Approved DEF STAN 91-94 (British)
- Analogue to IPM -10, VNII NP 50-1 4f and 4u, and 36Ku-A (Russian)
- Joint Service Designation OX-7
- Honeywell : GTCP 30, 36, 70, 85, 331 and 660 APUs Starters, Turbo Compressors
- Pratt & Whitney Canada : PW901A APU
- Rolls Royce : Conway, Spey, Tay, M45H
- Turbomeca : Astazou, Artouste, Bastan VII, Marbore 6, Makila, Turmo
- Hamilton-Sundstrand: APS 500, 1000, 2000, 3000

For a full listing of equipment approvals and recommendations, please consult your local Shell Technical Helpdesk, or the OEM Approvals website.

### Typical Physical Characteristics

Properties			DEF STAN 91-94	Typical
Oil type			-	Synthetic ester
Density	@15°C	kg/l	-	0.924
Kinematic viscosity	@40°C	mm <sup>2</sup> /s	16.0 max	12.9
Kinematic viscosity	@100°C	mm <sup>2</sup> /s	4.0 min	3.4
Kinematic viscosity	@-54°C	mm <sup>2</sup> /s	13000 max	<13000
Pourpoint		°C	-60 max	-68
Flashpoint Cleveland Open Cup		°C	225 min	225
Foam characteristics			Must pass	Passes
Trace element content			Must pass	Passes
Elastomer compatibility - nitrile		%	14 to 26	Within range

Properties		DEF STAN 91-94	Typical
Elastomer compatibility - viton	%	15 to 25	Within range
Elastomer compatibility - silicon	%	16 to 24	Within range
Solid particle contamination - sediment	mg/l	10 max	<10
Solid particle contamination - total ash of sediment	mg/l	1 max	<1
Corrosivity		Must pass	Passes
High temperature oxidative stability		Must pass	Passes
Load carrying ability		Report	Passes

These characteristics are typical of current production. Whilst future production will conform to Shell's specification, variations in these characteristics may occur.

### Health, Safety & Environment

#### ■ Health and Safety

Guidance on Health and Safety is available on the appropriate Material Safety Data Sheet, which can be obtained from <http://www.epc.shell.com/>

#### ■ Protect the Environment

Take used oil to an authorised collection point. Do not discharge into drains, soil or water.

### Additional Information

#### ■ Advice

Advice on applications not covered here may be obtained from your Shell representative.