Technical Data Sheet

AeroShell **Fluid *31***

- AeroShell Fluid 31 is a synthetic hydrocarbon based aircraft hydraulic fluid with greatly improved fire resistance characteristics when compared with conventional petroleum products.
- AeroShell Fluid 31 has a specially designed base stock which imparts a relatively high flash point, excellent low temperature properties and good oxidation and thermal stability. In addition, AeroShell Fluid 31 is formulated with high technology additives to provide oxidation and corrosion resistance, antiwear, and anti-foaming protection.
- AeroShell Fluid 31 is superclean filtered to ensure optimum performance in particulate monitored systems.
- AeroShell Fluid 31 is dyed red. The useful operating temperature range is –40 to +205^{0}C.

DESIGNED TO MEET CHALLENGES

Main Applications

- AeroShell Fluid 31 is recommended for use in aircraft, ordnance, and missile systems operating from –40^{0}C to +205^{0}C . This fluid should be considered for use in auto pilots, shock absorbers, brakes, flight control systems, hydraulic servo-controlled systems and other systems using synthetic elastomer seals. An increasing number of aircraft manufacturers now recommend use of this type of fluid in aircraft hydraulic systems in preference to mineral hydraulic oils. This move has been prompted by need to use fluids with better fire resistant properties.
- AeroShell Fluid 31 is also approved for use in the Honeywell (formerly Garrett) cooling turbine (cabin air compressors). Increasingly this type of hydraulic fluid is being adopted for use in hydraulic systems of military aircraft in place of mineral hydraulic fluids.
- AeroShell Fluid 31 is a synthetic hydrocarbon oil and should not be used in contact with incompatible seal materials.
- AeroShell Fluid 31 is compatible with AeroShell Fluids 4, 41, 51, 61 and 71 and can be used in systems designed to operate with MIL-PRF-5606, MIL-PRF-6083, MIL-PRF-87257 and MIL-PRF-46170 fluids.
- Chlorinated solvents should not be used for cleaning hydraulic components which use AeroShell Fluid 31. The residual solvent contaminates the hydraulic fluid and may lead to corrosion.

Specifications, Approvals & Recommendations

- Approved MIL-PRF-83282D (US)
- NATO Code H-537

For a full listing of equipment approvals and recommendations, please consult your local Shell Technical Helpdesk.

Typical Physical Characteristics

Properties			Method	MIL-PRF-83282D	Typical
Oil type				Synthetic Hydrocarbon	Synthetic Hydrocarbon
Kinematic viscosity	@205^{0}C	mm^2/s		1.0 minimum	1.1
Kinematic viscosity	@100^{0}C	mm^2/s		3.45 minimum	3.53
Kinematic viscosity	@40^{0}C	mm^2/s		14.0 minimum	14.2
Kinematic viscosity	@–40^{0}C	mm^2/s		2200 maximum	1937
Flashpoint (Cleveland Open Cup)		^{0}C		205 minimum	225
Fire Point		^{0}C		245 minimum	248
Total Acidity		mgKOH/g		0.10 maximum	0.04
Evaporation loss 6.5 hrs	@205^{0}C	% m		20 maximum	17

Properties			Method	MIL-PRF-83282D	Typical
Relative density	@15.6°C			Report	0.850
Pour point		°C maximum		-55	-78
Low temperature stability 72 hrs	@-40°C			Must pass	Passes
High temperature stability 100 hrs	@205°C			Must pass	Passes
Gravimetric Filtration		mg/100ml		0.3 maximum	0.1
Filtration time		minutes maximum		15	5
Particle Count, Automatic	5 to 15 µm	per Lt		10000 maximum	Passes
Particle Count, Automatic	16 to 25 µm	per Lt		1000 maximum	Passes
Particle Count, Automatic	26 to 50 µm	per Lt		150 maximum	Passes
Particle Count, Automatic	51 to 100 µm	per Lt		20 maximum	Passes
Particle Count, Automatic	>100 µm	per Lt		5 maximum	Passes
Water content		ppm		100 maximum	Passes
Foaming tendency	ASTM Seq 1			Must pass	Passes
Flame propagation		cm/s		Must pass	Passes
Rubber swell, NBR-L		%		18 to 30	Passes
4-Ball Wear, 1 hr @ 75°C scar dia	1 kg load/1200 rpm	mm		0.21 maximum	0.20
4-Ball Wear, 1 hr @ 75°C scar dia	10 kg load/1200 rpm	mm		0.30 maximum	0.25
4-Ball Wear, 1 hr @ 75°C scar dia	40 kg load/1200 rpm	mm		0.65 maximum	0.55
Oxidation & corrosion stability 168 hrs @ 121°C - metal weight change				Must pass	Passes
Oxidation & corrosion stability 168 hrs @ 121°C - change in viscosity @ 40°C	maximum	%		10	Passes
Oxidation & corrosion stability 168 hrs @ 121°C - change in acidity	maximum	mgKOH/g		0.2	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.