



# 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  $+205^{\circ}\text{C}$ .

## DESIGNED TO MEET CHALLENGES

### Main Applications

- AeroShell Fluid 31 is recommended for use in aircraft, ordnance, and missile systems operating from  $-40^{\circ}\text{C}$  to  $+205^{\circ}\text{C}$ . 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)
- (MIL-PRF-83282D) (British)
- Equivalent to DCSEA 437/A (French)
- NATO Code H-537
- Joint Service Designation OX-19

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

### Typical Physical Characteristics

Properties		MIL-PRF-83282D	Typical	
Oil type		Synthetic Hydrocarbon	Synthetic Hydrocarbon	
Kinematic viscosity	@ $205^{\circ}\text{C}$	$\text{mm}^2/\text{s}$	1.0 min	1.07
Kinematic viscosity	@ $100^{\circ}\text{C}$	$\text{mm}^2/\text{s}$	3.45 min	3.53
Kinematic viscosity	@ $40^{\circ}\text{C}$	$\text{mm}^2/\text{s}$	14.0 min	14.33
Kinematic viscosity	@ $-40^{\circ}\text{C}$	$\text{mm}^2/\text{s}$	2200 max	2098
Flashpoint (Cleveland Open Cup)		$^{\circ}\text{C}$	205 min	237
Fire Point		$^{\circ}\text{C}$	245 min	251
Total Acidity		$\text{mgKOH/g}$	0.10 max	0.01
Evaporation loss 6.5 hrs	@ $150^{\circ}\text{C}$	% m	20 max	10

Properties		MIL-PRF-83282D	Typical
Relative density	@15.6/15.6°C	Report	0.850
Pour point	°C	-55 max	Below -55
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 max	0.2
Filtration time	minutes	15 max	Less than 15
Particle Count, Automatic	5 to 15 µm per Lt	10000 max	1331
Particle Count, Automatic	16 to 25 µm per Lt	1000 max	190
Particle Count, Automatic	26 to 50 µm per Lt	150 max	55
Particle Count, Automatic	51 to 100 µm per Lt	20 max	4
Particle Count, Automatic	>100 µm per Lt	5 max	0
Water content	ppm	100 max	82
Foam resistance	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 max	0.18
4-Ball Wear, 1 hr @ 75°C scar dia	10 kg load/1200 rpm mm	0.30 max	0.24
4-Ball Wear, 1 hr @ 75°C scar dia	40 kg load/1200 rpm mm	0.65 max	0.50
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	%	10 max	Less than 10
Oxidation & corrosion stability 168 hrs @ 121°C - change in acidity	mgKOH/g	0.2 max	Less than 0.02
Flammability		Must pass	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.