



# AeroShell Fluid 41

AeroShell Fluid 41 is a mineral hydraulic oil manufactured to a very high level of cleanliness, and possesses improved fluid properties. AeroShell Fluid 41 contains additives which provide excellent low temperature fluidity as well as exceptional anti-wear, oxidation - corrosion inhibition and shear stability. In addition metal de-activators and foam inhibitors are included in this high viscosity index fluid to enhance performance in hydraulic applications. AeroShell Fluid 41 is capable of wide temperature range operation.

AeroShell Fluid 41 is dyed red.

## DESIGNED TO MEET CHALLENGES

### Main Applications

AeroShell Fluid 41 is intended as an hydraulic fluid in all modern aircraft applications requiring a mineral hydraulic fluid. AeroShell Fluid 41 is particularly recommended where use of a "superclean" fluid can contribute to improvements in component reliability, and can be used in aircraft systems operating unpressurised between  $-54^{\circ}\text{C}$  to  $90^{\circ}\text{C}$  and pressurised between  $-54^{\circ}\text{C}$  to  $135^{\circ}\text{C}$ .

AeroShell Fluid 41 should be used in systems with synthetic rubber components and must not be used in systems incorporating natural rubber.

AeroShell Fluid 41 is compatible with AeroShell Fluids 4, 31, 51, 61 and 71 and SSF/LGF.

Chlorinated solvents should not be used for cleaning hydraulic components which use AeroShell Fluid 41. The residual solvent contaminates the hydraulic fluid and may lead to corrosion.

### Specifications, Approvals & Recommendations

- COMAC Approved to QPL-CMS-OL-104
  - Approved MIL-PRF-5606H\* (both U.S. and European production)
  - Approved DEF STAN 91-48 Grade Superclean\* (European production only)  
Meets DEF STAN 91-48 Grade Normal (European production only) Equivalent to DEF STAN 91-48 Grades Superclean\* & Normal (U.S. production only)
  - Approved DCSEA 415/A (French)
  - Analogue to AMG-10 (Russian)
  - NATO Code H-515\* (equivalent H-520)
  - Joint Service Designation OM-15\* (equivalent OM-18)
- For a full listing of equipment approvals and recommendations, please consult your local Shell Technical Helpdesk.

### Typical Physical Characteristics

| Properties                            |                           | MIL-PRF-5606H | Typical US Production | Typical European Production |
|---------------------------------------|---------------------------|---------------|-----------------------|-----------------------------|
| Oil Type                              |                           | Mineral       | Mineral               | Mineral                     |
| Kinematic viscosity                   | @100°C mm <sup>2</sup> /s | 4.90 min      | 6.13                  | 5.30                        |
| Kinematic viscosity                   | @40°C mm <sup>2</sup> /s  | 13.2 min      | 15.68                 | 14.1                        |
| Kinematic viscosity                   | @-40°C mm <sup>2</sup> /s | 600 max       | 384                   | 491                         |
| Kinematic viscosity                   | @-54°C mm <sup>2</sup> /s | 2500 max      | 1450                  | 2300                        |
| Viscosity index                       |                           | –             | 214                   | Over 200                    |
| Flashpoint (Pensky Martin Closed Cup) | °C                        | 82 min        | 104                   | 105                         |
| Autoignition temperature              | °C                        | –             | 230                   | 230                         |
| Pour point                            | °C                        | -60 max       | <-60                  | <-60                        |
| Total acid number                     | mgKOH/g                   | 0.20 max      | 0                     | 0.01                        |
| Evaporation loss 6 hrs                | @71°C %m                  | 20 max        | 16.5                  | 10                          |
| Water content                         | ppm                       | 100 max       | 55                    | <100                        |

| Properties                                                              |                  | MIL-PRF-5606H | Typical US Production | Typical European Production |
|-------------------------------------------------------------------------|------------------|---------------|-----------------------|-----------------------------|
| Relative density                                                        | @15.6/1<br>5.6°C | Report        | 0.874                 | 0.87                        |
| Colour                                                                  |                  | Red           | Red                   | Red                         |
| Particulate contamination, number of particles per 100 ml in size range | 5 to 15 µm       | 10000 max     | 1200                  | 808                         |
| Particulate contamination, number of particles per 100 ml in size range | 15 to 25 µm      | 1000 max      | 550                   | 116                         |
| Particulate contamination, number of particles per 100 ml in size range | 25 to 50 µm      | 150 max       | 70                    | 44                          |
| Particulate contamination, number of particles per 100 ml in size range | 50 to 100 µm     | 20 max        | 5                     | 10                          |
| Particulate contamination, number of particles per 100 ml in size range | over 100 µm      | 5 max         | 0                     | 1                           |
| Copper corrosion                                                        |                  | 2e max        | 1b                    | 2b                          |
| Steel on steel wear, scar diam                                          | mm               | 1.0 max       | 0.65                  | 0.95                        |
| Rubber swell, L rubber                                                  | %                | 19 to 30      | 22                    | 25.4                        |
| Corrosiveness & oxidation, 168 hrs @135°C - metal weight change         |                  | Must Pass     | Passes                | Passes                      |
| Corrosiveness & oxidation, 168 hrs @ 135°C - viscosity change           | @40°C %          | -5 to +20     | 8.08                  | +0.1                        |
| Corrosiveness & oxidation, 168 hrs @135°C - acid number change          | mgKOH/g          | 0.20 max      | 0.02                  | +0.1                        |
| Low temperature stability 72 hrs                                        | @-54°C           | Must Pass     | Passes                | Passes                      |
| Shear stability - viscosity change                                      | @40°C            | Must Pass     | Passes                | Passes                      |
| Shear stability - acid number change                                    |                  | 0.2 max       | Less than 0.2         | Less than 0.2               |
| Gravimetric filtration                                                  | mg/100m          | 0.3 max       | 0.1                   | Less than 0.3               |
| filtration time                                                         | min              | 15 max        | 10                    | Less than 15                |
| Foaming tendency                                                        |                  | Must Pass     | Passes                | Passes                      |
| Barium content                                                          | ppm              | 10 max        | Nil                   | Nil                         |

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.

### \*Superclean grades

The British specification DEF STAN 91-48 covers two grades (normal and superclean) of mineral hydraulic fluid which differ only in their cleanliness limits. AeroShell Fluid 41 is manufactured to meet the superclean requirements and thus it also meets the requirements of the normal grade.