Shell Aviation

AEROSHELL
PISTON-ENGINE AIRCRAFT LUBRICANTS

AeroShell

YOU CAN RELY ON AEROSHELL LUBRICANTS TO GO **ABOVE AND BEYOND** TO BRING YOU LOW-COST, DEPENDABLE FLIGHT BY HELPING TO PROTECT YOUR AIRCRAFT, REDUCE MAINTENANCE COSTS AND IMPROVE EFFICIENCY.

AEROSHELL PISTON-ENGINE OILS

AEROSHELL GREASES

AEROSHELL HYDRAULIC FLUIDS

AEROSHELL PISTON ENGINE OILS

We understand your desire for low-cost, dependable flight. You can rely on the AeroShell range of piston engine oils (PEO) to help protect your engine, reduce its maintenance costs and improve its efficiency. Whether you keep a vintage aircraft flying, take off in sub-zero temperatures or run a compression-ignition (diesel) engine on jet fuel, there is an AeroShell oil designed specifically to help lift your performance.

GIVING YOU CONFIDENCE

A customer recently said, "An airplane is not a place you want to be testing new solutions, which is why we use AeroShell."

We understand your need to have confidence in your engine oil. Generations of pilots and engineers have trusted AeroShell in their aircraft. It is no surprise that AeroShell is one of the best-selling PEO ranges. If you are looking for peace of mind, we recommend our high-quality AeroShell oils.

REDUCING MAINTENANCE

Poor-quality oil may fail to protect your engine from wear and corrosion, and allow efficiency- and power-robbing sludge to form. The result could lead to frequent and costly maintenance.

AeroShell oils are designed to give your engine protection from wear, corrosion and deposits. For example, AeroShell Oil W 100 Plus had over one and a third times the load-carrying capacity of a competitor's multigrade oil in FZG scuffing load tests. That means it is better at keeping heavily loaded components apart and free from harmful metal-on-metal wear.

AeroShell can help to keep your aircraft out of the workshop and in the air for longer.

"MY GRANDFATHER USED AEROSHELL AND IT HAS A TRADITION OF EXCELLENCE THAT CANNOT BE MATCHED."

Skip Stewart, Award-Winning Air Show Pilot

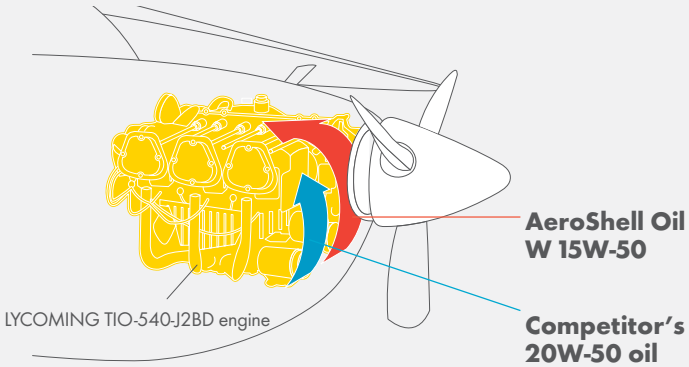
START-UP PROTECTION

Most wear occurs on engine start-up, so getting rapid low-temperature flow is critical.

At 0 °C ambient temperature, AeroShell Oil W 15W-50 reaches full pressure in the front oil gallery more than 25 seconds quicker than a competitor's 20W-50 oil.

MORE VALUE, MORE SAVINGS

Few pilots would risk excessive maintenance costs through using low-quality oil. The proven protection of AeroShell can help to reduce maintenance costs. But did you know that selecting the right product can also help to cut operating costs? For instance, in tests, AeroShell Oil W 15W-50 showed a measurable reduction in fuel consumption compared with single-grade oils. As a multigrade oil, it also helps to remove the cost of changing oil with the seasons. The bottom line is that AeroShell is great value.



ENGINE OILS

SPARK-IGNITION/ AVGAS ENGINES

AeroShell Oil W 15W-50

- Reduced maintenance costs
- Fast-acting protection
- Climatic versatility
- Fuel saving

Greater temperature range and advanced corrosion protection

AeroShell Oil W80 Plus, W100 Plus

- Added wear protection
- Added corrosion protection
- Proven ashless additive technology

Enhanced wear and corrosion protection

AeroShell Oil W80, W100, W120

- Improved performance
- Proven ashless additive technology

COMPRESSION IGNITION/ JET A ENGINES

AeroShell Oil Diesel Ultra

- Promotes long engine life
- Reduced maintenance
- Developed with equipment manufacturers
- The only oil designed for diesel aero engines burning jet fuel

BREAK-IN OIL[1]

AeroShell Oil 80, 100, 120

- High-quality straight mineral oil
- Aids engine break-in
- Prevents cylinders glazing
- Clean burning

[1] AeroShell oils are used primarily during the break-in of many new or recently overhauled four-stroke aviation piston engines and in a few engines that require them for normal operations.

LIGHT SPORT 4-STROKE ENGINES

AeroShell Oil Sport Plus 4

- Aviation-quality oil
- Multigrade climatic versatility
- Developed with Rotax

"YOU DO NOT EVEN GO TO THE OIL AS A POTENTIAL PROBLEM; YOU DO NOT EVEN THINK ABOUT IT BECAUSE IT IS AEROSHELL."

Dax Wanless, Crew Chief, Kevin Coleman Aerosports, and Co-owner of Tubreaux Aviation Maintenance

INNOVATION WITH ENGINE MANUFACTURERS

Engine and oil technologies are constantly being reinvented. For example, the recently developed diesel (compression-ignition) aircraft engines are becoming popular for good reasons. They can be up to 30% more fuel efficient[2] than spark-ignition engines and run on widely available, relatively low-cost jet fuel.

AeroShell has always been a pioneer. In this case, we created an AeroShell oil for these engines with SMA and Thielert's engine development teams. This work involved more than 40,000 hours of aircraft engine tests. The formula was then enhanced to meet the Mercedes-Benz Specification 229.5 and launched as AeroShell Oil Diesel Ultra.

[2] Published brake specific fuel consumption for a 135-hp Thielert Centurion engine is 0.36 lb/hp-hr, whereas that of a 150-hp Lycoming IO-320 engine is 0.55 lb/hp-hr.

DEDICATED AVIATION-QUALITY OIL FOR LIGHT SPORT ENGINES

Historically, light sport aircraft operators relied on motorcycle oils with formulations that could vary geographically and be changed without notifying the aviation community. Some of the changes that are good for motorbike engines may not be good for lightweight performance aviation engines.

With AeroShell Oil Sport Plus 4, aviators have a consistent worldwide formulation that cannot be changed without Rotax® agreement. It is designed to cope with the high shear stresses associated with integrated gearboxes and overload clutches, and it has detergents that help to keep critical areas, such as pistons and cylinders, clean.

AeroShell Oil Sport Plus 4 is the only aviation oil developed, tested and approved for all four-stroke BRP-Rotax aircraft engines.

"I RECOMMEND AEROSHELL OIL W 15W-50, ESPECIALLY IN OUR LOCAL CLIMATE, WHERE, IN WINTER, WE NEVER KNOW IF WE ARE GOING TO BE STARTING OUR ENGINES AT 30 OR 80°F."

Debby Rhin-Harvey, FAA Designated Examiner, Commercial Airline Captain and US Unlimited Aerobatic Team Member

"WE HAVE COLLABORATED WITH SHELL FOR OVER A DECADE. OUR DECISION TO WORK WITH SHELL TO DEVELOP AEROSHELL OIL SPORT PLUS 4 WAS BASED ON THE BENEFITS THE FORMULATION WOULD PROVIDE TO OUR CUSTOMERS."

Ing. Mag. Peter Ölsinger, General Manager BRP-Rotax / Member of the Management Board,
Vice President Sales, Marketing RPS-Business & Communications

Product	Benefits	Specifications and approvals (Full approval details can be obtained from your AeroShell representative)
Compression-ignition (diesel) engines		
AeroShell Oil Diesel Ultra	■ Promotes long engine life ■ Reduced maintenance ■ Developed with equipment manufacturers ■ The only oil designed for diesel aero engines burning jet fuel	■ Mercedes Benz 229.5 ■ Approved for Thielert/Centurion 1.7 and 2.0, Austro Engine AE300 and SMA SR305-230E engines ■ Meets automotive specifications ACEA A3/B4 and API SL/CF (aviation specifications are yet to be defined)
AeroShell Oil "W" range		
AeroShell Oil W 15W-50	■ Reduced maintenance costs ■ Fast-acting protection ■ Climatic versatility ■ Fuel saving	■ SAE J-1899 ■ Lycoming 301F (Service Bulletin 446E and 471B and Service Instruction 1409C) ■ Continental MHS-24B, SIL 99-2 ■ Pratt & Whitney (Service Bulletin 1183)
AeroShell Oil W80/100 Plus	■ Added wear protection ■ Added corrosion protection ■ Proven ashless additive technology	■ SAE J-1899 ■ Lycoming 301F (Service Bulletin 446E and 471B and Service Instruction 1409C) ■ Continental SIL 99-2
AeroShell Oil W80/100/120	■ Improved performance ■ Proven ashless additive technology	■ SAE J-1899 ■ Lycoming 301F (Service Bulletin 446E and 471B and Service Instruction 1409C) ■ Continental MHS-24B ■ Pratt & Whitney (Service Bulletin 1183)
Straight mineral grades		
AeroShell Oil 80/100/120	■ High-quality straight mineral oil ■ Aids engine break-in ■ Prevents cylinders glazing ■ Clean burning	■ SAE J-1966
Light-sport, very-light and ultralight engines		
AeroShell Oil Sport Plus 4	■ Aviation-quality oil ■ Multigrade climatic versatility ■ Developed with Rotax	■ API SL, JASO MA, VW 502 00 ■ Fully approved – all BRP-Rotax 912, 914 and 915 series engines, BRP-Rotax service instructions 912-016, 912i-001-912iS, 914-019 and 915iS/915iSC ■ Rotax Norm RON 424 specification

AEROSHELL GREASES

The AeroShell grease range includes advanced multipurpose and specialist products with high-load-carrying, extreme-temperature and corrosion-inhibition properties.

REDUCING OPERATING COSTS

Flying can be expensive, especially if you use poor-performing greases that lead to high component-replacement costs, grease consumption and maintenance requirements.

AeroShell specialist and multipurpose aviation greases are designed to cut the cost of owning and operating aircraft by helping to protect components from wear. The greases also perform for longer and thus help to reduce grease consumption.

GIVING YOU PEACE OF MIND

To fly with confidence, you need to trust your equipment and the lubricants that protect it. To give you peace of mind, our greases meet or exceed industry standards, are flight-proven and approved by aircraft manufacturers, and have provided many decades of trouble-free performance. For example, in June 2020, AeroShell Grease 33 celebrated 25 years of service and has more in-service time than any other grease in its class. It is also approved by leading airframe manufacturers and is a factory-fill product for equipment manufacturers. And AeroShell Grease 58 is approved for all Parker Hannifin non-amphibious wheel applications and first fill for Pilatus.

SIMPLER AND SAFER MAINTENANCE

The logistics of stocking multiple greases for different aircraft applications can be complicated. With numerous products, it is easy for an unsuitable grease to be used, one which may fail to protect components adequately and even be unsafe.

AeroShell Grease 33 was created to replace multiple specialist products and thus simplify maintenance and enhance safety by reducing product-misapplication risk. To further enhance safety, AeroShell Grease 33, 58 and 64 are built on the same lithium-complex thickener technology, which diminishes the potential product incompatibility issues.

GREASES

UNIVERSAL AIRFRAME

AeroShell Grease 33

- Simplified inventories
- Easier maintenance
- Lower labour costs
- Less misapplication risk

EXTREME PRESSURE

AeroShell Grease 64 [3]

- Extreme protection – 5% molybdenum disulphide
- Excellent corrosion and wear protection
- Proven AeroShell Grease 33 technology

WHEEL BEARING AND VERSATILE MULTIPURPOSE

AeroShell Grease 58

- Enhanced corrosion protection
- Excellent anti-wear and load-carrying properties
- Exceeds the SAE AMS 3058 specification

MULTIPURPOSE HELICOPTER

AeroShell Grease 14

- Outstanding fretting and corrosion protection
- Wide temperature range
- Approved by leading helicopter manufacturers
- Calcium soap thickener

GENERAL-PURPOSE AIRFRAME

AeroShell Grease 6

- Use in anti-friction bearings, gearboxes and plain bearings
- Good water resistance
- Low noise capability
- Mineral-oil based
- Microgel® thickener

VERSATILE MULTIPURPOSE

AeroShell Grease 22

- Severe operating conditions
- Long component life
- Versatile

ADVANCED MULTIPURPOSE AIRFRAME

AeroShell Grease 7

- Good corrosion protection
- High load-carrying capacity
- Wide temperature range

WHEEL BEARING AND ENGINE ACCESSORY

AeroShell Grease 5 [4]

- High load-carrying capacity
- Good water and heat resistance

[3]Formerly AeroShell Grease 33MS
[4]AeroShell Grease 5 will remain available in the Americas only. In all other regions, AeroShell Grease 22 replaces AeroShell Grease 5.

EXTENDING COMPONENT LIFE

The right grease can help to reduce operating costs by protecting components from wear. Take wheel bearings for example. During flight, aircraft wheel bearings can become extremely cold. They are motionless until the instant the aircraft's wheels touch the tarmac, when they rapidly accelerate to high speeds, become very hot and are often subjected to rain and runway de-icing fluids. The bearings may then sit in this hot, wet, corrosive environment for days, weeks or months depending on how often you get a chance to fly.

AeroShell Grease 58 is designed to protect aircraft wheel bearings operating in these severe conditions. It can help to extend component life and reduce maintenance costs through its excellent load-carrying capacity and resistance to wear, corrosion, oxidation and water washout.

INNOVATION YOU CAN TRUST

Shell is at the forefront of grease innovation and has a strong record of pioneering and rigorously testing new grease technologies for aviation applications.

In 2018, we introduced AeroShell Grease 58, developed with lithium-complex technology to exceed SAE AMS 3058 requirements and protect against corrosive runway de-icing fluids. In Shell-run EMCOR tests, two competitor greases failed to meet the SAE AMS 3058 requirements, with a popular red lithium-complex grease receiving the worst possible rating.

PROTECTING COMPONENTS FROM WEAR

AeroShell Greases can help to extend component life and reduce maintenance costs by preventing wear and corrosion.

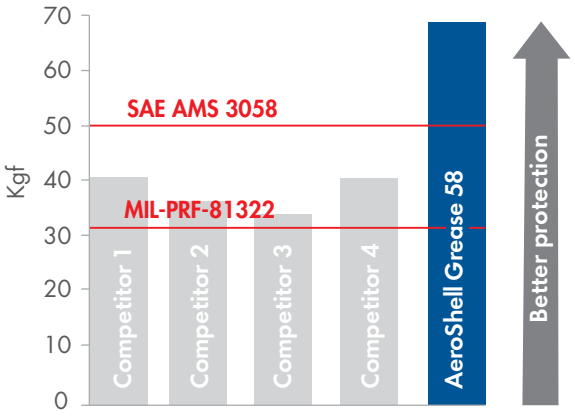
For example, in industry tests, AeroShell Grease 33 showed

- a smaller wear scar in a wear test than a MIL-PRF-81322G specification grease[5]
- no corrosion in saline solution, whereas a bearing with MIL-PRF-81322G specification grease showed corrosion between the rollers and the race.[6]

Its partner, AeroShell Grease 64, is designed to provide similar benefits for the protection of heavily loaded sliding surfaces such as the bogie pivot pins on landing gear assemblages. It contains 5% molybdenum disulphide for exceptional load-carrying and extreme-pressure performance.

AeroShell Grease 58 also offers longer component life and reduced bearing-scrap rate through better wear and corrosion protection.[7]

PERFORMANCE UNDER EXTREME PRESSURE



A step change in extreme-pressure protection. AeroShell Grease 58 has **better load wear protection** compared with MIL-PRF-81322 greases in ASTM D2596 tests.

[5]ASTM D2509 test, in which a cup rotates at 800 rpm on a block under an 18-kg load for 10 min while being continuously fed with fresh grease

[6]Modified ASTM D1743 test, where lightly loaded greased bearings are rotated while submerged in a 3% saline solution and then stored at 52°C and 100% humidity for 12 h

[7]Compared with MIL-PRF-81322 specification greases

AEROSHELL GREASE 58 SHOWS SUPERIOR ANTIWEAR PERFORMANCE COMPARED WITH THE RED LITHIUM-COMPLEX GREASE AUSTRIAN AIRLINES NORMALLY USES. ALL THE BEARINGS LOOK IN BETTER CONDITION AND SHOW LESS WEAR."

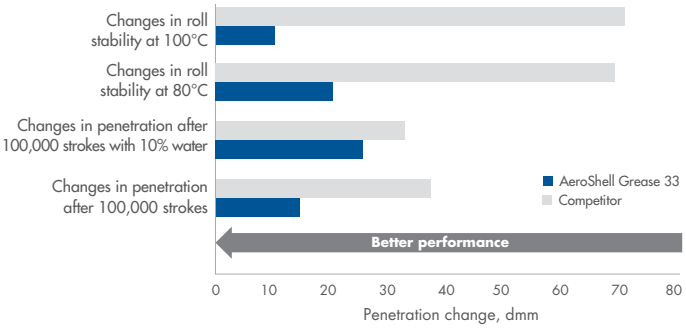
Roman Valentin, Component Engineering, Austrian Airlines

Austrian

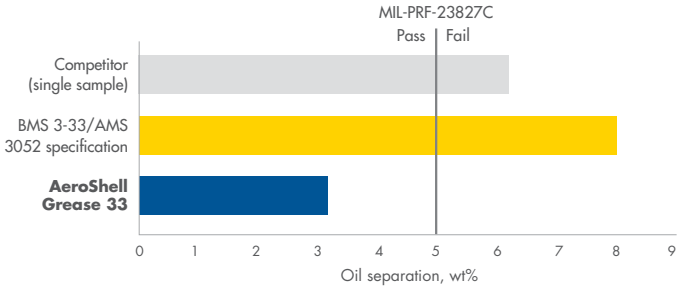
LONGER LUBRICATING LIFE

To protect components, a grease needs to maintain its mechanical stability to stay where it is needed. To lubricate effectively, a grease's base oil needs to be released from the thickener in a slow, controlled manner. If the oil separation is too fast, the grease may become too hard to provide adequate protection. If the separation is too slow, the grease may fail to lubricate efficiently and allow excessive component wear.

AeroShell Grease 33 has better mechanical stability compared with other currently approved products, which means it stays where it is needed.[8] It also offers lower oil separation[9] to help to ensure efficient lubrication throughout its life.



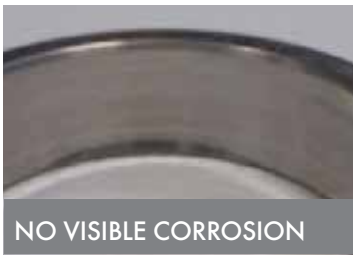
STAYING WHERE YOU NEED IT. AeroShell Grease 33 offers superior mechanical stability after being worked in two ways and when mixed with 10% water.[8]



CONTROLLED RELEASE. AeroShell Grease 33 offers lower oil separation to help to ensure efficient lubrication throughout its life.[9] The oil separation is about 1.6 wt% better than the maximum allowed in the MIL-PRF-23827C specification. This is better than another currently approved grease.

3% salt solution

(EMCOR test[10] required to meet the AMS 3058 specification)

AeroShell Grease 58	Competitor A	Competitor B
 NO VISIBLE CORROSION	 >10% CORROSION (FAILS TO MEET THE SAE AMS 3058 SPECIFICATION)	 1–5% CORROSION (FAILS TO MEET THE SAE AMS 3058 SPECIFICATION)

Meeting the specifications where others fail: AeroShell Grease 58 exceeds SAE AMS 3058 corrosion requirements. Not all the popular, lithium-complex wheel-bearing greases meet these specifications or protect against the effects of the latest runway de-icing fluids. Two other greases that were tested failed: a popular red lithium-complex grease received the worst possible rating. AeroShell Grease 58 is also better than or equals competitors' products in EMCOR tests with corrosive runway de-icing fluids, thereby offering the best overall corrosion protection.

[8]Mechanical stability is measured as the change in penetration by a cone dropped onto a grease sample before and after it has been repeatedly worked. The samples were squeezed through holes in a plate for more than 100,000 double strokes in the extended ASTM D217 test, and sheared for over 50 h at 80 and 100°C by turning a tube containing a heavy solid roller in the ASTM D1831 test. The first test was repeated with 10% water mixed into the grease.

[9]Industry-standard test ASTM D6184, which runs for 30 h at 100°C

[10]Industry standard EMCOR dynamic rust-prevention tests expose grease-lubricated moving bearings to water/sodium chloride solution for one week at room temperature with the bearings being partially immersed in the water/solution. The bearing rings are then examined for corrosion. The results are expressed from 0 to 5, with 0 showing no corrosion and 5 showing up to 10% of the inside surface of the bearing ring being corroded. Tests conducted by Shell scientists.

BENEFITS AND SPECIFICATIONS

Product	Benefits	Specifications and approvals (Full approval details can be obtained from your AeroShell representative.)
Universal airframe		
AeroShell Grease 64 (formerly AeroShell Grease 33MS)	■ Extreme protection – 5% molybdenum disulphide ■ Excellent corrosion and wear protection ■ Proven AeroShell Grease 33 technology	■ MIL-G-21164D
AeroShell Grease 33	■ Easier maintenance ■ Lower labour costs ■ Less misapplication risk ■ Simplified inventories	■ Airbus AIMS 09-06-002 ■ Boeing BMS 3-33C ■ MIL-PRF-23827C Type I ■ Can be used for virtually all grease points currently using greases with MIL-PRF-23827C, MIL-G-21164D, BMS 3-24, MIL-PRF-81322G, SAE AMS 3052 and AIMS09-06-002 specifications
Advanced multipurpose airframe		
AeroShell Grease 7	■ Good corrosion protection ■ High load-carrying capacity ■ Wide temperature range	■ MIL-PRF-23827C (Type II)
Wheel bearing and versatile multipurpose		
AeroShell Grease 58	■ Enhanced corrosion protection ■ Long component life ■ Exceeds the SAE AMS 3058 specification	■ SAE AMS 3058 ■ Approved for all Parker Hannifin non-amphibious wheel applications ■ Pilatus first fill ■ Airbus (selected greasing points on all civil A320, A330, A340, A350 and A380 family undercarriage systems,[12] and all wheels on A318, A319 and A320 aircraft, including neo, and A350-900 and -1000 models) ■ Collins wheels on most aircraft including Boeing, Airbus and DHC aircraft and ATR 42 (Collins and Safran wheels)
AeroShell Grease 22	■ Severe operating conditions ■ Long component life ■ Versatile	■ MIL-PRF-81322G ■ DOD-G-24508A
Wheel bearing and engine accessory		
AeroShell Grease 5[11]	■ High load-carrying capacity ■ Good water and heat resistance	■ MIL-G-3545C (obsolete)
Multipurpose helicopter		
AeroShell Grease 14	■ Outstanding fretting and corrosion protection ■ Wide temperature range ■ Approved by leading helicopter manufacturers ■ Calcium soap thickener	■ MIL-G-25537C
General-purpose airframe		
AeroShell Grease 6	■ Use in anti-friction bearings, gearboxes and plain bearings ■ Good water resistance ■ Low noise capability ■ Mineral oil based ■ Microgel thickener	■ MIL-PRF-24139A

[11] Only available in the Americas

[12] Please refer to your equipment manufacturer for the latest approval status.

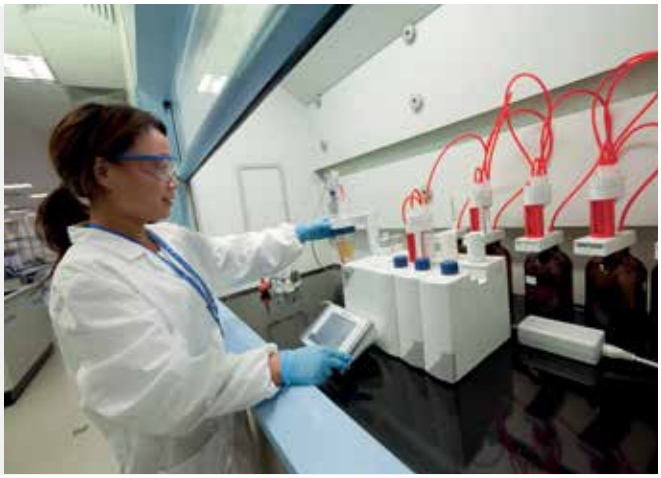
AEROSHELL HYDRAULIC FLUID 41

AeroShell offers a wide range of fluids designed to protect aircraft hydraulic systems.
For piston-engine aircraft, AeroShell Fluid 41 protects against system failure, promotes long component life and increases system reliability and efficiency.

SUPER-CLEAN RELIABILITY

Particulates in hydraulic fluids can cause system failures through valve sticking, wear or blockages in nozzles and tubes. Particulates are especially challenging for modern hydraulic systems that operate at high pressures and have components with tight tolerances.

AeroShell Fluid 41 is formulated to protect hydraulic systems against failure by meeting super-clean standards. Its particulate content is tightly controlled through special manufacturing processes, including multistage filtration, container cleaning just before filling and clean-room packaging conditions.



A SUPER-CLEAN, MINERAL HYDRAULIC FLUID

AeroShell Fluid 41 is a super-clean, mineral hydraulic fluid approved to MIL-PRF-5606J specification that offers

- enhanced system reliability by protecting against system failure through super cleanliness
- long component life through its anti-wear, antioxidant and corrosion-inhibition system and shear stability performance
- system efficiency through its low-temperature performance and a high viscosity index.

AeroShell Fluid 41 is intended for operational use in aircraft applications requiring a mineral hydraulic fluid. It is particularly recommended where the use of a super-clean fluid could help to improve component reliability. AeroShell Fluid 41 is fully compatible with other AeroShell hydraulic fluids (refer to the AeroShell Book for full details).

Fluid selection depends on the operational system requirements and manufacturer's recommendations. AeroShell Fluid 41 is suitable for use in systems with synthetic rubber components but must not be used in systems incorporating natural rubber.

To maintain the super-clean quality of AeroShell Fluid 41, users must apply strict handling procedures, as specified in equipment manuals.

SPECIFICATIONS

Product	Properties	Specifications and approvals (Full approval details can be obtained from your AeroShell representative.)
In-service hydraulic fluid		
AeroShell Fluid 41	■ Super clean ■ Mineral ■ Dyed red	MIL-PRF-5606J

CONTACT US

For more information, contact your Shell representative or visit **www.aeroshell.com**.