UCONALL Lubricants

For Compressors, Drivers, Gears, Anti-wear Hydraulics, Mobile Equipment, and Pumps

Product Description

UCONALL™ Lubricants 32, 46, 68, 150, 220, 460, and 680 comprise a complete line of fully formulated, extreme-pressure lubricants. Formulated to provide excellent lubrication, stability, and extended service life, they eliminate many of the problems commonly encountered with petroleum lubricants. The result is a series of superior lubricants that can provide a variety of cost savings to users.

Features

- Wide temperature range operability
- Highly resistant to oxidation and thermal degradation
- Excellent viscosity-temperature properties eliminate the need for seasonal changeover
- High viscosity indexes and low pour points provide lower start-up torques and help prevent cold-weather motor overloading
- Viscosities are unaffected by high rates of shear
- Excellent lubricity for reduced friction and wear
- Resistant to sludge and varnish formation
- Noncorrosive to metal surfaces—stain-resistant to nonferrous metals
- High flash points

Benefits

- Reduced energy consumption. Use of UCONALL lubricants has resulted in documented energy savings of three percent
- Extended service life. Under heavy-load, high-temperature conditions, UCONALL lubricants have exceeded four years of continuous service with no evidence of lubricant degradation or loss of performance
- Less lubricant used, resulting in lower disposal costs
- Can help reduce maintenance costs
- Helps reduce wear rates
- Eliminates sludge and carbonaceous residues
- Extreme-pressure lubrication without use of chlorine- or sulfur-containing additives
- High viscosity index
  - — Eliminates seasonal oil changeovers
  - — Facilitates cold-weather start-ups
  - — Eliminates motor overloading during start-up
- Product consolidation: fewer lubricants needed for total facility application
- Good seal and elastomer compatibility

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UCON Fluids and Lubricants

Typical Physical Properties[1]

	UCONALL Lubricant						
Property	32	46	68	150	220	460	680
Viscosity, ISO Grade, cSt	32	46	68	150	220	460	680
at 100°F	39	52	66	143	263	389	615
at 210°F	6.8	9.0	11.0	21.9	39.0	55.8	85.9
Viscosity Index	160	170	174	193	212	220	235
Pour Point, °F	-54	-49	-44	-38	-27	-27	-27
Flash Point, °F	475	490	530	545	555	560	555
Cleveland Open Cup (ASTM D 92)							
Water Content, % by wt	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Weight per Gallon at 60°F, lb	8.24	8.28	8.31	8.36	8.37	8.38	8.41

1. The data represent typical physical properties only and should not be construed as product specifications.

Performance Properties

The results of various wear, corrosion, friction, and foaming tests of UCONALL lubricants are shown in Table 1. UCONALL lubricants provide superior lubrication under most conditions because of good film strength and extreme-pressure properties. High viscosity indexes permit operation over a wide temperature range without a great change in viscosity.

Table 1 • Performance Test Results for UCONALL Lubricants

	UCONALL Lubricant						
Test	32	46	68	150	220	460	680
Falex Wear Test[1]							
Failure Load, psi	2900	2900	2900	2900	2900	2900	2900
Steam Turbine Rust Test[2]	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Copper Strip Corrosion Test[3]	1a	1a	1a	1a	1a	1a	1a
Coefficient of Friction[4]	----------0.0184----------						
Foam Tendency[5]							
at 75°F	0	0	0	0	0	0	0
at 200°F	0	0	0	0	0	0	0
at 75°F	0	0	0	0	0	0	0

1. ASTM D 3704
2. ATM D 665A
3. ASTM D 130
4. Phosphorous bronze on steel, determined by David Brown Gear Industries Limited.
5. ASTM D 892

Energy Savings

In an energy consumption study on UCONALL lubricants versus petroleum gear lubricants, four gear boxes were filled with a 4EP petroleum oil and left in service for 20 days. After the 20 days, the petroleum oil was drained out of the gear boxes and replaced with UCONALL Lubricant 150 which was also left in service for 20 days. Results showed that energy consumption averaged three percent lower using UCONALL Lubricant 150 than the 4EP petroleum lubricant.

Case Histories

The following case histories demonstrate the versatility and superior performance of UCONALL lubricants in actual commercial experience.

Gear Lubrication

A wastewater treatment facility with surface aerators and bottom mixers was using a petroleum gear oil (AGMA 2EP for winter operation and AGMA 4EP for summer operation) to lubricate equipment containing three-stage reduction gears with spur, helical, and bevel configurations. Internal gear box temperatures exceeded 200°F.

The petroleum oils created a number of problems. Excessive wear rates and scuffing were noted, as well as large amounts of sludge and residues on internal surfaces. Seasonal changeovers were required at six-month intervals every year. However, in cold weather, the 2EP was too viscous to allow start-up without motor overloading or use of sump heaters. In hot weather, the 4EP petroleum lubricant provided inadequate viscosity, resulting in excessive wear and rapid oxidation of the oil with shorter than normal service life.

All these problems were solved by switching to UCONALL Lubricant 150. The high viscosity index of UCONALL Lubricant 150 eliminated the need for seasonal changeover. Motor overloading ceased during cold start-up periods, yet during periods of high temperature sufficient lubricant viscosity was maintained and wear rates were dramatically reduced. The service life of UCONALL Lubricant 150 exceeded four years without any sign of degradation or loss in performance.

An analysis of the lubricant after four years of service is shown in Table 2. Lubricant stability is clearly demonstrated by the retention of original viscosity, antioxidant, and acidity level. Further proof of stability is provided by its low foam tendency, as measured by the ASTM D 892 foam test. No deposits or sludge have been observed in the gear box. Low wear rates are evidenced by the low level of iron present in the lubricant (i.e., 1 ppm after four years service).

Table 2 • UCONALL Lubricant 150 Properties After Four Years' Service

Property	New	After 4 Years' Service
Viscosity at 40°C, cSt	134.0	128.8
Antioxidant Level, % of Original	100.0	98.0
Ester Content[1], meq/g	0.02	0.03
Fe Concentration, ppm	0.3	1.0
Foam Height[2]		
at 75°F	0	0
at 200°F	0	0
at 75°F	0	0

1. Indication of total acidity, acceptable upper limit of 0.3-0.5
2. ASTM D 892

Journal Bearing Lubrication

A plastics company had been using a hydrocarbon-derived lubricant for rolling PVC in an Adamson calender for many years with satisfactory results. When the company had to shut down one production line because of an unscheduled maintenance problem with the calender, inspection revealed that carbon had built up in the journal bearing to such an extent that they were unable to provide proper lubrication to the calender.

Besides the cost of lost production time and a new journal bearing, the company incurred an additional cost—removal of part of the building's roof in order to remove the calender roll to replace the bearing. To prevent a recurrence of this expensive problem, the company converted the calender to UCONALL Lubricant 680, the lubricant routinely recommended by Adamson to obtain optimum performance in all their new calenders. Since converting to UCONALL Lubricant 680, no evidence of wear or carbon build-up in the journal bearing of this calender has been observed after three years of service.

Hydraulic Clutch Lubrication

After comparing in-plant performance, an Argentinean manufacturer of hydraulic clutches concluded that UCONALL Lubricant 68 was significantly superior to the hydrocarbon oils that they had been using for this application. Among the advantages the company cited for UCONALL 68 were:

- Reduced foaming. Hydrocarbon-based lubricants exhibited considerable foaming in this application.
- Considerably less leakage since UCONALL Lubricant 68 does not form varnish, seals work better and last longer.
- No sludge build-up after 5000 hours of operation. The hydrocarbon-based oils used previously generated copious amounts of sludge over the test period.
- Substantial reductions in wear were observed.
- Excellent clutch lubrication performance in humid environments. This is attributed to the superior water tolerance properties of UCONALL Lubricant 68.

All new clutches produced by the company are now filled with UCONALL Lubricant 68. The company has specified that continued use of UCONALL Lubricant 68 in their clutches is a warranty requirement.

Applications

EQUIPMENT APPLICATION		UCONALL Lubricant 32	46	68	150	220	460	680
Compressors	Axial[1]	✓	✓	✓				
	Radial[1]	✓	✓	✓				
	Radial Integral Gear[1]	✓	✓	✓				
	Reciprocating Crosshead (Cylinder, Packing & Crankcase)				✓	✓	✓	✓
	Reciprocating Diaphragm (Crankcase)				✓	✓	✓	✓
	Reciprocating Trunk (Crankcase)				✓	✓	✓	✓
	Rotary Liquid Ring Rotor	✓	✓	✓				
	Rotary Lobe (Gears)	✓	✓	✓	✓	✓	✓	✓
	Rotary Screw (Dry & Oil-Flooded)	✓	✓	✓	✓	✓	✓	✓
	Rotary Vane (Rotor)	✓	✓	✓	✓	✓	✓	✓
Drivers	Chain Drives	✓	✓	✓	✓	✓	✓	✓
	Electric Motors (Fixed & Variable Speed)	✓	✓	✓				
	Expansion Turbine	✓	✓	✓				
	Fluid Drive Couplings	✓	✓	✓				
	Gas Turbine	✓	✓	✓				
	Generators	✓	✓	✓				
	Hydraulic-Driven Turbine	✓	✓	✓				
	Steam-Driven Turbine	✓	✓	✓				
Gears	Gears of All Types	✓	✓	✓	✓	✓	✓	✓
Hydraulics	Fluid Drive Couplings	✓	✓	✓				
	Hydraulic-Driven Turbine	✓	✓	✓				
	Hydrodynamic Hydraulic Systems	✓	✓	✓				
	Hydrostatic Drives	✓	✓	✓				
Mobile	Cherry Pickers	✓	✓	✓	✓	✓	✓	✓
	End Loaders	✓	✓	✓	✓	✓	✓	✓
	Tractors	✓	✓	✓	✓	✓	✓	✓

1. For high speed turbo-machinery, please call for specific application information. UCONALL lubricants are recommended for some types of this equipment.

Applications (continued)

EQUIPMENT APPLICATION		UCONALL Lubricant 32	46	68	150	220	460	680
Pumps	Axial Piston	✓	✓	✓	✓	✓	✓	✓
	Bent Axial Piston	✓	✓	✓	✓	✓	✓	✓
	Centrifugal	✓	✓	✓	✓	✓	✓	✓
	Diaphragm	✓	✓	✓	✓	✓	✓	✓
	Double Diaphragm Fluid	✓	✓	✓	✓	✓	✓	✓
	External Gear	✓	✓	✓	✓	✓	✓	✓
	Internal Gear	✓	✓	✓	✓	✓	✓	✓
	Liquid Ring	✓	✓	✓	✓	✓	✓	✓
	Radial Piston	✓	✓	✓	✓	✓	✓	✓
	Reciprocating	✓	✓	✓	✓	✓	✓	✓
	Reciprocating Diaphragm	✓	✓	✓	✓	✓	✓	✓
	Rotary Lobe	✓	✓	✓	✓	✓	✓	✓
	Rotary Screw	✓	✓	✓	✓	✓	✓	✓
	Rotary Vane	✓	✓	✓	✓	✓	✓	✓
	Triplex	✓	✓	✓	✓	✓	✓	✓
Others	Calenders	✓	✓	✓	✓	✓	✓	✓
	Conveyors	✓	✓	✓	✓	✓	✓	✓
	Crushers	✓	✓	✓	✓	✓	✓	✓
	Grinders	✓	✓	✓	✓	✓	✓	✓

Selecting UCONALL Lubricants

AGMA Viscosity Grades

Because of the high viscosity index exhibited by UCONALL lubricants (160-230 vs. 90-100 for most petroleum gear lubricants), they are not classified by one AGMA viscosity rating. UCONALL lubricants will effectively span 2 or 3 AGMA petroleum lubricant grades over the operating range of most gear boxes. Figure 1 and Table 3 can be used to guide users in the proper selection of a UCONALL lubricant to replace an AGMA petroleum lubricant. By knowing either the viscosity required at the operating temperature or the AGMA rating of the current lubricant, the appropriate performing UCONALL lubricant can easily be chosen.

Figure 1 • UCONALL Lubricants Viscosity vs. Temperature

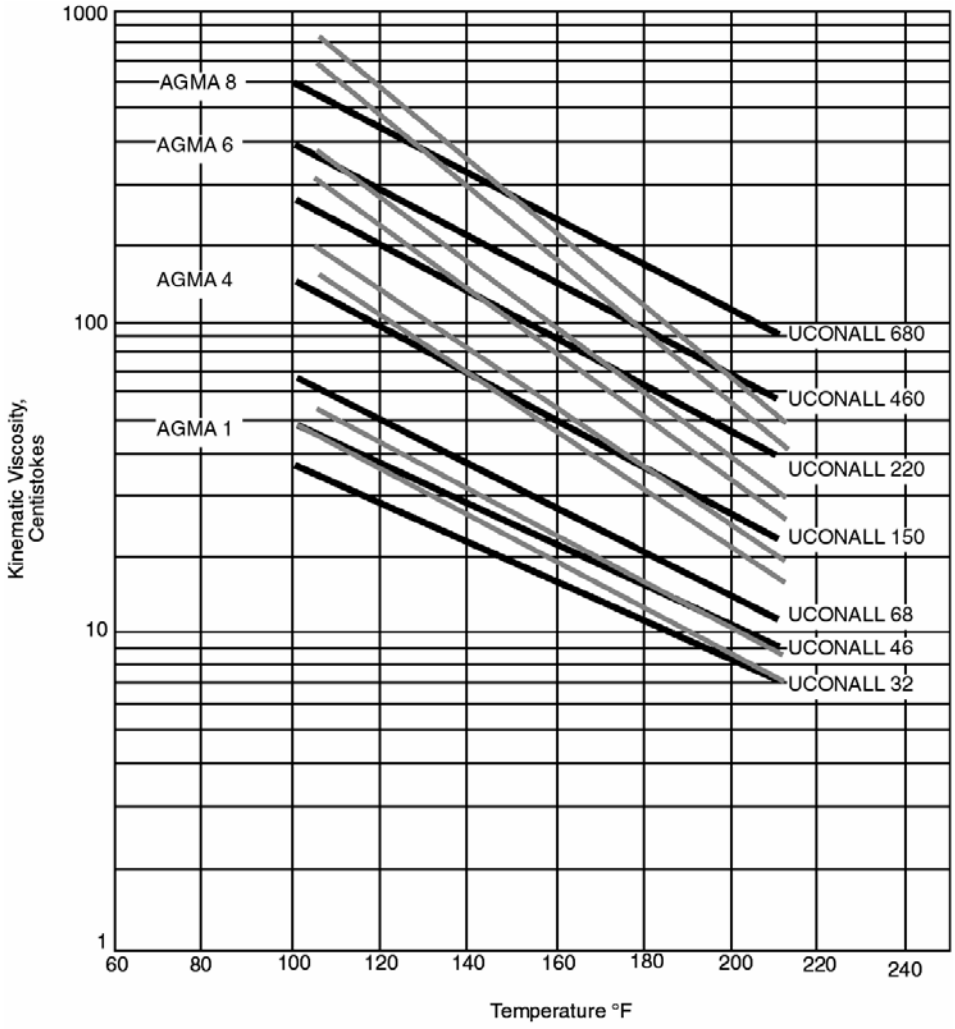

Table 3 • Selection Guide for UCONALL Lubricant

Lubricant	AGMA Grades Usually Replaced
UCONALL Lubricant 32	1
UCONALL Lubricant 46	1-2
UCONALL Lubricant 68	2-3
UCONALL Lubricant 150	3-6
UCONALL Lubricant 220	5-7
UCONALL Lubricant 460	6-8
UCONALL Lubricant 680	8-8A

Converting to UCONALL Lubricants

Installation of UCONALL lubricants into machinery that previously contained petroleum oils should follow the recommended flush procedure below:

- Drain previous lubricant from the equipment.
- Replace oil filters.
- Fill the system with the UCONALL lubricant to be used. Run or circulate under normal operating conditions for 24 hours. UCONALL lubricants will generally clean varnish and sludge build-up formed from petroleum oils.
- Thoroughly drain the UCONALL lubricant from the system while warm.
- Inspect the oil filters and replace as needed.
- Fill the equipment with fresh UCONALL lubricant and begin normal operation.
- Inspect and change filters as required.

This procedure should be followed for best results. Residual petroleum lubricant can usually be tolerated at low levels in the UCONALL lubricant.

Monitoring UCONALL Lubricants

Although UCONALL lubricants will show a greatly extended service life under most conditions, one should not neglect to perform periodic maintenance and inspection, which will help ensure continued trouble-free operation.

Paint, Elastomer, and Sealant Compatibility

UCONALL lubricants show some solvency for common oil-based paints, but many epoxy-based paints have been resistant. If, for example, interior surfaces of hydraulic system components have been painted, they should be carefully monitored for trends toward paint softening, lifting, and peeling. If paint removal does occur, frequent maintenance of filters may be required to avoid any equipment malfunctioning.

UCONALL lubricants are suitable for use with most elastomeric materials used in seals and gaskets. Below is a partial list of elastomers compatible with UCONALL lubricants:

Viton	EPDM	Neoprene
Kalrez	Butyl Rubber	Hypalon
Silicone	Buna N (high nitrile)	Aflas
Polysulfide	Hycar	
EPR	Fluoraz	

In selective tests, UCONALL lubricants have been shown to be compatible with Silicone rubber 732 RTV and Loctite PST and 290 in direct lubricant contact, and in exposure to the sealants between bonded copper surfaces.

UCON Fluids and Lubricants

In addition to UCONALL lubricants, Dow offers a wide range of UCON™ fluids and lubricants for many industrial applications. These products include:

- Chemical Intermediates
- Coating Fluids
- Compressor Lubricants
- Electronic Chemicals
- Food-Grade Lubricants
- Heat Transfer Fluids
- High-Temperature Lubricants
- Fire-Resistant Hydraulic Fluids
- Metalworking Fluids
- Process Fluids
- Quenchants
- Rubber & Fiber Lubricants
- Refrigeration
- Textile Lubricants

Further Information

For additional information on these fluids and lubricants and/or customized products based on various additive packages, viscosities, or molecular weight ranges, contact the Dow office nearest you.

Product Stewardship

Dow encourages its customers and potential users to review their applications from the standpoint of human health and environmental aspects. To help ensure that Dow products are not used in ways for which they are not intended or tested, Dow personnel will assist customers in dealing with environmental and product safety considerations. Dow literature, including Material Safety Data Sheets, should be consulted prior to use.

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