UCON FLUIDS & LUBRICANTS

DOW

UCON Food Grade Lubricants 150, 220, and 400

For the Aluminum Industry

Product Description

UCON™ Food Grade Lubricants 150, 220, and 400 are fully-formulated, extreme-pressure synthetic lubricants, specifically developed for use in industrial machinery, especially machinery used in the manufacture of aluminum foil for the food industry.

UCON Food Grade Lubricants are formulated to provide extreme-pressure performances similar to those found in commonly used sulfur- and phosphorus-containing EP gear lubricants.

UCON Food Grade Lubricants offer significantly improved performance over food-grade white oils and non-food-grade-rated petroleum oils by providing excellent lubricity, increased oxidative and thermal stability, high viscosity indexes (187-220), and low pour points.

All the components of UCON Food Grade Lubricants are identified in FDA Regulation 21 CFR 178.3570(a), permitting use as components of lubricants in food processing and packaging machinery where incidental food contact may occur. These lubricants also have H1 status for use on food processing and packaging equipment in USDA-inspected meat, poultry, or egg processing plants.

Features and Benefits

Low-Stain Characteristics
The low-stain characteristics of UCON Food Grade Lubricants allow for longer intervals between mill sump changes caused by mechanical lubricant contamination, thereby reducing rolling fluid cost, as well as disposal costs.

Free Unwinding
Aluminum rolled within acceptable contamination limits and then annealed has shown no evidence of tearouts due to residue and is considered "free unwinding."

Universal Lubricants
UCON Food Grade Lubricants have been considered universal mechanical lubricants for mill hydraulic, bearing, and gear drive systems. This reduces lubrication storage costs and minimizes potential use of the "wrong" lubricant.

Special Applications
UCON Food Grade Lubricants 150, 220, and 400 can be blended to meet viscosity requirements in a variety of special applications.

Applications

Hydraulics
UCON Food Grade Lubricants can be formulated to meet the wide range of viscosity requirements of pump and valve manufacturers. Excellent results have been obtained on low- and high-pressure hydraulic systems using gear or piston pumps and lapped or packed spool valves. UCON Food Grade Lubricants also meet the stringent requirements for use in hydraulic roll-force and counter-balance systems.

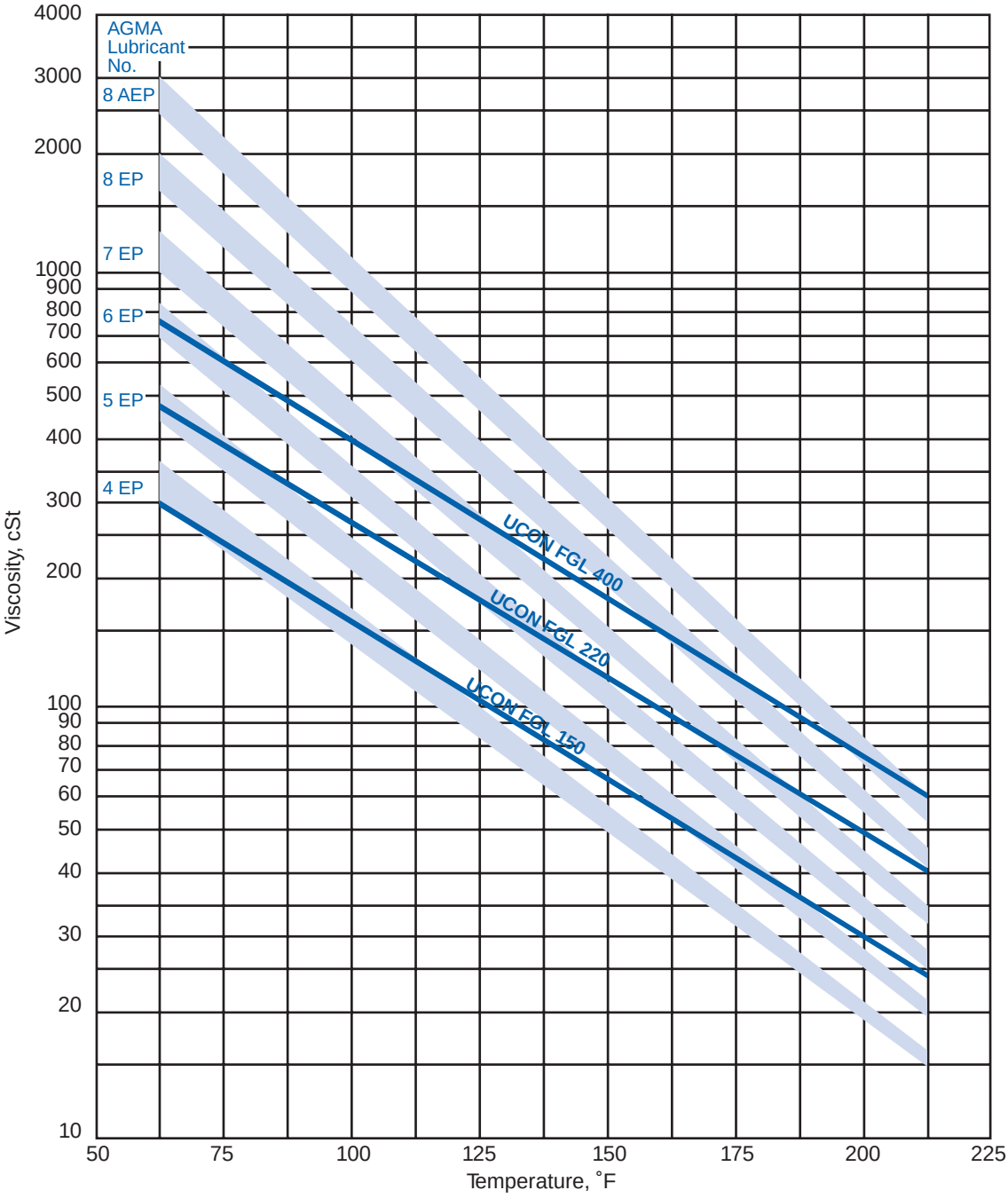
Bearings
UCON Food Grade Lubricants have demonstrated excellent load-carrying ability and extended life for babbitted journal bearings using hydrodynamic lubrication. These same results have been exhibited for anti-friction ball and roller bearings using oil mist or recirculating oil lubrication systems.

Gears
UCON Food Grade Lubricants can be used in all types of gearboxes ranging from fractional to high-horsepower rolling mill drives. They possess superior operating characteristics, therefore providing reduced operating temperatures, reduced friction, and very little wear. The excellent thermal and oxidative stability of UCON Food Grade Lubricants eliminates the need for frequent changeover due to premature oxidation.

Viscosity Ratings of UCON Food Grade Lubricants vs Petroleum Lubricant AGMA Ratings

Due to the high viscosity index exhibited by UCON Food Grade Lubricants (187-220 vs. 90-100 for most petroleum gear lubricants), they are not classified by a single AGMA viscosity rating. UCON Food Grade Lubricants will effectively span two or three AGMA petroleum lubricants ratings over the operating range of most gear-boxes. The following chart (Figure 1) and selection guide can be used to guide users in the proper choice of the UCON Food Grade 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, an appropriately performing UCON Food Grade Lubricant can easily be chosen.

Figure 1 • Viscosity Ranges — UCON FG Lubricants versus AGMA Ratings of Petroleum Lubricants



Selection Guide

UCON FG Lubricants	AGMA Grades Usually Replaced
UCON FG Lubricant 150	3 – 6
UCON FG Lubricant 220	5 – 7
UCON FG Lubricant 400	6 – 8A

Compatibility with Elastomers

UCON Food Grade Lubricants are suitable for use with most elastomeric materials used in seals and gaskets. Below is a partial list of elastomers that are compatible with UCON Food Grade Lubricants:

Viton	Butyl Rubber	Natural Red Rubber
Kalrez	Buna N	Natural Gum Rubber
Silicone	Hycar	Neoprene
Polysulfide	Fluoraz	Hypalon
EPR	Natural Black Rubber	Aflas
EPDM		Teflon

In selective tests, UCON Food Grade 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.

Typical Physical Properties

	UCON Food Grade Lubricant		
Property	**150**	**220**	**400**
Weight per Gallon, lb			
at 60°F (15.6°C)	8.35	8.38	8.39
at 68°F (20°C)	8.32	8.35	8.36
Specific Gravity, 20/20°C	0.9996	1.0036	1.0041
Viscosity, cSt			
at 100°F (37.8°C)	155	285	425
at 210°F (98.9°C)	22.9	40.7	59.5
Viscosity Index	187	206	220
Pour Point, °F (°C)	-20 (-29)	-15 (-26)	-5 (-21)
Flash Point, ASTM D 93, °F (°C)	355 (179)	405 (207)	355 (179)
Coefficient of Expansion at 55°C, per °C	0.00078	0.00081	0.00079

Performance Properties†

	UCON Food Grade Lubricant		
Property	**150**	**220**	**400**
Additives			
Rust Inhibitor	Yes	Yes	Yes
Oxidation Inhibitor	Yes	Yes	Yes
Extreme Pressure	Yes	Yes	Yes
Turbine Oil Test, ASTM D 665A	Pass	Pass	Pass
Copper Corrosion, ASTM D 130	No Effect	No Effect	No Effect
Babbit Corrosion (89 Sn/7.5 Sb/3.5 Cu)	No Effect	No Effect	No Effect
Mist Test	Pass	Pass	Pass
FZG Spur Gear Test, Stages Passed (12 max)	12	12	12
Shell Four Ball Wear Test, ASTM D 2266, Scar Diameter, mm	0.38	0.38	0.38
Timken Test, lb			
OK Load	40	45	45
Score	45	50	50

† These data are representative of typical production lots

Storage and Handling

UCON Food Grade Lubricants are stable, non-corrosive materials that can be stored in carbon steel tanks. Heated storage tanks can be employed if outside storage is to be installed. A number of heating methods and media can be used. Either hot water or low-pressure steam (15 psig or less) can be used in external heat transfer panels or internal coils. Electrical heating by means of heating tape or cable is also satisfactory. Heated tanks and piping should be completely insulated. The expense of heating and insulation is often avoided by installing tanks and piping inside a warm building.

UCON Food Grade Lubricants will soften and lift many industrial coatings. Preferably, they should contact no coatings and be stored in clean carbon steel tanks. If coatings cannot be removed, be sure to clean all filters and strainers frequently, especially during the initial period of use.

UCON Food Grade Lubricants are slightly miscible with petroleum-based lubricants. Tanks previously used for petroleum products should be flushed clean before UCON Food Grade Lubricants are introduced.

These products are only slightly hygroscopic in nature. If moisture content is critical, precautions should be taken to prevent atmospheric moisture from entering the storage tank. A desiccant unit can be installed on the vent line, or the tank can be blanketed with dry air or nitrogen.

Where viscosities in excess of 500 cSt are to be handled, a rotary or gear pump is preferable. Transfer lines should be carbon steel and should be of a size adequate to handle the desired flow and viscosity with a reasonable pressure drop in the line. A three-inch line should be provided for unloading of bulk shipments.

Product Stewardship

When considering the use of any DOW products in a particular application, you should review Dow's latest Material Safety Data Sheets and ensure that the use you intend can be accomplished safely. For Material Safety Data Sheets and other product safety information, contact the Dow office nearest you. Before handling any other products mentioned in the text, you should obtain available product safety information and take necessary steps to ensure safety of use.

No chemical should be used as or in a food, drug, medical device, or cosmetic, or in a product or process in which it may contact a food, drug, medical device or cosmetic until the user has determined the suitability and legality of the use. Since government regulations and use conditions are subject to change it is the user's responsibility to determine that this information is appropriate and suitable under current, applicable laws and regulations.

Dow requests that the customer read, understand and comply with the information contained in this publication and the current Material Safety Data Sheets(s). The customer should furnish the information in this publication to its employees, contractors and customers, or any other users of the product(s) and request that they do the same.

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