



# IMPREGNATING OILS & GELS

Premium Lubrication for Sintered Metal Bearings



**ULTRACHEM INC**  
PREMIUM SYNTHETIC LUBRICANTS





## Introduction

Ultrachem is well known worldwide for its unique formulations of synthetic impregnating oils designed for use in vacuum impregnated powder metal (sintered) sleeve bearings, often used in sub-fractional hp electric motors. These are the motors that consumers find every day in their automobiles (window lift motors, car seat motors, wiper motors, blower motors, etc.), in all kinds of appliances including power tools, garbage disposals, ceiling fans, fans and blowers used in business machines, range hoods, garage door openers and so on. Any small motor not using ball bearings will likely use powder metal sleeve bearings. Many of these bearings also have a felt wick or reservoir in the shape of a donut around the outer perimeter of the bearing.

The bearings are porous due to their make-up of powder metal. Popular choices are usually bronze bearings or iron/graphite bearings. Proprietary blends of many different metals are also found. They are then sintered or fired in high temperature ovens until the powders begin to melt together. The bearings are then sized and placed in baskets in a vacuum impregnator with the impregnating oil. Typically, the oil is heated to ~150° F. As the vacuum is formed, the oil fills the many pores in the bearing structure.

As the motor shaft starts to spin on the inner diameter (id) of the bearing the heat draws the oil out to form a boundary of lubrication. When properly sized and lubricated the shaft is actually spinning on a film of oil. Therefore, the selection of the oil is of the utmost importance. When the motor is turned off, the bearing cools down and capillary action draws the oil back into the bearing until the next time the motor is turned on.

Ultrachem has pioneered the use of unique additives in impregnating oils to control oil migration and spread, as well as performance and long life. Let Ultrachem formulate an oil to meet your specific needs.

### Graphite (Denoted by “G” or “5P”)

Ultrachem has been instrumental in developing impregnating oils fortified with solid lubricant additives such as colloidal graphite. The properly sized graphite particles will actually travel through the porous structure of the bearing and provide a physical solid lubricant on the id of the bearing on cold start-up conditions. Studies have shown that the average pore size of a pm bearing to be 20 to 40 microns in size. The average particle size of our colloidal graphite is approximately 1.0 micron. The addition of graphite has proven of importance in many automobile applications where most motors are required to start at -40°. Additional benefits can be found at high speeds associated with motors used in applications such as vacuum cleaners, routers and others. Hand held power tools also benefit, as any other motor that may sit idle for long periods of time.

The Pressure/Velocity value can also be increased when using colloidal graphite with many of our impregnating oils. The graphite can stay in suspension for many months in most of our oils. Some of the heavier Omnilubes may require agitation prior to impregnation. That will not affect the final quality of the product once it is impregnated.

Ultrachem also manufactures an UltraGel that is designed for use in a pm bearing as a lubricant and an OmniGel and SynGel that are designed for use outside the bearing as back-up lubricant for the impregnating oil.



TYPE OF SERVICE	SERVICE TEMPERATURES <sup>1)</sup>	BASE OIL	PRODUCT
Economical Performance	99°C to -10°C 210°F to 15°F	Mineral Oil	A-110, A-110-5P A-121, A-121-5P
General Performance Fans, Blowers, Vacuum Cleaners, Power Tools	155°C to -40°C 310°F to 40°F	Synthetic Hydrocarbon	Omnilube® 180, 300, 350
Low Temperature Performance Refrigerator Defroster Fans, Ice Maker Motors	105°C to -50°C 220°F to -60°F	Synthetic Hydrocarbon	Omnilube® 60, 100
High Temperature Performance Ovens, Vertical Shaft Designs, Slow Bearing Speed Applications, Power Tools	Up to 177°C Up to 350°F	Synthetic Hydrocarbon	Omnilube® 550, 850
Food Grade Applications Processors, Blenders, Blowers, Reduced Starting Torque	Various	Synthetic Hydrocarbon	Omnilube® 60, 100 Omnilube® Non-Tox 520, 280, 370
General Performance Economical & Versatile	163°C to -29°C 325°F to -20°F	Synthetic Hydrocarbon/Ester	Chemlube® 626, 626G
General Performance "The Original" Synthetic Impregnating Fluids, Wide Application Range	177°C to -51°C 350°F to -60°F	Ester	Chemlube® 201, 207, 645
Premium High Temperature Performance Widely Used in Automotive Applications, Wiper Motors, Seat Motors, Window Lift Motors, Radiator Fans, Fireplace Inserts	Up to 205°C Up to 400°F	Ester	Chemlube® 209, 217, 5072 Syntroil® 220, 330, 440, 555
High Load Performance Gear Sets, High Load Applications	205°C to -35°C 400°F to -30°F	PAG	Chemlube® 62, 90, 128 180, 650

## PERFORMANCE BENEFITS

- Economical
- Widely Used for Over 40 Years
- Available with Graphite

### **Omnilube Impregnating Fluids Offer:**

- Good Compatibility with Plastics<sup>2)</sup> and Elastomers
- Qualified for Either USDA H-1 (Incidental Contact) or H-2 (No Direct Contact) for Food Grade Applications
- Compatible with All Sintered Bearing Materials
- Most Omnilube Products are Available with Graphite to Prevent “Dry” Start-Up
- Superior Anti-Corrosion Protection
- Wide Viscosity Range Available

- Good Compatibility with Plastics<sup>2)</sup> and Elastomers; Compatible with All Sintered Bearing Materials
- Superior Anti-Corrosion Protection
- Available with Graphite<sup>3)</sup>

- Polar Tendencies for Metal Surface Protection
- High VI Leading to Reduced Viscosity Change with Temperature
- Excellent Low-Friction Torque
- Generally Not Recommended For Use with Plastics or Elastomers<sup>5)</sup>

- Excellent Performance Over a Wide Temperature Range
- Polar Tendency to “Wet” Metal Surface
- Excellent Anti-Wear Protection
- Superior Anti-Corrosion Protection
- The “Industry Standard” for Performance in High-Temperature Applications

- Highest Load-Carrying Capabilities
- Superior Anti-Corrosion Protection and Resistance to Deposit Formation
- Will Not Mix with Petroleum Oils; Limited Synthetic Compatibility



ULTRACHEM PRODUCT	RESERVOIR LUBRICANT	BASE OIL/GEL
Omnilube Oil <sup>4)</sup>	OmniGel 300-1, 300-2	Synthetic Hydrocarbon/Silicate
Chemlube® or Syntroil Oil	SynGel 217-1, 217-2	Ester/Silicate
Omnilube® Oil	UltraGel 300-00	Synthetic Hydrocarbon/ Aluminum Complex

Footnotes:

- 1) Service temperatures are dependent on many variables and are intended for help in selecting a suitable product.
- 2) The Omnilube® oils have been tested with a large variety of plastics over the years, but it is always best to test them on your particular plastic. We can provide a sample free of cost for evaluations conducted by you or your plastic vendor.
- 3) The addition of our graphite to some oils helps provide a solid lubricant to prevent “dry” start-up where a lot of wear can occur. Graphite is intended for bearings only and not bearing reservoirs. Best if used in bearings with no “free” graphite.
- 4) Not for use with Chemlube® PAG oils.
- 5) Contact us for our ester compatibility guide.

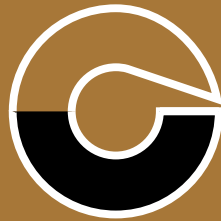
OmniGels and SynGels are specially thickened versions of our impregnating oils. They are specifically designed for use as replacements for felt wicks and greases used previously as back-up lubrication for sintered metal; bearings. They purposely release lubricant as required to the outside diameter of the bearing and replenish bearing oil lost through migration or evaporation. These gels extend the life of the bearing and are excellent for automated high speed reservoir injection.

UltraGel is specifically intended to be impregnated into the bearing to control the release of the oil to the inner diameter of the bearing without releasing excess oil that may be lost down the motor shaft and not recovered.

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**PREMIUM SYNTHETIC LUBRICANTS**



**FOOD GRADE LUBRICANTS**  
Premium Synthetic Lubricants for the Food Manufacturing  
& Processing Industry



**GAS COMPRESSION LUBRICANTS**  
Premium Synthetic Lubricants for Gas Compression  
& Engine Application



**HIGH PRESSURE COMPRESSOR LUBRICANTS**  
Premium Synthetic Lubricants for High Pressure  
Compressor Applications

