

PASTE LUBRICANTS

LIQUID LUBRICANTS

SOLID LUBRICANTS

BOELUBE LIQUIDS

High Performance MQL Lubricants



BOELUBE®



A BOEING DEVELOPED LUBRICANT

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BOELUBE LUBRICANTS FOR NEAR DRY MACHINING ■■■

One of the earlier uses of near dry machining was in aircraft manufacturing. Freon® gas was used in three distinct areas of the riveting process – drilling, rivet insertion, and rivet-head milling. Because of the undesirable effects of Freon® gas on the ozone layer, Boeing manufacturing research and development engineers introduced an alternate method using BOELUBE lubricant compositions to efficiently lubricate and cool tools by preventing heat buildup, while greatly reducing the reworking after drilling that had been necessary with Freon® because of exit burns, oversized holes, and a rough finish on the inside surface of the holes.

BOELUBE lubricants were used in drilling, reaming, and cold working of fastener holes in aircraft wing skins; installation of wedge-head lock bolts, lubrication of hand drills, and on machinery that automatically drill rivet holes and install rivets on large sections of airplanes. It was shown that the application of minimal quantities of BOELUBE lubricant could reduce friction, speed production, increase tool life, and improve surface finish and hole quality in a number of machining operations.



TYPICAL PROPERTIES ■■■

70090

- Liquid
- Insoluble in water
- Viscosity: 24 cSt @ 40C
- Pour Point: 59C (-74F)

70104

- Liquid
- Red
- Insoluble in water
- Viscosity: 30 cSt @ 40C

70106

- Liquid
- Colorless
- Insoluble in water
- Viscosity: 30 cSt @ 40C

PRODUCT BENEFITS ■■■

70090

- High lubricity
- Useful at low temperatures
- High oxidative stability enables long shelf life

70104

- High lubricity
- BAC process specifications
- High oxidative stability enables long shelf life

70106

- High lubricity
- BAC process specifications
- High oxidative stability enables long shelf life



MATERIALS ■■■

	70090	70104	70106
Alloy	✓	✓	✓
Aluminum	✓	✓	✓
CFRP	✓	✓	✓
Composite	✓	✓	✓
Copper	✓	✓	✓
Glass fiber	✓	✓	✓
Kevlar	✓	✓	✓
Stainless steel	✓	✓	✓
Titanium	✓	✓	✓
Wood	✓	✓	✓

Certifications

BOEING

BAC Boeing Process Specification
5008 • 5054 • 5063 • 5492 • 5540 •
5578 • 5657 • 5768

AIRBUS

A2MS 569-001 Rev B
Lubricants/Coolants

Applications

Drilling



Tapping
Reaming



Forming



Milling



And many more...

BOELUBE LIQUIDS

Technical information

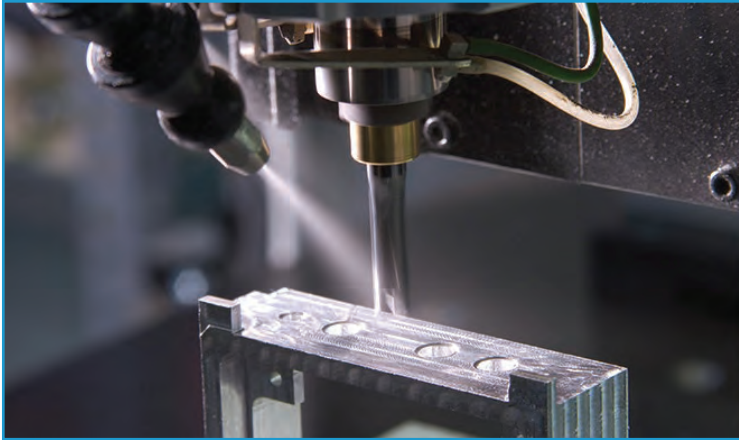
COST SAVINGS ■■■

Cost savings are derived through longer tool life, better surface finish, increased productivity, reduction in lubricant usage and subsequent cleaning and disposal costs, reduced environmental impact, improved housekeeping and easier chip handling and recycling.



WORKER FRIENDLY ■■■

Manufactured from personal care ingredients, BOELUBE is dermal non-irritant and biodegradable.



Using a coaxial supply of compressed air and lubricant, the nozzle directs minimal quantity of BOELUBE lubricant droplets in the compressed air directly to the cutting edge. The compressed air will help move chips away as the fine lubricant droplets form a thin film at the tool cutting edge to reduce friction and heat.

BOELUBE LIQUIDS ■■■



- Non-petroleum
- Non-sulfur
- Non-phosphorus
- Non-silicone
- Non-paraffin wax
- Non-halogen
- Non-corrosive
- Contain no water
- Used in aerospace and other manufacturing industries

BOELUBE LIQUIDS PRODUCT LIST ■■■

70090-L	Clear, Colorless	Bottle 4 oz - 118 ml	36 or 72 per Box	150 per Case
70090-S	Clear, Colorless	Can 7 oz - 207 ml	1 or 2 per Box	6 per Case
70090-04	Clear, Colorless	Container 1 gal - 3.8 l	1 each	6 per Case
70090-05	Clear, Colorless	Pail 5 gal - 18.9 l	1 each	
70090-07	Clear, Colorless	Drum 15 gal	1 each	
70090-09	Clear, Colorless	Drum 55 gal	1 each	
70104-L	Clear, Red	Bottle 4 oz - 118 ml	36 or 72 per Box	150 per Case
70104-S	Clear, Red	Can 7 oz - 207 ml	1 or 2 per Box	6 per Case
70104-04	Clear, Red	Container 1 gal - 3.8 l	1 each	6 per Case
70104-05	Clear, Red	Pail 5 gal - 18.9 l	1 each	
70104-07	Clear, Red	Drum 15 gal	1 each	
70104-09	Clear, Red	Drum 55 gal	1 each	
70106-L	Clear, Colorless	Bottle 4 oz - 118 ml	36 or 72 per Box	150 per Case
70106-04	Clear, Colorless	Container 1 gal - 3.8 l	1 each	6 per Case
70106-05	Clear, Colorless	Pail 5 gal - 18.9 l	1 each	
70106-07	Clear, Colorless	Drum 15 gal	1 each	
70106-09	Clear, Colorless	Drum 55 gal	1 each	

BOELUBE® LIQUID FOR DRILLING ■■■

Save time and money while being environmentally responsible.

In the near dry machining process, BOELUBE Liquid can be delivered as fine droplets or spray through one or more nozzles positioned accordingly around the cutting tool. Delivering the BOELUBE Liquid as fine droplets to the cutting edge is necessary in order to reduce friction between the chip, tool, and workpiece, and prevent chips from adhering to the tool cutting edge.

The MQL machining processes using BOELUBE requires continual reapplication of lubricant to the tool cutting edge and wear surfaces. This can be accomplished externally on shallow drilling, reaming and tapping operations, on milling cutters, and on band and circular saws.

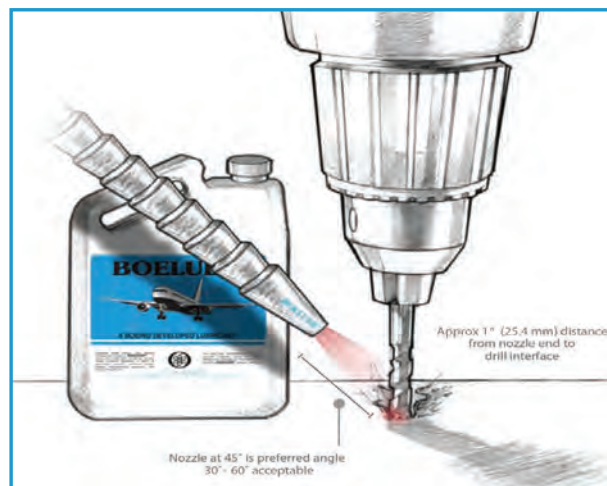
In MQL machining the goal is high efficiency, which is achieved as a result of using a minimal quantity of lubricant. Typical BOELUBE Liquid usage is about 1 fluid oz. (30 ml) per hour of machining time, which is best determined by the particular machining process and workpiece composition. Because minimal quantities are used and consumed for the most part in the machining process, BOELUBE Liquid produces near dry workpieces and chips with little or no clean-up or related costs and no disposal costs.

Historically, the metalworking industry has used metalworking fluids by flood application in machining operations. But because the costs associated with use, management, and disposal of flood coolants has risen over the years, in part due to increasing federal, state, and local regulations aimed at worker safety and fluid disposal, there has been a growing trend to utilize methods requiring less metalworking fluid to reduce cost, protect the environment, and improve and protect worker health, without sacrificing productivity and quality.

REDUCE FRICTION WITH MINIMAL CLEAN-UP ■■■

A metalworking lubricant should impart sufficient lubricity between the tool and the workpiece to cause a significant reduction in friction to occur. BOELUBE is a technologically advanced MQL lubricant that significantly reduces friction (one of the major elements in generating heat during the material removal process). BOELUBE Liquid can replace flood type metalworking lubricant in machining operations – being applied by positive displacement lubricant applicator in precise amounts to reduce friction at the interface of the tool cutting edge and workpiece. The reduction of friction at these surfaces minimizes heat generation and concurrent chip weld. Tools retain their cutting edge longer, leading to closer tolerances and prime chip yield.

MQL machining can be described as a process by which a minimum quantity of lubricant mixed with air is continuously applied to the tool/workpiece interface during the machining operation. The application of BOELUBE Liquid typically consumed in the machining process, provides desirable economic, employee, and environmental benefits.



On comparative basis, MQL machining can yield longer tool life than machining with flood coolant. The lubricity of BOELUBE that is applied in small quantities is greater than that of high volume, water based flood coolant. Chip removal can be enhanced because a chip saturated in coolant can acquire both added weight and adhesion that make it more difficult to move away. Cleanliness is a major benefit of near dry machining as greatly reduced use of cutting fluid results in both cleaner machines and shops.

MACHINING PROCESSES ■■■

Drilling is one of the most widely used machining processes to produce circular holes in metallic and nonmetallic materials.

A drill is a rotary end cutting tool, with the most common type being the twist drill. The drill, attached to either a stationary machine or hand held, is used to originate or enlarge a hole in a solid material. A drill will have cutting edges and straight or helical grooves or flutes, which allow for movement of chips and cutting fluids. Drill wear is not proportional to the number of holes drilled, but occurs at an accelerated rate.

A reamer is a rotary cutting tool (similar to a drill) with one or more cutting elements, used to enlarge to an exact size and impart a smooth finish to a previously drilled hole. Drilling can be characterized as in a rough form, whereas reaming is the exact form. Reaming is essentially a finishing operation. A reamer can be either straight or tapered.

Milling produces machined surfaces by removing metal or other material using a rotating cutter having a certain number of cutting elements of teeth. In the milling process each tooth of the rotating cutter takes a portion of material in the form of small, individual chips.



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Specialty Industrial Lubricants Since 1958

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