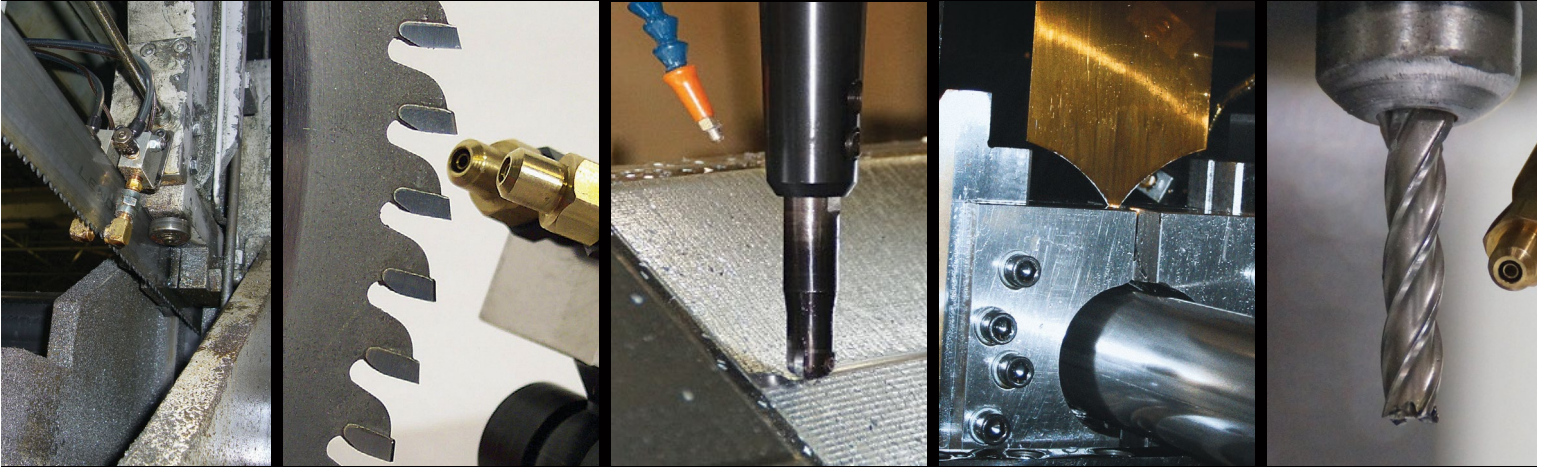


**Precision Applied  
Minimum Quantity Lubrication  
For Near Dry Metalworking**



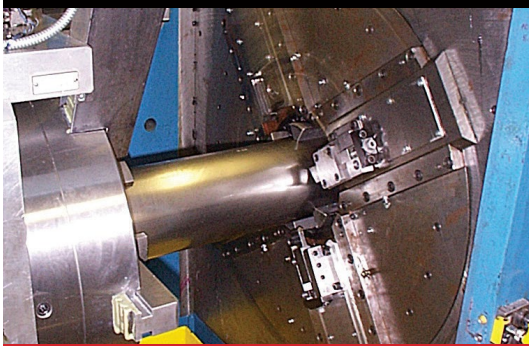
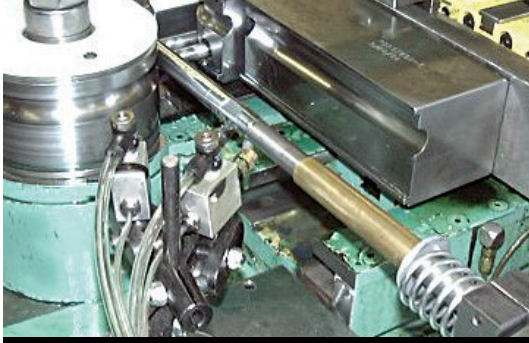
**AMCOL  
Corporation**



# The **AMCOL** Approach

Proven technology,  
refined over decades,  
helps maximize tool  
life and minimize  
fluid usage.





## Near Dry Metalworking

High performance precision lubrication from AMCOL incorporates concentrated lubricants that are focused to the cutting tool workpiece interface with extremely accurate spray equipment. The result is maximum tool life with a near dry working environment and is frequently referred to as **Minimum Quantity Lubrication (MQL)**.

**MQL is able to replace conventional lubrication methods in many applications** resulting in reduced fluid usage with less handling, mess, cleaning, and disposal.

**MQL has gained widespread use in machining, forming, and fabricating** aluminum, copper, brass, steel, stainless steel, titanium, and other exotic alloys.

**AMCOL has spent years refining this technology** with our best in class 6000 Series Precision Applicators and CANMIST lubricant concentrates. **Our unique equipment designs and variety of fluid options** are time tested to be installation, operation, and maintenance friendly.

## Ideal Applications for MQL include:

- ◆ **Sawing** — Extrusions, rolled profiles, billets, plate, castings.
- ◆ **Machining** — Milling, drilling, tapping, turning, profiling, threading, rotary lathe.
- ◆ **Forming** — Stamping, swaging, mandrel bending, drawing.
- ◆ **Piercing** — Guillotine shear, punching, notching, perforating.
- ◆ **Rolling** — Rollforming, sizing, straightening, spinning.

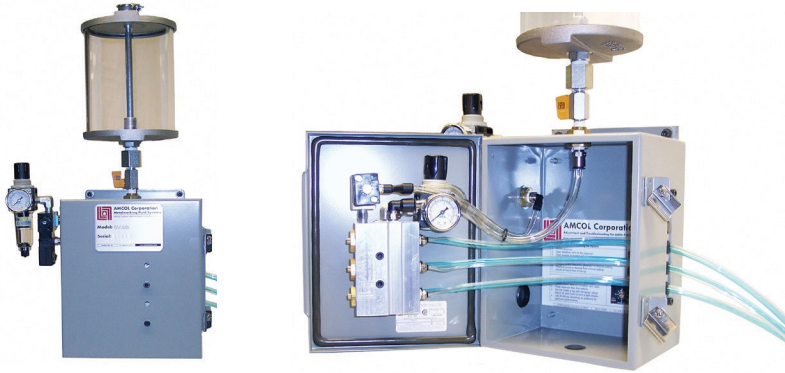
## Instant Payback with Precise Fluid Metering

- 💰 **Deliver consistent and repeatable volumes in very low quantities.**
- 💰 **Maximize productivity with longer tool life and better finish.**
- 💰 **Reduce chemical cleaning time for parts and machinery.**
- 💰 **Decrease storage, freight, shipping, and handling costs.**
- 💰 **Increase scrap value with dryer chips and slugs.**



Certified ISO 9001:2008  
SRI Quality System Registrar

# AMCOL Precision Metering Systems



The **AMCOL 6000 Series Precision Applicators** utilize one or more T60A Posi-pump injectors that cycle back and forth in unison to displace a minute quantity of fluid fed from a gravity reservoir with each stroke. Metered liquid travels side-by-side with air and is mixed at the spray tip. Air then propels the fluid to the tool or workpiece.

At the lowest setting, each injector is capable of reliably dispensing approximately 1 gallon of fluid per 200,000 injection cycles. Air and liquid are independently adjustable. Injection frequency is typically controlled with an integral air timer or PLC controlled three-way valve.



## Spray System Adjustments for AMCOL 6000 Series Applicators include:

- ◆ **Injection Stroke Length** — Fluid volume per injection cycle.
- ◆ **Number of Injectors** — Typically one per spray point.
- ◆ **Air Pressure and Flow to the Spray Point** — For high or low velocity.
- ◆ **Spray Pattern** — Solid cone, flat fan, or through the tool.
- ◆ **Spray Time** — Single pulse or multiple injection cycles.

## A Little CANMIST Goes a Long Way

**CANMIST high performance concentrates work best when dispensed in minute quantities** which ultimately results in reduced chemical exposure for workers and the environment. Many of the CANMIST concentrates are based on naturally derived vegetable esters or cosmetic grade emollients for the best possible health and safety profile.

**CANMIST high performance cutting fluids are packed with the best available additives** that coat the tool surface using capillary action that is accelerated with heat. Polar compounds bond with the tool to create a continuous low-friction thin film coating that protects the cutting edge, facilitates chip formation, and eliminates build-up for longer tool life and superior cut quality.

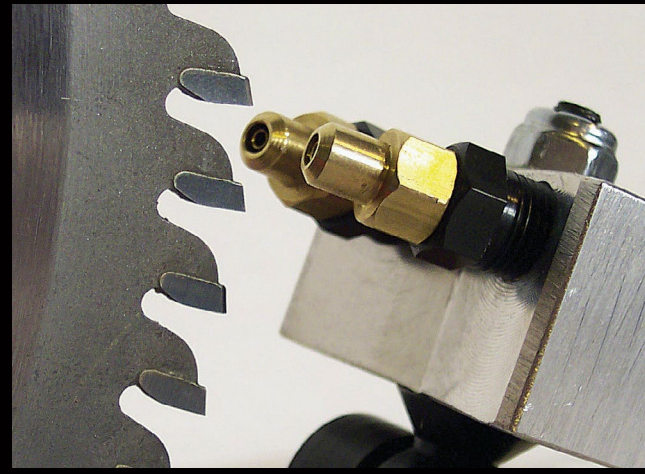


**AMCOL provides many different CANMIST fluids to meet your exacting performance and price point requirements.** All are petroleum free. Most are formulated to be used as received and require no mixing; simply fill a gravity reservoir and operate. CANMIST fluids are often purchased in single gallons to further ease handling and labeling issues.

## AMCOL 6000 Series Precision Applicators

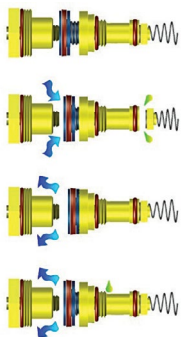
*offer ultimate control of fluid output with precise repeatability that is ideal to replace a long list of conventional lubrication methods.*





## The T60A Posi-pump

**The T60A Posi-pump is simply the most accurate, repeatable, and reliable pump on the market today! At the heart of every AMCOL 6000 Series Applicator,** these self-priming injectors create positive suction of oil into the injection chamber to eliminate pump cavitation. All liquid contact seals are long lasting PTFE elastomers as standard. Injectors are inserted into an extruded body to eliminate assembly and stacking of individual injectors; this also allows for complete rebuilding of individual injectors and reduces potential leak points.



**The injection cycle begins in the idle position.** A piston sits ready to fire in a cylinder filled with liquid that is held in place with a check valve. During the injection cycle, the piston is driven forward with air pressure and displaces the volume of liquid in the cylinder. At the end of the piston stroke, the piston is depressurized and spring returned to the original idle position. The patented design creates positive inlet suction from the reservoir and refills the

chamber during the return stroke. Liquid output (volume) per injection cycle is determined by setting the stroke distance of the piston; a longer travel will result in an increased volume.

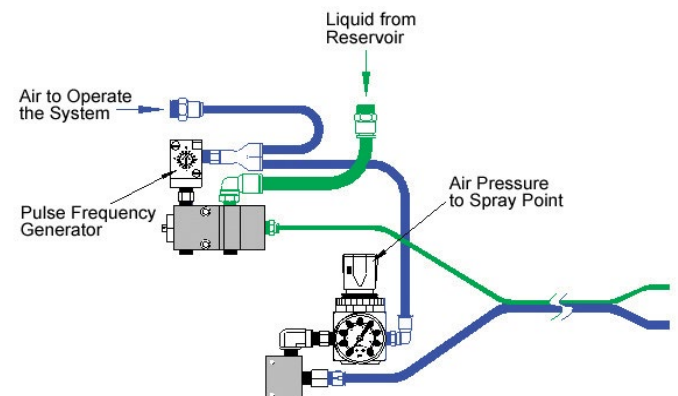
**At the lowest setting, each injector is capable of precisely and reliably dispensing 1 gallon per 200,000 injection cycles;** higher output levels are also possible by simply rotating the

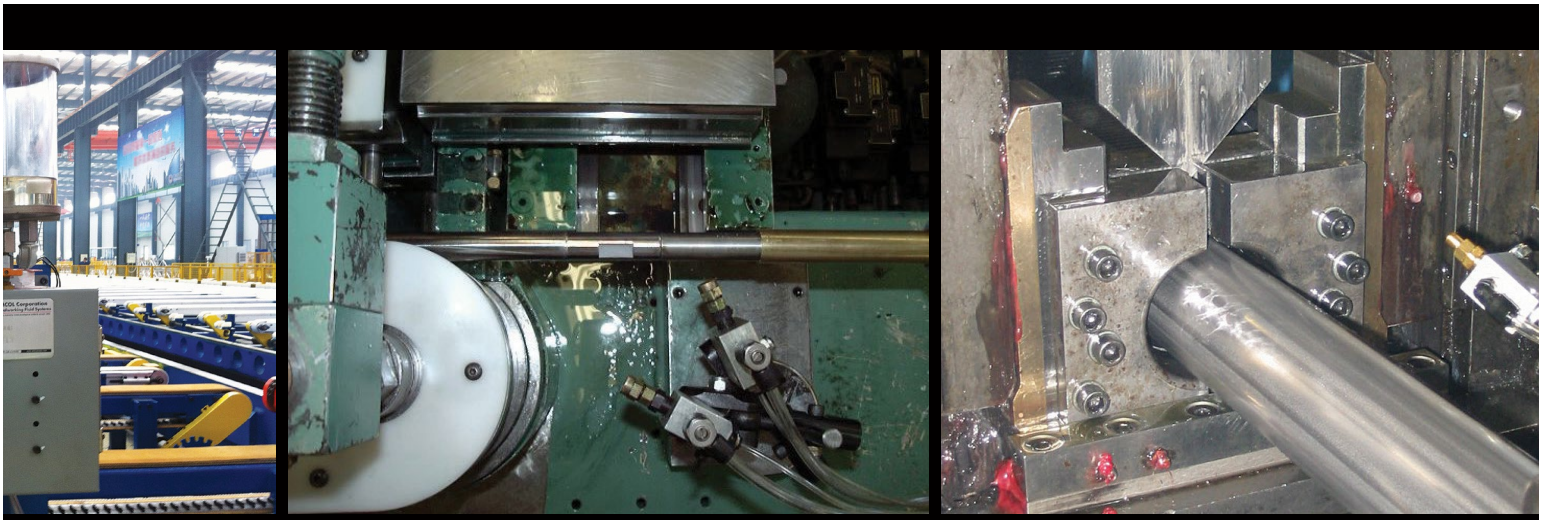
liquid adjustment screw to lengthen the idle chamber. Individual injectors can be completely shut-off by rotating the adjustment screw until the piston is held closed. Injection volume per cycle is set in half turn increments from the off position.

**Up to 5 injectors can be manifolded to operate in unison.** Manifolds can be coupled to have a total of 10 injectors (5+5) together. Liquid output per cycle for each injector is always individually adjustable.

## The T60A Posi-pump in a System

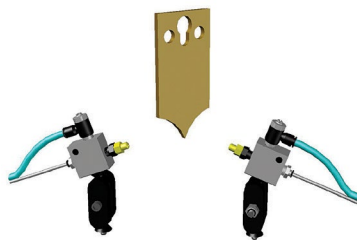
**A pneumatic pulse frequency generator is used to determine injection rate on basic 6000 applicators.** Liquid is supplied to the injector from a gravity reservoir. Air to the spray point is pressure regulated and manifolded to mate one air line per injector. Liquid and air travel side by side to each spray point.





## Mixing Liquid and Air at the Spray Point

**Transition Blocks reorient the liquid to be surrounded by air.** Spray tips connected to the transition blocks ultimately



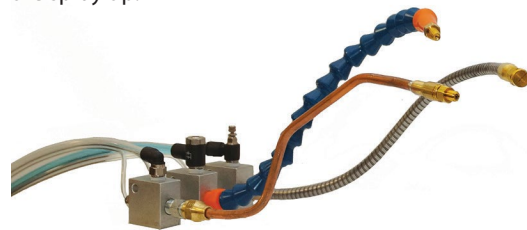
mix the liquid and air. Mounting systems are available to permanently or magnetically mount transition blocks to your machine.

**The Wet Tip, which mixes liquid and air,** is specifically designed to generate a high velocity round spray pattern without mist or fog. This pattern is ideal for many cutting and fabricating operations that require a



highly directed spray to an exacting point. A fan type pattern can be created with the Fan Wet Tip or Wide Fan Wet Tip.

**Copper, plastic, and flexible steel extensions to the spray tip are available to ease installation and setup.** 12" lengths are standard with special sizes available on request. Flow controls can be included at the transition block for precise control of air flow at the spray tip.

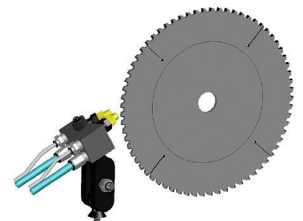


## Transition Manifolds for Circular Saws



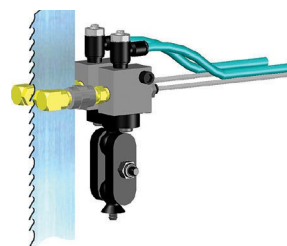
**The B Manifolds are specialized transition blocks with multiple spray points set at ideal angles to lubricate the teeth, gullet, and sides of a circular saw blade.** B Manifolds incorporate Wet Tips to generate a high velocity spray that can penetrate the wind force typical of high speed sawing for maximum tool life with minimal

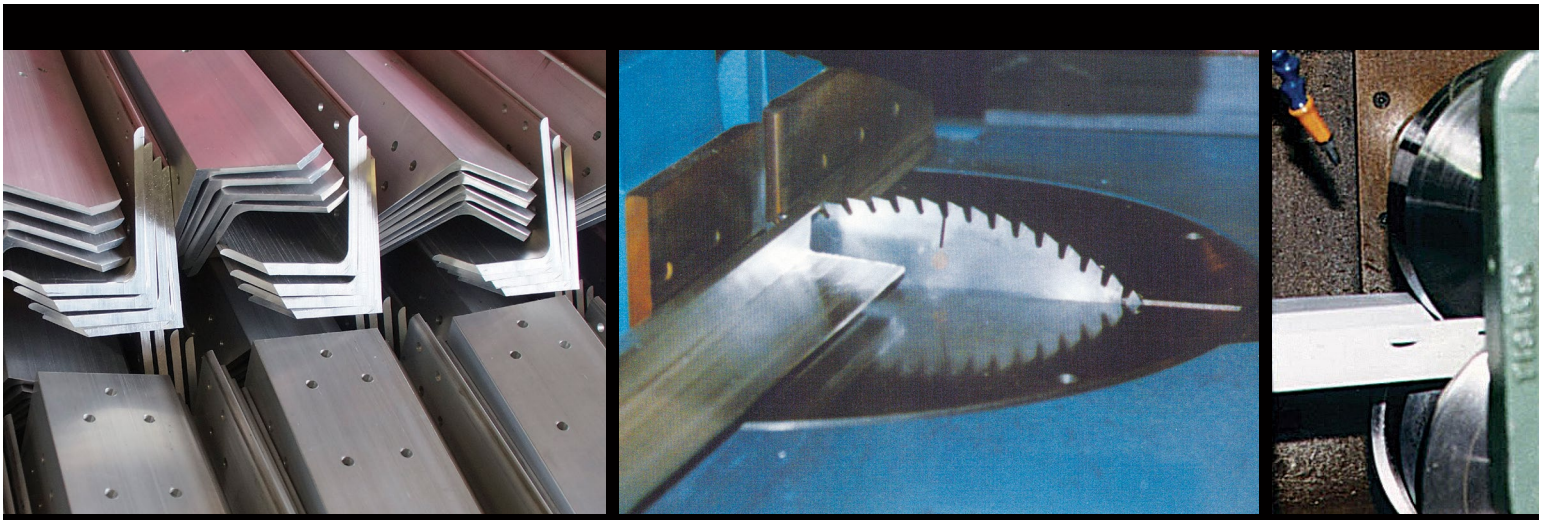
overspray. The multi-functional mounting bracket simplifies installation and allows quick, easy access to the spray block and saw blade for repair. B2 Manifolds with two tips for small saws are available in three sizes. The B3 manifold for larger saw blades has three spray points.



## Spray Assemblies for Bandsaws

**This combination of transition blocks with low profile flow controls and 90 degree spray tips dispenses the liquid evenly to both sides of the blade.** The compact multifunctional mounting bracket allows quick easy fitting to most any band saw and is mounted from the non-cutting side of the blade to avoid damage and ease blade changing.





## Single Line Connection

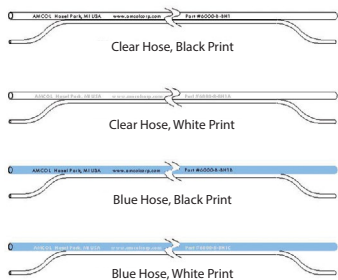


The **Single Line Connector** is a unique version of the **Wet Tip** with an **1/8" NPT male thread** on the exit side that can be connected directly to a hose, tube, pipe, or machined hole. Spray tips can be used to refine or direct the pattern. This type of connection is extremely versatile and may simplify fitting



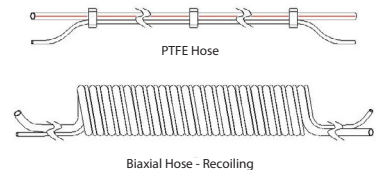
MQL technology to your machine. The liquid/air mix can also be split up to four times so long as the divisions are reasonably short, equidistant, and of similar flow design.

## Biaxial Hose Options



**Biaxial hose has liquid and air traveling side by side to the point of dispensing for ease of viewing.** Flexible urethane biaxial hose is sold in coiled form to be cut-to-length and quickly inserted into push-to-connect fittings for easy installation and replacement;

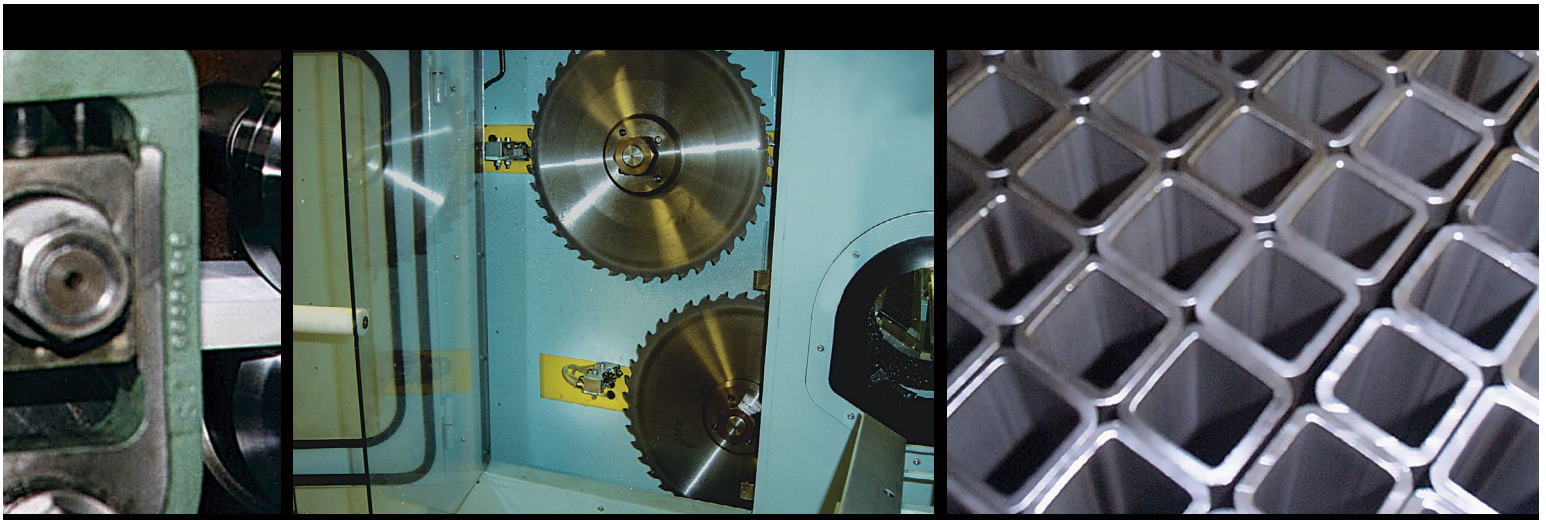
four different colors allow matching injectors with spray points. PTFE hose is offered for high temperature or high wear applications. Recoiling hose is also available for traveling spray applications.



## Reservoirs

**Gravity service reservoirs are available from 10 ounce to 10 gallon.** Smaller reservoirs are hard piped directly to the control box inlet or the injectors. Larger reservoirs are wall mounted for safety and security. All reservoirs are completely enclosed with an air breather on the top to protect the fluid from the elements and a mesh strainer on the exit side to protect the injectors. Fluid level is always visible and electronic float switches are optional on all reservoirs 1/2 gallon and larger. A liquid shut-off is always included to allow servicing injectors without emptying the reservoir.





## System Actuation and Mounting



Air to the system is turned off and on with one or more 3-way air valves. Automated systems typically utilize electric solenoid operated valves.

Air pilot valves can be incorporated when an air cylinder is used to clamp the part in place for fabrication. A roller toggle is also an option for machines that cycle open and closed with each spray cycle.

High cycle rate machines that require precise timing of liquid output are controlled with two air valves; one valve to control the atomizing air and a second to control the injection timing. This insures liquid is dispensed at the exact moment required without mist or fog. Pulse rate can be one per machine cycle, multi-pulse when controlled with a pneumatic pulse frequency generator, or by machine PLC.



Manual toggle valves or selector switches are available for applications that require the ability to manually actuate individual injectors.



The T60A Posi-pump and pneumatic controls are most commonly mounted to a steel NEMA 12/13 enclosure to protect system controls. Alternatively, they can be panel mounted for ease of access or magnetically mounted where mobility and space are a consideration.

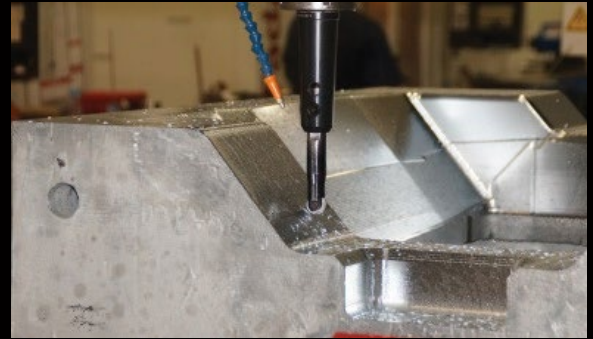
## Specialized Systems with Complex Controls

Multi-point applicators with independent actuation to each set of injectors are designed and built to customer specification. AMCOL has built hundreds of specialized systems that are tailor-made for an exact piece of equipment or application. Systems are built to have one plant air connection and one liquid connection. Both are manifolded to service each set of injectors. Controls can be electronic, manual, air pilot, or a combination.



# Eliminate Flood Coolants

AMCOL MQL is proven to replace flood coolants to eliminate mixing, monitoring, filtering, skimming, and disposing of spent coolant. No mess on the floor.



## Compare the Alternatives

Lubrication Method	Instant Air at Nozzle	Not Affected by Viscosity	Eliminates Mist and Fog	Low Metering Capability	Consistent Fluid Output
<b>AMCOL 6000 Series Precision Applicators</b>	X	X	X	X	X
Airless Spray			X		X
Venturi Siphon	X				
Pressurized Air Over Oil	X		X		
Drip			X	X	
Roller Coat			X		

## Absolutely, Positively, Quality

The **AMCOL Customer Commitment** is based on the knowledge that our future is dependent on the success of our customers. We commit to provide high quality customer driven products supported with best in class customer service.

**AMCOL pioneered MQL in the early 1980's** and we continue to hone this technology with high performance lubricants and user friendly applicators able to meet your exacting requirements. Contact your AMCOL representative today to get started.



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