



*Mau-Sherwood Supply Company*

*Tech Line March 2008*

## Minimum Quantity Lubricant (MQL) is it right for you?

Minimum Quantity Lubricant (MQL) also known as Near Dry Machining (NDM) is the process of applying a very small volume of lubricant directly to the cutting zone. Near dry because dry machining does not use liquid lubrication.

The argument behind dry machining is the elimination of the costs and potential problems normally associated with the cutting fluids used in wet machining. Such as escalating fluid prices, dermatitis, waste disposal, and misting issues. However, dry machining presents challenges of its own. Increased temperatures in the tool and the work piece resulting in shorter tool life and poorer finishes. Dry machining also does not provide a way to remove chips from the work area or reduce the potential risk of dust particles becoming airborne.

Wet machining too has many strong arguments. Flood cooling controls temperature in both the tooling and the work piece improving tool life, surface finishes and tolerances. It also keeps the work zone free of chips and debris. Applying the fluid at high pressures aids the machining process by breaking chips and helping evacuate debris from drilled or tapped holes.

MQL falls somewhere in between dry and wet machining. The use of a small volume of lubrication directly to the cut reduces the friction between the tool and the work piece. This reduced friction lessens the heat generated by the machining process thereby increasing tool life, improving finishes and tolerances. By applying small volumes (6-12ml per hour), the need for recirculating coolant systems is eliminated. Since the fluid is used only once, problems associated with reusing coolants disappear. The parts are drier, possibly eliminating a wash stage and the chips are drier increasing their resale value.

MQL seems to be the perfect solution, but it too has its limitations. The process requires a small volume of lubricant applied precisely to the cutting zone. This requires the correct application equipment. Over applying lubricant will result in increased residues (MQL is not a misting operation). Not applying the lubricant directly to the cutting zone will reduce or eliminate the effectiveness of MQL. MQL also does not have the ability to remove chip and debris from the work zone. This can be accomplished with vacuum systems.

Although MQL might not be the answer to every situation, it definitely has a place in today's manufacturing environment. As with any change, a thorough evaluation of the process should be considered for each application.