



**API Solutions**  
**“An Easier Way”**  
**Bulletin M-102**

## High Speed Machining

Over the past two decades, there have been a lot of changes in CNC machining. With improvements in microprocessor controls, carbide, ceramic and diamond tooling, the metal working industry has been given a new toolbox from which to work. The new toolbox is speed. With higher RPM's from milling and turning spindles, material is removed faster; generating less heat, which extends tool life and produces better finishes. The amount of cubic inches of material that is removed from milling cavities is three to four times the amount of metal removal from just 10 years ago. This means it takes less time to do the same job. With increases in material and labor, the reduction in time spent in material removal goes to the bottom line.

20 years ago, a CNC milling machine generated RPM's in the 4,500rpm range. Now, new machining centers generate RPM ranges averaging 16,000rpm. The increase of speed by a factor of 400% reduces total machining time. By removing material faster, heat is reduced and also reduces the tolerance band. Higher speed generates closer tolerances. CNC turning allows for the spindle to produce constant RPM, turning faster and faster as the cutter moves to the center of the part. This generates better finishes and closer tolerances. Some turning centers can actually generate optical grade finishes on plastics.

The tooling industry has produced new cutting tools designed to work with the higher speed equipment. Many tough to machine materials now are significantly easier to machine with the higher speed machining.

The machining industry has accepted the challenge to work toward lower cost manufacturing, higher quality and faster time to market. Shops that embrace this challenge have added speed to their capital equipment choices with faster spindle speeds, faster tool changes and faster positional control. In 1986, 3,200rpm and positional motion at 70 inches per minute with one-minute tool changes have been replaced with 16,000rpm and positional motion at 400 inches per minute and a 1.3-second tool change. Machined components that took several minutes are now produced in seconds. Speed is a key part of machining technology. Your vendor that has added this tool to their toolbox can meet your machining needs competitively and produce a quality level that stands out in industry.

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