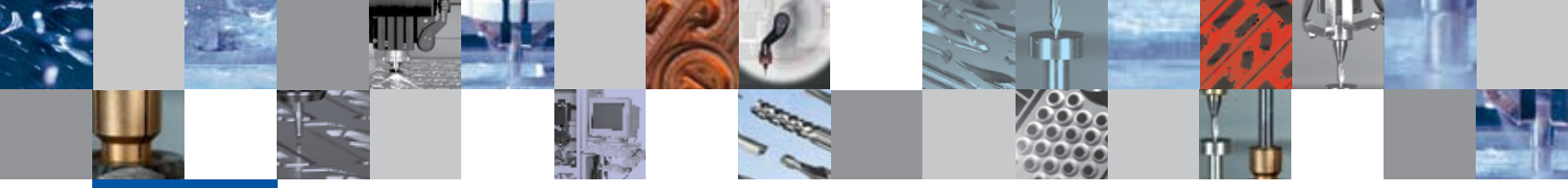

DATRON Dynamics ▫ a distributor for DATRON Electronics
115 Emerson Road ▫ Milford, New Hampshire 03055 ▫ USA
t 888.262.2833 ▫ f 603.672.8067 ▫ www.datrondynamics.com

Environmentally Friendly Machining Systems

Helping the environment and your business' bottom-line

This paper identifies two aspects of high-speed machining that can adversely effect both the environment and a company's bottom-line. Conversely, it then focuses on features of particular micro-tooling machines that inherently yield both environmental and economic benefits.

The situation defined

It is fact that manufacturing creates byproducts — something that is in addition to the intended end product. Unusable byproducts or those deemed to have adverse effects on the environment are thereby known as waste. Additionally, manufacturing involves the consumption of power and associated renewable and nonrenewable resources. Over the last thirty years, an increase in awareness regarding how manufacturing impacts our environment has resulted in regulations and mandates, and even a self-governed or self-imposed environmental consciousness within corporate America. This evolution has increased mindshare for environmental issues among manufacturing management seeking to be both altruistic and cost conscious.

The challenge

The prevailing question is, "How can machining manufacturers approach waste management and power consumption without diminishing production or profit margins."

The one-two punch for success

The reality is that both issues can be addressed and actually result in significant savings, improved quality and increased revenue.

With regard to the first issue, waste management, the ideal solution would be to eliminate the use of environmentally-unfriendly chemicals or the production of harmful wastes that need to be disposed of in a controlled manner — at an expense to the manufacturer. Within the machining industry, this poses a particular challenge because coolants required for most conventional machines are petroleum-based. As such, the coolant waste can have adverse effects on the environment. So, it needs to be properly disposed of at a significant cost to the manufacturer (recycling an oil-based coolant can run about $12,000 a year).

However, if the manufacturer utilizes particular high-speed machining centers such as Datron's M35 Aluminator, they can avoid these petroleum-based coolants and the costs associated with disposal while at the same time protecting the environment. The M35 uses an ethanol-based micro-volume coolant. Ethanol is a form of alcohol that results naturally through the sugar

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fermentation process. It is ideal for high-speed, micro-tooling of non-ferrous metals and some plastics due to a thinner-than-water viscosity that allows the ethanol to quickly cover and cool more of the surface area on fast-moving parts. The low evaporation point of ethanol makes it an efficient cooling and lubricating solution. Since the ethanol simply evaporates, disposal, recycling and their associated costs are a thing of the past. Plus, ethanol coolants leave no residue on machined parts, which makes costly secondary operations, like de-greasing, obsolete — maximizing throughput, increasing efficiency and ultimately improving a manufacturer's bottom-line.

Note: *Steel-based materials require an oil-based coolant because carbide tooling on steel surfaces can cause sparks and create a fire hazard.*

In addressing the second environmental issue, energy conservation, the same high-speed machining centers that eliminated waste management will reduce energy consumption. Why? Simply because they have smaller power demands. While most machines run on 440 volt 3-phase power, using approximately 20 amps, machines like the M35 Aluminator runs on 208 volt single-phase power and uses less than 10 amps — about the amount of electricity required to run a clothing dryer. Manufacturers who implement these machines decrease their energy consumption, which is good for the environment ... and good for their bottom-line since it saves money on utility bills.

Wrapping it up

Due to machine designs developed in order to maximize efficiency and quality in the micro-tooling process, high-speed machining centers, such as the M35, inherently are better for the environment than traditional machines. Through the incorporation of these machines, manufacturers can produce a better end product, while at the same time, positioning themselves as an environmentally-conscious company.