

# Environmentally Safe Fluids for Industrial Cutting, Lubrication, & Cleaning

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Not long ago, many manufacturing managers thought sensitivity to environmental protection standards meant additional expenses, decreased productivity, and a plethora of headaches and hassles.

But today, thanks to new technology and products, helping to save the environment can actually help manufacturing companies save money, time, and wear on equipment and improve the workplace for employees.

Sometimes it might seem hard to switch to a new product after growing comfortable with or accustomed to an old one, but it's becoming important that everyone does his or her part to better protect the environment. And, as in many cases, when affordable technology is available that will help, and when the initial cost is the same as what many companies are paying for older, environmentally hazardous products, there's no reason for not switching.

Notably, vast improvements have been made in the formulation of industrial cutting fluids for tapping, machining, grinding, and other metal-working tasks. These fluids are required to extend the life of tools that are subjected to heat, stress, and friction in their normal operation.

For example, most current, popular tapping fluids pose an environmental risk because they contain 1,1,1-trichloroethane

(methylchloroform) as a primary active ingredient. The substance evaporates readily, and this family of solvents has been identified as a leading cause of decay in the earth's ozone layer, which protects living matter from over-exposure to ultraviolet rays from the sun. Recent findings indicate serious ozone depletion over the most densely populated portions of the Northern Hemisphere. Previously, damage primarily affected the unpopulated South Polar Region.

Additionally, 1,1,1-trichloroethane can find its way into and contaminate groundwater systems. Moreover, plant employees who inhale the vapor by-products can suffer adverse effects.

As a result, 1,1,1-trichloroethane is scheduled to be banned by international agreement by the year 2002. In the United States that deadline has been moved up considerably. President George Bush recently announced that the U.S. firms are required to phase out production of chlorofluorocarbons, halons, carbon tetrachloride, and 1,1,1-trichloroethane by December 31, 1995. According to the HSIA (Halogenated Solvents Industry Alliance), the only exception to the ban will be "essential uses and the servicing of existing equipment."

That's a strong message. What it means is that companies have three, not 10 years to

convert to other tapping fluids, free of such hazardous ingredients as 1,1,1-trichloroethane. The pressure is on.

#### **Besides Tapping Fluids...**

Other commonly used metalworking fluids pose environmental threats. In most cases, these are oil-based fluids that need to be applied generously to surfaces for metalworking. Every year users dispose of thousands of gallons of spent product classified as hazardous waste.

In addition to disposal problems, flood coolants create health hazards, such as skin irritations, slippery floors, and smoke/mist in the air.

To combat such hazards safer metalworking lubrication systems, comprised of a high-performance, vegetable-based fluid and application system, have been developed. Tests show that these systems pose no health risks to workers or the environment.

Because of a higher lubricity factor, they also require only a thin molecular coating on the cutting edge of a tool to dramatically reduce heat build-up during operation. When properly applied with an applicator, the lubricant is consumed in the machining process, thus eliminating the need for maintenance of flood or water-diluted coolants, sumps, and other elaborate drainage systems and waste disposal.

Previously, on one machining line, 280,000 gallons per year of diluted oil-based coolant were used. There was a constant need to dispose of the coolant as it became contaminated and rancid. With the new system, each nozzle uses only one-and-a-half ounces of lubricant daily, and the whole operation uses only about 200 gallons per month or 2,400 gallons per year.

The resulting savings are substantial, and there is virtually no mess to clean. Previously, oil-based fluids had to be collected and disposed of at a waste dump. They also might have been incinerated. Furthermore, the floor and other surfaces at plants that have switched to the vegetable-based lubricant systems are no longer covered with oil.

The natural lubricants also offer other benefits. Metal chips, which result from machining, remain dry and fall away cleanly from operations. When traditional coolants are used, the chips and oil remain on the finished parts and can require an additional cleaning process - and can create more contaminated run-off. If

the metal shavings aren't completely removed from a part, they can impair the operation of a final assembly.

The superior lubricity of the new vegetable-oil based products increases tool life because reduced friction on the cutting surfaces eliminates the heat that causes the tool to quickly wear out.

For instance, a steel fabricator began using a vegetable-based oil and application system for its sawing operation and maintained detailed records for a 30-day period. By the end of the span, saw-blade life had almost doubled from a previous average of 28-32 hours to as much as 52 hours. Additionally, there was no longer a need for cleanup after sawing. The firm now sends parts directly to layout, punching, and end preparation, resulting in time and labor savings.

Moreover, because such systems are free of hazardous substances, their use isn't governed by the myriad of federal, state, and local regulations that apply to most other industrial lubricant and tapping fluids. So firms that switch to the newer, environmentally safe products can avoid compliance, disposal, and administrative hassles.

#### **Industrial Cleaners Can Be A Problem**

Another problem area toward which to cast an environmentally attuned eye is that of heavy duty industrial cleaners. Butyl Cellosolve, a substance that reportedly causes a variety of severe health problems in laboratory animals and humans, is found in some prominent industrial cleaners that call themselves "safe." However, the American Conference of Governmental Industrial Hygienists has established a maximum exposure level of 25 parts per million for the substance, and the use of Butyl Cellosolve has been condemned by the Registry of Toxic Effects of Chemicals.

New non-toxic, biodegradable products are available which contain no hazardous ingredients or solvents and which, with minor equipment modifications, can replace vapor degreasing systems currently utilizing 1,1,1-trichloroethane as a primary cleaning agent.

The environment is everyone's business. Utilizing today's new technology not only helps protect the environment, but also makes good business sense because the products are affordable, readily available, and easy to use. ■

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