

Specialty metalworking fluids target specific applications.

BOUTIQUE SHOPPING

► BY GREG FARNUM

Coolant, that ubiquitous aid to machining and grinding, is the Rodney Dangerfield of the metalworking world—it just doesn't get any respect.

Consult with the distributor, the manufacturer's rep or the guy on the plant floor who's been around the longest, choose one of several competing brands formulated for a variety of applications, order in bulk and then, unless there's a problem, forget about it.

So the term "boutique fluids" seems like an oxymoron—like designer athletic socks. A closer look, however, reveals some innovative new products, and an industry that's a lot more dynamic than its image suggests.

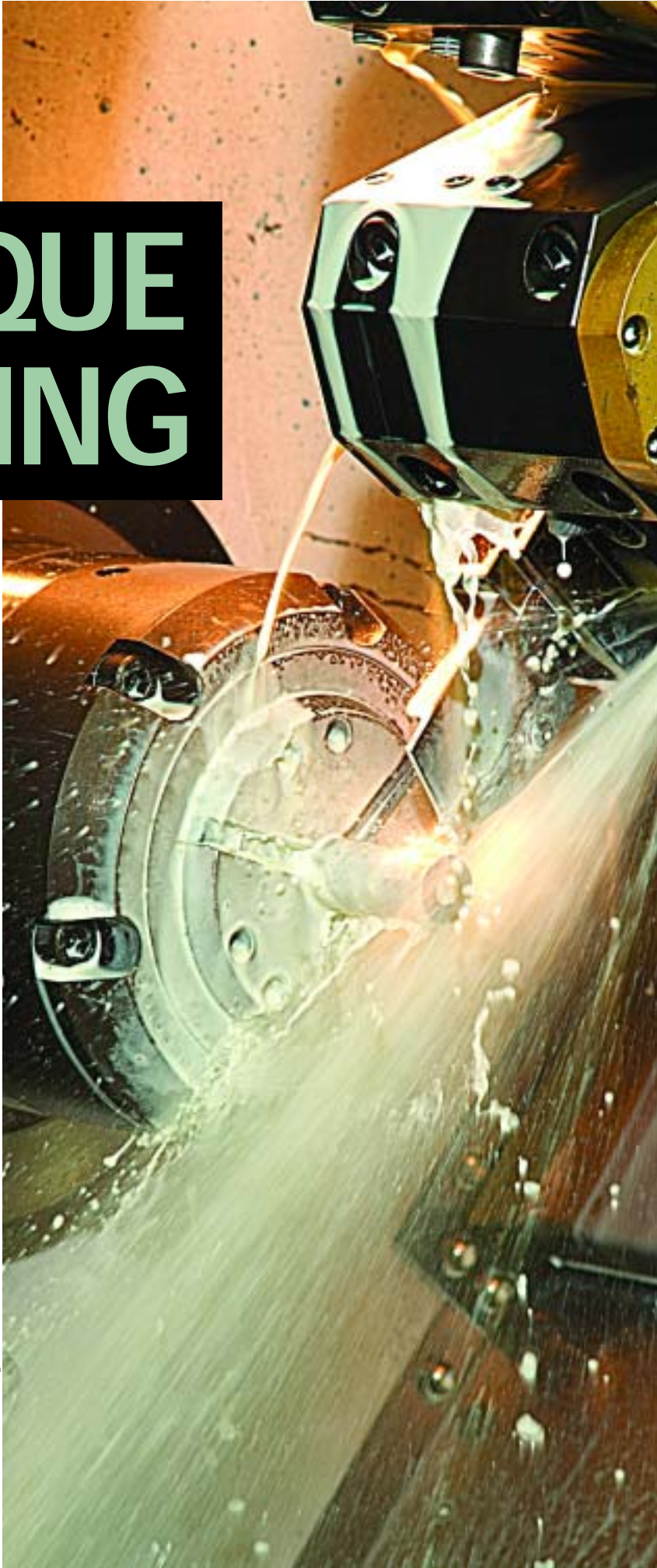
Ready for Red

One boutique fluid that is sparking interest is Valley Forge, Pa.-based Houghton International Inc.'s Hocut 795-CU, a coolant formulated specifically for machining "red metals"—copper, bronze and brass.

"Red metals can be touchy and present unique challenges to machining," said Hank Limper, manager of Houghton's Cutting and Grinding Division. He said Hocut 795-CU protects against oxidation and compensates for the buildup of fines that can overwhelm the coolant sump. The fluid does not change color as red metal fines build up in the sump.

The company reports that Hocut 795-CU is biostable without adding biocides and provides a high level of lubrication for machine ways and

Hocut 795 biostable coolant comes in a variety of formulations for machining different metals.



Houghton International

indexing mechanisms. In addition, Houghton says its low foaming characteristics render Hocut 795-CU particularly suitable for gundrilling.

Psychic Not Needed

While the prime, or optimal, application of Hocut 795-CU is cutting red metals, the optimal application for Cincinnati-based Milacron Inc.'s Cimcool Cimstar 3890 is aluminum. Fairris Dean was one of the first users of Cimstar 3890. The reason he became an early adopter speaks volumes about the need, and promise, of boutique fluids.

Dean is manager of Ward Corp.'s Machining Division, Fort Wayne, Ind., a supplier of aluminum parts to the automotive industry. Plagued by a persistent—but puzzlingly erratic—tapping problem of ripped or oversized threads on a gear housing, Dean checked all the key variables, although there appeared to be no cause.

Dean and a task force led by Phil Conner, Ward's project engineer, continued checking all of the mechanics of the process for a cause, including trying out five different styles of taps from different manufacturers.

"Not only was the scrap rate too high," said Dean, "but it was ruining the taps. I was going through \$9 and \$10 taps like they were glasses of water."

Because the tooling was gumming up and sticking, which resulted in the torn and oversized threads, the MWF could have been a contributing factor. Dean, Conner and Ron Springer of industrial distributor Specialty Tool, Fort Wayne, Ind., decided to focus on the coolant.

"I decided to look for a fluid with better lubricity than what we were using, preferably one that was designed for aluminum work and specifically for tapping," said Dean. "Ron knew about the new Cimcool Cimstar 3890, which was just coming out of R&D, and suggested we try it."

Milacron representatives introduced Dean to Cimstar 3890, a MWF billed as biostable, chlorine-free, and being highly lubricious and specifically formulated for machining, threading and finishing aluminum.

Dean noted that the gear-housing

scrap rate fell from around 7 percent to less than 1 percent, tool life increased 12 percent and productivity rose significantly.

Greg J. Foltz, Cimcool Industrial Fluids' engineering and development manager, sees the success story as testimony to the efficacy of, and need for, highly targeted fluids. He said: "Many larger operations, such as automotive plants, bearing grinding facilities and aircraft [factories], where productivity and cost control are the driving factors, require specialized products to meet their needs. And so we formulate products such as Cimtech 310 for aircraft aluminum, Cimstar 3890 for automotive aluminum and Cimtech 46C for carbide grinding. While these products can certainly be used in other areas and other applications, these are the focus markets for which they were developed."

One Size Doesn't Fit All

Castrol Industrial Americas is another coolant manufacturer that provides specialized products for a variety of workpiece materials. Brent Brennan, segment manager for the Downers Grove, Ill., company, said, "Castrol's expertise lies in matching to each specific application that product which minimizes the customer's total manufacturing costs."

Castrol Industrial produces Castrol Alusol XT, a coolant optimized for machining aluminum, as well as products for machining magnesium and creep-feed grinding of ferrous metals. "There is no perfect coolant and the 'one-size-fits-all' philosophy is not appropriate for MWFs," said Brennan. "With the proliferation of specialty metals such as magnesium, Inconel and some of the aluminums used in aerospace applications, the requirements for MWFs have changed."

In addition, he said, manufacturers incorporate factors like waste treatability,



With the proliferation of specialty metals, manufacturers are finding that it's best not to target one metalworking fluid for all applications.

operator health and safety and fluid maintenance, as well as machining performance, when evaluating an MWF. That's why he believes specialized fluids are a significant factor in metalworking.

Skip Wolford, vice president of Spartan Chemicals Co. Inc.'s Industrial Products Group, Maumee, Ohio, concurred that specialty fluids will grow in importance.

"Market dynamics will continue to dictate that technologies be improved with regard to lightweight alloys and aluminum," he said. "The overall focus on weight reduction as it relates to all aspects of our transportation technologies will also spur development of cleaner fluids that are capable of performing operations previously associated with oil-based chemistries."

In addition to its "multimetal" products, Spartan IPG makes a variety of specialty fluids. Wolford stressed that "the market for specialty—or boutique—fluids is one that we look at very carefully."

Some Don't Believe the Hype

Not everyone, however, is rushing to jump on the bandwagon of boutique

fluids. Paul Michael, technical director for Milwaukee-based Benz Oil, sounds this cautionary note: "All MWFs are to some extent customized. This is nothing new—it's inherent in the process. There historically has been very little standardization in the MWF business. Each formulation is unique."

He added that products are often optimized based on metallurgy and operation. Secondary operations are also considered. These would include fluid filtration, cleaning processes, mist collection and other issues that may loom larger for one customer than another. Finally, the formulators of these fluids often select raw materials based on availability. A given ingredient may become hard to obtain or temporarily too expensive, so the

manufacturer may switch to a different additive. "The idea of boutique fluids for metalworking is a bit misleading," Michael said.

Michael cited a recent development outside of the MWF field as the sort of thing that is constantly engaging the attention and effort of fluid companies. He said: "With straight oils, there have been developments that increase options for oil formulations. Recently, many oil refineries have converted from solvent-refining to catalytic-refining techniques to produce higher quality lubricating oils. This conversion was driven by the need for more oxidation—stable, lower—volatility base oils for use in passenger car engines. These higher quality lubricants blur the line between synthetic oils and conventional oils. At Benz Oil, we have found these new base oils useful in grinding-oil formulations."

Michael added that Benz Oil recently developed a high-speed grinding oil for carbide and ceramic operations based on these new materials. Acceptance has been good, not only because of product performance but because the color is water-white and the odor is minimal compared to traditional oils. With these new soluble-oil formulations, unit costs are usually lower than with water-based products. Metalworking oils cost more per gallon, but they tend to be kinder to machine tools.

Dan Hermanson, manufacturing engineer at Precision Twist Drill Co., Crystal Lake, Ill., has used the Benz Oil products and concurs with Michael's assessment. "Our machine tool maintenance costs are three times higher for water-based coolants than these oil-based MWFs."

More Than One Use

Houghton stresses that its mainline Hocut 795 fluid, which is different than the Hocut 795-CU, was customized to lower fluid replacement and additive



Hangsterfer's Laboratories

Timely and intelligent fluid and system maintenance benefits all processes that require the use of a metalworking fluid.

costs with longer lasting chemistry for steel and gray iron applications. The company cites Rolls Royce (RR) Gear Systems, Park City, Utah, (acquired by Triumph Gear Systems Inc.) as an example.

Fluid disposal costs at RR Gear System's 200,000-sq.-ft. facility, which engineers, machines and assembles parts and subsystems for military and civilian aircraft, were spiraling out of control. The company was disposing of more than 16,000 gal. of contaminated liquid waste annually. Although not uncommon in the industry, this volume of liquid waste forced the facility into a federally regulated waste-generator category. RR Gear Systems thus faced disposal costs of \$2.35 to \$7.50 per gal. vs. 25 cents per gal. for unregulated waste.

An RR Gear Systems task force studied the problem and eventually replaced the existing fluid with Hocut 795. "We went from using six drums of coolant a month to using two drums every three months," said Travis Larson, environmental health and safety manager for RR Gear Systems. "We were able to use less product to do the

The following companies contributed to this report:

Benz Oil
(414) 442-2900
www.benzoil.com

Castrol Industrial Americas
(630) 743-3334
www.castrolindustrialna.com

Hangsterfer's Laboratories Inc.
(856) 468-0216
www.hangsterfers.com

Houghton International Inc.
(610) 666-4000
www.houghtonintl.com

Milacron Inc./Cimcool
(888) CIMCOOL
www.cimcool.com

Precision Twist Drill Co.
(800) 877-3745
www.precisiontwistdrill.com

Rolls Royce Gear Systems Inc.
(435) 649-1900
www.triumphgs.com

Spartan Chemical Co. Inc. IPG
(800) 537-8990
www.spartanipg.com

Valenite Inc.
(800) 544-3336
www.valenite.com

Ward Corp.
(260) 426-8700
www.wardcorp.com

same job.” Hazardous waste disposal costs slid from \$67,276 to a little over \$600—a 98.5 percent savings.

Karl Kuchler, district sales manager for Valenite Inc., Madison Heights, Mich., agreed with this “yes ... but” approach to the question of boutique fluids. “Our latest introductions in the fluid market were three products—VNT 780 light-duty, VNT 785 medium-duty and VNT 790 heavy-duty—for nonferrous machining. We saw a market there because lighter and stronger nonferrous materials are needed for many applications in automotive, aerospace and medical.”

He added that the lubricity package and nonstaining characteristics of the three products lend themselves to nonferrous applications.

Here’s the “but” part. “While these new products are particularly suited for nonferrous materials,” Kuchler said, “they can also be used for ferrous materials.”

Ed Jones, president of Hangsterfer’s Laboratories Inc., Mantua, N.J., which produces coolants and lubricants, insists that the most important customization must ultimately be performed by the user—in the form of timely and intelligent fluid and system maintenance.

“It is extremely important that the users of MWFs retain ownership and responsibility of the fluids in their facility by becoming more educated,” he said. “Regardless of perception and trends, ultimately the buyer is responsible for the positive or negative impact of the MFW on their current processes and the future potential liabilities.”

It’s a safe bet that every fluid manufacturer would agree with Jones.

About the Author

Gregory Farnum is a Detroit-based journalist specializing in industrial and scientific issues.