

Everything-Friendly Lubricants

Lubricant experts are doing more than ever to make their products less toxic and harmful to everything from the environment to the people using them – which comes with plenty of extra benefits for productivity, too!

Alex Cannella, Associate Editor

Of the dozens of different challenges lubricant specialists have to weigh and consider, you might not think that their impact on the surroundings would be a priority. Most thoughts

would immediately jump to matters of grave import such as manufacturing efficiency, productivity, cost efficiency, and so on. But the environment, and just as importantly, the people existing in it, is rightly an important consideration right alongside the usual suspects that's been on the minds of a lot of lubricant manufacturers. And they've been doing a lot lately to improve their products on that front.

Lubricants are getting friendlier than ever. More environmentally friendly, more user friendly and more machinery

friendly. Across the board, you can find evidence of all kinds of different ways coolants and cutting oils damage their surroundings, from the environment itself to the individual people working with them. But across the board, you also see lubricant specialists think-

you've probably already heard of is the advent of hydro- and vegetable-based oils that break down more easily and don't fester as toxic waste, but there's so much more going on behind the scenes. Anti-misting and foaming measures. Reducing toxicity and removing chemi-

“We've found our most environmentally friendly products also work extremely well for gear manufacturing and gear hobbing.”

ing about these problems and making adjustments to minimize them. The process is still ongoing, but it is going somewhere, and we're seeing the fruits of those labors today.

The most well-known industry shift

calls that are flammable or harmful to the skin. Even the materials a cutting or grinding machine are made of and how coolants interact with them is a consideration.

That last one might sound surprising,



Lubricants typically have many toxic properties that can damage everything from the environment to a machine operator's skin, but suppliers are finding new ways to tackle and eliminate their products' capacity for harm.



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but for Oelheld, it's an important issue that they've devoted significant effort and time towards. Oelheld has developed its own entire system for testing those materials, and there are a surprising number of considerations when just focusing on this one small aspect of designing lubricants.

A prime example is a silicon-based lubricant that is sometimes sprayed on a machine's wiring. Oelheld's found that over time, that silicon can wreak havoc with cutting oils when exposed repeatedly. As it's weathered off, the silicon itself gets into the cutting oil, creating a reaction that causes massive foaming, and that foaming in turn spirals into a whole host of other issues and can even leak out of the machine and start flooding your work space with cutting fluids. Silicon can actually be used as a defoaming agent, but only when used in very minute amounts. Just like with medicine, a little bit can help, but too much is a poison, and over time, wash off from silicon coatings becomes too concentrated and achieves the exact opposite of its intended effect in a cutting oil.

"We go to many machine manufacturers and say 'listen, why don't you use, for example, a synthetic PAO to coat the wires in?'" Stephan Hecht, CEO of Oelheld, said. "It's a good lubricant, just as good as silicon, but it's compatible with any oils."

And that's just one example. Oelheld has an entire lab set up to test the effects of lubricants on other components' materials, and they're regularly tapped by machine manufacturers to test their machines' materials and see how they react to Oelheld's products, or to discover the root cause of why another company's lubricant isn't playing well with their machines.

While it might sound like such a minor thing, Oelheld's efforts on this front can actually have a big impact by preventing unexpected costs during production. Once the silicon gets into your lubricant, your only course of action is to just replace it. Entire barrels of lubricants can get ruined in this fashion, which not only affects your bottom line as you have



Caption: "Oelheld regularly tests machinery components to see how their materials interact with the company's cutting oils."

to replace the spoiled cutting oils, but can be disastrous for the environment if said lubricant can't be broken down easily.

"When the silicon gets in, it's over for the oil," Markus Munde, global technical support at Oelheld, said.

In its own roundabout way, reducing or eliminating reasons to prematurely dump lubricants is a primary method that manufacturers are using to improve their footprint on the environment. After all, the fewer lubricants that need to be dumped before they're used, the less harm they'll do. And the number of ways different lubricant experts are finding to do that are extensive, from smaller efforts such as pointing out and addressing potential ways lubricants can be compromised such as Oelheld's work with machining components to more obvious ones such as just improving a lubricant's shelf life.

But all of that only treats a symptom. Taking soft measures to lessen lubricants' environmental imprint is all well and good, but the root cause — that many lubricants do not play well with the ecosystem — still remains. So while we might be mitigating the issue, how do we solve it?

Luckily, there are a fair number of lubricant manufacturers that are tackling that exact question, and the best way they've found is those hydro- and vegetable-based oils I mentioned before.

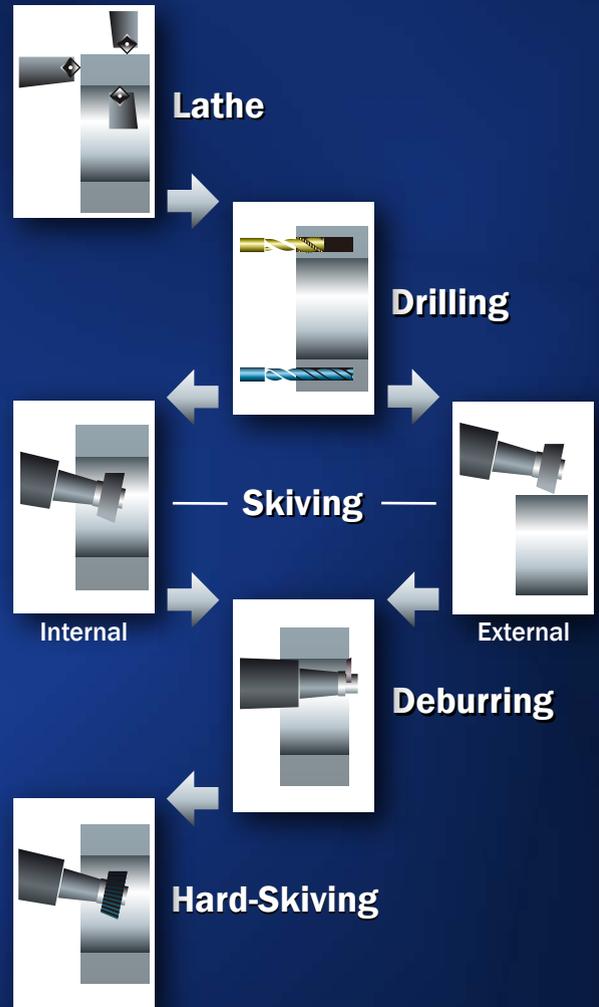
Blaser utilizes an ester base for many of their cutting oils, including their Vascomill and Vascomill MMS lines. Ester is significantly more biodegradable than mineral-based oils, making Blaser's Vascomill lines far gentler on the environment. But Blaser was also pleasantly surprised to discover that the switch to ester-based cutting oils was actually a win all around. It turns out that there are numerous side benefits to using ester that directly improve manufacturing efficiency for gear manufacturers.

"We've found our most environmentally friendly products also work extremely well for gear manufacturing and gear hobbing," Randy Templin, vice president of Blaser Swisslube Inc., said.

Using an ester-based lubricant provides plenty of additional benefits that are appealing to gear manufacturers. Primary among them is increased lubricity, and increased lubricity in turn means more parts can be machined with less oil. They also have a high flash point, low misting and vaporizing and a low

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drag out on parts, all beneficial traits that just naturally come with using ester-based lubricants. And in addition, many of Blaser's cutting oils also offer wear protection and low discharge rates.

"The consumption is low and the performance is also very high, so it's the best of both worlds," Templin said. "You have high productivity on the machine and also low consumption of the cutting oil, which is also renewable."

But according to Templin, if there's one issue Blaser's run into with their ester-based cutting oils, it's oxidization. This can be an issue for many cutting oils, but is a little more pronounced with ester-based ones.

Blaser's answer to that issue is their GTL (gas-to-liquid) products, primary amongst them being Blasomill GT and Blasogrind GTC 7. While they're both mineral-based products and thus not all that biodegradable, they do offer an alternative that covers the Vascomill

line's primary weakness. The primary advantage of utilizing GTL is that even if air gets into the cutting fluids, they release it drastically faster than other lubrication products might.

biodegradable vegetable-based lubricants is the availability of the vegetable oil itself, as Houghton International discovered when they found out how expensive it would be to transport their

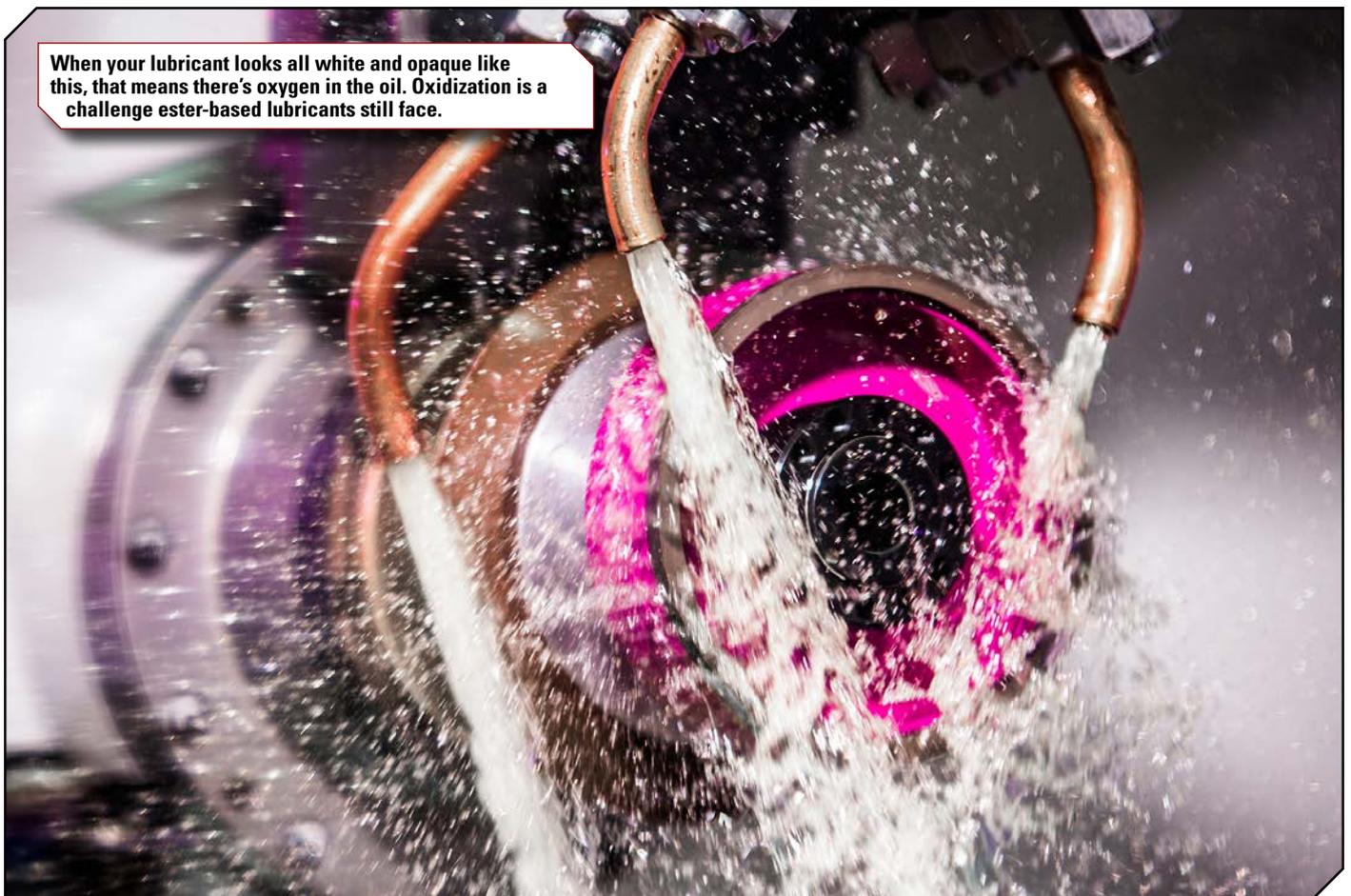
“In the end, even though they might pay more with one of our products, they should be paying less overall once you look at the total cost of operation because the product benefits outweigh the extra cost.”

"When oil comes back to the machine, the air comes out of it, so by the time the pump [delivers the oil], it's air free," Templin said. "You're delivering nothing but oil to the cutting zone or the grinding zone."

Lubricant suppliers can also run into another unexpected challenge with ester-based lubricants if they operate globally. One of the primary sticking points of making the jump over to

lubricants. Between the cost of transporting vegetable oil in bulk halfway across the world and import regulations in some parts of the world such as Europe, Houghton International found that it was actually cheaper to develop individual copies of the same lubricant for each major region of the world they serve, each redesigned to work with locally available vegetable oils. It was an unexpected hurdle, but one

When your lubricant looks all white and opaque like this, that means there's oxygen in the oil. Oxidization is a challenge ester-based lubricants still face.



that Houghton International was able to overcome.

“We try to develop our new products with global markets in mind, and so one of the challenges is that vegetable oils come from different sources around the world, different crops, and even the different environmental conditions impact the vegetable oil,” Mike Smith, technical director of new product development at Houghton International, said. “So you get different properties from the different vegetable oil sources, and a lot of our work goes into making appropriate adaptations to regional needs.”

One final issue that might tempt manufacturers to not buy in for vegetable oils is the cost. As with most products on the leading edge of technology, it’s going to cost a bit extra to get an ester-based cutting oil. But remember that some of the natural benefits that come from using that ester base are increased tool life and lubricity. And according to Dave Slinkman, senior vice president of research and technology at Houghton International, those natural benefits can actually help you save money in the long run when you switch.

“The approach that we take, the product might be a little bit more expensive due to a vegetable oil or some other improvement, but typically that benefit is going to be seen in the fluid lasting much longer than it typically would or providing much better lubricity so that they increase the number of parts they can make per tool,” Slinkman said. “And in the end, even though they might pay more with one of our products, they should be paying less overall once you look at the total cost of operation because the product benefits outweigh the extra cost.”

That cost can still make both lubricant suppliers and their customers look the other way, however, even when it’s disadvantageous to do so. The chemistry behind lubricants can get complicated fast when you consider just how many different needs a coolant or cutting oil manufacturer has to cater to. You need to be efficient, clean, and have a long shelf life, low misting, low foaming, and

low oxygen absorption. To say nothing of individual considerations that certain products need to weigh like chip removal. When faced with all that, “secondary” concerns like the environment can often take a backseat instead of being added to the considerations to be balanced when concocting a new lubricant.

But the environment shouldn’t be a secondary concern, and your own workers that have to interact with these lubricants definitely shouldn’t be, either. And there are a lot of lubricant suppliers out there now going the extra mile to nullify the hazardous nature of formerly toxic, damaging products, to the benefit of pretty much everyone. The only question now is how many gear manufacturers will go that extra mile, too. ⚙️

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Ester-based lubricants may be a little more expensive, but most often, they’ll save you money in the long run by enhancing tool life.