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LUBES'N'GREASES

HELPING YOU NAVIGATE THE LUBRICANTS INDUSTRY

2020
VOL. 26 ISSUE 8

AUGUST

BASE OILS

Cybersecurity and the Supply Chain

PACKAGING

Hitting a Tricky Target

AUTOMOTIVE LUBRICANTS

OEMs Eye Up Africa

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What's New at LNG

With the summer heat has also come relief for finished lubricant, additive and base oil manufacturers here in North America. As orders picked up in June, companies were busy figuring out how to sustain the nascent recovery.

We've been charging forward here at LNG, too. The new LubesnGreases.com website is now live! The new website continues to deliver the great content you rely on in a more intuitive, accessible format categorized by topic. We hope you enjoy the new experience, and we're eager to hear your feedback. Please contact me at HBriskin@LubesnGreases.com.

As I wrote in July, *Lubes'n'Greases* magazine is moving to a paid subscription model starting next month. Don't forget to **subscribe today** to ensure you receive the September 2020 issue! To launch the new subscriptions, we are offering a 25% discount on the price of a one-year subscription. Visit www.LubesnGreases.com and look for the "Subscribe" button.

This month will also see the launch of a new online platform for Lubes'n'Greases Perspective on Electric Vehicles. It offers subscribers a deep-dive into the intersection between the lubricants industry and the full range of electrified vehicles. Subscribers will receive regular alerts about changes to legislation and incentives, fresh sales figures, OEMs' electrification strategies, lubricant technology developments and sector growth forecasts and how these will affect the industry —all at a new subscription price. Find out more at www.LubesnGreases.com/electric-vehicles.

Last but not least, the Lubes'n'Greases Factbook, our annual data-packed resource about the industry, will also be appearing in a new, all-digital format this year. Keep an eye out for it in September.

This industry is resilient, and we'll keep finding creative ways to adapt and succeed. Let us continue to be your trusted resource for the knowledge you need to keep moving forward.

Howard Briskin

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Aiming at a Tricky Target

The best packages hit the bull's eye in the center of sustainability, product differentiation, performance claims and other priorities—all in a format that end users can easily understand.

FEATURES

LUBES'N'GREASES

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DEPARTMENTS

BASE STOCKS | WORLD

Weathering a Silent Storm

Many of the developments that affect base oils and lubricants are best described in terms of natural phenomena. When Chevron's Pascagoula base oils plant came online in 2014, participants talked about a "tsunami" of product hitting the market. This July, during a webinar hosted by the Independent Lubricant Manufacturers Association, Colleen Murphy of Motiva said that the company's leadership team referred to the COVID-19 pandemic as a "global hurricane."

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Just when you think the situation may be under control, something happens to upend everything again. In early June, the base oils market showed the first signs of recovery, having been pelted by a hail storm of pandemic-related effects since March. A sharp drop in fuel and lubricant demand on the back of stay-at-home orders, reduced manufacturing operations and supply chain disruptions, and deeply damaged consumer confidence were some of the challenges the industry faced.

As lockdowns and other pandemic-related measures eased and demand began to pick up, base oil suppliers introduced price increases on tight supplies and rising feedstock costs.

Paraffinic producers implemented 15 to 16 cents-per-gallon posted price increases between June 15 and July 1, with Motiva, Chevron and ExxonMobil leading the pack. For naphthenics, Cross Oil increased its pale oils by 20 and 25 cents on July 16, and other producers considered similar moves.

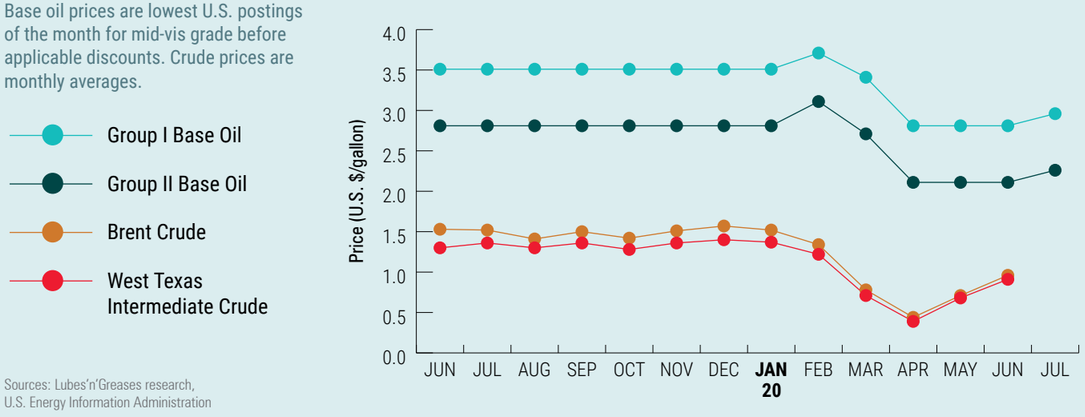
In other parts of the world, prices also stabilized or edged up in June, with Asian producers, for instance, lifting some offers by as much as $40 per metric ton.

Then came another wave of infections in the United States—more insidious and worrisome than the first—testing participants' confidence in the market recovery.

With no roadmap to follow and no precedents to emulate, the industry must find its own way to deal with the consequences of a silent but devastating storm that is affecting all aspects of life. One element that seems to be crucial is flexibility, and the industry has fortunately shown through previous disasters that it can muster plenty of it.

Base Oil Report | August 2020

Base oil prices are lowest U.S. postings of the month for mid-vis grade before applicable discounts. Crude prices are monthly averages.



Sources: Lubes'n'Greases research, U.S. Energy Information Administration

The Survival of Group I

Group I base oil has been around a long time, and its demise has been predicted for years. But recent tightness in the market shows this old category still has some life left in it.

It seems that the industry has come a long way, with Group II being deemed the "workhorse" base oil and revolutionizing the lubricant scene. The assumption has been that progress means the replacement of outdated Group I production, starting with older facilities that would require substantial reinvestment to maintain. These units are uneconomical, with lower demand and dwindling uses for their output.

This scene is set against a backdrop of investment in new Group II and Group III facilities with their own dedicated feedstock streams and technology. These processes have allowed maximized return on capital investment and the development of a new generation of finished lubricants.

Some refineries converted Group I production into Group II, but many refinery projects were too expensive. So started the decline of Group I base oils, which seemed a natural progression. However, sectors such as marine and process oils voiced concerns that viscosity and solvency requirements made them dependent on Group I products. A switch also involved higher investment costs along with the higher prices levied on Group II and Group III base oils.

In some markets where there was ample Group I supply, such as in Europe, Group III base oils were initially employed as a diluent, promoting the continuation of Group I production, much of which was owned and operated by state oil companies. Commercially run refineries were first to cut Group I production, only maintaining output to cover sectors that could not use Group II.

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With this in mind, the question remains: Will Group I base oils survive?

In the years running up to 2020, there was reason to continue Group I production. One of those was the marine sector's need for high-alkalinity lubricants to counter high-sulfur fuels.

The International Maritime Organization's newest marine pollution restrictions, implemented in January, require international sea-going vessels to use fuel with max sulfur content of 0.5%. This legislation reduced demand for marine cylinder oils with high total base number, as only ships outfitted with scrubbers will now need them. A new generation of lower TBN marine lubricants has evolved, meaning that Group II base oils can be used in marine formulations—a blow to the Group I camp.

In the United States and Europe especially, rising performance demands for passenger car and heavy-duty motor oils have steadily shrunk formulary windows for those products, increasing reliance on Group II, Group III and even Group IV polyalphaolefin base stocks—continuing to crowd out Group I.

The automotive sector has a massive influence on lubricants and the base oils used in blending them. This has pressured lube producers in developed regions to abandon Group I base oils. The emergence of electric vehicles will force revision of lubricant requirements again, with Group II and Group III being used in gear oils and other transmission lubrication systems. Will this be another nail in the coffin for Group I?

In defense of Group I, one of the products resulting from its production is paraffin wax, which is a growing market with positive demand. Waxes are high margin products for refiners, and with continuing demand from a number of sources, there is pressure for producers to maintain supply.

Other sectors that favor the retention of Group I are greases, process oils, compressor oils and certain gear oils, all of which favor higher sulfur content.

The use of Group I has also varied regionally with traditional "export" markets like those in Africa, the Middle East, India and farther east, where economic factors and logistical constraints play a part in preventing a move to higher-performance lubricants. Older vehicles on the roads and existing machinery in factories dictate that an older generation of lubricants can still be employed in these locations.

> Early in the pandemic in East Asia, Middle East and Europe, some blenders had difficulty accessing suitable Group I material for military and health services.

Globally, we are in the grip of possibly the worst health and wealth disaster to hit this planet. Nations are reacting to the pandemic with lockdowns, curtailment of industry and the movement of people. The situation has created a tranche of unknowns, which has blown forecasts for return on investment in capital projects and delayed or cancelled investment in many industries.

With this uncertain future, producers of all types of base oils have trimmed production levels to accommodate reduced demand, and it will take time to return to pre-pandemic levels. Group I producers have probably cut back output the most. Even before the pandemic, demand for Group I base oils had decreased, prices were under pressure and numbers in some regions fell below breakeven.

This has changed in recent weeks, with reports of shortages of Group I grades including solvent neutral 500. Early in the pandemic in East Asia, Middle East and Europe, some blenders had difficulty accessing suitable Group I material for military and health services. This situation is continually evolving, with buyers struggling to obtain supplies and prices rising. Nonetheless, it is increasing incentive for refiners to turn on the taps again.

Looks like Group I may be here to stay. ♦

BUSINESS | WORLD

Don't Waste a Crisis, Revisited

A *Lubes'n'Greases* reader recently wrote to me that he appreciated my January 2018 column entitled "Don't Waste That Crisis" and that it was highly pertinent in today's turbulent environment. I have excerpted a few key points from that article and expanded upon them in light of current events.

The key point of the column was that a business can reap some value from a crisis—even one as painful as this pandemic—in the following ways:

- A crisis can act as an organizational rallying cry and bring laser-like unity of purpose.
- A crisis can allow or even facilitate the examination of new ideas and the tearing down of outdated or unhelpful paradigms.
- A crisis can lead to radical re-prioritization of resources.

What organizational rallying cry might you choose from the pandemic? No doubt this may be very specific to your company, but one that may be common to all is to be better prepared for a future pandemic or other business disruption. I suggest you reflect on your company's performance in the following areas:

- How well did you do with regard to communications to employees during the crisis? Were communications consistent and regular as the situation developed? Did people heed the communications?
- You likely had (and may still have) a portion of your employees working from home during the pandemic. Did these employees have the necessary equipment to perform their jobs? Did you properly address cybersecurity issues?
- Were you able to set up and conduct productive and secure online meetings?
- Were you able to keep track of employees to the extent necessary?
- Were your human resources, medical and IT resources given the tools necessary to support the multitude of issues being thrown at them during the pandemic?
- How well did your company do in its communications with customers and suppliers, the community, your board of directors, shareholders and owners?

In some of these areas, you may want to do a survey to collect feedback on your company's performance and specific areas for improvement.

You may wish to implement improved business continuity plans for a wider range of potential situations rather than simply put in place a plan for the inevitable next pandemic. For example, you may wish to consider specific business disruption scenarios such as plant shutdowns, work-from-home situations, supplier and customer disruptions, etc. Then, address the implications and potential actions with a broad, cross-functional team.

This more general approach to scenario planning may be more useful than planning for a specific disruption such as a hurricane or a pandemic. Building flexibility into your business—for example, more plant turndown capability as well as plant surge capacity—could be valuable in these turbulent times. My expectation is that even if this particular pandemic eventually ends due to a successful vaccine, the shake-out of 2020 events may take several years to be completely assessed.

What breakout ideas have emerged for your company during the pandemic? One area that seems to have emerged for many companies is the degree to which they rely on physical stores in order to do business. We have seen restaurants adapt to online ordering and customer pickup or delivery; supermarkets have adapted to social distancing and various online ordering and delivery models; and retail has shifted at a rapid pace to Amazon, Etsy and other online retailers with payment through PayPal and other financial technology options.

What about your company? Have you managed to shift sales online or direct-to-consumer? This is an optimum time to consider your various sales channels and evaluate how you intend to utilize them going forward. Consider how your competition performed during this time and whether the comparison supports your company's brand promise.

What opportunity do you see for a radical, or at least material, re-prioritization of resources post-pandemic? Consider as a starting point the activities and projects that you had to stop in order to focus attention on the ongoing crisis. What activities didn't you miss, or what's more, discovered how time-consuming they really were? Here are some areas you might want to think about:

- Do you have some expansion projects that you were planning? In light of potential significant shifts in commuting behavior, global travel and other aspects of consumer demand, can you delay such expansions?
- Are there opportunities to increase automation in your plants or processes in order to improve safety or reduce costs?
- Are there projects that you may need to re-evaluate economically or cancel in this low energy price and low interest rate environment? Conversely, perhaps there are projects for which the economics may improve.
- Can you incorporate working from home and reduced travel and entertainment spending into your longer-term budgeting and planning? Can you consolidate staff into smaller office space?

A final area for your management team to consider during and after this crisis is that of morale. People have been through a great deal of stress coping with the pandemic on both a personal and a business level. Loyalty to colleagues and good will can be built upon a foundation of kindness and appreciation during difficult times.

Consider how your company can show thanks to your employees for keeping your business running and your customers satisfied during this time of stress. If you have had to furlough or lay off employees, consider whether your communications and financial arrangements were sufficiently well-handled.

It is especially hard to support company culture and feelings of collegiality when meetings cannot be held face to face and the size of gatherings is limited. You may want to consider the use of video messages or more frequent written communications or newsletters from management to bolster a sense of belonging and show appreciation. Give special consideration to how you may want to approach onboarding of new employees in this environment.

My very best wishes go to the community of *Lubes'n'Greases* readers. Let's do our best to learn and grow from this crisis! ♦

Our columnists are temporarily writing every other month. Look for the next Best Practices column in the October issue.

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AUTOMOTIVE LUBRICANTS | WORLD

Are Aftermarket Additives All They're Cracked Up to Be?

I recently got an internet advertisement for an aftermarket oil treatment. The brand is not important, but the concept and presentation speak to many of the conflicting thoughts I have about aftermarket additives, which are often referred to as "snake oil" or "mouse milk."

I'm sure many of you, if not all, have seen advertisements for various additives designed to give engine oils and transmission fluids extra performance features, or at least add to the already strong performance of the oil. I think it is of enough interest that I wanted to share some of my thoughts on the subject. The question is: Do aftermarket oil additives actually add to vehicle performance, or is it just hype?

What do aftermarket additives do? First and foremost, they modify viscosity properties. We all know that viscosity is the fundamental oil property of resistance to flow. Lower viscosity means faster flow, which can be a valuable property. However, for older, high-mileage engines, lower viscosity often translates into more oil consumption, often to the point of an oil slick on the garage floor. It used to be that owners of older vehicles went to higher viscosity engine oils to reduce the losses. I can tell you that modern engines like the 3.5-liter V-6 in my Nissan Quest have solved many consumption questions. Using the recommended SAE 5W-30, it is still not consuming excess engine oil, even after 158,000 miles.

Another important property is wear protection. All modern engine oils have antiwear additives included in the formulation. Some of the older engine designs are based on a so-called flat tappet valve train design. These engines have a larger need for antiwear additives in the oil. That's usually measured by the zinc content of the oil. While zinc doesn't actually impact wear protection, the chemical molecule of which it is a part also contains sulfur and phosphorus—the go-to twins for wear protection. They act to form a thin, molecular layer on metal surfaces that wears off without significant damage. Modern engine oils are designed with lower zinc levels in order to improve the emissions performance of the engine per United States emissions requirements.

Oil oxidation resistance is also an important feature for engine oils. When oil oxidizes, it becomes thick and generates byproducts that can be harmful to the engine's function. The byproducts can really gum up the works, causing piston rings not to function properly and resulting in such things as smoking exhaust. Detergents and dispersants trap the products of oxidation in the oil before it can get to metal surfaces. This prolongs engine life, so the addition of deposit control agents is a big feature.

With all of the interest in fuel economy, friction modifiers are a big part of the story. These materials reduce the friction between metal surfaces. Lower friction means less energy needed to operate the engine, which means less fuel is consumed. The chemistry of friction modifiers is quite variable, including everything from liquids such as fatty acid esters all the way to dispersed solids such as graphite or fluorocarbons.

When it comes to aftermarket additives, there are a number of major and secondary petroleum additive suppliers that have developed the componentry and data to support marketers' technical performance claims. But that's only half of the story, and things get a lot more "creative" in the promotion and sales aspects. Promoting aftermarket additives is one of the biggest parts of the business. Two very common ways to do this are with testimonials from satisfied customers and actual field test programs.

> The issue with testimonials is that there is no control or baseline from which to work. In the simplest case, if someone claims fuel economy benefits, there is no way of knowing what the level was before using the additive.

Testimonials are always a compelling way to tell your story. There is nothing like a satisfied customer to make an aftermarket product stand out. The issue with testimonials is that there is no control or baseline from which to work. In the simplest case, if someone claims fuel economy benefits, there is no way of knowing what the level was before using the additive.

There's also the "anticipated results" aspect. When someone uses an additive designed to do something, the expectation of the user is that they will see a benefit. That can lead to unconscious adjustments in behavior, which could influence the outcome. For example, if someone were to add a fuel economy additive, they might not drive quite as fast or accelerate as quickly. The impact could be major.

Field tests are better, provided the test design is carefully thought out. Vehicle choice, driving cycle and other issues have an effect. If they are not controlled as much as possible, the results could be barely more reliable than a testimonial.

Another way to promote the additives is with some specialized test procedure or apparatus. While these can be very dramatic, they often do not actually relate to the claims

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> If a vehicle is under the manufacturer's warranty, I wouldn't use any aftermarket additive. If it is out of warranty and appears to need something to help it last longer, consideration can be given to using an aftermarket additive.

made. One of the enduring promotional devices is the "wear/EP" machine. I've seen it in many different designs such as lever arms that push a metal piece (often a roller from a bearing) down on a rotating bearing ring. Another version has a device that looks much like a postal scale but does essentially the same thing.

One of my earliest stories about these testers was related to the Kaiser steel mill in Fontana, California. I was working at Richfield Research (later ARCO), and Kaiser was a customer for a grease we supplied. A would-be competitor arrived at the lube engineer's office with one of the postage scale-like extreme pressure testers. He proudly showed how much load his grease could stand and challenged the lube engineer to see how Richfield's in-use product could stand.

When everything was prepared with grease in the lubrication cup, the salesman began loading his weights on the pan. He never could get our grease to fail. He actually took the lube engineer's paper weight and a piece of steel rod to add to the pan! Even then, the Richfield grease still was chugging right along. Sometimes, the best story can run afoul of a better product.

So, why buy aftermarket additives? For many, there are no specific problems, just the hope that something will be improved. For others, specific issues show up and a quick fix is desired. Here are some of the potential drivers for aftermarket additives:

- **Rust.** Rust is one of the leading causes of deterioration in older engines, especially common in small engines such as those found in lawn mowers. It's also common in seasonal engine applications.
- **Engine cleanliness.** Some engine oil additives include detergent components. Engines with sticky parts such as rings or valve train assemblies would be helped by additives that unclog and remove impurities.
- **Excessive smoke.** Stuck rings or excessive wear can result in high oil consumption, which produces smoke. By raising viscosity or including antiwear additives, oil consumption may be reduced. As an extra benefit, it also may reduce engine noise.
- **Oil leakage.** Excess oil leakage can be controlled to some degree by seal swell agents. An increase in viscosity has the same effect.
- **Fuel Economy.** Reducing internal friction in an engine improves the engine's efficiency. Friction modifiers help to do just that.

All of that sounds like something that should be available to oil change shops and garages. It could be very valuable in giving your customers the very best protection for their vehicles, but the fact is that every engine oil sold with an API license has additive systems that already do just that. A current performance level (API SP/ILSAC GF-6) engine oil is a complex mix of base stocks and chemical components carefully balanced to provide a level of protection to all passenger cars and light-duty trucks. That's because API categories are backwards compatible, meaning they'll protect older engines, including flat tappet engines that call for higher zinc content.

Believe it or not, adding an aftermarket additive to an engine oil may actually make it noncompliant with its API license designation, meaning your GF-6 engine oil could fail to pass necessary test requirements for the category. If a vehicle is under the manufacturer's warranty, I wouldn't use any aftermarket additive. If it is out of warranty and appears to need something to help it last longer, consideration can be given to using an aftermarket additive.

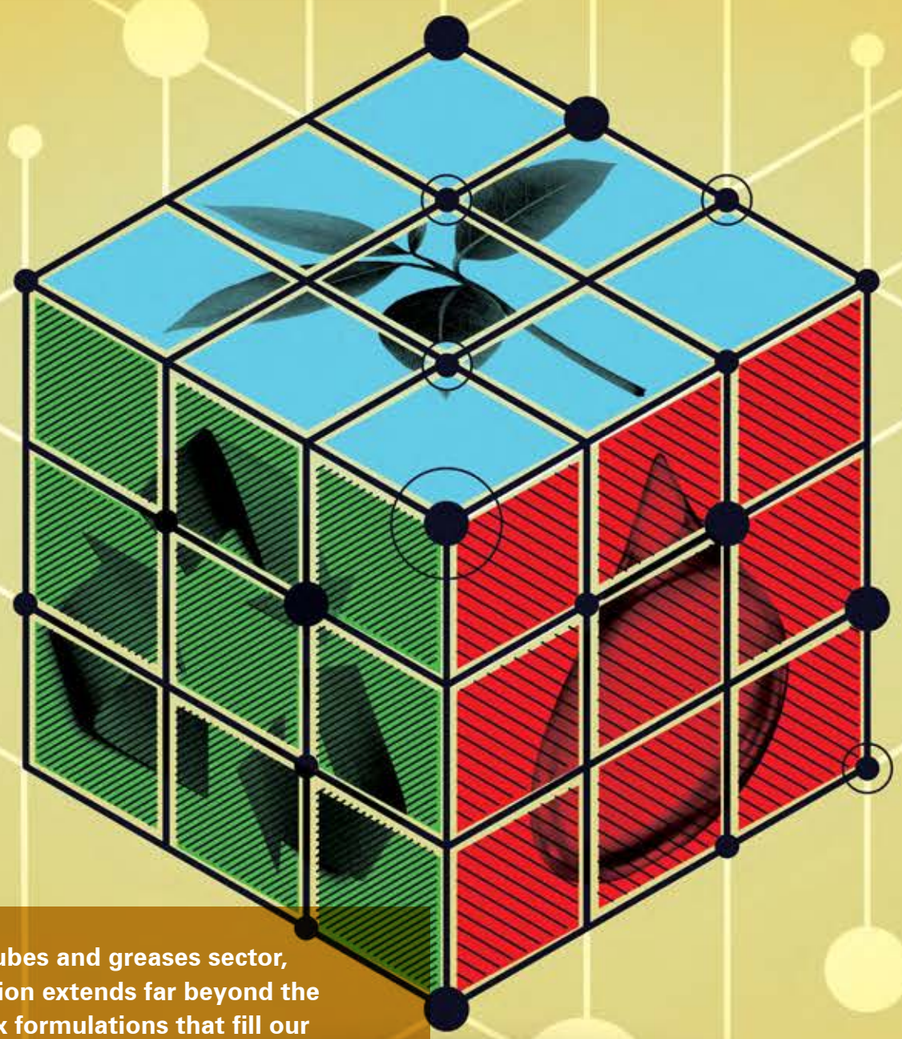
All of the owner's manuals I have seen have specific statements regarding aftermarket additives. There are several versions, but the message is that the automakers frown on their use.

As I mentioned at the beginning of this column, my Nissan Quest has about 158,000 miles on it and has never seen an aftermarket additive. The engine runs well on an SAE 5W-30, ILSAC GF-4 engine oil, which is my preference.

So the bottom line is this: Follow the owner's manual requirements while in warranty, and only consider aftermarket products after the warranty has ended. Be sure that the additive you use or recommend actually addresses your customer's specific problem. I hope your recommendations offer your customers a good ride for a long time. ♦

Our columnists are temporarily writing every other month. Look for the next Automotive column in the October issue.

Spotlight on
Packaging



For the lubes and greases sector, innovation extends far beyond the complex formulations that fill our workshops, factories and store shelves. Packaging is paramount, and rather than relying on standard drums, containers and totes, brand owners are looking for unique solutions that provide the perfect balance of performance, convenience and protection for the products within.

These may incorporate tamper-proof seals and security caps, pull-out spouts for precise pouring, fill level indicators and durable anti-counterfeit labeling with QR codes to access additional technical information and data sheets.

Above all, a successful lubricant container must be robust, ergonomic and easy to handle.

Valvoline's Easy Pour Bottle, for example, has won plenty of plaudits. It was recognized with the world's largest annual consumer award for product innovation as winner of the 2018 Product of the Year in the Car Care Category. The motor oil supplier was praised for the handle design and resealable overcap, as well as the bottle's spout and anti-glug tube.

"Consumers are at the heart of any innovation that Valvoline launches in the marketplace," said Heidi Matheys, senior vice president & chief marketing officer at Valvoline. "In our consumer segment, our packaging has a lot of important roles. Product protection, usability, as well as branding and marketing, are all components of packaging we spend time evaluating. Each brings unique challenges to the table."

"Whether through feedback at the retailer or consumer level, or legislation, sustainability is shaping the future of packaging," she added. "We continue to work at this to improve our environmental impact. Examples of this include the use of recycled materials, projects focused on light-weighting materials, and participation in industry efforts to improve packaging recycling."

Consumers and end users have become far more conscious about the importance of greener solutions and packaging that is easier to clean, reuse and recycle. Studies suggest there is even a willingness to pay a premium for more environmentally-friendly options.

> It's often said that the best things come in small packages, and with the increased uptake of flexible packaging and pouches in recent years, it appears many end users believe that to be true.

It's often said that the best things come in small packages, and with the increased uptake of flexible packaging and pouches in recent years, it appears many end users believe that to be true.

Back in 2012, Wichita-based Universal Lubricants—now a subsidiary of PetroChoice—was thought to be the first United States company to introduce a retail motor oil in a pouch. It consisted of three barrier layers of nylon, polyester and linear low-density polyethylene, and incorporated a spout designed to prevent glugs and spills.

Its Eco Ultra FlexPak stand-up pouch was heralded as a lightweight and sustainable alternative to bulkier rigid plastic containers, winning the Automotive Aftermarket Products Expo 2012 New Packaging Award for Innovation.

Strong and durable, convenient and easy to store, pouches have since been wholly embraced by the sector.

"We continue to be the fastest-growing segment of the packaging industry in the U.S. and worldwide," noted Alison Keane, president and CEO at the Flexible Packaging Association, adding that their environmental credentials are far better than traditional rigid containers.

From water usage, greenhouse gas emissions and fossil fuel consumption to the product-to-package ratio, or the material that heads to landfill, the pouch routinely comes out on top, she said.

Not only do pouches also use the least amount of material to package and protect the product, there is less waste too. Rigid containers can leave as much as 6% to 14% of the product behind, while pouches can evacuate up to 99.5% of the product.

"According to the U.S. Environmental Protection Agency Waste Hierarchy, the most preferred method for waste management is source reduction," added Keane. "A major benefit of flexible packaging is the high product-to-package ratio that it offers and what is key is that it can do so without sacrificing performance attributes, like strength and shelf life. This is due to the incredible innovation in the design of each layer of flexible packaging. You may have five to 10 layers, and each plays a key role in protecting the product through processing, shipping, retail and use in a home or business."

Another relatively new concept is the bag-in-a-box, a single-use cardboard container that houses a plastic bag filled with product. Recognized for being easy to stack, store and ship, these use far less material than the equivalent-sized rigid plastic bottles, significantly helping to reduce landfill waste.

Fuchs Lubricants first introduced its Lube Cube in 2012 to tackle growing environmental concerns. The packaging system was shortlisted as a finalist in the Supply Chain Solution of the Year category for the United Kingdom Packaging Awards last year.

The Lube Cube is fully recyclable and can be included with the normal recycling waste, resulting in significant savings with its disposal. The 20-liter version uses 79% less plastic than a conventional plastic container and cuts disposal costs by as much as 96%, says Fuchs. Since launch, the company has saved more than 78 metric tons (1.7 million pounds) of plastic, equivalent to 15.6 million plastic bottles or 93.6 million plastic carrier bags.

Boxes are delivered to Fuchs in flatpack form, ready for filling. Some 15,600 of the 20-liter Lube Cubes can be transported on just two trucks, whereas six would be required to deliver the same number of plastic containers.

"These statistics demonstrate the significant reduction in the number of lorries it takes to deliver Lube Cubes in comparison to plastic containers," said Rosemary Mellor, UK automotive product manager. "Fewer lorries on the roads means less CO_2, less congestion and reduced operational costs. It's good news for everyone."

Modern packaging is no longer just a way of storing product. It is fundamental to increasing productivity and efficiency, as well as helping to reduce costs and environmental impact.

An effective design will ultimately be judged on whether it is functional and fit for purpose. Yet with portfolios becoming more diverse and lubricants more specialized, there is a growing focus on creating containers that offer much more. ♦

In this Spotlight, Fluid-Bag explains how its packaging solution keeps lubricants clean and free of contaminants, helping to extend the life of equipment.

Keeping Clean and Contaminant Free

FLUID-BAG

Contaminated lubricants can be costly for machinery operators, and even the finest of particles can wear out servos, bearings and pumps. Downtime can be expensive, impacting both productivity and your bottom line.

Packaging that ensures lubes and greases are kept clean can therefore greatly extend the life of equipment and the product itself, says John Robinson, sales manager Lubricants USA at Fluid-Bag.

"What we do with our packaging is deliver a clean product in a sustainable container," he says. "Today's packaging has to be smart; it has to solve customers' problems and issues. It isn't just about transporting product from where it's manufactured to the end user."

Fluid-Bag's FLEXI and MULTI systems have established themselves as an affordable and effective alternative to conventional drums, totes, and IBCs.

Consisting of a multi-layer foil inner-container and a durable polypropylene (PP) outer transport bag mounted on a pallet, the unique packaging solution stores product in a secure closed system that keeps it free from dirt and dust.

The flexible bag can be filled completely, leaving no air pockets, and the plastic material does not breathe, or expand and contract in different temperatures – helping to prevent moisture contamination. The use of polypropylene also means that unlike a metal container, there is no risk of rust tarnishing the lubricant.

"Ours is a completely sealed container. All our bags are assembled in a clean room so the inside of the bag is evacuated of air before it's filled. We introduce no particulates, dirt or grime. That can't be said of other packaging," says Robinson. "It's not uncommon to lose several ISO codes of cleanliness when filling a 55-gallon drum, purely because of the environment they're manufactured in."

Fluid-Bag's design also helps minimize wastage compared with rigid packaging, leaving less than 1% residue compared with about 5-10% in a traditional drum, he says. Even then, there is no need to worry about cleaning and returning it for a refill. Once emptied, the single-use inner bag can be easily recycled, removing any risk of contamination. ♦

To find out more, visit www.fluid-bag.com/lubes

CYBERSECURITY AND THE SUPPLY CHAIN

DON'T BE THE WEAKEST LINK

By Dan Strachan

In March, COVID-19 upended our daily lives. Visiting the grocery store one morning that month, I saw that there was some meat, some dairy, lots of produce and no paper products. While hoarding was partly to blame, this was also a result of a disruption to the supply chain. In this case, production and transportation could not keep up with demand using current supply chain methods.

Manufacturers recognized the problem and have largely made the necessary changes to address the shortages. It was easy to see which steps everyone in the affected supply chains needed to make.

But what if the disruption was not caused by sudden changes in demand but by something more sinister? What if that disruption could break a supply chain and leave it broken for an extended period? This could be the case with a cybersecurity attack.

An extended disruption to the supply chain would have financial consequences for all entities in that chain. Some companies might not be able to handle such a financial setback for an extended time. For this reason, cybersecurity in the lubricants supply chain is essential. Base oil producers in particular are a fundamental part of the lubricants industry supply chain, since virtually no lubricants can be made without base stocks.

There are multiple reasons why a hacker might target your plant, ranging from financial to political gain and a host of other reasons. They could be vengeful ex-employees or thrill-seekers.

Supply chains are particularly tempting to hackers because any chain will have a weak point that could be an easy target. Further, one incident can have consequences all along the chain.

Hackers typically don't go after large manufacturers, as they know those companies are more likely to have up-to-date cybersecurity protocols. Instead, they target the weakest link. This could be a small supplier with one or two locations that is dependent upon its industrial control system to keep everything working.

Hacking into a small supplier's ICS and bringing it to a halt might have significant consequences for that supplier, but it won't disrupt the supply chain very much. The hacker will have their eyes on a larger prize.

The small supplier has, through its slack cybersecurity and risk management protocols, allowed the hacker access to its own suppliers and customers. Using the stolen credentials from its original victim, the hacker now has carte blanche to access more areas of the supply chain.

For example, many networks today use what

is known as single sign-on software. SSO is an authentication scheme that allows a user to log in with a single username and password to any of several related yet independent software systems. Thus, a hacker could use one password to access multiple areas of a network.

The hacker can then work through the supply chain, using more companies whose cybersecurity protocols are outdated or non-existent, until they find their optimal mark. At this point, the hacker will launch their weapon.

Areas of opportunity for hackers include transportation of product, scheduling of supplies, product mixture ratios, process control data reports, communications and even physical areas such as flaring. A weapon of choice for many is ransomware, which forces the company to pay to get access to its data or to have the malware removed from its system. Suddenly, everything comes to a halt.

Members of the American Fuel and Petrochemical Manufacturers' Cybersecurity Committee point out one example specific to base oils.

Base oils are manufactured in customized batches that are not very large. For transportation of base oils via tanker truck, the protocol in the past was for the driver to wait for the laboratory analysis of the batch of base oils. When that analysis was completed and the certification was printed, the trucker would get on the road.

Today's protocol usually involves a "load-and-go" method, whereby the trucker leaves the facility and then receives confirmation of the blend from the facility's lab by fax or email.

If a hacker were to access the blending procedures of the facility, they could disrupt the blend ratios or provide false information on the blends. A hacker could also access lab analysis files. These files could be erased or changed to include false information on the label.

As many base oil manufacturing facilities work with "just-in-time" inventory, any of these strategies would quickly affect product shipments. With the load-and-go method of shipping, misleading blends or labels would probably not be noticed until they were delivered to the customer.

Once a manufacturer knows that its supply chain is compromised, it must figure out where that compromise originated. The supply chain must be examined like old Christmas lights that won't light up: going through the entire string to see which bulb needs replacing. This hunt takes time and money. The company probably will have to hire an outside firm to help. In the meantime, orders are backing up, materials are not coming in, and no one wants to answer those calls and emails from customers.

When the industry finds out that the supply chain crashed because your company allowed hackers access, your company's reputation will be considerably marred. You will lose customers.

There are some steps you can take to shield your company from this scenario.

First, make sure your company's cybersecurity protocols are up to date and in place. Never settle for someone in the information technology department or someone who handles the ICS saying that everything is ok. Have them prove that everything is okay.

There is no such thing as being too small to be of interest to a cybersecurity hacker. Hackers equate smaller companies with less security.

Familiarize yourself with how a hacker can gain access to your system. For example, the United States-based Independent Lubricant Manufacturers Association's June "Scam of the Month" highlighted a phishing email campaign that appears to come from the Coronavirus Research Center of Johns Hopkins University, a well-known medical center in Baltimore, Maryland. An attached Microsoft Excel file includes a piece of malware called NetSupport Manager that allows remote access to the host computer. Cybercriminals can then steal sensitive data, install more malicious software or use the machine for other criminal activities.

Demand—don't ask—that any supplier on which your company depends is current in their cybersecurity and risk management protocols. Put this in your contracts. You don't want your company exposed due to the lack of cybersecurity protocols in any of your suppliers.

Listen to your IT and ICS personnel. They are your subject matter experts. Strongly encourage them to go to training. It might be expensive, but it's a good investment in your company. Talk to them about the systems' needs, both in IT and in ICS. Question them, but try not to second-guess them. You hired them to be your experts when it comes to cybersecurity.

If they see a need to increase the cybersecurity budget, it is fine to inquire why, but don't assume that nothing will happen in the future since nothing has happened in the past. While you can afford to be frugal with your cybersecurity budget, you can't afford to be cheap. Think of the cybersecurity budget line in the same way you think about insurance.

Assume nothing. A contractor could link their laptop to your network for a legitimate purpose, but that same laptop might have malware that could affect your network. Ensure that your system has software that will allow contractors and other third-party entities to access only those areas you want them to access and only for a set period. You'd be surprised how many contractors can still access the refinery's networks remotely long after the completion of a turnaround.

Make sure all staff has training in cybersecurity. It is not a stretch to say that cybersecurity should become as important as safety at your company.

In 2020, any company in a supply chain, whether it is base oils or toilet paper, must realize the importance of cybersecurity. You can't see an attack coming, and you won't hear it, but it will disrupt your business in ways you probably could not imagine. If needed, find a contractor that can help your company be proactive about cybersecurity.

I'll close with this story: An IT manager was trying to get the CEO and others to let him have a larger budget for cybersecurity. The CEO was stonewalling, saying that cybersecurity was not a priority, and its budget was too large already. The IT manager finally got frustrated and said to the CEO, "If someone hacks into our ICS system and causes a catastrophic event, it won't be me whom Congress and the shareholders call upon to explain why this happened."

He got his budget approved. ♦

Important Cybersecurity Terms

Malware
Software designed to cause damage to a computer, server, client or computer network.

Ransomware
A type of malware that threatens to publish the victim's data or block access to it unless the victim pays a ransom.

Phishing
The fraudulent practice of sending emails purporting to be from reputable companies to induce individuals to reveal personal information, such as passwords and credit card numbers.

Penetration test
A simulated cyberattack on a computer system performed to evaluate the security of the system. Also known as pen testing.

Vulnerability testing
A software testing technique performed to evaluate the risks involved in the system to reduce the probability of a hack. Different from penetration testing.

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AFRICA DRIVES FORWARD AGAIN

By Matt Mossman

African countries account for just 1% of global new car sales, and in the past making vehicles there has been no easier than selling them. In fact, it has been a "monumental failure," said Volkswagen Group South Africa's CEO, Thomas Schafer, in an article published by the Economist.

During an October 29 interview for that article, Schafer said that VW is now trying again in as many as five African countries, and it isn't alone; executives with Ford, Toyota, Suzuki, Nissan and others are signing deals and starting assembly lines across the continent. VW's current plant in Rwanda has capacity of up to 5,000 vehicles per year, and Ford's facility in Nigeria is comparable.

The results of these expansion efforts will help to shape global lubricants trends in the coming decades.

According to a study published by consulting firm Deloitte Africa, the continent's motorization rate was 44 vehicles per 1,000 people in 2015, a clear contrast with the global average of 180. But the United Nations says it has the fastest population growth and urbanization rate of any continent, and increased political stability since the end of the Cold War has brought economic growth. For an emerging middle class, cars have become increasingly affordable.

"Demand for energy is increasing at a much faster pace in Africa than in other regions of the world," said Rakesh Vyas, a market development advisor for ExxonMobil. "Car ownership and motorization rates are skyrocketing."

There are multiple ways this surge in transportation demand can be satisfied, each solution having different implications for lubricants. Africa's current system relies on importing used vehicles. This method dictates that lubricant demand will follow the speed at which these aging options are displaced by new cars or younger imports.

Precise figures for Africa's vehicle stock and lubricants markets aren't always reliable, as data-gathering efforts vary by country. However,

44
Vehicles per 1,000 people, vs. 180 globally

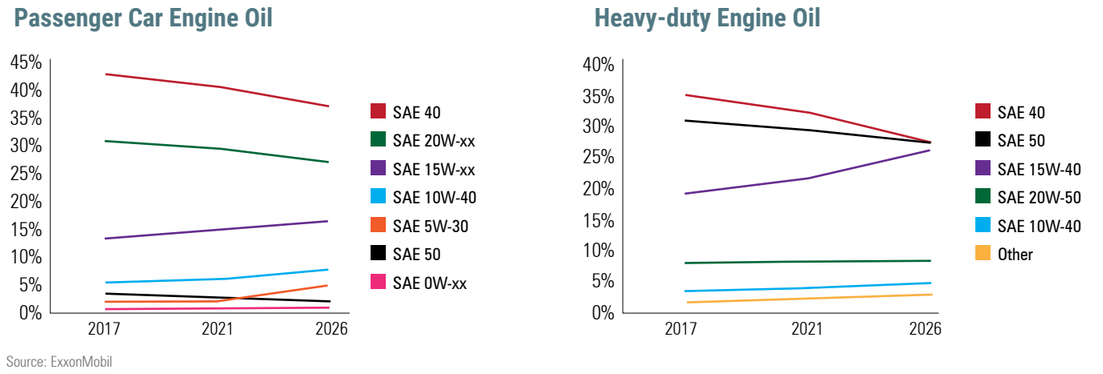
1.2%
Percentage of global vehicle production

5%
Africa's share of global lubricant demand

135 million
Projected number of vehicles in Africa by 2040

© JEAN BIZIMANA/REUTERS/Newscom

Multigrades Growing in Africa



Source: ExxonMobil

according to the U.N., the continent accounts for about 1.2% of global vehicle production and 5% of global lubricants demand. In 2018, the total vehicle count was about 45 million, and that amount could triple in the next 20 years, according to the United Nations Environment Programme.

New vehicles represent a small share of the overall market. In Nigeria—Africa's largest economy and home to roughly a fifth of its people—for every new car sold in 2017, there were 131 used car sales, according to UNEP. Vehicle demand is typically met by imports of used light-duty vehicles from the United States, Japan and Europe.

Lubricants demand in Africa is expected to rise by about 13% from 2020 to 2025, from about 1.7 million tons to 2 million, according to forecasting by ExxonMobil's Vyas. Global demand is expected to grow about 2% in that same period. Lubricant blending capacity is on the rise on the continent, but new facilities in countries including Kenya, Cote d'Ivoire, Tanzania and Uganda complement existing ones in the automotive assembly hubs, said Siva Konar, Lubrizol Corp.'s managing director for Africa.

Demand for API Group I base oils will increase by 6% in Africa, against a 16% drop worldwide said Vyas. There are six African base oil production sites: four in Egypt, and one each in Algeria and South Africa, but the continent is expected to remain a net importer of base oils for the foreseeable future, said Unathi Fani, automotive products manager at South Africa's Engen Petroleum.

According to the International Organization of Motor Vehicle Manufacturers, South Africa and Morocco accounted for 92.9% of vehicles produced on the continent in 2019. However, the manufacturing process utilized in Africa is typically one in which semi-complete or complete knockdown kits are shipped to sites, often with the engines already filled with lubricants. In South Africa, the goal is to boost local content of the finished autos from 38% in 2018 to 60% by 2035, according to consulting firm TechSci Research.

Assembly elsewhere on the continent is typically limited to small-scale operations such as VW's plants in Kenya and Rwanda, but production is ongoing, planned or under consideration in Egypt, Algeria, Nigeria, Ghana and Ethiopia.

Policy is Pivotal

Government policies on vehicle and fuel standards will also shape the future of lubricant supply, production and demand. One of the main variables these policies control is the age of used imports. Half of Africa's 54 countries have no maximum age for used imports, but the countries with the largest economies do. In South Africa, Morocco and Egypt, used imports are banned. In six of Africa's top ten economies—Algeria, Angola, Nigeria, Kenya, Tanzania and Ghana—the maximum is between three and 12 years.

During the ICIS African Base Oils & Lubricants Conference in November, Vyas noted that Ethiopia has the ninth-largest economy and no cap on used imports. The country also stands out because its motorization rate is far lower than other countries, with only two vehicles per 1,000 people. In comparison, Kenya has 28 vehicles per 1,000 people, and Nigeria has 20, according to Deloitte.

Governments across the continent are offering a combination of tax breaks, caps and tariffs on imports, and other incentives. In return, they expect job creation. Ghana, where VW, Suzuki, Toyota and Nissan have signed memoranda of understanding, offered 10-year tax breaks and to boost duties on imports to 35% from the existing range between 5% and 20%, according to Bloomberg and Nigerian news source BusinessDay.

As vehicle stocks get younger, it is more important to ensure appropriate lubricants are used. "Today you might find a car that's five to eight years old filled with lubricants meant for a vehicle that's 12 to 15 years old, hence the need for higher-performing lubricants," Lubrizol's Konar said.

This is one reason why vehicle maintenance is difficult, said Patrick Swan, principal at Aswan Consulting in Cape Town, South Africa. "People expect vehicles to last as long as they do elsewhere, but the operating life is generally less than in Europe or the U.S.A."

In the global automotive aftermarket, Africa accounted for about $3.68 billion of the $33.17 billion total in 2018, according to TechSci Research. The figure is expected to grow to $5.42 billion by 2024, or 11.36% of the total $47.73 billion market.

Counterfeit lubricants—typically just base oils without additives—are another variable, Engen's Fani said. "Governments and lubricants suppliers need to do more to ensure consumers are educated on the benefits of buying quality lubricants," she urged.

For factory-fill lubricants, it's not yet clear that more domestic automotive production in Africa would help drive the adoption of newer lube alternatives because lubricant producers tailor production to existing standards. Kenya, for example, planned to adopt Euro 4 emissions standards, but the Kenya Motor Industry Association asked for extra time to comply. The group instead proposed moving to Euro 2 by 2021 and Euro 4 by 2024, Rita Kavashe, chairperson of KMIA, told Business Daily.

In March, before the coronavirus pandemic, African governments were moving to implement the landmark African Continental Free Trade Area, which will create the largest free-trade area since the formation of the World Trade Organization. Zero-tariff trade was to have begun by July 1, but implementation was delayed in April. A new start date had not been set at the time of writing.

"What we envision is a hub-and-spoke model, with regional supply chains," said Dave Coffey, CEO of the newly-formed African Association of Automotive Manufacturers. "Some countries could be manufacturing hubs, and in others, parts suppliers would emerge."

While negotiations of tariff lines and exemptions were ongoing before the pandemic halted progress, it was expected that vehicles assembled in Africa would be considered domestic goods as long as they included at least some local content from African countries, said Komi Tsowu, an economist for the United Nations Economic Commission for Africa.

For lubricants, he said, once negotiations are complete, the deal could allow blenders to import base oils and export to the region without paying the tariffs, giving them a leg up on importers of finished products. This already happens on a smaller scale in

a regional trading bloc for 13 southern African states that are members of the Southern African Development Community. Blended lubricants with at least 40% local content are exempt from import tariffs of up to 10%, said Konar.

For now, as governments and executives work to uncover the best conditions for investment, production, jobs and growth, lubricants producers are working to cut deals and boost capacity. Storage facilities in South Africa and Morocco are expanding, said Cliff Classen, business manager for lubricants and specialities for South Africa's national oil company, PetroSA, and former CEO of Orbichem Petrochemicals, a South African base oils importer.

In Nigeria, a recent deal saw GP Global, a United Arab Emirates-based lubricants supplier, acquire Lagos-based blending, distribution and marketing operation Grand Petroleum, its third acquisition in Africa since 2014. Other recent investments include France's Total SA investing $20 million in a blending plant in Dar es Salaam, Tanzania, and China's Sinopec entering the Kenyan market via a distribution agreement with Nairobi-based marketer Bitutech Ltd.

Electric or ICE?

While policy moves may dictate immediate changes for the African automotive lubricants market, electricity supply could determine the speed at which Africa moves away from Group I-based lubricants. According to the U.S. Agency for International Development, roughly two-thirds of Africans lack access to electricity, meaning that a widespread transition to electric vehicles is less likely on the continent.

This is an important distinction for the lubricants industry because EVs, as they evolve, are expected to require fewer but more expensive lubricants. Without enough electricity and slow development of charging station networks, African demand for internal combustion engines could provide a buffer against the slow-moving global disruption to the lubricants industry that EVs present. Currently, only South Africa offers a network of charging stations to facilitate long trips in EVs, and import duties on EVs are higher than for ICEs, Fani said.

For now, hybrid cars are a better fit for Africans seeking low-emissions vehicles, but global trends could also change Africa's market. "What happens elsewhere could shape supply for Africa, and we may have to switch over," said Classen. "If the rest of the world switches to EVs, I can't see automakers going to dual assembly lines in the long term so that they can still make internal-combustion cars for Africa."

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A GLIMPSE AT THE FUTURE OF PACKAGING

Market surveys can give companies a look at successes and problem areas within their industry, allowing a glimpse into the future and enabling better decision-making. A survey conducted by industrial packaging specialist Greif helps elucidate potential growth areas and trends shaping packaging for the lubricants sector.

During the six months prior to the COVID-19 outbreak, Greif undertook a full market appraisal by surveying customers, conducting online market research, analyzing sales and consulting with influencers operating in the lubricants market. The research aimed to explore future trends for the lubricants industry and assess their impacts on the packaging sector, with a specific focus on industrial packaging. One-on-one interviews were conducted with a sample of 25 customers across the globe, including some of the world's leading lubricant manufacturers and suppliers.

At the time, data from Grand Market Research showed that lubricant demand was anticipated to grow across each of four main sub-segments: automotive, industrial, marine and aerospace. The total lubricant market was expected to see a 2.9% compound annual growth rate through to 2027. In terms of the lubricants packaging market, the automotive sector was expected to grow at a 3.1% rate over that time frame. For industrial, this figure is 3.5%, marine 3.8% and aerospace 4.6%.

However, less than six months on, industrial packaging and lubricant companies are now implementing resilience strategies and redirecting resources in response to the new and highly dynamic operating conditions they are facing. Greif's research provides an insight into the long-term trends that are likely to hold. For example, new technologies, services or production activities, augmented by stronger environmental credentials, are likely to be required to help create differentiation to weather the wider market recovery.

Sustainability Tops the List

Perhaps unsurprisingly, Greif's research points to an ever-growing focus on sustainability within the lubricants industry. The importance of sustainability was mentioned by 90 percent of Greif's interviewees and confirmed by the top industry players' key strategies. This perhaps mirrors the increasing commitment to decarbonization and circular economy business models industry wide.

While acknowledging that environmental policy varies by country and region, there is a growing coalescence around circular economy principles as evidenced by a brief published by the World Business Council for Sustainable Development in October 2018. This provides information on the increasing number of circular economy policies that are already in place within the European Union and China. Furthermore, the European Green Deal, announced in December 2019, covers all sectors of the economy and sets out proposals to help make Europe the first climate-neutral continent by 2050.

Study findings also highlight the increasing purchasing power held by consumers and the fact that sustainability credentials are now a core part of today's purchasing decisions. They show a push toward using more biodegradable and cleaner lubricants and increased awareness about the hazardous impact of industrial waste on the environment. This is creating a growing demand for more eco-friendly packaging and sustainable practices.

In April of this year, Shell became the latest global energy company to commit to a net-zero emissions goal by 2050. Other leading lubricant manufacturers, including Total, ExxonMobil, Chevron and BP, have all made similar commitments.

Aysu Katun, director of sustainability at Greif, explained the significance for packaging: "Before many companies will even consider adding you to their supply chain network, you need to have a robust sustainability program in place, including being able to demonstrate how you are proactively taking steps toward developing zero-waste-to-landfill operations and increasing circular systems.

"That said, there certainly isn't uniformity globally on this point. For example, waste programs in Europe are typically backed by the strong regulatory frameworks there. However, customers in other regions, such as North America, tend to operate with less environmental regulations compared to those in Europe," Katun observed.

Demand for smart packaging with features such as real-time tracking technology is expected to increase.

This is where sustainability ties into other priorities. "While sustainability has been a key concern for businesses and consumers throughout the world, smaller manufacturers are re-emphasizing the need for cost-effective and durable packaging options for various end-use markets," said David Richards, Chief Operating Officer for Philadelphia, Pennsylvania-based RichardsApex Inc.

"Recycling and reconditioning programs vary from state to state, not to mention throughout the many international markets. We lean on packaging suppliers to help us meet the growing demands of our customer base in various markets, which includes better outlets for recycling, reuse and disposal," he said.

Greif's research also demonstrates how customers within the lube industry are actively seeking reductions in the amount of raw material used in their packaging, such as using lower-gauge steel drums. Equally, there is a desire to see more packaging that encompasses recycled plastics and a drive to increase recycling and reconditioning.

"We are wholly committed to minimizing the environmental impact of packaging. However, there are trade-offs between different sustainability objectives," continued Katun. "For example, reconditioning provides the most emissions savings, which, depending on the product, can be up to 75% or more. Downgauging, on the other hand, (depending on the extent) can limit steel drums from being reconditioned. With plastic packaging, residual lubricant can be hard to remove, making recycling and

reconditioning difficult. Therefore we grind, wash and extrude the plastic.

"The challenge for the lubricant industry and us as industrial packaging suppliers is always to find the right balance. When implementing sustainable practices, we must ensure we are not compromising on either the quality or safety of our packaging. Strong, collaborative work between customers and suppliers on this issue is the only way to develop real sustainable value," she said.

Meeting Modern Challenges

While sustainability rates highly on the agenda for many companies in the industry, it is certainly not the only factor influencing the buying decision.

Growing competition within the highly fragmented lubricants industry means that manufacturers are increasingly seeking ways to differentiate and promote brand quality. Product differentiation to help underpin premium pricing models or to nurture brand loyalty is a key marketing tactic.

"In such a highly competitive space as the lube industry, especially when it comes to sectors such as automotive, being able to set yourself apart from the competition is vital," said Alain Sirejacob, product manager for steel at Greif. "Where brand image is important to customers, high-quality print and product decoration is critical. It allows customers to differentiate products and generate impactful packaging design to support the price point of high-value products."

Leon ten Hove, marketing manager from Kroon-Oil in the Netherlands, said, "High quality, digitally printed steel drums have been critical to our brand success. We have used digital printing to support our promotional initiatives. Importantly, it has helped boost our brand status through providing us with better brand recognition and protection."

Greif's research also highlights brand protection, anti-counterfeiting and product integrity as key issues for the global lubricants industry. There are various solutions to these challenges, including more branded packaging and anti-tamper technology and devices. Cost is an important factor, though, so finding cost-effective ways of surmounting these issues is critical for industrial packaging suppliers and customers. Examples include embossed logos on caps and the use of UV or infrared invisible marks.

Interestingly, the research points toward growing demand for specialist packaging in response to growth in specialty and premium-quality lubricants, such as white oil for food applications and special lubricants for wind turbines and aerospace.

For Greif, this has resulted in the introduction of food-approved lacquers and linings with no added bisphenol A—which some believe is harmful to human health—and cleaner steel drums. Used for highly sensitive filling goods, cleaner drums are specially cleaned using compressed air. This replaces the traditional manual cleaning process using solvents, which results in the loss of 1 liter of solvent per drum or 1.7 kilograms of carbon dioxide emissions per 55-gallon drum.

Comparatively, the use of compressed air creates little or no CO_2 impact. Therefore, it is safer for the environment, safer for workers and uses fewer resources.

Better packaging logistics and smart packaging solutions, for example real-time tracking technology, is another area where demand is set to increase. Greif's GCube Connect is an example of packaging that provides tracking information through an Internet of Things-based device. According to Sirejacob, tracking can save money by reducing operating working capital, optimizing production planning and automating procurement and sales processes.

"While smart technologies and appearances help differentiate the high-end products, the reality is the cost often outweighs the benefit for many smaller players," noted Richards. "However, opting for cheaper alternative packaging options risks compromising product integrity and handling safety. Finding a balance between economical packaging costs, durability and reusability seems to be the important feature during these challenging times."

The current COVID-19 crisis has undoubtedly created significant risks and uncertainties for both lubricant companies and industrial packaging suppliers. Many key questions about the market recovery and the medium-term market performance remain unanswered. Despite those macro-level uncertainties, Greif's pre-pandemic research signifies that any form of recovery is likely to witness greater focus on smart packaging solutions, better brand and product protection and more specialist packaging, all underpinned by sustainability throughout the lubricants value chain. ♦

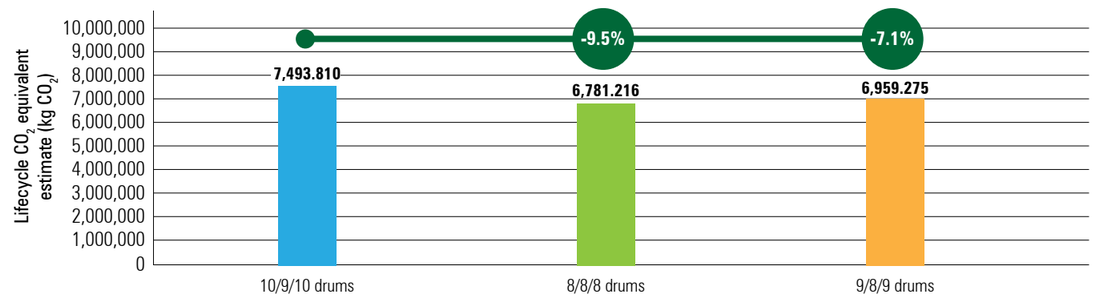
Drums are cleaned with pressurized air at one of Greif's plants in France. The process uses no cleaners, reducing its impact on the environment.

Bag-in-box is an increasingly popular form of sustainable lubricant packaging.

Digital printing can help with product differentiation and branding. An image is printed directly onto steel sheets that are made into drums. Each print can be different and there is no minimum quantity.

JENNIFER DALLY is responsible for global strategic marketing at Greif and has 30 years of marketing experience. She can be reached at **jen.dally@greif.com.**

Climate Change Impact of Lighter Steel Drums



This analysis represents the carbon footprint of 328,519 steel drums and is based on customer-specific data and assumptions. A similar analysis may produce different results for another customer scenario. 10/9/10, 8/8/8 and 9/8/9 refer to steel thickness for the lid, body and bottom of the drum.

Source: Greif

PACKAGING'S TRICKY TARGET

By Andrew Goddard

When it comes to creating effective packaging, lubricant marketers may feel like they are aiming at a moving target. How can a package hit the bull's eye in the center of sustainability, product differentiation, performance claims and many other priorities—all in a format that consumers and other end users can easily understand?

Being aware of potential stumbling blocks can help marketers design packaging and labels that land dead center.

Gone are the days when an SAE 10W-40 would cover all engine oil applications. Modern engines require an increasingly complex balance of chemistry to keep them in optimum condition, which has led to a wider range of lubricants being required to service different equipment. This means a higher product count to manage, increased stockholding and higher costs for both marketers and end users.

To help lower product counts and stocks, marketers want to make products that can claim as many specifications as technically feasible.

This presents a chemical headache for formulators, blenders and marketers that need to balance the needs of the consumer with meeting their legal obligation to make valid specification claims.

Packaging must appeal to its end user, from workshop mechanics to motorists. Marketers will want to demonstrate their product is the best choice—superior to alternatives, including those that may be cheaper. But ultimately, what the consumer wants to know is whether it's the right oil for their vehicle.

The product's brand, label and packaging are often the main points of interaction between the company and the customer. The packaging is the company's shop window, reinforcing its brand values and communicating the benefits of using the product. It assures the end user that a lubricant is suitable for its stated application by reference to market standards and original equipment manufacturer specifications.

These days, most marketers prefer to keep the front of the package fairly clear, focusing on the viscosity of the product, such as SAE 5W-30, its base

Oil Info at Your Fingertips

In an increasingly digital age, online lubricant databases can play an important role in helping consumers make their purchasing decisions. These databases are powered by the technical knowledge and expertise of large companies such as Netherlands-based Olyslager or Oats in the United Kingdom.

These companies spend many thousands of hours each year ploughing through numerous owner's manuals and service documents to identify the right products for a vehicle just by entering the registration. Depending on the database, these recommendations sometimes offer a choice of brands so that workshops or consumers can make their own selection, depending on local availability or their personal preference.

oil, such as semi- or fully synthetic, its ACEA rating in Europe or API or ILSAC rating in North America, and any specific OEM recommendations.

Realistically, the first thing users will do is turn to the back of the pack to try and decipher the myriad letters and numbers in order to find the desired manufacturer specification as listed in the vehicle handbook, such as a VW 504 00/507 00.

Yet vehicle handbooks don't always give clear or helpful recommendations. They may recommend one particular brand, but what if an end user's local retailer or distributor does not stock those specific products, or they want to use another brand? It can be difficult to decode the ACEA or API references and OEM specifications required, and even harder to find those on a crowded packaging label.

But while the marketer tries to deliver packaging that appeals to the consumer, aids their decision-making process and includes all the required legal information, the product must not fail to meet the claims that appear on the label. This has proven to be a stumbling block for some.

Missing the Mark

In the U.K., independent trade body Verification of Lubricant Specifications has investigated several cases in which claims made on packages were not substantiated or accurate.

While the number of cases per year has varied, VLS has investigated 65 cases since 2014, including five new cases last year. In the rigorous and anonymous investigation process, products are procured and tested at an independent testing house. The results are analyzed anonymously by VLS's Technical Review Panel, made up of experts from across the industry.

Investigations showed that in some cases the product couldn't meet its own performance claims or stated technical specification. Marketers had to remove claims, withdraw stock and update packaging to reflect the correct information.

For example, Case 160 involved a complaint against a fully synthetic SAE 5W-30 engine oil making conflicting claims on the product that were not technically feasible. The claims concerned industry standards such as the ACEA engine oil sequences as well as various OEM specifications. VLS worked with the company to resolve the conflicting claims, remove reference to obsolete claims and present the product's technical information in a compliant manner.

In a more serious instance, VLS escalated Case 154 against Kerax Hyperdrive (now Hyperdrive Lubricants Ltd) to Trading Standards, the U.K.'s authority departments that enforce consumer protection legislation. The complaint, received in 2019, involved the company's fully synthetic SAE 5W-30 C3 passenger car motor oil and alleged that the product failed its own technical specification for high-temperature high-shear viscosity and Noack volatility properties.

Independent testing confirmed that the product failed to meet both the HTHS and Noack test limits for the manufacturer's specification for Mercedes-Benz 229.51, which was claimed in the product's description.

Following discussions with VLS, the company reformulated the product, which was again tested and found to meet the specifications. But in April, testing for a six-month case review showed that the product met the minimum standards for Noack volatility but again failed to meet the minimum specification for HTHS viscosity. Given the potential adverse effect on fuel economy and engine durability, VLS escalated the case.

Hazardous Complexities

While the situation is most complex in the highly competitive automotive engine oil segment, confusion exists even as far afield as metalworking fluids, causing potential reporting violations and throwing up other obstacles.

For example, stock of metalworking fluids must be correctly labelled. But when the fluid is in use, containers such as fluid sumps are not required to be labeled under the European Union's Classification of Labelling and Packaging regulation.

CLP is based on the United Nations' Globally Harmonized System of Classification and Labelling of Chemicals. As a trans-national regulation, GHS aims to standardize the way products are packaged and classified in trade, including a requirement for hazard labelling if a product is known to be injurious to health.

In Europe, CLP does not stop there. It also includes a requirement for labels to be in a local language where the product is placed into the market. If a product is marketed across more than one country, then the use of multiple language labels is required. A

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folded label, which offers a practical solution to multi-country marketing and the need for multiple language labels, is not officially sanctioned. Marketers continue to grapple with limited label space on products sold into multiple country markets.

CLP requirements carry through from labelling and packaging to a product's manufacturer safety data sheet. The MSDS, which should always be made available throughout the supply chain, provides information on chemical products that help end users make a risk assessment. It describes the hazards present in chemicals and gives information on handling, storage and emergency measures in case of an accident.

Information contained in an MSDS is often used by National Poison Centers to ascertain risks relating to chemical use and inform the emergency services of the hazards these products present. In Europe, Poison Centers provide a service for health professionals and emergency services in dealing with chemical incidents.

Recently, the EU has introduced a harmonizing regulation for poison centers with the intent of developing a common approach throughout the continent for dealing with chemical hazards. This includes requirements to notify poison centers about the constituent elements that make up a product's formulation and the requirement to report if a product's blend exceeds a stated or given formulation tolerance.

The requirement to notify is a particularly difficult issue when dealing with metalworking fluids, where the formulation might change frequently in operation depending on environmental conditions such as heat or humidity, operating temperatures of the equipment used, and the presence of bacteria, and hence biocide, in the metalworking fluid.

As with many business decisions, the successful marketer is the one that manages to find the best balance between the needs of the industry, the company and the end user. This means working with everyone involved, including legal and technical departments to ensure that packaging is factually accurate and as clear as possible for end users, whilst still presenting an attractive pack. ♦

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Product News

Eurol Hits the Box

Eurol Lubricants has launched its new Bag in Box packaging for 19 of its automotive and industrial engine oils, coolants and hydraulic oils. The bag-in-box system consists of a plastic bag with a faucet packed inside an entirely recyclable cardboard box with handles. The new packaging uses 89% less plastic than traditional plastic bottles, can hold 20 liters of product and fits in the existing Eurol workshop rack. The company claims that the packaging system offers increased ease of use and sustainability in workshops. www.eurol.com

More packaging, less waste

Metalworking Fluid for Aerospace

Master Fluid Solutions' HyperSol 888NXT is a precision machining fluid based on what the formulator calls its neo-synthetic technology and designed to pass aerospace approval testing requirements. It delivers low foam, low odor and a long lifespan in the sump while meeting stringent environmental regulations. The fluid was created specifically for machining hard metals commonly used in aerospace applications such as titanium, stainless steel and nickel-based alloys. The water-soluble metalworking fluid replaces soluble oils that contain sulfur molecules that can cause corrosion, create odor and damage the metal being machined. According to the company, HyperSol 888NXT is operator-friendly and helps to improve machine life. www.masterfluidsolutions.com

MWF that aims high

Crane Boom Grease

Rocol has launched a new heavy-duty grease to support crane boom maintenance regimes. Tuflube Extreme is a highly adhesive grease formulated to protect and lubricate crane telescopic booms and open gears, even in the wettest and most corrosive conditions, says the grease maker. The product operates across a wide temperature range from minus 50 degrees Celsius up to 160 C, and its white color enables easier safety inspections. Tuflube Extreme offers mechanical and chemical protection against pitting and corrosion and a self-repairing film. It also provides a high load carrying capacity and protection against metal wear. www.rocol.com

Crane lubes get tough

A new member of the chain lube gang

Spray-on Chain Protection

Red Line Synthetic Oil has expanded its powersports product line with the addition of Chain Lube with ShockProof, an aerosol chain lubricant for motorcycles. It offers good anti-wear and corrosion protection properties for extended chain and sprocket life and forms an outer protective coating that doesn't attract dirt, sand or grit. The lube provides reduced friction for better power transfer, is easy to clean and is compatible with all O-, X- and Z-ring chains and roller chains for street, off-road and racing use, says the company. It also has minimal fling-off when used as directed. www.redlineoil.com

Fuel Economy for Renault Cars

Wolf Oil Corp. launched OfficialTech SAE 0W-20 C5 RFE, a synthetic lubricant meeting Renault's new RN17 FE fuel economy specification. The low-viscosity oil optimizes wear protection and engine cleanliness while increasing fuel economy and reducing emissions. It also offers good shear stability and low-temperature performance. The company also released OfficialTech SAE 5W-30 C3 RN, a fully synthetic lubricant formulated to promote increased fuel economy and extended service life. Its reduced ash formulation protects particulate filters and exhaust after-treatment devices, says Wolf. The ACEA C3 oil meets Renault's RN17 specification. www.wolfoil.com

ADVERTISER INDEX

Keep Stationary Engines Moving

Shell Mysella S7 N Ultra is suitable for use in 4-stroke, spark-ignition stationary gasoline engines, especially those with steel pistons. The oil offers extended oil life, excellent deposit handling and the ability to withstand stress in extreme operating conditions. It also boosts reliability, protects components, reduces operational downtime and lowers the total cost of ownership. The oil is approved by Innio for Jenbacher gas engines Type 6, versions C, E, F, J, H and K as well as Type 2 and Type 3 for fuel gas Class A. www.shell.com

Sparking reliability in stationary engines

Clean Before You Oil

Castrol Engine Shampoo is a pre-oil change treatment that maintains the cleanliness, efficiency and power of car engines. According to the company, the engine cleaning treatment removes up to 85% of sludge in gasoline engines by wrapping up dirt particles, allowing them to drain freely and prepping the engine for fresh oil. The treatment is solvent-free and does not damage vital oil seals. It can also be used in light diesel engines, motorcycles and light commercial vehicles. The company recommends it for use at every other oil change, mainly for older and high-mileage vehicles. www.castrol.com

Send your product news to
ProductNews@LubesnGreases.com

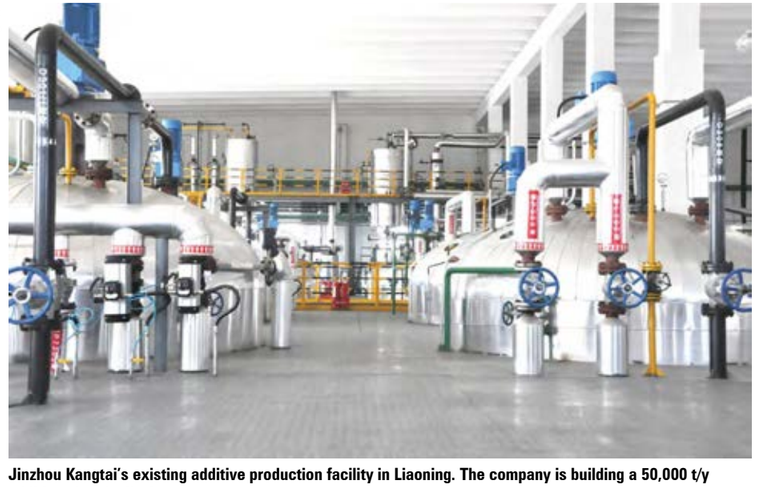
Places'n'Faces

Domestic supply for domestic demand

Chinese Producers Invest in Infrastructure

Chinese refiner Shandong Qinghe Chemical Technology Co. Ltd. is testing its newly completed 600,000 metric tons per year API Group III base oil plant in Zibo city, Shandong province. The 917 million yuan (U.S. $131.2 million) facility, built using units from multiple Chinese suppliers, uses Sinopec's dewaxing catalyst to treat Qinghe's hydrocracked residual fuel oil. The company said it aims to replace imported Group III oils in the Chinese market.

Only a fraction of the plant's output will be available to lube blenders; most of the base oil, especially 4 and 6 centistoke cuts, will be used to produce 520,000 t/y of industrial white oils.



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Jinzhou Kangtai's existing additive production facility in Liaoning. The company is building a 50,000 t/y additive plant in Jinzhou city.

Also in China, Kangtai Lubricant Additives Co. started construction in June on a 50,000 t/y additive manufacturing plant in Jinzhou city, Liaoning province. The facility, which will cost about ¥251 million, is scheduled to be completed in two years and will have capacity to produce 10,000 t/y of phenates, 20,000 t/y of salicylate and 20,000 t/y of zinc dialkyldithiophosphates.

In contrast, fuel supplier Bohui canceled plans to build an 800,000 t/y API Group II base oil plant in favor of production of treated distillate aromatic extracts, which the company says are more related to its development strategy. However, it has built a facility that produces paraffin wax, according to a company prospectus, and aims to allocate about ¥300 million to a 600,000 t/y facility for treated distillate aromatic extracts and the 200,000 t/y facility that produces paraffin wax.

Production along the pipeline

Siddharth Opens Plant in UAE

India-based Siddharth Grease & Lubes Pvt.'s subsidiary Trinity Lubes and Greases FZC opened a lubricant and grease manufacturing plant in the United Arab Emirates to supply markets from North Africa to the Commonwealth of Independent States.

The 6,305 square meter Trinity facility is located in the Hamriyah

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Free Zone in Sharjah, U.A.E., and has capacity to produce 36,000 kiloliters (32,400 metric tons) of lubricants and 12,000 tons of grease per year.

The company said 15 tanks of various capacities provide more than 2,500 kL of storage and flexibility to store multiple grades of base oils and additives.

The lube blending plant includes automatic batch-blending and drum decanting units and 14 storage tanks of 20 kL each to store finished lubricants, while the grease manufacturing portion of the site includes four 12-ton cooling kettles and four 12-ton holding kettles.

Base oils dodge import duties

EU Group II Imports Stay Below Quota

By a slender margin, base oil traders stayed within the half-year 200,000 metric ton quota on API Group II imports into the European Union.

Imports from the United States and Saudi Arabia of 150, 220 and 600 neutral viscosity grades totaled 183,032 tons during the first half of 2020, according to data provided by the European Commission.

Only certain Group II grades from countries without free-trade agreements with the EU fall afoul of the quota and face a 3.7% tax on quantities exceeding the limit. These include refiners in the U.S. such as Chevron, and Luberef in Saudi Arabia. Base oils with viscosities outside the range do not qualify for the extra duty.

According to data from base oil price reporting agency Argus Media, the total amount of all Group II grades entering the bloc—including those lighter than 150N or heavier than 600N—came to 324,625 tons in 2020's first quarter. Since the quota was rolled out, first-quarter Group II imports from the U.S. dropped to 198,880 tons and from Asia to 125,740 tons. These decreases were mitigated by ExxonMobil's 900,000 tons per year Group II unit in Rotterdam, which produced 158,000 tons in the same quarter.

Modern specs, more categories

NLGI Unveils New Grease Specs

The United States-based National Lubricating Grease Institute will launch in January a program to certify high-performance multiuse greases for industrial applications. The Grease Specifications Steering Committee revised its draft in response to feedback from a March workshop and is now arranging "road testing" for tests with only a small amount of lab data available.

The core spec includes the 60-stroke cone penetration ASTM D217 test as in the Institute's existing GC-LB specification, but adds a 100,000-stroke test to evaluate structural stability. The static corrosion prevention test, ASTM D1743, is unchanged from GC-LB.

The core spec also modifies limits of several tests in GC-LB: water washout (ASTM D1264), oil separation (ASTM D1742), four-ball wear (ASTM D2266) and extreme pressure (ASTM D2596). It adds tests for oxidation stability (ASTM D942), oil separation (ASTM D6184), roll stability (ASTM D1831), dynamic corrosion (ASTM D6138) and copper corrosion (ASTM D4048).

Road tests to be performed are a low-temperature torque test (ASTM D1478) and a new elastomer for the elastomer compatibility test (ASTM D4289). Others include the ASTM D8022 test for wet roll stability for the water resistance subcategory, the ASTM D2266 four-ball wear test for the high-load subcategory, and US Steel LT-37 test for grease mobility for the low-temperature subcategory.

NLGI's board of directors aims to approve the specs in September and publicize the certification ahead of the formal launch. Licensing procedures will be similar to those for GC-LB, but the Center for Quality Assurance will manage and audit both certification programs.

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The National Lubricating Grease Institute has scheduled a January launch for a program to certify high-performance multiuse greases for industrial applications.

Acquisition in Asia

Brenntag Acquires Thai Distributor

Chemicals company Brenntag acquired Thailand-based lubricants distributor Oils 'R Us Co. Ltd. as part of its expansion into Southeast Asia. Terms were not disclosed for the transaction, which is expected to close in the second half of this year.

The company said the acquisition will enlarge Brenntag's footprint in Southeast Asia, where it already markets, sells and distributes lubricants in Singapore, Hong Kong, the central and southern regions of Vietnam, and West Java, including Jakarta in Indonesia.

According to its website, Oils 'R Us was established as a trade marketing and distribution services provider for ExxonMobil lubricants. The Thai company offers consulting and analytical services as well as sales and distribution of lubricants, and established an industrial lubricants division in 2006.

According to Brenntag, Oils 'R Us generated sales of approximately €22 million (U.S. $24.8 million) in 2019.

All in the family

Hinduja in Court Over Ownership

The Hinduja Group, owner of several lubricant businesses, is embroiled in a dispute between the four aging brothers—Srichand, Gopichand, Prakash and Ashok—who control the parent company. The eldest has asked a London court to nullify a 2014 letter signed by each of them, stating that the assets held by each are held by all and that each brother would appoint the others as executors.

According to press reports, Srichand has asked the London court to declare the letter not legally binding and to conclude that the company's assets may be divided.

Among Hinduja's assets are Gulf Oil Lubricants India Ltd., one of the largest private lube suppliers in India, and Gulf Lubricants International, an expanding supplier operating in dozens of countries. Hinduja is also the largest shareholder in U.S.-based Quaker Houghton.

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Prakash Hinduja

Briefly Noted

Chevron Products Co. announced a base oil distribution agreement with Argentine energy company **YPF S.A.**, adding its second API Group II base oil hub in South America.

Canadian wax maker **The International Group Inc.** has acquired Picayune, Mississippi-based **Rheogistics LLC**, which supplies lubricants and mechanical stabilizers to the rigid polyvinyl chloride industry.

A Swedish court on June 15 approved an extension of **Nynas AB**'s company reorganization for another three months, until Sept. 15.

Chevron Australia Downstream Pty Ltd. completed the AU$425 million (U.S. $294 million) acquisition of **Puma Energy (Australia) Holdings Pty Ltd.**, a fuel and lubricants distributor and service station chain.

Faces in the News

Ohio-based Lubrication Specialties Inc. hired **Todd Cawley** as its first vice president of global sales. Cawley worked previously at Sinclair Oil Co., American Refining Group Inc. and Nanotech Industrial Solutions.

Todd Cawley

Vinod Paremal is the new regional president of the Indian Subcontinent for Evonik Industries AG.

Emery Oleochemicals has expanded its Bio-lubricants commercial team with the addition of **Alexis Weber** as sales manager in Düsseldorf, Germany, and **Michael Chong** as regional sales manager in Telok Panglima Garang, Malaysia.

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