

# MADENİ YAĞ DÜNYASI LUBRICANT WORLD

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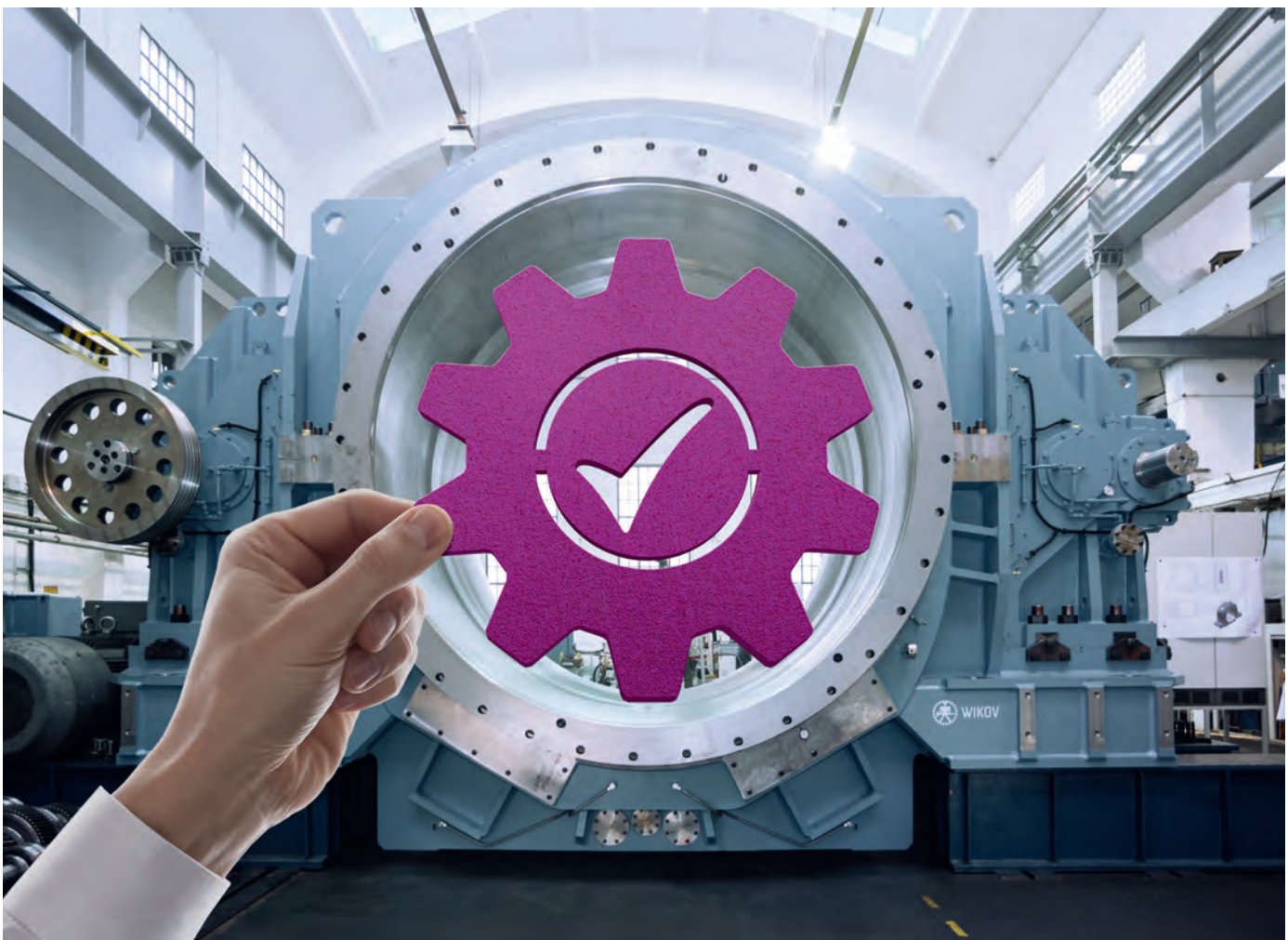
## ExxonMobil to enhance Group II base stocks supply

FUCHS China Suzhou  
High Intelligent Plant  
officially operational

Petrol Ofisi  
trains the engineers  
of the future

Calcium sulfonate  
complex greases





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## Editor's Letter



Lubricant World turns three with this issue! Our story, which started with the May-June issue of 2016, is crowned with the joy and pride of being in this sector for three years. We are grateful to everyone who believed in us and stood by our side in this journey.

Singapore is one of the most important hubs of Asia Pacific in the field of base oils, lubricants and chemicals as it has a very effective location in terms of maritime trade and raw material supplies, and has easy access to large markets while the country is a big market itself. Major companies such as Neste, Shell, Fuchs, Sinopec, Afton and BRB have manufacturing plants in Singapore. Some companies have been

operating in the country for more than 100 years. ExxonMobil made a huge investment in its Singapore plant and completed the expansion works. Singapore is currently home to ExxonMobil's largest integrated refinery and petrochemical complex in the world.

Another important development that shows Asia Pacific's increasing importance for the sector is Fuchs' decision to build a new 80,000 sqm facility in China. This state-of-the-art new plant will have over 100,000 tons of production capacity in the first phase. This investment by Fuchs in China is part of the company's strategy for the Asian market.

Although calcium sulfonate thickeners is known and used for many years, calcium sulfonate complex greases are gaining importance in the grease scene with their rust performance, high temperature properties and oxidation stability. However, they also have some disadvantages such as cost and pumpability. Tayfun Yılmaz from Akoni Kimya discusses these properties in his article about calcium sulfonate complex greases.

One of the most important and oldest events of the aviation industry, the International Paris Air Show held for the 53<sup>rd</sup> time this year at Le Bourget Airport, France. The event hosted many actors from the aviation industry, from aircraft manufacturers to supply industry representatives, maintenance and operation companies and so on. NYCO, sole European producer of aviation lubricants and expert in the development of synthetic ester-base stocks, participated in the show. In addition, military aircraft manufactured in Turkey was exhibited at Paris Air Show. Turkey's national combat aircraft, Atak and Gökbey helicopters, Hürjet and unmanned aerial system Anka were introduced.

With this issue, we will attend the ACI 2019 US Base Oils and Lubricants Summit in Orleans, Louisiana.

Enjoy reading.

**Cansu Tuncer**

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**Calcium sulfonate complex greases**





## BRB to be acquired by Petronas Chemicals Group Bhd

Petronas Chemicals Group Berhad (PCG) has entered into a Sale and Purchase Agreement in May 2019 to acquire 100 percent of Da Vinci Group BV, holding company of BRB International BV (BRB).

The acquisition is PCG's first step into specialty chemicals via inorganic growth. PCG has recently announced its next chapter of growth focusing on future strategic positioning venturing into derivatives and specialty chemicals.

"The acquisition is a strategic entry point for PCG's specialty chemicals portfolio," said PCG Managing Director and Chief Executive Officer Datuk Sazali Hamzah. "It accelerates the realization of PCG's vision to create value by diversifying its product portfolio into differentiated and specialty chemicals."

"BRB provides a compelling access into growing silicones business. The acquisition enables PCG to enhance its competitive position in attractive end-markets such as personal care, construction, paints & coatings, electronics, automotive and healthcare, particularly in the Asia Pacific region," he added.

Ralph Pinckaers, Chief Executive Officer of BRB, said, "This is an exciting opportunity in the further development of BRB to achieve its goals of becoming a global supplier in silicones. We wanted to ensure that our services and product solutions will remain available."

Upon completion of the Sales and Purchase Agreement, BRB International BV will become a wholly-owned subsidiary of PCG.

PETRONAS Chemicals Group Berhad (PCG) is the leading integrated chemicals producer in Malaysia and one of the largest in Southeast Asia. It operates a number of world class production sites, which are fully vertically integrated from feedstock to downstream end-products. With a total combined production capacity of 12.8 million tons per annum (tpa), it is involved primarily in manufacturing, marketing and selling a diversified range of chemical products, including olefins, polymers, fertilizers, methanol and other basic chemicals and derivative products.





## Chevron Oronite confirms its readiness for ILSAC GF-6

Chevron Oronite affirmed that it is ready for the May 2020 launch of GF-6 with the introduction of OLOA® 55600, which has been thoroughly tested in real-world conditions, is compatible with hybrids and incorporates the company's latest passenger car motor oil (PCMO) technology.

"PCMO specifications have seen a significant change in performance requirements over the last few years as we have moved from GF-5 through API SN Plus, and now into GF-6. Oronite remains focused on being a technical leader and supporting our customer's success in PCMO. Our latest flagship solution, OLOA 55600, is built on an innovative, robust and proven PCMO technology," said Barbara Smith, Vice President, Products and Technology, Chevron Oronite. "We are ready to deliver this exciting new product through our reliable, world-class supply chain, and will continue to work with our customers to fulfill their performance needs during and after GF-6 implementation."

OLOA 55600 delivers the increased engine protection and improved fuel economy required by the new ILSAC GF-6 standard at an efficient treat rate and will provide coverage for dexos1, API SP and ILSAC GF-6 A&B all through one additive package. In addition, it protects against low speed pre-ignition (LSPI), provides robust turbocharger protection, and is compatible with cars fitted with gasoline particulate filters. Customers will also enjoy the flexibility of wide-ranging base oil and viscosity modifier coverage in blending their finished oil packages.

"With over a million miles of testing, the OLOA 55600 platform is built on Oronite's innovative cascading product architecture that provides our customers with many options for performance differentiation and simplified logistics within their product lines," said Teri Crosby, Global Product Line Manager, Automotive Engine Oils, Chevron Oronite. "It's the latest example of our PCFlex ADDvantage, which represents the value, performance and flexibility our customers can achieve by working with our team of experts."

OLOA 55600 is formulated with their award-winning OLOA 55516 technology in mind. Oronite plans to offer additional flexibility to customers by making OLOA 55516 API SP and ILSAC GF-6 A&B capable. Oronite will also offer this technology with an embedded pour point depressant to interested customers.





## ExxonMobil to enhance Group II base stocks supply

ExxonMobil announced that it has completed an expansion at its Singapore refinery to upgrade its production of EHC™ Group II base stocks, strengthening the global supply of high-quality base stocks and enhancing the integrated facility's competitiveness. The expansion will enable customers to blend lubricants that satisfy more stringent specifications, help lower emissions and improve fuel economy and low-temperature performance. Customers will achieve short-term and long-term cost savings through blending optimization and reformulation.

"The safe, on-schedule completion and successful startup of this expansion further enhances ExxonMobil's competitiveness in manufacturing Group II base stocks," said Bryan Milton, President of ExxonMobil Fuels & Lubricants. "It further establishes ExxonMobil as a key producer of fuels and petrochemical products and affirms our confidence in Singapore, where we operate ExxonMobil's largest global integrated refining and petrochemical complex."

Supply to customers is expected in the third quarter of 2019, and builds upon recent expansions at ExxonMobil's Rotterdam facility, which along with existing production in Baytown, Texas strengthens the global supply of high-quality base stocks.

ExxonMobil's EHC™ product line has been designed to maximize the performance of all major automotive engine oil grades and to enhance the performance of finished lubricants used in multiple industries.

Construction of the expansion began in 2017 and was completed safely and on schedule with 1 million workforce hours. At peak construction, more than 300 workers were employed.

Earlier this year, ExxonMobil announced a final investment decision on a multi-billion dollar expansion of the Singapore integrated manufacturing complex as part of the company's plan to significantly increase earnings potential of the site.







# 9 Years of Leadership\*

\*Source: PETDER (Petroleum Industry Association)  
total lubricants and chemicals data for 2010-2018

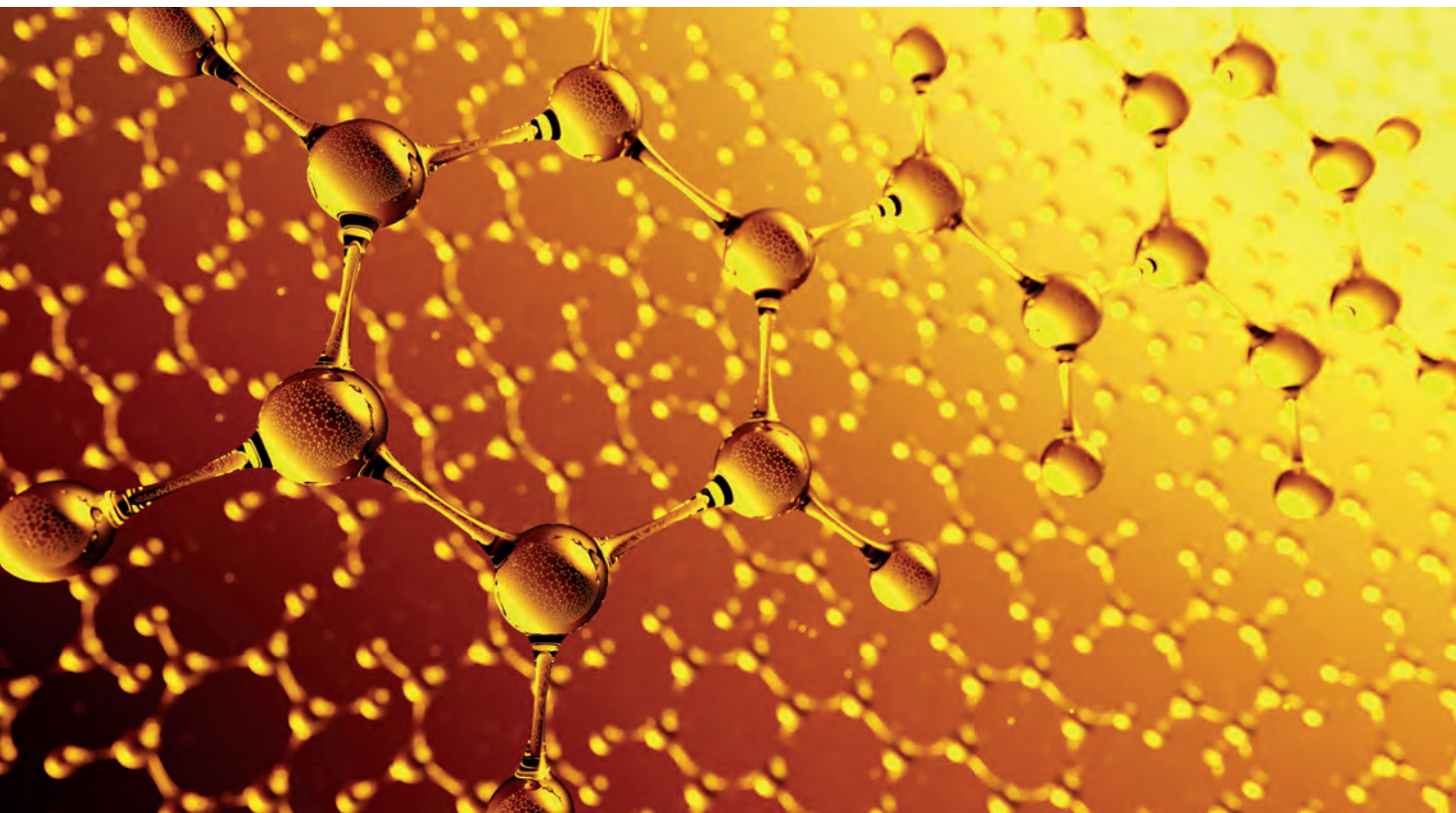
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MOTOR OILS

**MAXIMUS**  
DIESEL ENGINE OILS



**Petrol Ofisi**





## INEOS to invest \$2bn in Saudi Arabia

INEOS announced it has signed a Memorandum of Understanding with Saudi Aramco and Total, France, to build three new plants as part of the Jubail 2 complex in the Kingdom of Saudi Arabia.

A new state-of-the-art 425,000 tonne acrylonitrile plant will use INEOS' world leading technology and catalyst. It will be the first plant of its kind in the Middle East when it starts up 2025.

INEOS will also build a 400,000 tonne LinearAlphaOlefin (LAO) plant and associated world-scale PolyAlphaOlefin (PAO). These units will be the most energy efficient in the world when they begin production in 2025.

The location in Saudi Arabia will give INEOS access to competitive raw materials and energy, with well invested infrastructure, to better serve customers directly in the Middle East and markets across Asia.

Jim Ratcliffe, Chairman of INEOS, said: "This is a major milestone for INEOS that marks our first investment in the Middle East. The timing is right for us to enter this significant agreement in Saudi Arabia with Saudi Aramco and Total. We are bringing advanced downstream technology which will add value and create further jobs in the Kingdom."

The project represents a continuation of INEOS' growth strategy following the announcement of €3bn investment into a new plant at Antwerp, £1bn investment across the UK, acquisitions in China and capacity increases in the US Gulf Coast, Alabama and Chocolate Bayou facilities.

Paul Overment, CEO of INEOS Nitriles, said: "Global demand for acrylonitrile continues to grow ahead of GDP, to meet the demand for lighter, stronger, energy efficient materials such as ABS, composites and carbon fibre. This first investment in the Middle East consolidates our position as the market leader and shows a clear and ongoing commitment to meet our customers' needs wherever they are in the world."

Joe Walton, CEO of INEOS Oligomers said: "INEOS Oligomers is one of the world's leading merchant suppliers of LAO and PAO. The size and location of these new plants reinforces our commitment to keep pace with our LAO and PAO customers' expanding requirements globally."





# We Are Proud Of...

TOTAL lubricants or antifreezes  
are used for 1 out of every 2 vehicles  
manufactured in Turkey.\*



\*Based on 2014-2018 cumulative production data of Automotive Manufacturers Association (OSD).

[total.com.tr](http://total.com.tr)





## SkyUp Airlines selects Turbonycoil 600 for its fleet of Boeing 737 NG

SkyUp Airlines, one of Ukraine's leading airlines, recently selected Turbonycoil® 600, a synthetic standard turbine oil, to be used on its fleet of Boeing 737 NG.

SkyUp's current fleet consists of 8 Boeing 737 aircraft including Boeing Next Generation 737-700 aircraft powered by CFM56-7B22 engines and the Boeing Next Generation 737-800 aircraft powered by CFM56-7B26 engines. SkyUp Airlines and Boeing finalised a firm order for the purchase of two Boeing 737 MAX 8 and three Boeing 737 MAX 10 due to be delivered in 2023 with the option to purchase another five aircraft.

### Approved for use on General Electric GE90 engine family

General Electric recently approved Turbonycoil® 600 for use in General Electric GE90 engine which was specifically designed for the Boeing 777 aircraft. Its 115 000 lbs thrust version is the world's most powerful turbofan engine. This qualification enables NYCO to increase its support for mixed fleet airlines.

A service evaluation on a few GE90 engines following the manufacturer's procedures was led in collaboration with Air France. Air France's fleet includes 70 Boeing 777 and already uses Turbonycoil® 600 on all its Airbus A320 & A340 aircraft.

"The success of the turbine oil evaluation on some of our Boeing 777 engines shows that the product meets all the GE90's operation requirements. This allows us to contemplate a smooth transition on the Boeing fleet comparable to the one experienced on the Airbus fleet." Said Didier Verté, Engine Fleets and Engineering Vice President at Air France Industries.

Approved against demanding specifications, including SAE AS5780 SPC Class and MIL-PRF-23699 F STD Class, Turbonycoil® 600 is approved by all major engine manufacturers (General Electric, Pratt & Whitney, Pratt & Whitney Canada, Rolls-Royce, Snecma, Turbomeca, CFMI, Klimov, Motor Sich, Aviadvigatel). It has logged more than 30 years of experience in jet engines of military and commercial aircraft.





## API's improved engine oil standards at the door

Improved performance standards for engine oils announced by API are almost around the corner. These standards will provide greater protection and fuel efficiency for today's gasoline-engine-powered cars and trucks. It is expected that the final specifications and limits will be agreed in two or three months. Companies are now developing and testing their oils to qualify for GF-6.

Two of the new standards, ILSAC GF-6A and GF-6B, are the latest in a line of more stringent performance specifications put forward by the International Lubricant Standardization Advisory Committee (ILSAC), and a third standard, AP SP, is API's latest engine oil performance standard. API SP includes all of the ILSAC requirements while at the same time provides performance requirements for oils that do not fall under ILSAC-member recommendations. The new standards specify more stringent engine oil performance requirements for spark-ignited internal combustion engines. All three of these standards can be licensed under API's Engine Oil Licensing and Certification System beginning May 1, 2020.

"API developed these new performance standards in response to a request from automakers to introduce more robust engine oils that would be capable of meeting the needs of current and future gasoline engines. ILSAC GF-6A, GF-6B and API SP represent the fruits of the oil, additive, and automobile industries' labors to introduce such essential products for the people who use these vehicles every day," said Kevin Ferrick, director, API Product Programs.

The development of ILSAC GF-6A, GF-6B and API SP was done over the course of seven years. In that time, seven new tests were developed, evaluated, and measured for precision, and companies ran tests to demonstrate that oils can meet the more stringent requirements. Now, oil marketing companies are working to bring the oils that meet these standards to market to ensure current and future engines perform as designed.

Licensed oils that meet the ILSAC GF-6A standard will be allowed to display the API Certification Mark "Starburst" and may be used where oils meeting GF-5 or earlier gasoline engine oil standards had been recommended. Oils that meet ILSAC GF-6B will be allowed to display a new mark, the API Certification Mark "Shield," and may be used where SAE 0W-16 oils meeting API SN had been recommended. API is introducing this new "Shield" at the request of automakers to prevent confusion and ensure that 0W-16 oils are used only in applications where they are recommended.





## Record registration at Castrol Super Mechanic Contest 2019

India's largest mechanic testing and skilling initiative, Castrol Super Mechanic contest saw a record breaking participation of over 1.25 lakhs mechanics this year in the third edition of this popular annual contest. This was an increase of 15 percent over registrations last year.

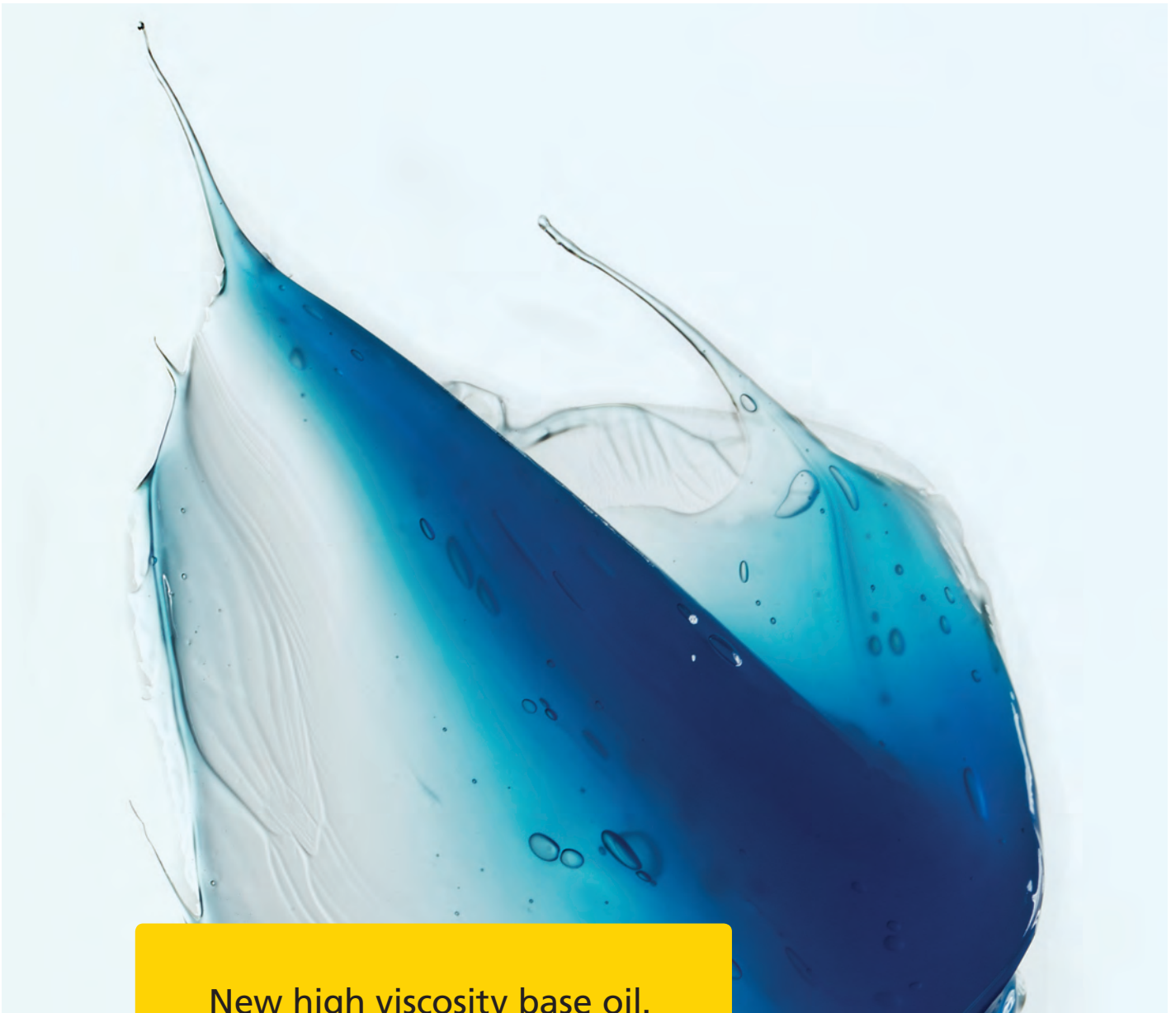
Castrol Super Mechanic Contest supports car and bike mechanics across India to test their skills by providing them with a platform with several competitive stages that exposes participants to extensive knowledge about automotive technologies and the lubricant industry. It is also considered as a unique national platform that allows mechanics to exhibit their talent earning them recognition and respect across the country.

As part of the Castrol Super Mechanic event, Masterclass sessions were conducted in 20 cities, where more than 6000 mechanics were trained and certified in association with Automotive Skill Development Council. The masterclass featured training sessions on new age vehicle diagnostics, digital tools for next gen vehicles and shift from BS IV to BS VI amongst others.

For the first time ever, audiences across the country will now witness mechanics taking part in a reality show as part of the shortlisting to the finale. The show will not only give the shortlisted mechanics a chance to be featured on television but also feature their life journey during the course of the contest.

Commenting on the overwhelming response towards the Castrol Super Mechanic platform, Omer Dormen, Managing Director, Castrol India Limited, said: "We are committed to contributing to the development of the mechanic community who play a critical role in keeping India moving. We take pride in creating a platform like Castrol Super Mechanic Contest, which supports their learning and also recognizes the importance of this community. Therefore, we are really excited to receive increasingly positive and encouraging response from the mechanic community towards Castrol Super Mechanic contest. It is extremely satisfying to see them instill their trust in the platform."

The program will conclude with the Super Mechanic contest winners being announced at a glittering red carpet finale in New Delhi. The program is slated to go on air in July 2019 and will be televised across all Zee Networks. The finale ceremony along with the award will be exclusively aired on &TV.



## New high viscosity base oil.

**NYNAS® T 600** is the latest addition to our base oil portfolio. Clear and bright, NYNAS T 600 is a highly refined naphthenic oil with a viscosity of approximately 600 cSt at 40°C, and further extends the range of solutions which Nynas offers the grease and lubricant industry. NYNAS T 600 naphthenic base oil can also be used in combination with paraffinic oils to increase viscosity, improve low temperature performance, and enhance additive solubility as a result of its excellent solvency.

**For more information visit [www.nynas.com](http://www.nynas.com) or contact your local Nynas sales office.**



### APPLICATIONS

NYNAS T 600 is suitable for all applications where high viscosity and appearance are critical. The new base oil performs very well in lubricating greases, where it improves process economies with a reduction of Lithium soap up to 50%. The base oil is also suitable for use in several industrial lubricant formulations, such as gear oil, metal rolling and forming.



### FEATURES

In addition to its high viscosity, NYNAS T 600 offers several advantages over paraffinic oils, including excellent low-temperature properties and unrivalled solvency power.



### AVAILABILITY

Committed to providing consistent and high-quality specialty naphthenic oils worldwide, Nynas is making NYNAS T 600 available on a global scale through its outstanding supply and distribution network.







## Petroyağ continues its investments with international growth strategy

Petroyağ Lubricants, having completed 26 years in the field of industrial oils, is one of the leading manufacturers in Turkey with more than 21 percent market share. The company continues to create added value for the national economy.

Petroyağ continues to develop with new investments in the areas of R&D, export and branding despite the contraction and recession in Turkish economy, and becomes a prominent brand in the international arena with the solutions it offers for niche areas.

Petroyağ, having the first Ministry-approved R&D center in the field of industrial oils, continues to work systematically to ensure the joint progress of academic studies with industry and to create employment opportunities for the bright minds of our country by establishing university-industry cooperation, which developed countries achieve very successfully. As a result of this vision, Petroyağ develops innovative and competitive products in its R&D center, carries out innovative projects and thus takes firm steps towards becoming a preferred brand in the international market.

Especially in the last 4 years, Petroyağ attaches more importance to exports and makes its operational investments in this direction. The company currently exports to 37 countries and offers products that meet the needs of many sectors,



such as aluminum, iron-steel, textiles, cosmetics, aviation, plastic, heavy industry and food. Growing its service network and geography in a controlled manner, Petroyağ aims to increase its ratio of exports in production to over 30 percent.

## Petroyağ invests in Georgia

In line with its growth strategy abroad, Petroyağ invests in Georgia and aims to turn this country into an important center in its distribution network.

“With our investment in Poti, Georgia, we aim to make efficient use of the railway and logistics facilities in the region. This will be a gateway to Russia, Kazakhstan, Uzbekistan and Turkmenistan. There is substantial demand in this region especially in the last 3 years. We understand that industrial investments in these countries have gained great momentum. Our goal is to increase our market share in these countries by responding quickly to the demands coming from the region,” says Ünal Soysal, Chairman of the Board, Petroyağ.

Soysal notes that they will continue to make investments and says, “We aim to establish a production base in Eastern Europe as our second investment by following the same model we applied in Poti, and to

increase our market share in these countries. We would like to commission a center in this region by 2020.”

“In addition to these investments and investment plans, we also focused on overseas fairs related to our field. We have actively participated in fairs for the last three years. Thanks to these events, we attracted substantial demand and established new collaborations. We use these demands to understand which sectors are more active and powerful in which countries and focus more on these areas.”

Petroyağ broke its own export sales record in 2018, and continues to grow unaffected by the contraction in the domestic market as a result of its investments for exports. It plans to increase its export volume by investing in branding and R&D.

Being aware of the fact that product quality as well as brand awareness and institutionalization are the essential factors of being a global player, Petroyağ takes important steps in this field as well. The company uninterruptedly continues its brand investments with the aim of becoming a recognized brand not only in Turkey but also all around the world.

Petroyağ is included in the ISO second 500 list in the last decade and goes higher in the ranking every year. It keeps on working to become a recognized and preferred industrial brand, create more jobs and contribute to the development of Turkish economy.







## Paris Air Show ended with new agreements and impressive shows

The International Paris Air Show is organized for the 53rd time this year. It is one of the most important events for the aviation industry, and it is the largest and longest-running aerospace trade show in the world.

NYCO, French high-performance lubricants and synthetic ester bases manufacturer, participated in Paris Air Show. With their broad range of products for the aviation and defense industry, the NYCO team received many visitors and special delegations from various countries at their booth throughout the show. ADCO, NYCO's distributor in Turkey, was also present at the show to meet the team and other delegations as well as to take the pulse of the aviation industry.

Halil Öztürk, Technical Sales Specialist at ADCO, says, "Paris Air Show is one of the world's largest fairs in this field in terms of demonstrating the development of global aviation and aviation supply industry. The leading companies of the aviation industry in Turkey, such as TAI, TEI, Roketsan and TUSAŞ, each of which is a source of national pride for us, represented Turkey at the show. As ADCO, we once again reinforced our knowledge on the product range and solutions by having meetings with the officials from NYCO."

Aysun Demir, Foreign Trade Specialist at ADCO underlines the importance of this show for the sector: "Throughout the week, valuable information was shared on major topics for the aerospace industry, such as manufacturing, space exploration and environment at Paris Air Lab. Ideas were shared about the future of air and space mobility. With Paris Air Show, I once again saw that it is high critical to provide the right product for all types of aircraft, and NYCO's and its distributors' expertise is very valuable in this regard."

Turkey's national systems were also exhibited at the show. An original mock-up of the National Combat Aircraft (MMU), of which the main contractor is the Turkish Aerospace and which is developed to meet the needs of the Turkish Armed Forces, was introduced. Besides, Atak and Gökbey helicopters, Anka unmanned aerial system, and Hürjet were exhibited. Atak helicopter made demonstration flights every day during the show.



Accurately together.

# WE HAVE SOMETHING TO ADD

With our broad line of products, strong distribution network, state of the art R&D department and tailor-made solutions, we always have something to add to your business.

## Special solutions for your specific areas

We have experience, knowledge and the R&D Center means to work with customers in developing customised projects with applications in a wide range of sectors.







# FUCHS China Suzhou High Intelligent Plant officially operational

**Fuchs opened a state-of-the-art plant in China, Suzhou with 100,000 tons of output capacity for the first phase. The plant is expected to strengthen Fuchs' place in the Chinese market, which is a highly strategic market for the company.**

**F**UCHS PETROLUB SE, the world's largest independent manufacturer of high-quality lubricants and related products, opened one of its most modern plants in Wujiang district of Suzhou, China. The state-of-the-art facility, which began construction in 2017 with an investment of EUR 46 million, is replacing the old plant in Shanghai.

On April 25, 2019, the inauguration of FUCHS China Suzhou Plant was held in Wujiang Economic and Technological Development Zone (WETDZ), Suzhou City, Jiangsu Province. Government officials of the Development Zone, Mr. Stefan FUCHS, Chairman of the FUCHS Group, Dr. Timo Reister, member of the executive board, Mr. Klaus

Hartig, EVP of East Asia, Mr. Zhu Qingping, CEO of FUCHS China, as well as customer representatives attended the grand ceremony.

**The new 80,000 m<sup>2</sup> plant has a capacity of 100,000 tons in phase 1**

The state-of-the-art new facility in Suzhou is an important deployment of FUCHS' north and south plant strategy. Located in the national WETDZ, the 80,000 m<sup>2</sup> plant has convenient logistics facilities in the vicinity.

Output capacity amounts to 100,000 tons for phase 1, almost double the capacity of the Shanghai plant.



**Stefan Fuchs**  
 Chairman  
 FUCHS PETROLUB SE

The automated high-bay warehouse has a capacity of 12,000 pallets. It covers a wide range product portfolio for high-end lubricant products, including automotive

oils, industrial oils, metalworking fluids, corrosion preventatives, rolling oils, coating materials and products for the forging industry.

### It will serve as a new benchmark

The plant meets the highest quality and conforms to FUCHS' latest standards worldwide. Special blender and high-speed automated filling lines are added to significantly improve the production efficiency, ensuring the future development of the company.

Brand-new systems will be provided for the Industry 4.0-based Suzhou plant, including an industry-leading automated high-bay warehouse, automatic control system for production, a fully automated filling line and conveying system, and a new SAP system with all above new systems integrated, which will become the powerful engine kernel for the Wujiang plant. The smart Suzhou plant will serve as a new benchmark for FUCHS.

### An essential part of FUCHS China 5:20 strategy

As Stefan Fuchs pointed out, China is the most critical and most promising market for the FUCHS Group. The Suzhou plant is an essential part of FUCHS China 5:20 strategy, an indispensable link of FUCHS Global 2025 Strategy, and an important commitment made by FUCHS Group to the Chinese market.

FUCHS Group entered the Chinese market as early as 1988 by establishing its first lubricant plant in Yingkou City, Liaoning Province, China. With three decades of







rapid development, FUCHS China has made remarkable contributions to the Group's growth and development. As the largest plant of FUCHS China, the Suzhou plant shall elevate the status of FUCHS China within the Group, and help expand the Group's business in China. Leveraging the strengths of FUCHS Group, the excellent R&D capabilities of the plant will allow FUCHS China to meet the application needs of customers in automotive and other industries, fulfill the demand for rapid market development with high-quality products, and realize its vision of becoming the preferred high-end lubricant supplier in China.

"During the past 30 years FUCHS has written a true success story in China. China has become one of our most important markets. The new Wujiang plant is another important milestone for the future of FUCHS in China," emphasizes Stefan Fuchs, Chairman of the Executive Board of FUCHS PETROLUB SE. "It is also an essential part of our global growth initiative in which we invest in the replacement, expansion and efficiency of our worldwide infrastructure, which enables FUCHS to grow and become more agile and efficient."

### **"Customers demand better responsiveness and product management"**

Zhu Qingping, CEO of FUCHS China, comments, "Our customers are international companies and Chinese corporations which are increasingly seeking high-quality products and demanding better responsiveness and product management. With our new improved manufacturing infrastructure, we have a competitive advantage, and will better satisfy our customers in the promising Chinese lubricants market."

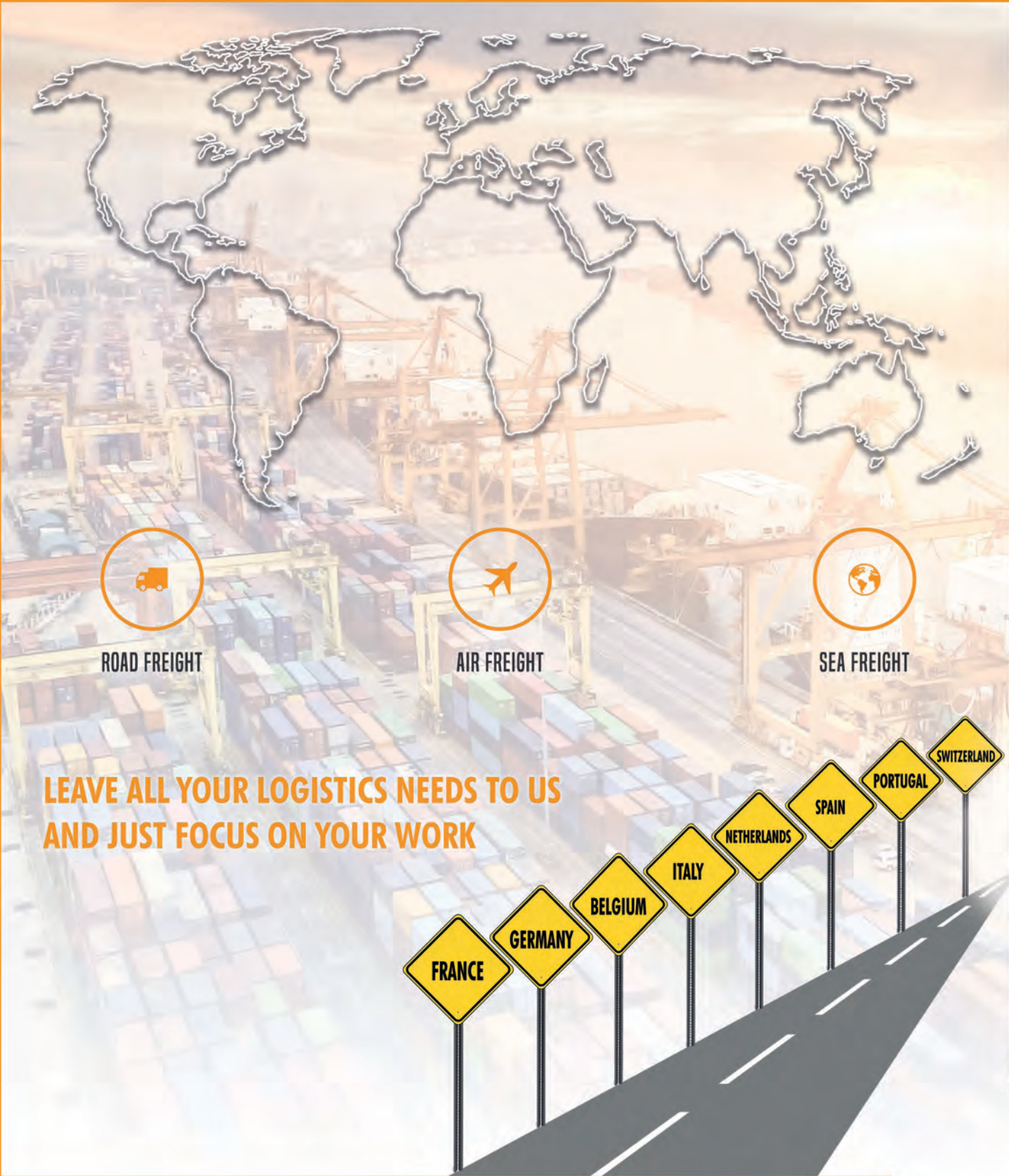
He also adds, "To increase production efficiency, the new plant is designed based on an 'intelligent plant'

concept. This means greater and more flexible production due to more automation, more effective material flows and optimized management processes in order to meet customer requirements even better than before. We will also work with an automated storage and retrieval system (ASRS). We will be one of the first lubricant manufacturers to use this extremely efficient storage technology in China."



**Zhu Qingping**  
CEO  
FUCHS China





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# Petrol Ofisi trains the engineers of the future

**Petrol Ofisi contributes to the solution to the lack of qualified personnel, which is one of the biggest problems in the business world. Collaborating with Gazi University, Petrol Ofisi held a conference for the students of the Faculty of Technology. In this conference, which was an important example of university–industry collaboration, students had the chance to receive training from the actors in the industry.**

**T**he problem of qualified personnel in the business world is being solved through university–industry collaborations. As the leader of the lubricants and chemicals industry, Petrol Ofisi held a conference for the engineers of the future in collaboration with Gazi University.

A conference on “Lubricating Technologies in the Current Automotive and Machine Industry” organized jointly by the Dean’s Office of Gazi University’s Faculty of Technology and Petrol Ofisi was held at Gazi University Faculty of Technology Taşkent Culture and Congress Centre.

The program began with the welcoming speech and presentation of the flow of the program and lecturers by Assoc. Prof. Dr. Mesut Düzgün, a professor at the Department of Automotive Engineering at the Faculty of Technology. Prof. Dr. Adnan Sözen, the Dean of the Faculty of Technology at the Gazi University, gave the opening speech.

Emphasizing the great importance of university–industry collaboration to their faculty, Sözen stated that

the faculty gives applied engineering education, which has received positive responses from the industry. Sözen said that they are receiving positive feedback on their applied education model and being supported by many organizations and enterprises. Moreover, Prof. Dr. Adnan Sözen mentioned the advantages of having individuals





graduated from an applied faculty in creating employment and remarked that such collaborations add significant value to the personal and academic development of students through conferences, training opportunities, and seminars. Sözen concluded his remarks by thanking those who contributed to this program, especially Petrol Ofisi officials, for their support and help.

## Export to 33 countries in 4 continents

After Prof. Dr. Adnan Sözen, Sezgin Gürsu, Director of Petrol Ofisi Lubricants, took the floor and said that he was thrilled to be with university students and happy to share information on the industry. Stating that Petrol Ofisi has a mission concerning lubricants, Gürsu gave information on the history of the company. Pointing out that they currently have storage facilities that can operate everywhere in Turkey, Gürsu said, "We operate with our 1,750 gas stations. We have 9 terminals, 20 air supply units that can deliver fuel to planes, and facilities that can deliver marine fuels and oil. As the leader of the lubricants and chemicals industry, Petrol Ofisi exports to 33 countries in 4 continents. Today, we are

the third largest company in Turkey with our one thousand employees."

Gürsu also mentioned the career opportunities for students at Petrol Ofisi, which has a very distinguished position in the oil and fuel industry in the world, and said that they could always support the students of the faculty in terms of employment.

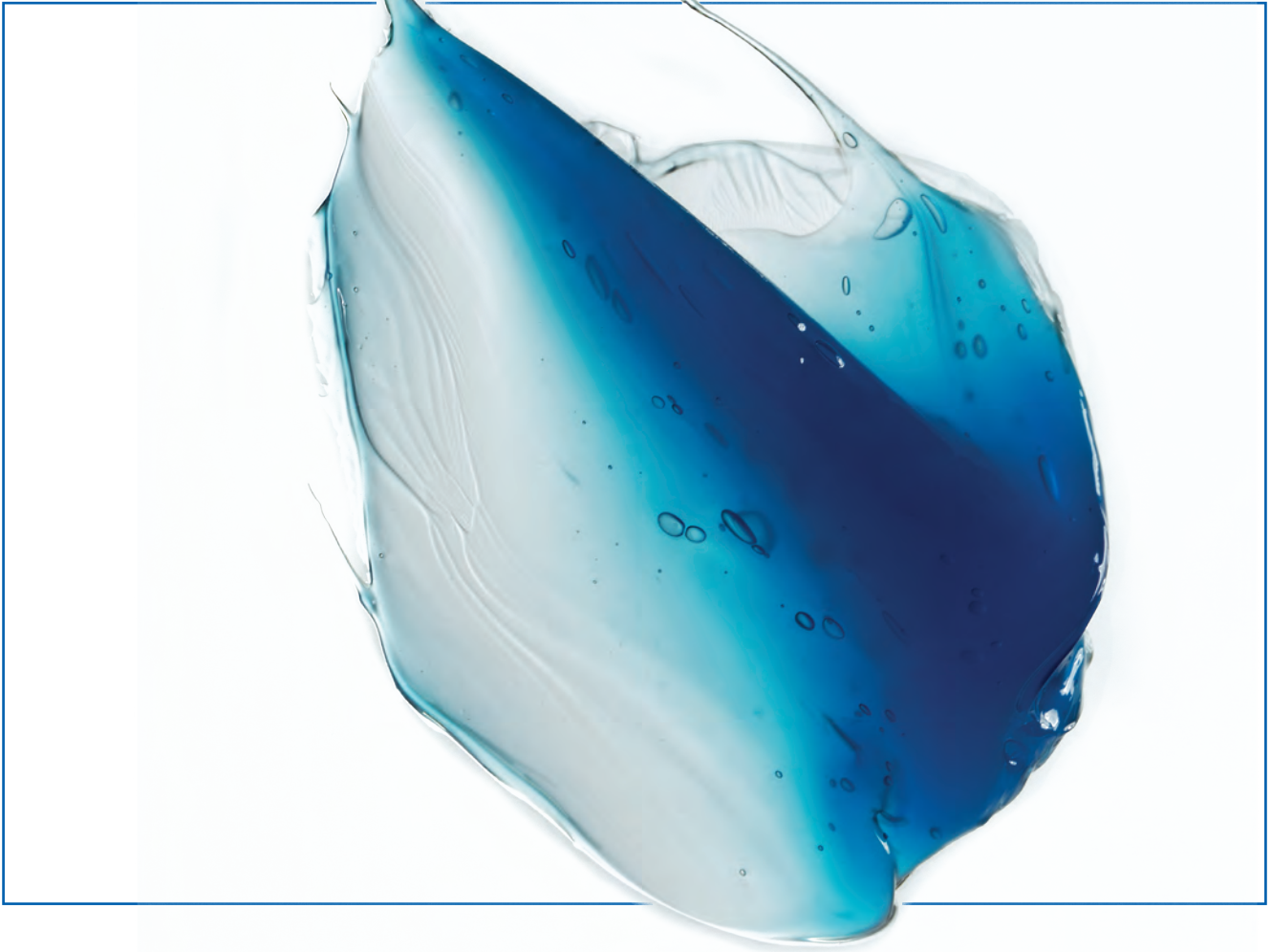


The program continued with the presentation of the Certificate of Appreciation issued by the Dean's Office of the Faculty of Technology by Prof. Dr. Adnan Sözen, Dean of the Faculty of Technology to the Sezgin Gürsu, Director of Petrol Ofisi Lubricants, for their support in the training organization.

During the remainder of the program, training on current lubricant technologies, tribology, oil production processes, engine oils and their features, industrial machine oils, gear system oils, and hydraulic oils was given. The program, which was attended by a large number of lecturers and students, ended with the short briefing of Gamze Hongur Altınok, Petrol Ofisi Human Resources Training and Development Coordinator, and souvenir photos.







## Less is more



**NYNAS® T 600 enables grease formulators to save up to 50 percent of the lithium soap content. But the benefits offered by Nynas' latest base oil don't end there.**

*Gittan Cedervall*

“T 600 combines high viscosity of around 600 mm/s at 40°C with very high solvency power and good low temperature mobility. Its performance was exemplary when we tested it in various grease formulations”, says Nynas' grease specialist Mehdi Fathi-Najafi.

The latest of Nynas' highly refined naphthenic base oils, NYNAS® T 600 is targeted at lube and grease manufacturers hampered by bright stock shortages

and skyrocketing lithium prices. And to prove that the hydrotreated naphthenic oil really can offer satisfactory solutions to these market issues, Mehdi Fathi-Najafi and his colleagues used it to prepare grease samples in the company's pilot plant.

“Our evaluation study was very successful and indicated that the thickener content, for instance lithium, can be considerably lower in grease formulated with T 600 without any compromise in performance,” he says.



Despite the low thickener content, greases based on the high viscosity-NYNAS® T 600 oil also displayed moderate oil separation as well as good shear stability and water resistance, resulting in good lubricity and storage stability.

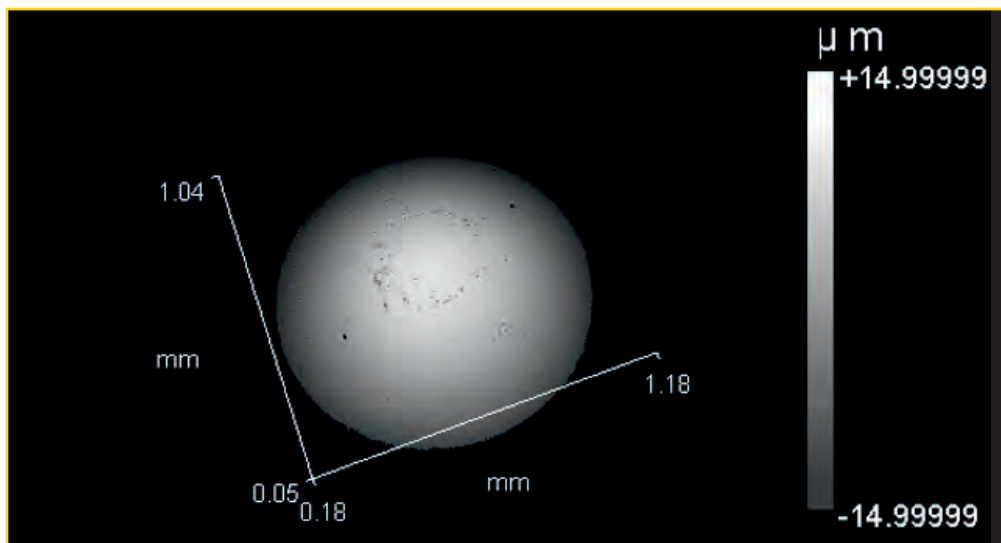
"The color of T 600 is also unusually light. This is another advantage of this new product that is particularly appreciated by some of our customers," says Mehdi Fathi-Najafi.

The study concluded that premium base oils with high viscosity and good solvency, such as NYNAS® T 600, can be used successfully in grease formulations. The results also indicate that the oil can be used to great effect in either pure form or in blends with paraffinic Group I, II or III oils, helping to alleviate the problems facing manufacturers in a market where Group I capacity is rapidly disappearing.

## Behaving perfectly

Tribological study of the performance of the base oil and the lithium and lithium complex greases were conducted using an SRV rig. This test method involves placing oil and grease samples between a disc and a ball that is allowed to slide and oscillate at a controlled frequency and amplitude. The wear on the tested balls and discs are then measured using a 3D profilometer.

A low and stable friction coefficient was measured for both the neat T 600 oil and the lithium greases formulated with it. The photo shows the result of a SRV test using a T 600 lithium complex grease, indicating very limited scarring on the ball. An excellent result, particularly bearing in mind that the tested grease sample was produced without additives.



The width of scar on Ball = 0.300 (mm)

## Mehdi Fathi-Najafi

Senior Technical Advisor and Group specialist at Technical Development and Market Support, Nynas Naphthenics, joined Nynas in 2008.





# Calcium sulfonate complex greases



Tayfun YILMAZ  
Manufacturing Plants Manager

Thanks to the various advantages they offer, many companies are currently conducting research and development activities on calcium sulfonate based greases, which are preferred in different applications today. Among these companies, Akoni Kimya supports its activities in this field with two projects within the scope of their R&D works. The company currently continues their efforts to develop these greases.

Overbased chemicals called calcium sulfonate (TBN numbers > 350 mg/KOHgr) are used in lubricants and greases as rust inhibitors and corrosion inhibitors. Especially in greases and engine oils, the usage rate of these chemicals can go up to 10 percent when some

performance criteria are considered.

Calcium sulfonate-based greases have excellent technology for grease applications with high temperature, water, high or shock loads. These greases have superior rust and abrasion protection and high load carrying capacity, and they show excellent mechanical stability



even at high dropping point and in the presence of water. Unlike other types of greases, these performance characteristics are achieved without any additional raw materials.

It is observed that calcium sulfonate complex-based greases generally act as problem solvers in heavy-duty applications. They are successfully used in marine, iron and steel plants, paper mills, off-road, construction and mining equipment and even in food processing industries.

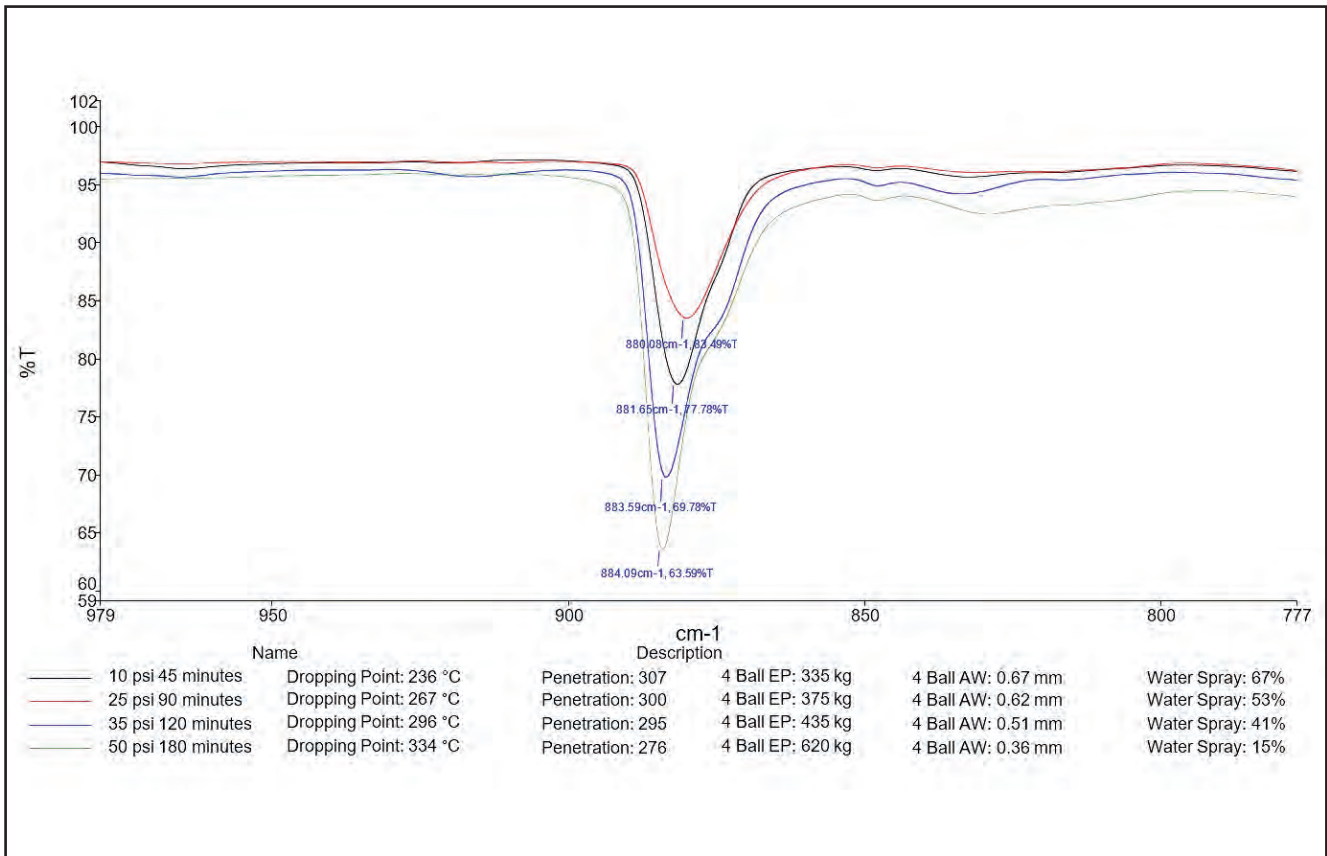
Overbased calcium sulfonates contain a large amount of amorphous calcium carbonate dispersed in the sulfonate matrix. After the gelation process in the presence of suitable chemicals such as alcohols and acids with high boiling point and in the appropriate temperature range, the amorphous calcium carbonate is converted into crystalline calcite. Since the particle size of the dispersed calcite phase is in the nano range (4-5 nm), it forms a stable gel structure that is strong enough to provide an extremely high surface area and grease-like consistency. It should be noted that the pressure should be 50 psi

on average in the appropriate reactor. At this point the grease still contains water due to the reaction and must be dehydrated to produce lubricating grease. This is often referred to as calcium sulfonate gel or calcium sulfonate grease.

In performing this process, overbased calcium sulfonates must be prepared by starting a reaction with appropriate acids in the presence of calcium oxide and carbon dioxide by stoichiometric calculations in a typically closed and pressurized (50 psi) reactor.

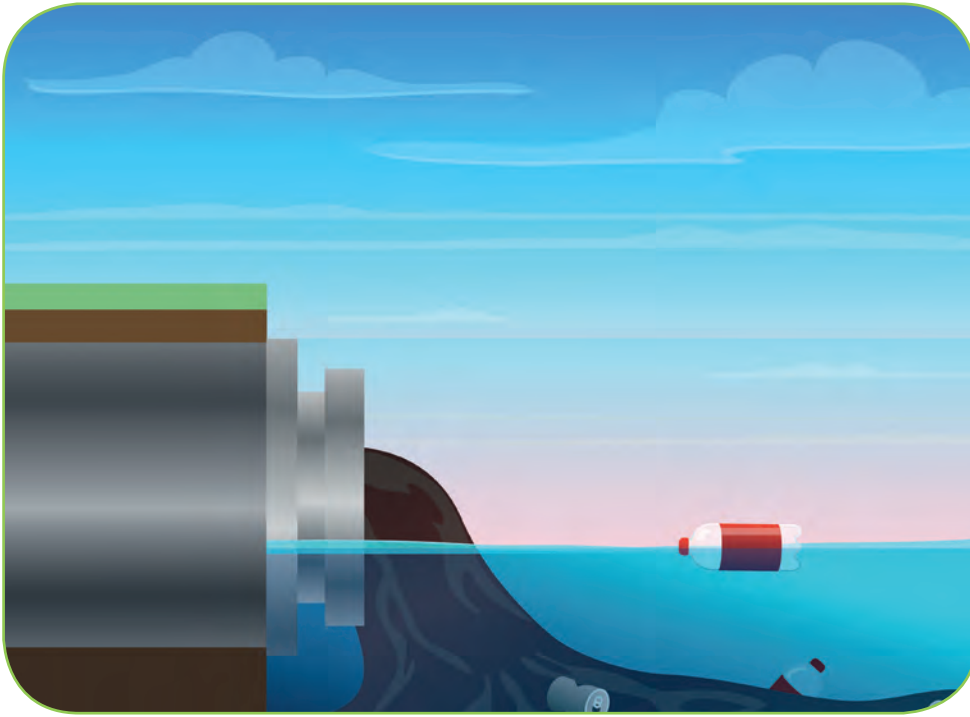
After the conversion in the chemistry of calcium sulfonate greases, complexity occurs by the addition of calcium oxide or (usually) hydroxide, followed by reaction with boric acid/acetic acid and 12-hydroxystearic acid.

Although their ability to pump at low temperatures seems like a disadvantage, synthetic base oils (Ester, Polyalphaolefin, Silicone) with very low freezing point and low viscosity allow working at very low operating temperatures (such as aircraft and vessels) even as low as -50 degree.



In order to develop the manufacturing technology for calcium sulfonate greases, all of the excess calcium oxide or hydroxide should not be promoted to amorphous calcium carbonate. Time and pressure are very important at this stage. The change in FTIR and certain performances according to time and pressure as a result of our laboratory studies can be observed here.





**Prof. Dr.  
Filiz Karaosmanoğlu**

Academic Member of ITU  
Chemical Engineering  
Department  
President of Sustainable  
Production and Consumption  
Association  
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# Waste lubricating oils and blue homeland



**T**he management of wastes in the life cycle of lubricating oils is important for our country with its importance in circular economy. The revised Environmental Law in terms of the management of waste lubricants, the Zero Waste Regulations which is almost finalized, the Regulation on the Recycling Share (GEKAP), and the establishment of the Zero Waste Foundation in Turkey assign duties to the sector. These duties require the reduction of the environmental impact caused by the consumption of individual or indirect lubricants by citizens in many parts of life, within the framework of the concept "Accountable Producer, Conscious Consumer". In many products consumed and services received, lubricants have an impact on air-water-soil pollution by releasing solid-liquid-gas pollutants. Thus, the indispensable technical contribution of lubricants to daily and industrial life has negative effects on soil and water pollution, and most importantly on climate change due to the carbon footprint.

Lubricating oils and waste lubricating oils have direct and indirect effects on human and ecosystem components when they interact with the environment in water, leak or spill. This effect can be seen in small amounts or in millions of liters. When rivers, seas, oceans and coastal waters are polluted, lubricant accumulates on the water surface and floats. The groundwater is also affected. Fish and other organisms in the sea are polluted, the food chain is affected and harmful food is consumed. The economic value of the seas decreases, especially for fishing and

tourism. For these reasons, we must prevent the negative effects of lubricating oils and waste lubricating oils on our seas.

In scope of the "Zero Waste Project" being implemented since 2017 by the Ministry of Environment and Urbanization under the auspices of First Lady Emine Erdoğan, the Zero Waste - Blue Project will continue during summer and a widespread impact will be created for zero waste in our seas. In this context, the elimination of pollution caused by petroleum, petroleum products and lubricating oils/ waste lubricating oils gains special importance. The Zero Waste - Blue Project is carried out by the MEU General Directorate of Environmental Management, Department of Marine and Coastal Management. Our waste oils should not be poured into the sea. Waste oils should not pollute our blue homeland, they should add value to our national economy as a raw material. Our lubricant production is almost 100 percent dependent on foreign supplies. Therefore, recovering waste lubricating oils is of great importance for our national wealth. Marine engine oils and wastes should not be a danger to our seas, but should be an element of the blue economy. For our beautiful seas, Yahya Kemal Beyatlı's verses will be the best way to finish this article:

*On your way out today, all aboard in loneliness,  
Eyes not turned back, reckless  
Walk! Till the end of the free blue!  
People live as long as they have dreams to come true.*

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- Executives & professionals from lubricants industry
- Additive and base stock producers and suppliers
- Maintenance department managers
- Academia representatives
- Regulators and government representatives
- Traders and marketers
- Accompanied person who only like to enjoy

## FEATURED TOPICS

- Future outlook for the lubricants industry, markets and trends
- Development of Base Oils & Additives - moving to higher performance lubricants
- Highlights on the latest development in automotive lubricants and related fluids
- Recent movements of industrial lubricants
- The newest HSE regulations impact on lubricants industry
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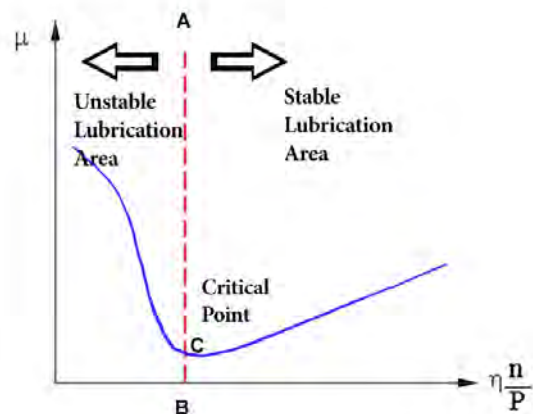
# Journal bearing design criteria - II

**B**earing selection and design processes can be summarized as:

- Selecting the optimum bearing type,
- Calculating bearing sizes that will ensure safety,
- Reviewing the performance analysis of bearing if it fulfils the needs,
- Modifying the design in light of the feedback information of design and sizes until the bearing performance is closest to the optimum.

In journal bearings, the average bearing pressure ( $P$ ), which can be calculated by the friction coefficient ( $\mu$ ) and the load on the system to the projection area ratio, the relation between the dynamic viscosity of lubricant and the rotating speed of the shaft ( $n$ ) is diagrammatically shown in the tribology discipline and this change is called the “**Stribeck Curve**” in the literature (Figure 1). This graph is important for informing the designer and the technical personnel about the stability of lubrication. It is also highly important for providing information about boundary or thin film lubrication and hydrodynamic lubrication, which is defined as the minimum-wear and

desired operation condition in terms of bearing design. If a pressurized oil film is created with optimum thickness thanks to operating parameters such as speed, load and oil viscosity even in the largest asperity areas on shaft surfaces and bearing surfaces, this can be called “**Hydrodynamic Lubrication**”. If the oil film thickness and oil film pressure is not able to bear the load in an application where the load is too large and the speed is too low, an oil film with optimum thickness and pressure



**Figure 1.** Change in friction coefficient according to bearing parameters



can be created between these surfaces by externally supplying pressurized oil between bearing and shaft surfaces. The lubrication type under these conditions is defined as “**Hydrostatic Lubrication**”.

Either hydrodynamic or hydrostatic, the desired thick oil film is called ‘stable lubrication’. When the operating conditions meet the parameters on the right side of the **AB** line in Figure 1, it is inevitable that the oil temperature will gradually increase for some reason. As the oil viscosity will decrease due to the increase in temperature, the  $\left(\frac{\eta \cdot n}{P}\right)$  value in the horizontal axis will also decrease and the curve will move towards the left. Moving to the left in the horizontal axis means a decline in the friction coefficient value. As this decline is not too much to increase the temperature that will be generated with the movement of the lubricant, the temperature of the lubricant will decrease. Therefore, as the lubrication on the right side of the BA ordinate can correct itself, it is called **Stable Lubrication**.

On the other hand, any decrease in viscosity on the left side of the **AB** line will lead to an increase in the friction coefficient and thus in the temperature. If it happens recurrently, the shaft and bearing surfaces will penetrate into each other. This means there is **Unstable Lubrication** on the left side of the AB line.

Low viscosity means low  $\left(\frac{\eta \cdot n}{P}\right)$  value. This causes too much thinning in the oil film. As a result, the possibility of metal-to-metal contact on shaft and bearing surfaces

increases and this will lead to an even bigger friction coefficient. Accordingly, the point C indicates that there is a **Critical Point** that shows the start of metal-to-metal contact on shaft and bearing surfaces due to a decreasing  $\left(\frac{\eta \cdot n}{P}\right)$  value. The most important factors that affect the critical point can be listed as follows:

**Bearing clearance:** As the clearance between shaft and bearing gets smaller, the curve in the graph will go upwards, which means an increase in friction coefficient. On the contrary, the critical point comes closer to the vertical axis and thus the stable lubrication area becomes larger.

**Oil leakage:** If oil leakages on bearing ends are too much, the peripheral length of hydrodynamic pressure decreases and pressure propagation is affected. It may lead to an increase in friction coefficient.

**Oil grooves:** Presence of oil grooves in the pressure area of bearing will cause a decline in bearing pressure. This will make the critical point move rightwards.

**Active surface:** Any cause that decreases the active load carrying surface of bearing will increase the bearing pressure and thus decrease the  $\left(\frac{\eta \cdot n}{P}\right)$  value, which means getting closer to the critical point.

**Lubrication capability:** Using a lubricant with high lubrication capability in the bearing will pull the critical point toward the vertical axis. This means larger stable lubrication area. **(to be continued)**

**References:** Gemalmayan, N., [websitem.gazi.edu.tr/site/nihatgem/files](http://websitem.gazi.edu.tr/site/nihatgem/files), Tevriüz, T., *Makine Elemanları ve Konstrüksiyon Örnekleri*, Vol. 2., Çağlayan Bookstore, Shigley J.E., *Mechanical Engineering Design*, McGraw-Hill Book Company, Durak, E., *Industrial Lubrication Techniques Lecture Notes*





# Engine oil user guide



**VISCOSITY GRADE:** is the main feature of an engine oil and is important for product selection

## Signification of grades



**xx** refers to viscosity when cold (measured at different temperatures)

The lower the viscosity when cold, the more fluid the oil is at low temperatures and the more easily it can be pumped.

For example, a 0W-20 or 5W-30 oil will make start-ups easier and will protect engines during trips to cold regions. These high technology “fluid” oils will meet the requirements of recent engines.

**yy** refers to viscosity when hot (measured at 100 °C)

The higher the viscosity when hot, the more viscous the oil is.

For example, a 15W-40 or 20W-50 oil has been developed for use in hot countries, and their “viscous” nature makes them suitable for older engines.



### POINTS TO REMEMBER

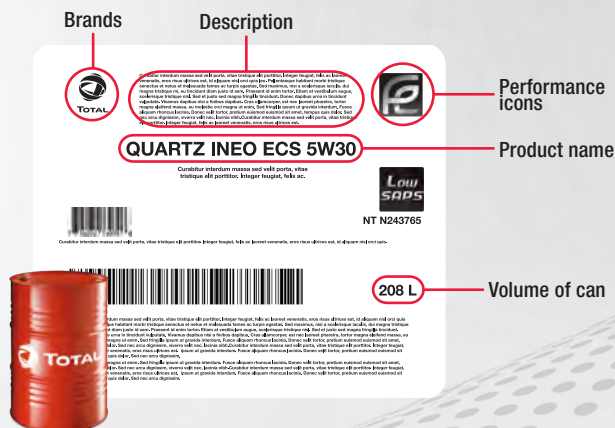
New-generation engine oils and those currently being developed by TOTAL are of increasingly fluid grades: 0W-20, 5W-20, 0W-30 and 0W-16.

## How to read a product label for product selection?

Small packaging:



Large packaging:



# ÜRETİMDEN SON TÜKETİME KADAR HER AŞAMADA FROM PRIMARY PRODUCTION TO FINAL CONSUMPTION

Sondaj  
Kimyasalları



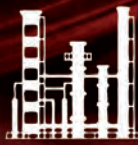
Drilling  
Chemicals

Üretim  
Kimyasalları



Production  
Chemicals

Rafineri  
Katkıları



Refinery  
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