

MADENİ YAĞ DÜNYASI LUBRICANT WORLD

International Edition

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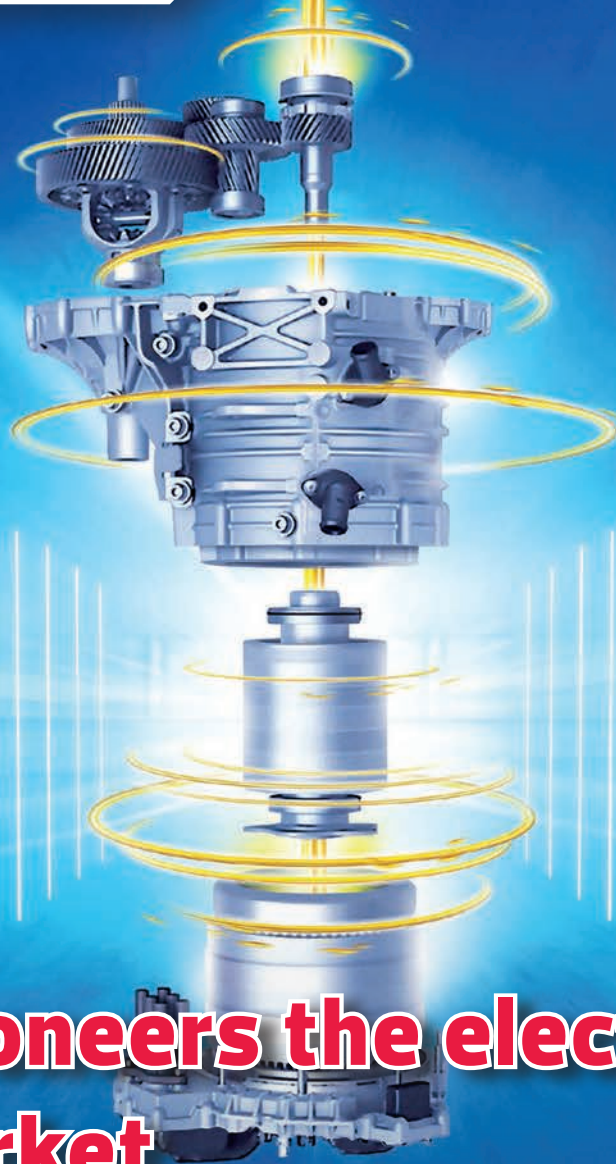
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TOTAL pioneers the electric vehicle fluids market

Chemical

structure of greases

in a nutshell

Formula 1™

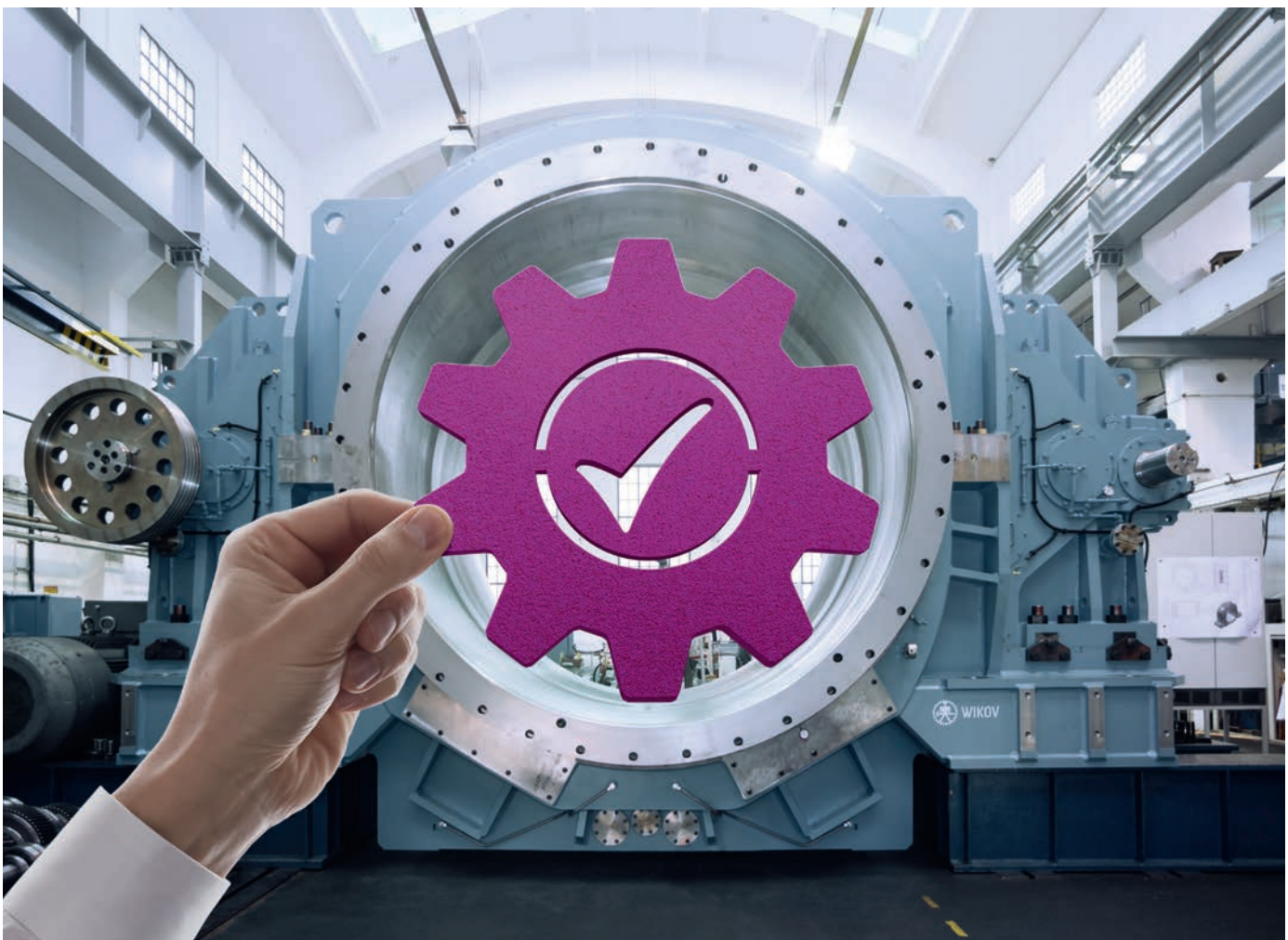
returns to Turkey

after nine years!

Proil offers

bio-based solutions

for industrial needs



Gear-up for efficiency.

NUFLUX™

Industrial gear oils are transformed with Evonik's NUFLUX™ technology. Geared for higher performance with lower formulation cost, Evonik additive technology provides a premium solution backed up by OEM approvals, industry standards and performance tests. With NUFLUX™ technology, you'll find a broad range of viscosity grades suitable for a variety of demanding industrial gear applications.

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POWER TO CREATE



Editor's Letter



Electric vehicles have started to rise to an increasingly important place in the agenda of the lubricants industry. While efforts are under way both by the state and private initiatives to strengthen the electric vehicle infrastructure and increase the use of these vehicles all over the world, lubricant companies are competing with each other to achieve an important position in the market by fulfilling the requirements of this trend in the best way. Total, with its many years of experience in automotive lubricants and special fluids, is one of these companies. With its EV Fluids product line specially developed

for electric vehicles, it aims to meet the needs of both passenger and light commercial vehicles, as well as buses and heavy commercial vehicles. Özgecan Çakıcı, Technical Services Manager of Total Turkey Pazarlama, explains the Total EV Fluids products, which is our cover story in this issue.

One of the most exciting topics of this issue is Formula 1. The Turkish Grand Prix, which is added to the F1 calendar after 9 years, promises a breathtaking weekend for the teams and the audience with its track, the famous 8th turn, and the uncertainty that the 9-year break will bring.

Petroyağ, offering specific solutions with its oils and lubricating products in Turkey for 25 years, consistently continues to meet the growing demand for oleo-chemical products and to deliver bio-based products with its environmental responsibility via its sister company Proil.

We have two comprehensive articles on greases and lube oil analyses, I believe you will be interested. Efsun Acar, Production Coordinator at Vario Grease, tells the chemical structure and history of greases in a very briefly but in a comprehensive manner. Sümer Analitik shares important information about the method and purpose of the Viscosity, Total Acid Number (TAN) and Total Base Number (TBN) analyses in lubricants.

In the second week of November, Holger Pletsch, Technical Services Manager from Evonik Oil Additives, will be the guest of our webinar series and will explain how energy efficient hydraulic fluids can provide energy savings and many other benefits in industrial equipment. Do not miss our YouTube live broadcast, which will be held in two languages, English and Turkish.

Good reading.

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**MADENİ YAG
DÜNYASI
LUBRICANT
WORLD**

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Evonik Oil Additives and MCC signed distribution partnership agreement for North America



NYCO strengthens its product range with 2 new Nycobase synthetic esters

NYCO is launching Nycobase® SNG EL and Nycobase® SMP EL, performance base fluids for environmentally sensitive applications. Together with Nycobase® STM EL and Nycobase® 8318S EL, they constitute a line of saturated synthetic esters that comply with the requirements of the European Ecolabel and the Vessel General Permit. They are also LuSC listed, thus extending the line of now 13 registered Nycobase® EL esters on this list.

Nycobase® SNG EL and Nycobase® 8318S EL (ISO VGV 46), STM EL (ISO VG 100), and SMP EL (ISO VG 150) cover a wide range of viscosities. They are designed to deliver the best performance features in marine applications (hydraulic systems, stern tubes, thrusters, stabilizers, rudders, propellers, wire ropes, etc.) and in any other partial or total loss lubrication applications, where lubricants may be released to the environment (dams, tunnels and other public works lubrication systems).

In particular, they demonstrate excellent oxidation stability, air and water separation properties, as well as superior seal compatibility performance. They also show excellent lubricity features.

Nycobase® SNG EL, 8318S EL, STM EL and SMP EL allow you to minimize the environmental impact of your lubricants whilst ensuring the best performance features for your customers.

NYCO is the sole European producer of aviation lubricants and expert in the development of synthetic ester-base stocks. NYCO is a French independent and privately-owned company, expert in the development and manufacture of high-performance lubricants and synthetic ester bases for Aeronautics, Defense, Industry and Automotive. Research is at the heart of the company's activities in order to develop tailor-made solutions for its customers and to meet the most demanding specifications.



ADNOC guarantees ADbase specification as Group III+ base oil

The Abu Dhabi National Oil Company (ADNOC) announced that its Group III Base Oil, ADbase, will now be sold with a new guaranteed specification, placing it in the elite Group III+ category of base oils. The company also announced that it has obtained more approvals for the European market.

Muhra Al Suwaidi, Acting Vice President of Base Oil and Special Product Sales, in ADNOC's Marketing, Supply and Trading Directorate, said: "ADbase has a solid reputation as a high quality, reliable and consistent Group III+ base oil. Produced in large volumes from Abu Dhabi's light, high paraffinic crude oil, we are pleased to provide our customers with a new guaranteed specification for our premium quality base oil. For lubricant manufacturers, a higher grade base oil is an optimal option for top tier lubricants, while for customers a higher quality base oil means better fuel efficiency for their cars."

The new ADbase specification guarantees are:

	Viscosity Index (VI))	Noack
ADbase 4cSt	127	12
ADbase 6cSt	130	7
ADbase 8cSt	130	4

ADbase is produced by ADNOC in Abu Dhabi and sold internationally through a network of exclusive sellers. This includes, *Penthol C.V.* for the United States of America, *Chemlube S.A.* for Europe, *Xiamen Sinolook Co. Ltd.* for China, and ADNOC Distribution, the UAE's largest fuel and convenience store operator, for the GCC region.

ADNOC Refining produces up to 500,000 metric tons per year of high quality Group III base oil and around 100,000 metric tons per year of Group II base oil, at its Ruwais refinery in Abu Dhabi.

ADbase has a high Viscosity Index (VI) making it an ideal lubricant component, ensuring efficiency and fuel economy for high performance engines, while meeting ever stringent environmental regulations.

In the European market, ADNOC has already completed ACEA C2/C3/C5-16, API SP, BMW LL-04, MB-229.31/51/52 and OPEL OV 0401547 approvals, and is actively working with additive companies to achieve even more Original Equipment Manufacturers (OEM) formulation approvals.



Evonik Oil Additives and MCC signed distribution partnership agreement for North America

MidContinental Chemical Company, Inc. (MCC) announced that it has been selected by Evonik Oil Additives to be their distribution partner in the United States and Canada. MCC will now offer Evonik's superior quality VISCOPLEX® viscosity index improvers, VISCOPLEX® pour point depressants, and VISCOBASE® base fluids.

Evonik's comprehensive range of VISCOPLEX® products are built around the unique benefits of polyalkyl methacrylate (PAMA) chemistry to deliver solutions that create possibilities for a sustainable world. VISCOPLEX® viscosity index improvers, pour point depressants, and defoamers are used to formulate engine oils, transmission fluids, hydraulic fluids, gear oils, and other industrial lubricants. VISCOPLEX® products deliver improved fuel economy, reduced carbon emissions, and improved productivity in automotive and industrial applications.

VISCOBASE® base fluids are tailored to readily blend and deliver high viscosity index, shear-stable synthetic lubricants. Evonik's technology improves additive package solubility, reducing or eliminating the need for additional ester components.

Evonik is a global leader in the innovation, manufacture, and marketing of lubricant additives that control viscosity and enhance the environmental sustainability of our world through improved fuel economy. Evonik's diverse line of products includes pour point depressants, viscosity index improvers, dewaxing aids, biodiesel cold flow improvers, synthetic base fluids and defoamers. The VISCOPLEX® and VISCOBASE® product lines are used in many applications, including biodegradable fluids, engine oils, driveline fluids, hydraulic fluids, dewaxing applications, and biodiesel.

MidContinental Chemical Company, Inc. (MCC) manufactures and distributes petroleum additives that enhance the performance of fuels and lubricating oils in vehicles, equipment and machinery. MCC provides comprehensive additive solutions and services to the lubricant and fuel industries.



Nynas premium base oils.
The daily grind just got smoother.

The superiority of metalworking fluids made with Nynas base oils is just one example of how a daily chore can turn into a regular delight with the right naphthenic solution. The same goes for greases and lubricants, where Nynas base oils offer high solvency and excellent low temperature properties.

www.nynas.com > base oils





Chevron Oronite introduces a new Mid-SAPS additive meeting multiple OEM claims

Chevron Oronite Company, LLC recently introduced OLOA® 54530, an innovative new Mid-SAPS additive package that is compatible with all types of modern after-treatment systems in both diesel and gasoline engines and helps protect against low-speed pre-ignition (LSPI) events. It also meets multiple OEM claims, including BMW, Daimler, and Opel.

"With a reliable supply, simplified logistics, and solutions that are easily adapted to customer product offerings, we can help customers meet ever-changing automotive engine oil performance needs," said Teri Crosby, vice-president, Global Technology, Chevron Oronite. "OLOA 54530 meets many of the latest industry and OEM specifications, including: ACEA C2 / C3, API SP, BMW LL-04, Daimler MB 228.51, MB 229.52, and the new Opel Vauxhall 0401547."

Because of the demand for improved fuel economy and reduced emissions, passenger car manufacturers are designing new and different engines that provide higher power density and improved efficiency. As a result, they are also prone to LSPI events and this newest Oronite product takes on all those issues in one additive package.

"OLOA 54530 meets the latest, most-demanding OEM requirements by delivering fuel economy benefits; protecting against LSPI; and extending drain intervals," said Patrice Estouieg, product line manager, Automotive, Europe-Africa-Middle East Region, Chevron Oronite. "Our customers will appreciate these and many other performance benefits it offers, including excellent wear protection, piston cleanliness, sludge reduction, and oxidation control."

Using Chevron Oronite's PCFlex ADDvantage® approach, OLOA 54530 is an example of a product created with flexibility in mind that is also approved for use with a wide range of Group III base oils and meets multiple OEM claims.



ExxonMobil and INNIO introduce Jenbacher N Oil 40 lubricant for Jenbacher gas engines

ExxonMobil and INNIO are delighted to announce the release of Jenbacher N Oil 40 lubricant for all INNIO's Jenbacher* Type 2, 3, 4, 6 and 9 natural gas engines. This follows the collaboration agreement between the two companies that was announced earlier.

Jenbacher N Oil 40 has been developed to meet the evolving needs of natural gas engine lubrication, providing increased engine uptime and enhanced engine reliability, leading to more power generation and revenue potential. Benefits of the new technology include extended and unique condemning limits for longer drain intervals without compromising protection of critical engine parts and components.

INNIO's myPlant Asset Performance Management solution can be used to monitor oil consumption, exhaust gas temperature and oil change intervals along with the full offer of oil analyses, technical expertise and borescopic inspections of Mobil ServSM. These analytics will help predict oil lifetime and ensure the performance and protection of the gas engine, to provide a life cycle cost reduction of up to 30% (**).

"We have evaluated Jenbacher N Oil 40 in a long-term, multi-site testing programme with different situations (e.g. a German university, a Russian factory and a greenhouse facility in the UK)," said Andreas Kunz, Chief Technology Officer at INNIO Group, "The high performance lubricant was tested and validated over several Jenbacher engine types under the most demanding circumstances. The new oil has demonstrated its capabilities in each to help optimise oil consumption, reduce waste and lower spare parts costs."

"ExxonMobil and INNIO engineers focused on INNIO Jenbacher gas engines lubrication requirements in more than 160,000 hours of field data across multiple engine platforms. This contributed to the development of the new Jenbacher N Oil 40 that helps to double both oil and filter life(**)," added Elisabetta Scossa, Europe Energy Manager of ExxonMobil. "In addition, operators will appreciate that this one lubricant can be used in the entire Jenbacher natural gas engine portfolio and therefore can optimise inventory costs for operators with multiple types of Jenbacher engines."

**Indicates a trademark*

***Actual benefits can vary depending upon the type of equipment used and its maintenance, operating conditions and environment, and any prior lubricant used. Extended used oil and filter life as well as reduced waste are based on normal use of the product, as described in the technical instructions from INNIO Jenbacher.*



Petronas Track Lab contributes to the world of motorsports

As Title partner, PETRONAS co-engineered PETRONAS Fluid Technology Solutions™ which includes PETRONAS Primax fuel, PETRONAS Syntium engine oil and PETRONAS Tutela functional fluids, in close collaboration with the technical team at Mercedes AMG High Performance Powertrains (HPP).

PETRONAS's support in Mercedes-AMG PETRONAS team fluids management does not come only from R&D but also from the constant presence on the track, thanks to a state-of-the-art mobile laboratory capable of monitoring the behaviors of the fluids before the race and, of course, during the rounds.

The PETRONAS Trackside Laboratory is an integral part of the Mercedes-AMG PETRONAS Formula One Team infrastructure. The facility brings precise laboratory conditions to the heart of the paddock, affording engineers the benefit of full diagnostic support during the race weekend.

Utilizing the most high-tech equipment in the industry, the PETRONAS Trackside Lab is managed by two PETRONAS Trackside Fluid Engineers, Stephanie Travers and En De Liow. Their task is to analyze samples of PETRONAS Primax racing fuel, PETRONAS Syntium oil and PETRONAS Tutela functional fluids to monitor the health and performance of the engine and gearbox.

What do Trackside Fluid Engineers do?

Their initial task at each race weekend is to extract a sample from each drum of PETRONAS Primax fuel for gas chromatography analysis. The fuel must be the same as the formulation registered and approved by the FIA, the sport's sanctioning body, in order to be eligible and avoid incurring penalties.

Once the cars have been fired up, the PETRONAS Trackside Fluid Engineers analyze the PETRONAS Syntium engine oil and PETRONAS Tutela lubricant from the Energy Recovery System using a spectrometer. The fluids provide a diagnostic tool to give a snapshot of what is happening in the engine and gearbox. Particles in the oil, indicative of engine degradation, provide the team with an early warning of any problems.

Across the three days of track action at each race weekend, typically 65 engine oil and 30 transmission oil samples are taken. In addition to other samples taken in spot-checks, an impressive total of approximately 200 oil tests are executed per weekend. Furthermore, the PETRONAS Trackside Fluid Engineers take over 30 fuel samples each race weekend.

The fuel and lubricants development program that PETRONAS has undertaken since 2010 has brought unrivalled success to the Mercedes-AMG PETRONAS Formula One Team and created one of the most dominant eras in the history of Formula 1®.

Future will come with bio-solutions.

With our state-of-the-art R&D department and expert team, we are providing sustainable and environmentally friendly products which meet all international standards since we established.

We keep on expanding our product range every day and keep walking towards future with firm steps in our new factory.





Toprak Razgatlıođlu made his mark in Motul WorldSBK

The 2020 season of WorldSBK, one of the most important motorcycle track racing organizations in the world and sponsored by Motul, is completed despite the challenging pandemic conditions. The cooperation between Motul and Dorna, the organizer of WorldSBK since 2016, has continued this year, and a successful season has been finalized.

Being the title sponsor of the WorldSBK races, known for Kenan Sofuođlu's championships in our country and popularized with the participation of Toprak Razgatlıođlu this year, Motul also supported Toprak Razgatlıođlu's team Pata Yamaha as a technical partner throughout the season.

The championship witnessed a very exciting start with the Australia race held at the end of February. Motorcycle lovers, excited by the victory of the young Turkish rider Toprak Razgatlıođlu in the first race, had to take a 5-month break due to the Covid-19 pandemic. However, after the necessary measures were taken, the championship, consisting of 7 races in different tracks in Spain, Portugal, Catalonia and France, and 8 races in total, was completed despite the difficult conditions.

Razgatlıođlu, who made a great start to the season with the Pata Yamaha Racing team, completed the first WorldSBK season with another great final race. The Turkish rider, who collected 228 points in superpoles and races during the season, became the 4th in the general classification as the most successful Yamaha rider of the season.

Motul, the title sponsor of the WorldSBK and providing technical support to racing teams, continues to be preferred with its 300V series performance oils, transmission oils and MC Care maintenance products. Most of the teams in the grid prefer 300V Factory Line with Ester Core technology. Motul, the first lubricant manufacturer that comes to mind when we say two wheels, continues to be the first choice as it easily responds to the performance expectations of racing teams under harsh conditions.





Özerşah Energy exports its products to three continents

Özerşah Energy, which has increased the limits of lubricant production from waste oil with an investment of 1 million Turkish Lira last year, has turned towards export with the aim of realizing its international targets. The company has exported its products to more than 15 countries in Asia, Africa and Europe continents, thanks to the cooperation with the e-export platform TurkishExporter.

“We produce at world standards”

Fetullah Arvas, Chairman of the Board of Directors of Özerşah Enerji, noted that they meet the lubricant demand of the domestic market for 20 years. “Following our first factory established in 2001, we accelerated our works to establish our second factory in Adana in 2007. With the third factory we established in Dilovası, Kocaeli in 2015, we have started to produce at world standards. We continue our production and sales activities in product groups such as automotive lubricants, industrial lubricants, marine lubricants, process oils, greases, car care products, organic and concentrated antifreeze,” he said.

Expressing that they have chosen a new business route by focusing on exports, Fetullah Arvas said: “We met with TurkishExporter while conducting research and investigation in order to introduce the quality and reliability of our Monex, Woil and Hexon brands with more consumers both in the domestic and international markets and to increase the popularity of our brands. Thanks to this journey we set off together, we now export our products to 15 countries in Asia, Europe and Africa. We will continue to grow by aiming higher in our exports. At the same time, we successfully continue the contract manufacturing of distinguished brands,” he said.





Services win gifts with the “Welcome Campaign” of OtoAsistanım

OtoAsistanım, the digital maintenance platform introduced in Turkey by Petronas Türkiye to ensure the establishment of better relations between customers and private services, launched the Welcome Campaign for services. In this context, services collect rewards that can be useful for their business while using the Otoasistanım program. In each category, top 10 services that create the highest number of “Care Cards” and set the highest number of “Reminders” receive special gifts. Among the gifts offered within the scope of the campaign, which will continue until January 2021, include lifts, tool cabinets, devices for oil extractor from the crankcase, Android tablets and products from the Petronas lubricants family.

Service quality of private services increases with OtoAsistanım



OtoAsistanım
.com

Dijital Araç Bakım Kartınız

OtoAsistanım, which relieves private services of methods where vehicle maintenance works are recorded only on paper or on the computer via certain software, allows each work to be recorded digitally. The OtoAsistanım program enables recording of all retrospective maintenance and oil change operations by creating a digital maintenance card specific to the vehicles of the customers who come to the service. Vehicle owners, who enter their vehicle brand model and license plate in OtoAsistanım and register their vehicle free of charge, easily access the services that use OtoAsistanım. Users who want to be reminded of the obligations they have to fulfill with their vehicles can benefit from the reminder feature of OtoAsistanım. In this context, for example, users can receive reminder SMS and e-mails as “make an appointment for vehicle inspection” or “do not forget to renew your policy before the expiry date” minimum 15 days in advance by entering the inspection date for the vehicle they want. Although it was launched not long ago, OtoAsistanım is now used by a high number of private services, and it aims to create a large network consisting of many small or large-sized private services in Turkey. OtoAsistanım is the first platform in Turkey, that offers services fully free of charge.





Mobil and Groupe PSA to enter into engine oil cooperation

Mobil 1 ESP 5W-30, synthetic engine oil developed for the automotive industry by Mobil, which produces solutions in many different areas from automotive to industrial oils with its wide product range, continues to obtain the approval of manufacturers with its successful performance. Mobil 1 ESP 5W-30 has recently been awarded "PSA 2297" approval for first fill oils of the engines of the PSA Group, which has the brands of Peugeot, Citroen, DS, Opel/Vauxhall. Now Mobil 1 ESP 5W-30 oil can be used as a manufacturer approved product in new or up to 7-year-old vehicles of PSA Group, being sold in the markets of the warm climate zone where Turkey is also located in.

Münci Bilgiç, Mobil Oil Türk A.Ş. General Manager, said: "New engine technologies expect more from lubricants. Primary expectations include emission life, fuel efficiency, durability and performance. Mobil 1 ESP 5W-30 increases the number of its approvals by providing performance beyond all these expectations. The approval obtained from the PSA Group is an indication of this. "PSA 2297" is an approval that the manufacturer attaches great importance to. Lubrication solutions are highly important in regions where four seasons are experienced throughout the year, such as Turkey. Mobil 1 products adapt to all kinds of conditions, from very high temperatures at sea level to cold conditions in high altitude mountains and can protect the engine with superior performance."

Mobil 1 ESP 5W-30 extends the life of exhaust emission systems for diesel and gasoline cars, while helping to preserve fuel efficiency and vehicle performance just like the first day. Mobil 1 ESP 5W-30, which is recommended for all kinds of modern vehicle engines, especially high performance engines of passenger cars, SUVs and light commercial vehicles, differs from its competitors with its performance, especially in severe conditions where conventional oils cannot provide the required performance. Mobil 1 ESP 5W-30 also helps to reduce deposits and sludge formation to ensure a long and clean engine life. It plays an important role in reducing the accumulation of particles in diesel particulate filters, and in reducing the wear of catalytic converters in gasoline-powered vehicles.





Formula 1™ returns to Turkey after nine years!

On November 15th, after a gap of nine years, Intercity Istanbul Park will host Formula 1™, the world's most important motorsports event. Formula 1™ returns to Intercity Istanbul Park as part of its 2020 schedule, coming back to the country that hosted the event between 2005 and 2011.

Formula 1™ is followed by millions of viewers around the world and is one of the key sporting events at which countries showcase themselves. The 14th race of the season, Formula 1 DHL Turkish Grand Prix 2020, will take place at Intercity Istanbul Park on the 13th, 14th and 15th of November.

Vural Ak, Chairman of the Intercity Board, pointed

out that Intercity had been awarded the project of bringing Formula 1™ races back to Turkey by the Presidency of the Republic of Turkey. Ak continued: "We are both delighted and proud to announce that we are bringing Formula 1™, the world's biggest motorsport event, back to Turkey. Ever since 2013, when we took over the management of Intercity Istanbul Park, one of the most extraordinary

tracks in the world, we have been striving to reintroduce Formula 1™ to Turkey. We are overjoyed for our country that our efforts have been successful. During that time, we have been taking meticulous care of Intercity Istanbul Park, one of our country's most valuable investments, and we are extremely excited by the prospect of preparing the venue for the Formula 1™ event, so that we can ensure that Istanbul receives the attention from the world it truly deserves."

Mr. Ak added, "In signing the contract, we as Intercity pledged to undertake all obligations ourselves. Given the great challenges currently facing the world and Turkey, it was crucial that, while endeavoring to bring Formula 1™ back to Turkey, we did not place any burden on our state. Throughout the project, however, we felt the constant support of our state, and for this we would like to express our gratitude to everyone who has assisted, above all to our President Recep Tayyip Erdoğan."

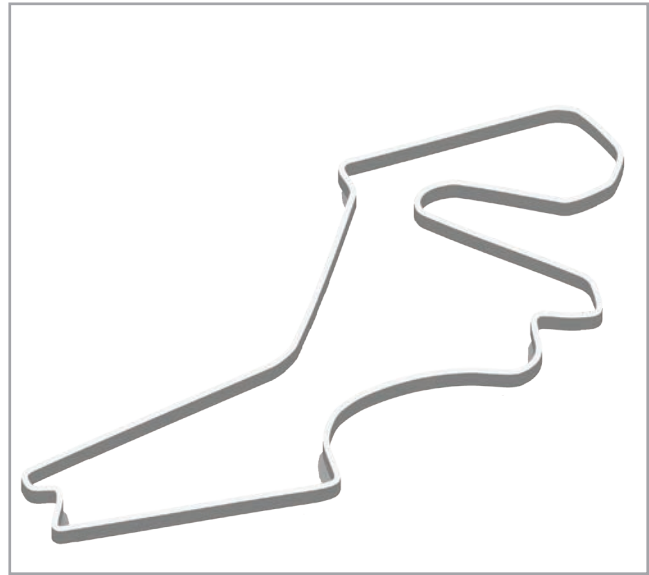
"Dreaming about it since 2013"

Vural Ak stressed that, ever since taking over the management rights of the Intercity Istanbul Park in 2013, Intercity had been working with great dedication and care to bring Formula 1™ races back to Turkey. He explained: "Since the very first day we took over the management of Intercity Istanbul Park, every year we have organized more than 300 days of events, educational programs and festivals related to motorsports, traffic safety and the automotive sector. One of the key factors that led the management of Formula 1™ to include Istanbul in its 2020 schedule was the fact that, throughout the past nine years, even when races were not taking place, we always kept the track active and prepared, as if races could resume at any moment."

"Races will take place without spectators"

As a result of the measures taken due to the Covid-19 pandemic that affects the entire world, the Formula 1 Istanbul Grand Prix 2020 will take place without spectators. Following the recommendations of the Istanbul Provincial Pandemic Board, the Istanbul Governorship Provincial Hygiene Board decided to proceed with the event without spectators.

About this decision, Intercity Chairman Vural Ak said: "As we have previously stated on numerous occasions, the health and wellbeing of all those involved is our top



priority. Since day one we have been prepared to carry on with the event given a variety of scenarios. As Intercity Istanbul Park we made great efforts, both financially and physically, to bring Formula 1™ back to our country. Upon being entrusted to bring Formula 1™ back to our country under the auspices of the Presidency of the Republic of Turkey, we are proud to say that we are able to do so at such troubling times without any financial burden to our country. We've not only brought Formula 1™ back to our country but have also offered our public the most affordable Formula 1™ tickets in the world. I would especially like to emphasize that while we continue our preparations to host our participants, 85 million will welcome Intercity Istanbul Park into their hearts. With the support of our nation will host the Turkish Grand Prix 2020 in a way that suits our country. With any concessions, we will make it our mission to promote our country in the best way possible through this event which will be watched by 2 billion people across the globe. I am certain that even without spectators, we will host a spectacular event this year, and will welcome the race back to Turkey next year with full spectator participation. I would like to thank all motor sports lovers for their interest and support. All fans who purchased tickets will be refunded in full as soon as possible through Biletix."

5 reasons we are excited F1 is going back to Istanbul

With reference to the article authored by Greg Stuart on Formula 1™ official website, here is why we are excited to have F1 races back in Istanbul:

1

The epic Turn 8

Istanbul Park is one of Hermann Tilke's finest creations. The track's been compared to Spa-Francorchamps (high praise indeed) and features some properly good corners. The sharp Turn 8 is the most challenging part for both Formula 1TM drivers and technical teams.

2

It's witnessed some iconic F1 moments

There may only have been seven Turkish Grands Prix to date but they certainly packed a lot of action in. The 2006 race witnessed a monumental battle between Fernando Alonso and Michael Schumacher for second place, the pair crossing the line in that order with just 0.081s between them. Sebastian Vettel made his F1 debut with BMW Sauber. Four years later, when Vettel, now at Red Bull, crashed with team mate Mark Webber on the run down to Turn 12.

3

It's yet another classic track on the 2020 F1 calendar

No one wanted the coronavirus pandemic. 2020 will probably not be looked back on by many people as their fondest year. But it will be the F1 season where we saw cars race at Imola, Mugello, Portimao, the Nurburgring and now Istanbul Park.

4

It will add more uncertainty to an already uncertain season

Most of the teams will have some Friday data for Istanbul Park. Trouble is, it will be from May 6 2011, which is the last time F1 held a Friday practice at the venue. That will be of very little use to the teams operating high-downforce, V6 turbo-hybrid F1 cars (rather than naturally-aspirated V8s, as they were in 2011) at the track in November, when average temperatures in Istanbul are around 10 degrees cooler than May. Then there's the drivers. Lewis Hamilton, Kimi Raikkonen, Sergio Perez and Sebastian Vettel are the only ones to have raced F1 machinery around the venue – with Vettel, Raikkonen and Hamilton all one-time winners here – giving them a leg up on the competition, and meaning the youngsters will have to catch up on their sim racing rigs at home.

5

It will be mega in 2020-spec cars

If you have plans for November 14, cancel them because qualifying day for the 2020 Turkish Grand Prix is going to be worth tuning in for. Considering that around the similar-length Silverstone circuit this year, pole for the British Grand Prix was over six seconds quicker than it was in 2011, watching these modern cars attacking Istanbul Park is likely to be a jaw-dropping spectacle

We are getting excited already...

References:
intercitypark.com
formula1.com



REXOIL®

LUBRICANTS

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TOTAL pioneers the electric vehicle fluids market with its EV Fluids product series



Özgecan Çakıcı
Total Turkey Pazarlama
Technical Services Manager

Total Lubricants introduced two new product series for electric vehicles whose importance and use are increasing day by day. The company aims to meet the expectations of manufacturers and users at the highest level with the EV fluids developed for passenger cars and light commercial vehicles as well as buses and heavy commercial vehicles.

Although internal combustion engine vehicles have the largest share in the automotive industry today, the demand for electric and hybrid

vehicles is increasing every day. Studies show that electric vehicle sales will account for 20 to 50 percent of the light commercial vehicle market by 2030. It is



expected that 70 percent of newly produced vehicles will be hybrid and electric in 2050.

Decisions taken to reduce carbon emissions around the world play a major role in the future of electric and hybrid vehicles. This change, which is expected to occur in the medium and long term, creates a need for lubricant products that are suitable for new technologies.

France-based energy giant TOTAL leads the market with its innovative cooling and lubrication product series developed for electric and hybrid vehicles. TOTAL has two product series: Total Quartz EV Fluid for passenger cars and light commercial vehicles and Total Rubia EV Fluid for off-road vehicles, electric buses and other electric heavy commercial vehicles.

These two product series offered to the market by Total Lubricants occupy a prominent place in the latest generation segment of the market, in addition to the wide range of products and services already offered

at the same time to meet user expectations for quality and performance," she said.

"We meet the expectations of the producers"

Stating that there were approximately 2 million electric vehicles in the world in 2018, Çakıcı said: "According to the International Energy Agency (IEA) data and market research conducted by TOTAL, electric vehicle sales are expected to constitute 20 to 50 percent of the light commercial vehicle market by 2030. Some vehicle manufacturers have announced that they are planning to stop diesel car production in the passenger car segment. In parallel with these developments, products such as lubricants, engine oils or transmission oils were not a concern in electric and hybrid vehicle design until now, but today manufacturers are looking for new products

Tested on racetracks

With a long history in motorsports, TOTAL partners with teams competing to win, and it is the partner of DS Automobiles in the ABB FIA Formula E Championship since 2016. TOTAL, which supplies electric vehicle fluids to the DS Techeetah team competing in Formula E and uses the racetrack as a test platform, thus developed the EV Fluids series. DS Techeetah won the Teams and Pilots championship consecutively in the 2018-2019 and 2019-2020 seasons.



for charging, storage and fleet management. High performance fluids, which are filled before the vehicles leave the production line, accompany the vehicles throughout their service life.

Özgecan Çakıcı, Technical Services Manager at Total Turkey Pazarlama, stated that TOTAL always prefers cleaner energy resources with its "Committed to Better Energy" commitment and shapes its product range accordingly. "Currently we meet the needs of gasoline, diesel and gas powered vehicles with our Total Quartz and ELF engine oils for passenger cars, Total Rubia engine oils for heavy duty diesel vehicles and transmission oils. However, our world is going through a significant change, which we are very strongly faced with due to the Covid-19 pandemic... Actually we are altogether experiencing this change in recent years. The environmental impacts we are exposed to as a result of this energy-centered change and the resulting legal regulations force the automotive industry to make continuous innovations and

with additional functions to help them meet changing requirements. These products are not only necessary for lubrication and cooling of electric motors, new types of powertrains and transmissions, but also for regulating the temperature of the vehicle's battery and power electronic systems."

"Electric Vehicle fluids are quite different from conventional lubricants"

Expressing that TOTAL works in close cooperation with manufacturers, Çakıcı continued: "TOTAL's primary goal is to develop special solutions that meet the specific needs of our customers and guarantee the most efficient operation and maintenance of vehicles and equipment. We are proud to be the first company to introduce a special product range for electric vehicles to the market in 2018 after extensive R&D studies. We pioneer the market with two product series that meet the needs of

vehicle manufacturers and help them design increasingly efficient electric and hybrid vehicles. With our Total Quartz EV Fluids for passenger cars and Total Rubia EV Fluids for heavy duty diesel vehicles, we offer a special solution for high-speed electric motors and transmissions, and control the excess heat generation in electric batteries. These products include not only conventional engine oil and transmission oil, but also lubricants with different features. In fact, we call these products fluid, not oil, and

long time."

"We will continue to offer new generation technologies"

Çakıcı also noted that the product series offered by Total Lubricants for electric and hybrid vehicles is in accord with the Total Climate Strategy and the vision of reducing the carbon footprint of the energy products

Battery cooperation between PSA and TOTAL

French automotive manufacturer PSA and energy company TOTAL cooperated in the production of batteries for use in electric vehicles. As part of the joint venture of the two companies named Automotive Cells Company (ACC), a plant will be established both in France and Germany. It is aimed to reach 1 million annual production capacity in the plants, which are expected to be operational in 2023. PSA has brands such as Peugeot, Citroen, DS and Opel under its roof. The company, which signed a merger agreement with Fiat Chrysler Automobiles (FCA), will be acquired by the new company named 'Stellantis' to be established after the completion of the merger. The merger of the two groups will create the world's 4th largest automotive manufacturer.



we will see that they will be referred to in the sector in this way because of their different characteristics from the mineral and synthetic lubricant products we know so far. The products in our EV Fluids product range not only have the standard lubrication, cooling and friction prevention properties of conventional engine and transmission oils, but also provide insulation with dielectric properties, easy operation with the materials of electric motor technology with compatibility feature, and safe operation against fire risk at very high temperatures with thermal properties."

Çakıcı stated that TOTAL has developed special lubricating and cooling fluids by focusing on four important issues required by electric and hybrid vehicles: "The first of these is insulation. Insulation is an important safety requirement for any use with electric current. The second one is compliance with the conditions of use of new electric vehicle materials in order to prevent the corrosion of copper coils in electric motors and to protect polymer coatings. The third one is heat... In electrical models, we enable the fast release of heat and prevent the batteries from heating up during rapid acceleration or fast charging. Lastly, the fourth one is the lubrication of the transmission and other components in order to protect the mechanical components, provide less friction and ensure the efficient operation of the vehicles for a

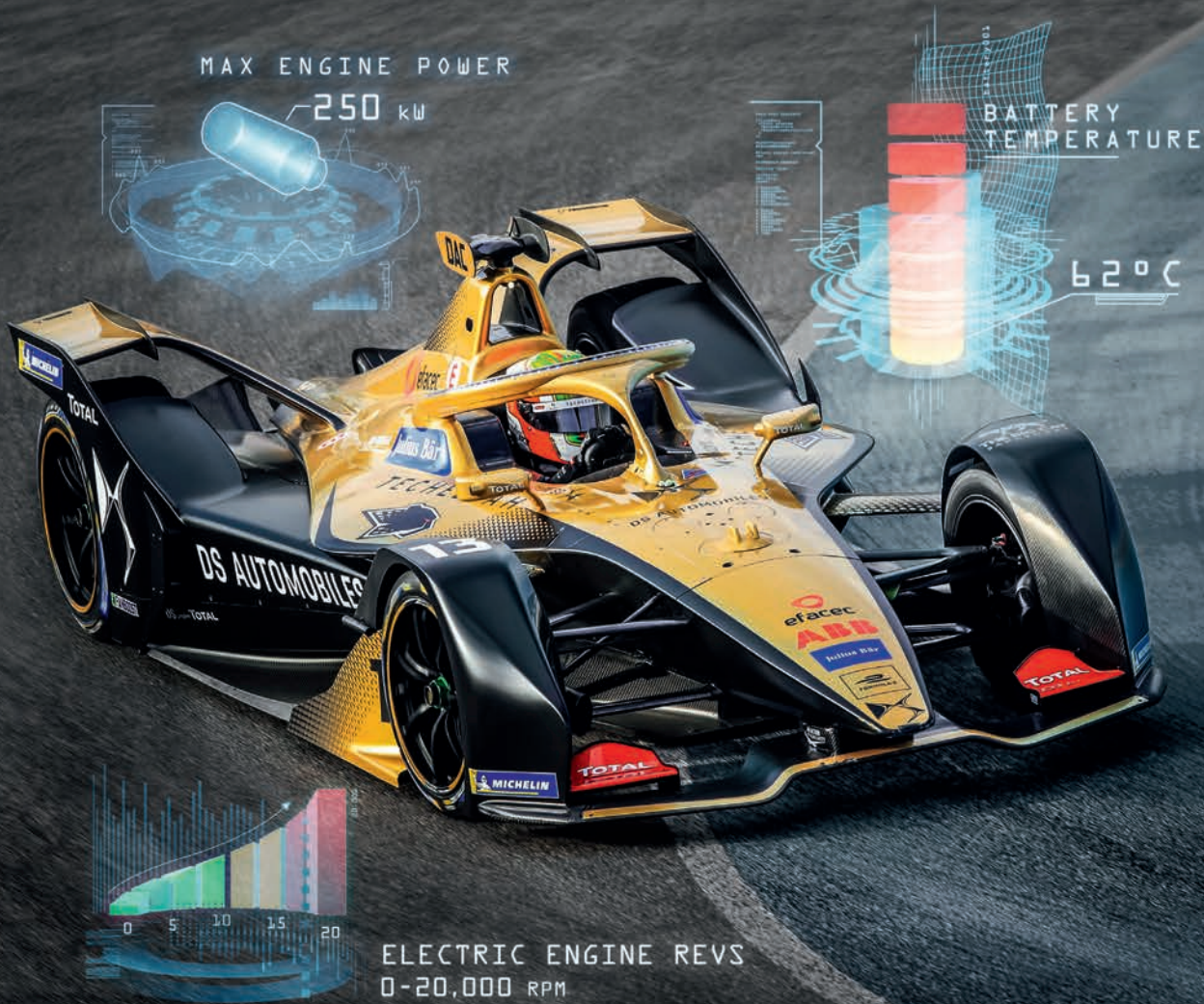
TOTAL offers to its customers. "With the investments we have made and planned in the field of electric mobility, we will continue to be a pioneer in the future mobility trends as a product and service provider and to offer new generation technologies to our customers and business partners. We will not only respond to the expectations and needs of the automotive sector, but also expand our service network with rational and easy solutions," she said.

The wide range of electric mobility solutions currently available at TOTAL and its subsidiaries also include:

- A network of charging points planned to include 1.000 high-power (150 kW) charging points at 300 fuel stations at every 150 km in Western Europe
- Access to tens of thousands of public charging points across Europe for professional drivers via TOTAL GR Card
- 10.000 charging points in France managed by G2Mobility and served to regional authorities as well as businesses and companies
- Special use solutions with electricity charging solutions and electricity supply services from Direct Energie and Total Spring in France as well as Lampiris in Belgium



The Formula E track is our lab



Grégory Lebrond / DPP1



Formula E is our laboratory to develop cutting-edge products and innovative solutions to advance electric mobility to the next level. Since 2016, we partnered with DS Automobiles in the ABB FIA Formula E Championship, resulting in the 2018/2019 double manufacturer and driver titles with DS TEHEETAH. This collaboration allowed us to develop TOTAL QUARTZ EV FLUID, a pioneering line of fluids for electric and hybrid vehicles that provides performance and efficiency.

lubricants.total.com



Prooil offers bio-based solutions for industrial needs

Prooil, a sister company of Petroyağ which offers lubricants and lubricating solutions to the Turkish industry for 25 years, serves many sectors that are engaged in production in Turkey and the neighboring geography as a manufacturer and a supplier in the Oleo-Chemicals

industry.

Working with the objective to meet the ever increasing demand for bio-based products in the global market, to support the transition process and to be a pioneer in this field in Turkey, Prooil continues to grow consistently since its establishment in 2015.



Proil is a pioneer in the sector with its sustainable, standardized and certified production processes, experienced R&D team, production staff and sales staff. The company offers innovative and competitive products to its customers with 100 percent domestic production since in 2015.

The pandemic process we are experiencing has once again revealed the problems that global production may cause and underlined the importance of national production. Proil aims to respond to this need effectively in line with its goals, and to fully meet the expectations of its customers in this field with its experienced production and sales team equipped with technical knowledge.

New production facilities, developing product range

Proil has been carrying out its production activities under the same roof with Petroyağ since its establishment, and it has moved to its new production facilities in August 2020 in order to respond faster and more effectively to the increasing demand. Proil facilities, which were built by taking into account the infrastructure requirements of its customers, especially in the food, cosmetics and pharmaceutical industries, and are established on an open area of 8000 sqm and a closed area of 2000 sqm, meet all required international standards. While constantly adding new products to its product range with its strong R&D works, it develops turnkey solutions for its customers with its expert staff.

Bio alternatives to petroleum derivatives

Bio-based products are of great importance in responding to changing environmental conditions and consumer demands. Proil develops new products that can be alternative to petroleum-derived products and even reveal new production capabilities. The company is proud to be one of the leading companies in this field and taking fast action today, when even the largest oil companies in the world started to develop biodegradable products.

With the products it developed through intensive R&D studies, Proil offers a wide range of Oleo-Chemical solutions needed by different sectors, from food to cosmetics, from asphalt to pharmacology, from agriculture to mining.

Distribution network spanning over 3 continents

Proil, with its international distribution network,

offers services to its customers not only in Turkey but also in the neighboring geography. Thanks to its global collaborations and strategic partnerships, it meets all the needs of its customers with the products it develops and many special Oleo-Chemical products it distributes.

Combining its high production capacity with its strong distribution network, Proil minimizes the lead times of the products and prevents disruption of the production of its customers.

Dependence on imports decreases

Thanks to the production capability and capacity brought by the new production center, as well as the competencies of the advanced R&D team, Proil becomes a strong solution partner for all industrial organizations that demand bio-based products.

It reduces dependence on imports by developing its own products, producing in its own facilities, and prioritizing domestic raw material production. In addition, with its stock production capability, it eliminates the risks of possible delays due to product shipments or customs processes.

Bio solutions will stand out in the future

Proil offers renewable, sustainable and environmentally friendly products at international standards and affordable conditions, and it continues to develop new products and product groups. Adopting the mission of presenting the products of the future today, Proil has resolutely maintained its consistent growth and strong cooperation since the day it was founded.



Chemical structure of greases in a nutshell



Efsun ACAR

Chemical Engineer

Vario Engineering and Production Technologies Inc.

Production Coordinator

Greases are paste-like lubricants that are generally a yield of the reaction between base oils and metal hydroxides with acids and have consistencies ranging from semi-liquid to solid and consist of emulsifying agents determined by the application area.

According to the historical records, around 1400 B.C.,

Egyptians prepared greases by combining olive oil with lime and used these lubricants in various vehicle wheel journals. The production of sodium (Na) greases started in the 1870s which is followed by the production of aluminum (Al) and calcium (Ca) greases in the 1880s and the lithium and complex soap greases, which rapidly came into wide use, were invented during the World War II. Patents of the first barium (Ba), lithium complex (LiX) and aluminum (Al) soap greases were registered in 1952.

Considering the sales volumes, lower amount of sales compared to other lubricants does not mean that the greases are of poor quality or not as widely used as other lubricants. On the contrary, greases entirely require extensive knowledge, research, R&D and innovation and are harder to produce than other lubricants only because they offer longer lubrication periods and shelf life.

Metal soap greases are the most commonly used grease types (80–85%) in the world. Greases that do not



contain metal soaps are usually preferred for more specific sectors and processes. Nowadays, the new technology "Calcium Sulphonate Complex" greases are replacing many other grease types.

What do we expect from modern lubricating greases?

If the sector or process you work in includes;

- High speed rolling bearings
- Long-lasting lubrication time requirement due to the difficulty of the lubrication point
 - Rolling bearings operating at very high or low temperatures
 - Neutral against elastomer and plastic seals in your system

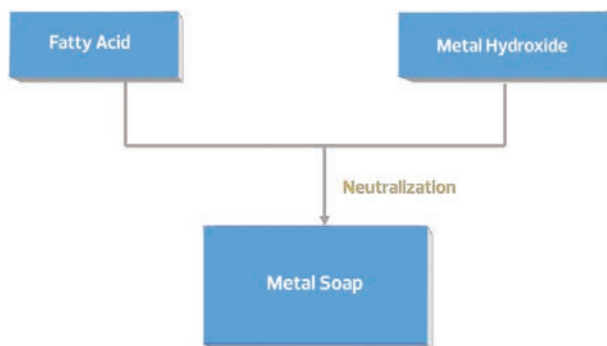
- Reduction in maintenance and repair costs
- Less labor because of the compatibility with central lubrication systems
- Silent operation
- And more, grease is a must.

How are they obtained?

A metal soap is obtained through a chemical saponification process. A fatty acid reacts with a metal hydroxide. Metal soap and water are released during this reaction process. These two reaction products are both neutral, so this chemical reaction is also called the neutralization reaction.

Structure	Nomenclature	Formula	Structural Formula
Long chain acid	Stearic acid	$C_{17}H_{35}-COOH$	
Short chain acid	Acetic acid	$CH_3 - COOH$	
Polyvalent acid	Sebacic acid	$HOOC-(CH_2)_8-COOH$	
Fatty acid	Hydroxy-stearic acid	$C_{17}H_{34}(OH)-COOH$	
Aromatic acid	Benzoic acid	C_6H_5-COOH	

Table 1. Acids used in the reaction



Fatty acids are obtained from animal or vegetable oils by chemical separation (in acid or alkaline medium). In this process, glycerol (multi-bound alcohol) emerges as a by-product and is withdrawn from the system.

Metal hydroxides used in reaction

- Al(OH)₃ = Aluminium Hydroxide**
- Ba(OH)₂ = Barium Hydroxide**
- Ca(OH)₂ = Calcium Hydroxide**
- LiOH = Lithium Hydroxide**
- NaOH = Sodium Hydroxide**

Metal soap greases are classified as simple and complex soap greases. As the name suggests, production of simple soap is not as difficult as the complex soap. For production of simple soap, a fatty acid that gives a neutralization reaction with a hydroxide is used.

STEARIC ACID + LITHIUM HYDROXIDE = SIMPLE SOAP

The simple soap obtained is also called Lithium simple soap. Lithium simple soap and mineral oil (base oil) greases are the most commonly used standard greases.

Complex soap grease production, as the name suggests, is more complex, takes longer to obtain and requires deeper product know-how than simple greases. To produce complex soap grease, a hydroxide is saponified with two different fatty acids:

STEARIC ACID + ALUMINUM HYDROXIDE = COMPLEX SOAP BENZOIC ACID

All mentioned "metals" are combined with known base oils and used in complex soap greases (Mineral, PAO, Ester, Poly Glycol, Silicone, PFPE). Thus, very specific and featured products are obtained to meet the needs for defined applications.





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Viscosity, Moisture, Total Acid Number (TAN), Total Base Number (TBN) analyses in lubricants

Lubricant manufacturers develop products with the aim of meeting customer expectations and ensuring the long-term use of equipment. Lubricant analyses are important in terms of determining the time of oil change properly, monitoring oil quality, decreasing costs by minimizing the risk of damaging relevant facilities and equipment, and limiting the environmental impacts of waste oil. Lubricant analyses provides fast and accurate

results about the condition of lubricants and tells if there is any problem with the equipment. Below are the main advantages provided by the tests, which are run in accordance with the relevant standard test methods with the aim of determining the condition of lubricants and if there is any problem with the equipment:

Taking precautions before any breakdown that would cause additional expenses in the equipment occurs,



- ☑ Decreasing costs by changing or topping-up oil on time,
- ☑ Contributing to decreasing environmental impacts of waste oil.

Key lubricant analyses are as follows:

- ☑ Kinematic Viscosity | ASTM D 445
- ☑ Moisture Determination (by Coulometric Karl Fischer method) | ASTM D 6304
- ☑ TAN (Total Acid Number) | ASTM D 664
- ☑ TBN (Total Base Number) | ISO 3771

SI Analytics® – Kinematic Viscosity Analysis (ASTM D 445)

Kinematic viscosity is the most important feature of a lubricant. It is a measure of a fluid's internal resistance to flow, it determines the fluidity of the liquid. Its measuring unit is cSt (centiStoke) or mm^2/s . If the viscosity of a used oil increased, we can say that the oil is polluted. On the other hand, if the viscosity of a used oil decreased, we can think of possibilities such as fuel leaking, unintentionally mixing thin oil or breaking of molecular bonds due to oil's wearing.

This is based on the method of flowing the sample under gravity from a "Ubbelohde" type capillary measurement tube with appropriate inner diameter in a water or silicon oil bath at 40°C in industrial applications and at 100°C in automotive sector applications. The kinematic viscosity of the lubricant is determined by multiplying the K constant value of the certified "Ubbelohde" capillary measuring tube using the flow time between two fixed points, and the kinematic viscosity of the oil is determined in cSt (mm^2/s).

Kinematic viscosity analyzes with manual, semi-automatic or fully automatic systems can be performed with high precision, reproducibility and reliability with SI Analytics® devices. It can be configured with systems that are suitable for application, using various products such as systems with multiple measurement units that can be



preferred according to daily analysis frequency, viscosity measuring tubes with wide range, professional software, documentation, etc.

Moisture Analysis (ASTM D 6304) with SI Analytics® – TitroLine® 7500 Coulometric Karl Fischer Titrator

It is known that water (moisture) is one of the most dangerous external factors in lubricants. The most important result of this factor in lubricants is that the oxygen (O) atom in the water combines with hydrogen (H) and carbon (C) atoms to form acid (COOH). This can cause corrosion on the surfaces in the area where it is formed. Therefore, moisture analysis is of great importance in lubricants. "Ppm" unit is used in water analysis.



The SI Analytics® TitroLine® 7500 Coulometric Karl Fischer Titrator allows performing precise, reproducible and reliable analyzes in two minutes on average and can be automatically reported in GLP format.

TAN (ASTM D 664) and TBN (ISO 3771) Analysis with SI Analytics® – TitroLine® 7000 Potentiometrical Titrator

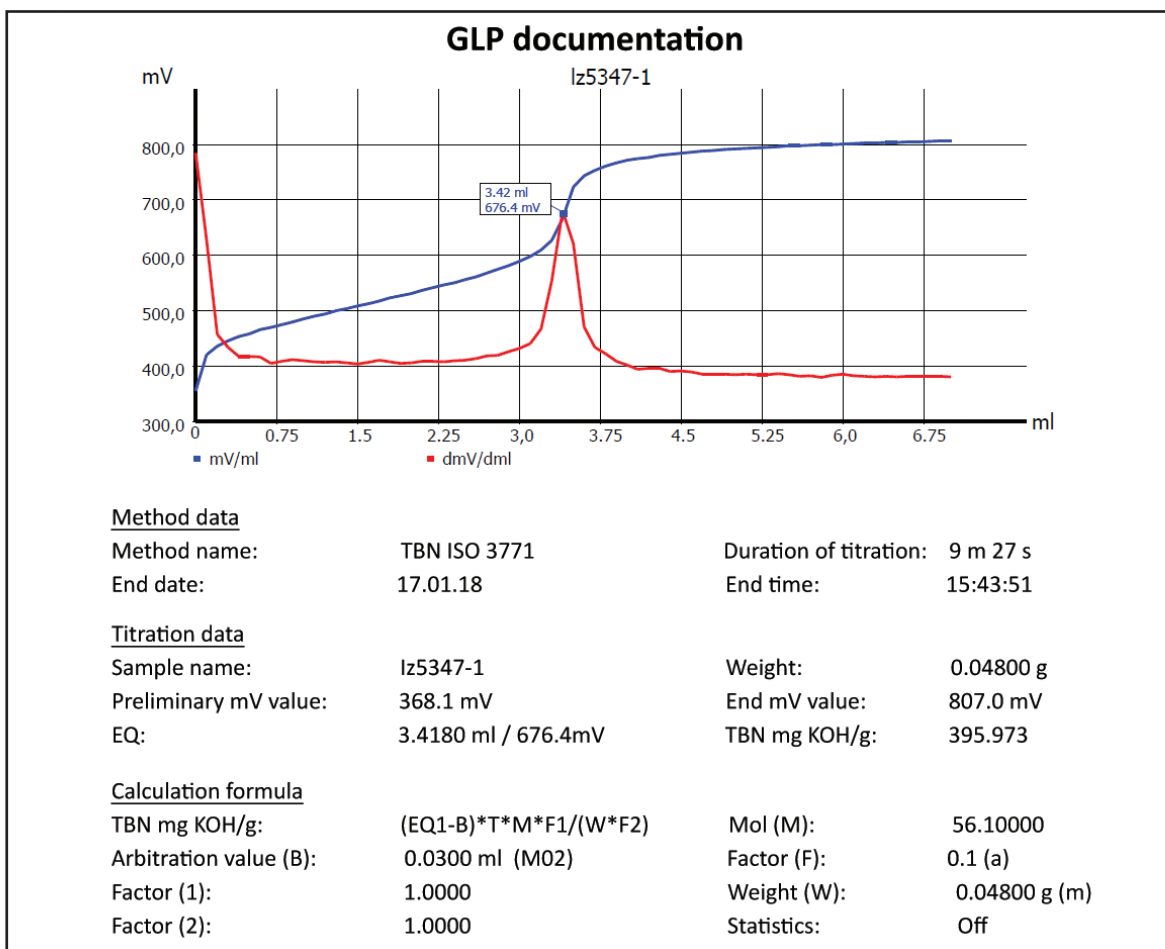
Alkali (base) additives are added to the lubricant in order to balance the acidification that occurs with the moisture formation in used lubricants. These are usually compounds such as calcium (Ca), magnesium (Mg), zinc (Zn), and phosphorus (P). The formation of acid with the oxidation of lubricant can be evaluated by measuring the level of alkali (base) additives in the mineral lubricant. Total base number (TBN) is the amount of HClO_4 required for 1 gram of lubricant to neutralize all essential compounds. TBN is not expressed as $\text{mg}(\text{HClO}_4)/\text{g}$, but as $\text{mg KOH}/\text{g}$. TBN value of a lubricant within acceptable limits protects the equipment against acid. It neutralizes the acid formed and consumes the added base additive. Total acid number (TAN) is the amount of base, expressed in mg KOH ,



required to neutralize all acidic components in 1 gram of mineral lubricant. Its unit is mg KOH/g.

SI Analytics® TitroLine® 7000 Potentiometric Titrator device can automatically perform precise, reproducible and reliable analyzes without the need for an indicator, automatically reporting in GLP format, using a suitable electrode. The same device can also perform different titration applications by using electrodes suitable for the application together with smart dosing units that can be easily changed by the user in seconds. With this user-friendly device with a Turkish menu, methods can be created for relevant applications, and the analysis can be started at any time by selecting the desired application and using the appropriate dosing unit and electrode connection. In addition, all these analyzes can be optionally controlled on the computer with the TitrSoft® software.

Partial analysis report for the TAN Number of the lubricant sample performed on the TitroLine® 7000 Potentiometric Titrator is shown below. The report separately shows the name of the sample, time, date and duration of the analysis, start and end mV values as well as the mathematical calculation. Method and dosing parameters are detailed on the second page of the GLP report. In addition, the device allows the identification and authorization of a user.



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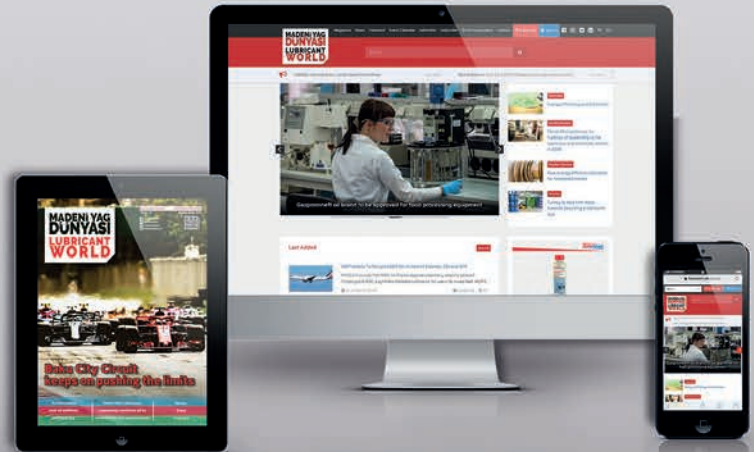
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Lubricant World Magazine

**MADENİ YAG
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Used oil management and upcycling

Waste management should be done in the best way within the lubricant life cycle. According to the waste hierarchy, waste is managed through the following phases: prevention, reduction, reusing if possible, recycling, chemical/material recovery, energy recovery, and disposal. In waste recycling, the origin, quality added to the original waste, functionality, value and price -in short the added value created with technology- constitutes the basis for the concepts of upcycling, recycling and downcycling. The term recycling is frequently used, while upcycling takes its place in our lives and in the circular economy with increasing R&D studies and industrial applications. Base oil production with the re-refining of lubricants that have completed their useful life is the perfect example of upcycling technology in the world of lubricants.

Lubricant consumption causes the largest amount of liquid and anhydrous hazardous waste in the world. While used oils are mostly managed by processing them in small or large traditional facilities and/or burning them in accordance with the legislation, upcycling investments based on the circular economy with waste prioritization are not enough yet.

While base oil is produced from used oil by re-refining in upcycling refineries, used oil creates employment in sustainable development by gaining human, nature, environment and climate friendly added value in the circular

economy. Thus, upcycled base oil is offered to the market with its many advantages over petroleum based base oils.

We started this year with the developments in the European Green Deal, the Circular Economy Action Plan, the Industry Strategy, the Emission Trading System, and the Climate Law. The momentum for a green enthusiasm for the industry had begun. The pandemic reminded us the need for green and blue recovery of land and water ecosystems. GEIR (Groupement Européen de l'Industrie de la Régénération), the European Re-refining Industry Group of UEIL (Independent Union of the European Lubricants Industry), represents 17 companies in 12 countries. TAYRAŞ Base Oil Refinery is the only GEIR member of our country. Dr. Christian Hartmann's article "2020: The year of new green resolutions" is featured in the Lube Magazine, February 2020 edition. In his article he emphasized the importance of these developments for used oil management with the European Green Deal, the Circular Economy Action Plan, and the Industry Strategy. I wish all the best for Marco Codognola, the new GEIR President.

Industry, exporters, lubricant producers and used oil processors in our country closely follow the developments in Europe. Our climate change policy will gain strength with the Climate Change Law and the Emission Trading System Regulation, which are almost finalized. In our country, used oil upcycling will have a special place in the sustainability management of the lubricants industry.



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Journal bearing design criteria – VII

Measuring oil film thickness

As stated in the previous articles, radial journal bearings have operating parameters sufficient to carry the bearing load between the journal (shaft) and the bearing surface. These parameters include speed, load, oil flow, oil viscosity, bearing width, bearing diameter, bearing and oil temperatures, surface texture, etc. One of the main objectives in bearing design is to separate the bearing surface from the journal surface by means of an easily transformable elastic oil film with a suitable thickness. This oil film layer acts as a suspension. However, its easily transformable nature, the intensity and direction of the load, the size and direction of the shaft speeds and changeable nature of the thickness of this oil film at any time pose a risk in terms of the life of the bearing - shaft.

In terms of bearing design, it is a phenomenon that there should be an eccentricity (amount of offset of the centers) between shaft and bearing centers. This misalignment allows easier assembly, creates a place for oil volume and a dynamic operation and pressure-generation mechanism. As a result of this eccentricity, an oil layer that narrows and expands between the two surfaces is formed. In the lubrication literature, this oil layer is called oil wedge. An inclined wedge touches the shell (hub) and shaft surfaces and connects the surfaces to each other, and with this compression of the wedge the surfaces can move together.

Again, the transverse wedges serve to adjust the position between the connected elements, the oil wedge moves the shaft away from the bearing surface and almost floats the shaft in the body of the oil, keeping the shaft suspended in the oil. Therefore, the shaft surface transfers the load to the bearing surfaces while rotating via this suspension. Thus, the bearings serve as the shaft supporting element. With the variable thickness of the oil layer, direct contact of the shaft and bearing surface is cut, ensuring a longer life of the system.

The nominal minimum film thickness in radial journal bearing, which carry variable loads such as the engine bearings in vehicles, is defined according to the surface roughness. Depending on the operation environment, the roughness of the shaft and the bearing surfaces must be greater than the sum. Here, in general, the average roughness (Ra) as well as the maximum surface roughness (Rt, Rz, etc.) should be taken into account. In the lubrication literature, there are tables and charts that recommend minimum oil film thicknesses at micrometer level for operation areas (engine bearings, electric motors, general purpose machine applications, slides, etc.). These charts should be used in bearing design. In addition, oil filtration and compliance in the system is another important factor that affects the minimum oil film. **(To be continued)**



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

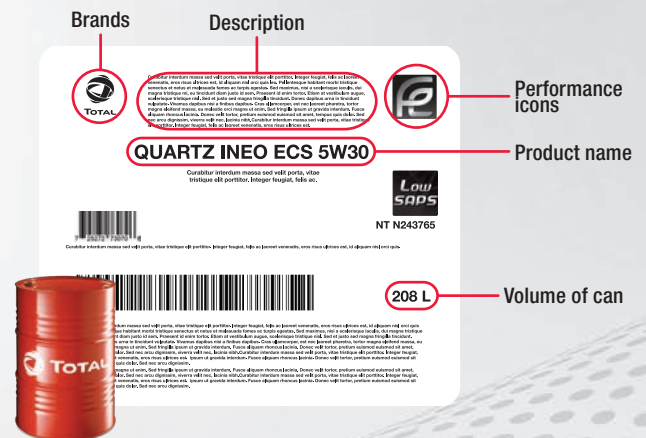
New-generation engine oils and those currently being developed by TOTAL are of increasingly fluid grades: 0W-20, 5W-20, 0W-30 and 0W-16.

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
Chemicals

Madeni Yağ
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