



FOREW

SRIKANTH VISVANATHAN

GLOBAL MARKETING DIRECTOR CVO & INDUSTRIAL



Welcome to the third issue of Industrial Insights, our e-magazine filled with news, trends, features, and customer success stories every quarter. And what a quarter it's been. The situation caused by a global pandemic has seen widespread operational shutdowns, and challenged industry to adapt fast to the changing circumstances.

After rising to that challenge, the world now has one eye on the possibility of a second lockdown and one eye on recovery. But what should that recovery look like? We firmly believe in building back better, whether that takes the form of renewed commitment to efficiency, more innovative use of technology, or a re-focus on sustainability.

All of these and more can be found in this issue. Learn how Castrol Alusol XBB and Hysol XBB cutting fluids are supporting the restart, remaining stable even after the long shutdown. See how renewable energy is getting a boost by reducing wind turbine downtime and maintenance costs.

Discover Castrol's work with leading researchers to develop high performance for the electric vehicles of tomorrow.

The results of our global robotics research reveal insights on how industrial end users are maintaining the growing stock of robots. Discover their key goals and the challenges they face.



You'll also meet a Castrol employee closely involved with developing new offers for the evolving industrial market, and get an insight into our ambitions for the future.

I'd like to assure you of our continued support as we all work to rebuild. As always, your local rep is on hand to assist with any questions or concerns you may have.

Otherwise, please enjoy this issue, and feel free to share any <u>feedback</u> with us.

Let's recover with a focus on optimisation, cost control and quality, without environmental compromise."

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As the move to electric gathers pace, lubricants are evolving, driven by expert engineering and cutting-edge collaboration.

Castrol

Your industrial success: we help make it happen

Castrol has been collaborating with industrial businesses like yours since 1899. Whatever challenges you are facing, we'll help you identify key decisions you can make that could give you the edge. Together we can help make your business even stronger.



Castrol's new synthetic receives approval from FANUC

FANUC, the specialist in factory automation, has put its seal of approval on a synthetic metalworking fluid developed by Castrol.

Syntilo SC 9917 was developed for use in computer numerical control (CNC) machining applications. It will now be used by FANUC, whose machine tools are widely used in the electronics manufacturing services (EMS) sector, including mobile and 5G technology.

The corporation builds dedicated CNC and robotic solutions for various industrial applications, including cutting, drilling, grinding, milling, wire electrical discharge machining, and complex machining.

Factory Automation: Industrial Robots

The cooperation with FANUC China is a major milestone for Castrol and opens the door for potential collaboration on robotics in the near future. This is especially important given FANUC's status as the number one robotics manufacturer globally.

This approval is the latest in a series of original equipment manufacturer (OEM) approvals and collaborations, reflecting Castrol's commitment to working with OEMs to develop optimal lubrication solutions for industrial use cases.

These applications are wideranging, as Castrol interacts with multiple departments at several high-performing industrial companies.

One key area of increasing activity is robotics. High-performance lubrication products are being developed and honed, to service the growing operational stock of robots.

To find out more, turn to our feature on Robo-Trends.

Find out more about our lubricants to maximise uptime in industrial robots

Learn more

like FANUC to develop and optimise products ensures that Castrol is delivering exactly what the industrial market needs."

Subscribe





+ CASE STUDY | LEADING RENEWABLES COMPANY

A leading renewables company achieved cost savings of millions and up to three years more oil life, with Castrol's better oil technology.

The challenge

Changing the main gearbox oil in wind turbines presents a number of challenges:

- Significant cost outlay.
- Detailed logistical planning for new oil and flushing oil.
- Technician time in often hot and humid conditions.
- Turbine downtime.
- Disposal of used oil.

The location of offshore turbines can make the challenges even greater. Even with good quality pure polyalphaolefin (PAO) synthetic gear oils with extended drain intervals, there is a need for better oil technology.

The solution

The leading tier one wind turbine manufacturer had used Castrol Optigear Synthetic X 320 globally since 2011. They began with a calendar-based 5-year main gearbox oil change interval, which has been extended over time.

Castrol has developed an additive boost package, Optigear Synthetic X 320 AD, that can be added to the main gearbox oil to replenish additives, keeping the oil suitable for further use.

In-depth analysis with their project engineer, as well as field trial data, revealed significant benefits from using Optigear Synthetic X 320 AD.

ABOUT

<u>Castrol Optigear</u> <u>Synthetic X 320</u>

Premium synthetic oil for wind turbine gears operating in wide temperature ranges and under high loads.

- Suited for high-capacity wind turbine gears.
- + Delivers best-in-class surface protection.
- Proven to reduce friction by up to 30%.
- Unique MicrofluxTrans Plastic Deformation (MFT-PD) technology to improve the quality of gear surfaces.
- Reduces critical gearbox stress, operating temperatures, and wear.
- Significantly reduces further damage in pre-micropitted gears.
- Meets BSI PAS 2060 specification for complete carbon neutrality.



+ CASE STUDY | LEADING RENEWABLES COMPANY

The results

This is a game changer for the wind industry: reducing carbon footprint, HSSE risk, and levelised cost of energy (LCOE)."

said the project engineer from the tier one wind turbine manufacturer.

Based on test data from field trials, Optigear Synthetic X 320 AD can eliminate at least one main gearbox oil change over the life of the turbine. For some turbine types, it can eliminate two changes.

In either case, major cost savings can be achieved. Eliminating even one gearbox change means eliminating the associated costs of technician time, oil filling, and lost turbine revenue during the downtime.

The cost saving of eliminating one main gearbox oil change is calculated to be at least a couple of thousand US dollars per

turbine (depending on the platform).
As the customer has an installed capacity of 10,000+ turbines, eliminating one gearbox oil change per turbine gives a multi-million dollar cost saving.

Field trial data also showed that, by using Optigear Synthetic X 320 AD, it was possible to stretch the 7-year oil life to 10 years.

As well as these tangible savings, changing oil less frequently brings other important benefits. Operator safety is increased, environmental risk is reduced, and sustainability is enhanced*.

Implementing this cost saving incurs very low implementation outlay and setup time. As soon as the maintenance schedules are updated, the cost savings can begin to flow.

Using a forecasting and planning tool designed specifically for Optigear Synthetic X 320 AD, costs can be smoothed out across a number of years. The typical spike associated with having many oil changes in one season can be avoided.



- Castrol's innovative additive boost package can be used to extend the useful life of Optigear Synthetic X 320 even further than before.
- Removing at least one main gearbox oil change during the lifetime of each turbine can result in significant cost savings.
- Reducing oil usage, as well as using a certified carbon neutral oil for initial fill, helps to minimise the turbine's impact on the environment.

Contact us at industrialinsights@ castrol.com to learn more about Castrol Optigear Synthetic X 320 AD.

*Due to the proven elimination of at least one main gearbox oil change over the life of the turbine.









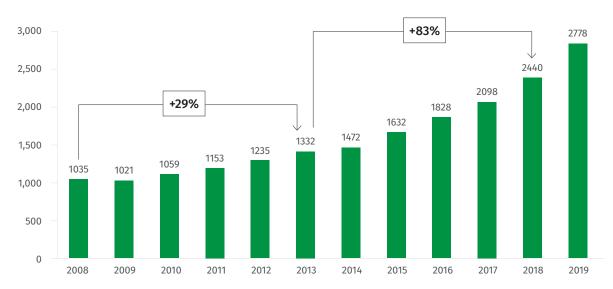
+ FEATURE | ROBO-TRENDS

How industry handles robot maintenance today, and tomorrow

Castrol conducted in-depth research with a number* of industrial customers, leading companies with many household names among them.

Our goals were to learn how industry is maintaining the growing operational stock of robots, understand the challenges faced, and look ahead to the near future of industrial robotics maintenance.

Annual global operational stock of industrial robots (Unit: 1,000)



Source: IFR World Robotics 2018

Robot installations are rising

It's clear that the global operational stock of industrial robots is rising. Not only that, but the rate of increase is accelerating too. In the

five years from 2008 to 2013, there was a 29% increase. But in the next five years from 2013 to 2018, this leapt to an 83% increase. Average unit prices have levelled out around the \$45,000-mark. Many predict that they are likely to remain stable for the next five years due to supplier margins, although it is also likely

that robot costs are reduced due to a different mix of 'average nominal price'.

*Qualitative interview with 30+ customers across China, Europe, Japan, South Korea, and the USA in Q2 2020.



+ FEATURE | ROBO-TRENDS

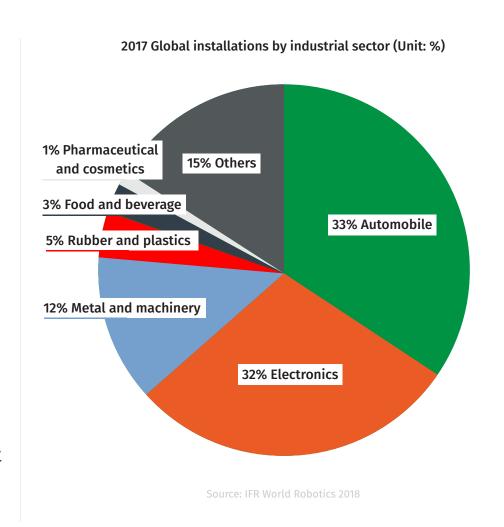
Two sectors dominate the market for industrial robots. The automotive (33%) and electronics (32%) industries each account for a third of total global installations.

For end users in these sectors, there is a natural incremental installation of robots, which is largely driven by product innovation. Here's one example from the automotive industry:



Take welding as an example: although today's robots are flexible and can be reprogrammed with new requirements, there may be a need to install new robots when a new model comes out, as the process of welding needs to change the movement or technique."

Automotive end user





+ FEATURE | ROBO-TRENDS

HOW END-USERS ARE MANAGING THEIR ROBOTS

Most industrial robot maintenance is conducted by OEMs, in-house maintenance teams, and an increasing emergence of independent service companies.

The key goals of industrial robot operation are:

- Productivity
- Cost reduction
- Zero downtime
- 5S environment (the methodology for organizing, cleaning, developing, and sustaining a productive work environment)

Robot uptime is therefore important in creating a productive industrial workplace. For the automotive and electrical sector end users who took part in the research, there are a number of challenges they must handle to keep the robots working, and achieve their goals.

*qualitative interview

across China, Europe,

Japan, South Korea, and

with 30+ customers

the USA in Q2 2020.

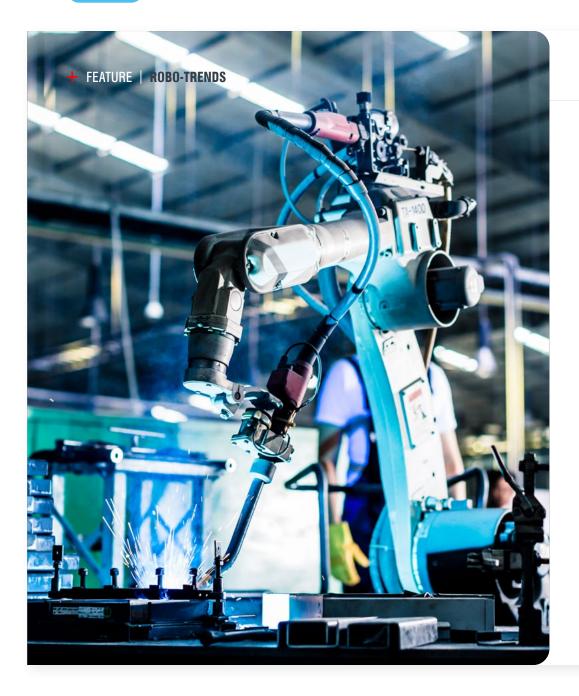
Challenges of industrial robot maintenance				
Skills shortage	"I hope there's more training, or troubleshooting by internet or phone, so we could fix the problem in the field immediately."			
Resources shortage	"We've got hundreds of robots in one shop, but only 6 maintenance technicians. We know routine lubrication is important, but we don't have time to do that."			
Need for data-driven lubrication	"The volume and changeover time is based on our own experience"			
Reducer wear	"We can fix the problem but we still need to buy the reducer, and the supply can be slow."			
Lubricant leakage	"We have clear 5S requirements. That's why we need lubricants with cleanness."			

For more information on how Castrol can help

contact us at: industrialinsights@castrol.com

industrial companies overcome these challenges,





The next 5 years: **Evolution of the 0&M model**

In the light of Industry 4.0, the future operations and maintenance (O&M) model of robot will be data-driven and predictive.

"We could collect data from robots across the world. With larger amounts of historical data, we could calculate the probability of failure under various conditions, and send immediate recommendations for maintenance, to achieve zero downtime and reliable production."

Robot OEM

In order to achieve this vision, current limitations will have to be overcome, including the lack of variety of data and concerns around data sharing. There is also a push to go beyond robot management, and connect maintenance solutions with the wider overall performance of factories.

For more information on the research, contact us at: industrialinsights@ castrol.com

Learn more



+ CASE STUDY | GEHRING

GEHRING AND CASTROL



Watch this video to see how Gehring Group and Castrol give customers the high performance they demand today, while also future-proofing their operations.

About Gehring Group

- Supplies cutting-edge surface finish technology solutions for internal combustion engines, gears, and numerous other industrial applications.
- In operation for over 100 years.
- World-class reputation for high productivity and precision.



+ CASE STUDY | GEHRING

The challenge

"Gehring is a world leader of solutions for honing technology. We now face market changes to sustainable solutions, therefore it's very important to create a new ecosystem that allows us to follow this transformation path."

Sebastian Schöning, CEO, Gehring Group

For Gehring to maintain its well-earned reputation for excellence, any cutting fluids used have to be able to deliver the high performance that customers demand.

Looking ahead, it's also essential that they are future-proof and meet sustainability criteria.

The solution

Castrol is Gehring's preferred supplier of cutting fluids for honing machines.

Partnering with Castrol delivers three key benefits to Gehring:

- Castrol's products and services optimise their manufacturing and application performance.
- Castrol helps them save costs: maintenance, fluid, and overall factory costs.
- Castrol optimises their environmental footprint (longer system life and less waste).

Castrol also integrates

SmartControl digital fluid

monitoring into Gehring's new

core system, helping Gehring's

customers optimise their honing

machine performance.

With Castrol we have a partner that we trust based on a long-term relationship, working together on very innovative solutions."

Sebastian Schöning, CEO, Gehring Group

Find out more about Castrol's latest cutting fluids with XBB technology

Learn more









+ FEATURE | SMOOTH RECOVERY

Easing the road to recovery

As the world starts to recover from the pandemic with a keen eye on costs, it's more vital than ever for industry to maximise efficiency, reduce downtime, and minimise O&M costs.

As a partner on the road to recovery, Castrol's high-performance lubricant range delivers return on investment with extended maintenance intervals and increased efficiency, combined with superior performance to turbocharge success.

High pressure calls for high performance

The planet's industrial installations may have had something of a break recently, but as production starts back, the pressure is on again.

Equipment is often subjected to speeds, loads, and temperatures beyond its design and specifications, causing excessive wear and premature failure*.

High-performance lubrication is essential to properly protect and prolong the working life of machinery. Castrol's range is engineered to exceed the capabilities of conventional lubricants.

*To learn more about high-performance lubricants visit https://thelubricantoracle.castrol.com/hplguide/

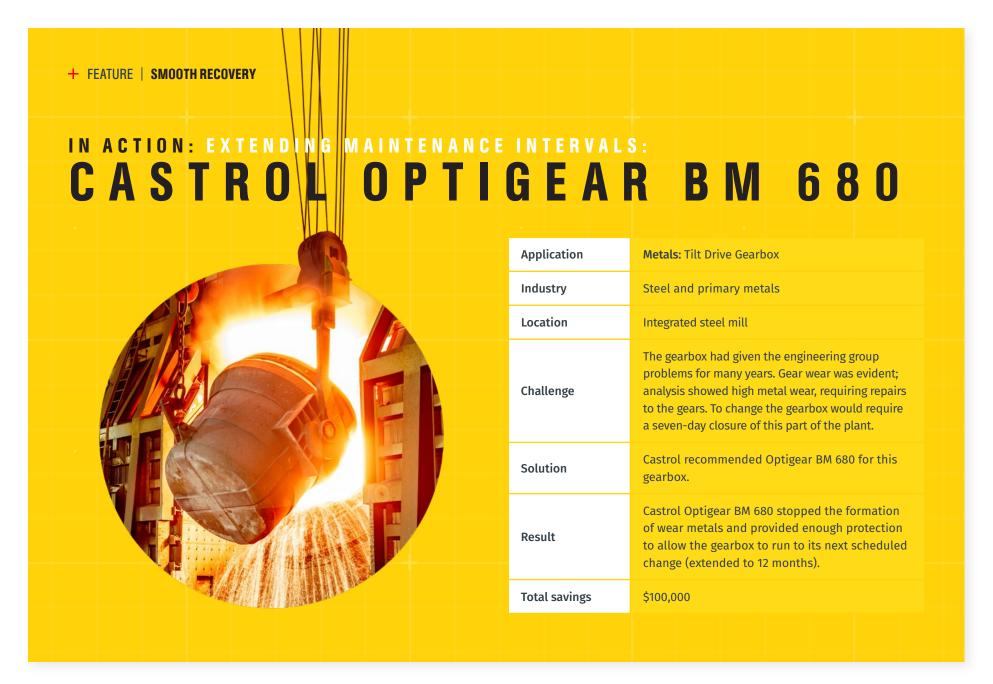
Castrol high-performance lubricants:

- Offer superior and differentiated performance not readily achievable with conventional industrial lubricants.
- Are for longer life of critical or capital-intensive equipment.
- Are formulated to go beyond industry specifications.

- Deliver significant value in enhancing protection, reliability, and productivity at reduced operating costs.
- Are used in a range of sectors including automotive manufacturing, machinery manufacture, wind energy, steel and primary metals, and mining.
- Include Optigear, Molub-Alloy, Tribol, LubeCon, Viscogen, Optileb, Optitemp, Brayco, and Braycote.









+ FEATURE | SMOOTH RECOVERY

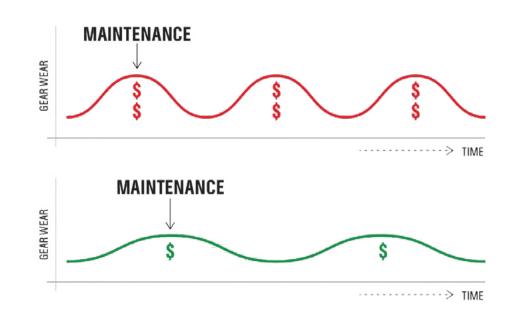
From reactive to reliability: maintenance continues to evolve

Industry's mass movement from reactive to predictive maintenance (PM) has brought greater efficiency, reduced cost outlay, and a fall in downtime*. The next frontier is reliability-centred maintenance (RCM).

RCM takes PM to the next level of performance and cost-effectiveness. It originated in the airline industry as a means to minimise and even eliminate component failures.

Building proper lubrication management into this maintenance agenda is essential, given the direct impact on the moving components in equipment. If selected and managed effectively, lubricants can contribute to much larger savings in maintenance and production activities.

*To learn more about high-performance lubricants visit https://thelubricantoracle.castrol.com/hplguide/



Build back better we help make it happen

As industry returns to capacity, smart companies are looking for ways to improve and enhance their operations. Our high-performance lubricant range is perfectly

honed to bring better outputs and greater efficiency.

Get to know Castrol's high-performance lubricants.

Learn more



+ FEATURE | XBB CUTTING FLUUIDS

CASTROL CUTTING DOWN RESTART TIME WITH CASTROL CUTTING DOWN RESTART TIME WITH WITH CASTROL CUTTING DOWN RESTART TIME WITH CASTROLOGY



Metalworking engineers are finding that central systems running with Castrol Alusol XBB and/or Castrol Hysol XBB cutting fluids showed better stability* during the shutdown period and are quicker at starting up than those on other fluids.



+ FEATURE | XBB CUTTING FLUUIDS

Castrol's XBB technology cuts the need for compromise between productivity, performance, safety, and cost. Both Castrol Alusol XBB and Castrol Hysol XBB fluids use a dual-action chemical buffer that resists pH changes for longer, delivering greater stability and better machining performance.

Conventional fluids provide an environment for bacteria to thrive, leading to corrosion-causing pH fluctuations and unstable emulsions. Use of biocides to combat this introduces substances like harmful formaldehydereleasing agents.

Castrol Alusol XBB and Castrol Hysol XBB cutting fluids are formulated without biocides, boron, or formaldehydereleasing agents. The range also reduces additive use by up to 90% or more, keeping control of a major source of costs. As industry reopens and rebuilds, XBB technology is helping to support a strong and more sustainable recovery by:

- Reducing or eliminating the need for expensive treatment additive top-ups.
- Exceeding system lifetime expectations — without formaldehyde-releasing agents or boron.
- Increasing production efficiency, cutting costs, and reducing labour time.
- Prolonging fluid life and cutting down on repairs and interventions.

Castrol Alusol XBB and Castrol Hysol XBB range					
	Cast iron	Low-alloyed steel	High-alloyed steel	Aluminium	
Castrol Alusol SL 61 XBB	•	• •	•	• •	
Castrol Alusol SL 51 XBB	•	• •	•	• •	
Castrol Hysol SL 50 XBB	•	• •	•	• •	
Castrol Hysol SL 45 XBB	•	• •	•	• •	
Castrol Hysol SL 37 XBB	•	• •	• •	• •	
Castrol Hysol SL 36 XBB	• •	• •	•	•	
Castrol Hysol SL 35 XBB	• •	•			
Castrol Hysol SL 30 XBB	• •	•			

- Use recommendedUse possible
- *Based on TIER 1 European OEM customers' feedback based on their experience during/post COVID lockdown.

Together, Castrol Techniclean XBC and Castrol SmartControl form an ecosystem built around the Castrol Alusol XBB and Castrol Hysol XBB range to help customers decrease O&M cost by reaching longer system life and stable systems. Find out more about Castrol Techniclean XBC cleaners and Castrol SmartControl.



EMPLOYEE SPOTLIGHT

LUKAS KALUZA

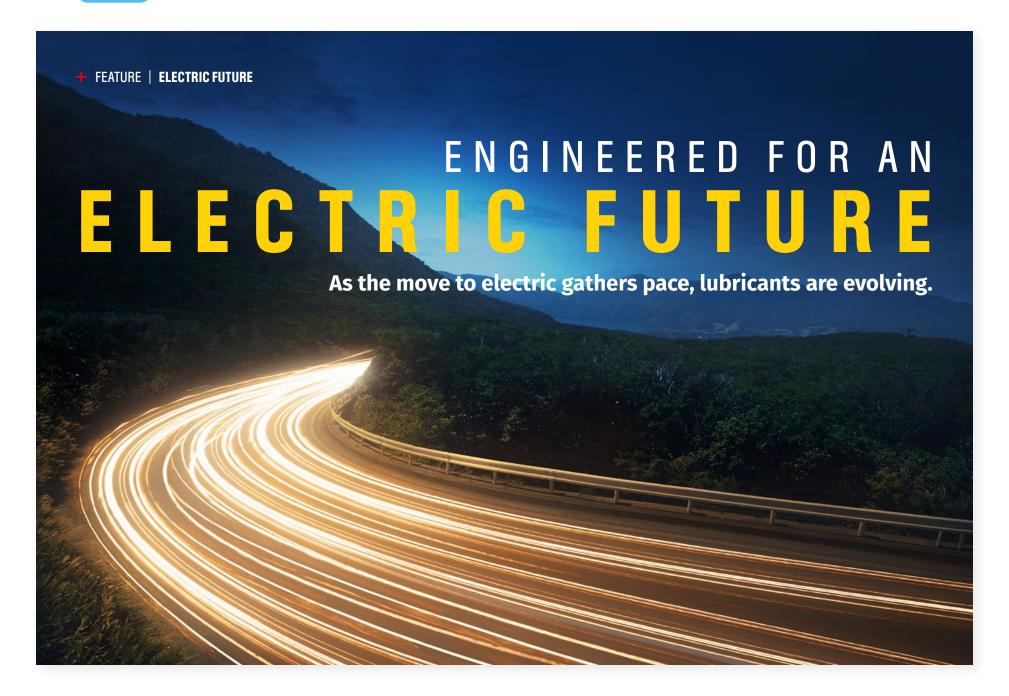
GLOBAL OFFER DEVELOPMENT MANAGER CASTROL INDUSTRIAL

This month we're talking with Lukas Kaluza
He works on developing new offers for
industrial customers, from ideation through
to implementation. Lukas has been involved
with exciting projects and investments from
the beginning of his Castrol journey. Watch
the video to learn more about his role,
inspirations, and the ultimate dream product
he would love to develop.

WE WANT TO CREATE THE BEST PRODUCTS AVAILABLE."









+ FEATURE | **ELECTRIC FUTURE**

Castrol has extensive experience in producing ON-CAR components. Electric vehicles are the latest stage in an exciting journey.

We have worked in collaboration with original equipment manufacturers (OEMs) to bring you the optimal grease products, tailored to the challenges faced by electric vehicles.

Lubricant selection for electric vehicles has broad implications, impacting:

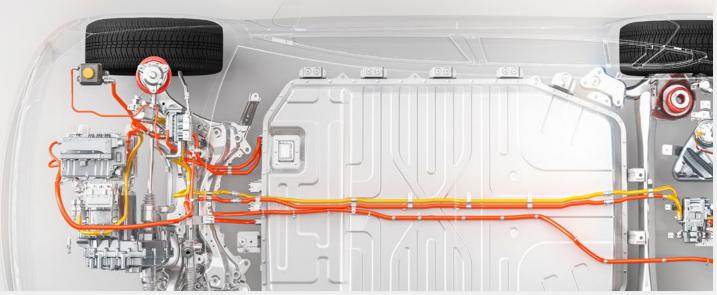
- Speed
- Efficiency
- Endurance
- Insulating media
- Temperature
- Noise
- Corrosion

The right solution for every function

Electric vehicles present a set of specific conditions that any lubricant must be able to both withstand and excel in. Greases must be resistant to peak temperatures of up to 180°C, high-frequency electrical conductivity, and wear.

Energy efficiency and low noise are two of the key expectations placed on the electric motor, so compatible lubrication has to support and enhance these features.

We're continuing to invest in the development of novel technology to meet the full requirements of next generation greases, including advanced research with leading universities to explore the use of polyurea grease in electric motors.





+ FEATURE | **ELECTRIC FUTURE**

A range of greases for a range of components

Castrol's engineers have collaborated with original equipment manufacturers (OEMs) to develop a range of optimal greases for ON-CAR applications. The portfolio includes greases to suit a broad range of components with differing mechanical, chemical, and physical properties.

Different thickener technologies are used, including lithium/lithium complex, calcium/calcium sulfonate/complex (CaSx), aluminium, polyurea, mixed soap (lithium/calcium), polymer (nonionic), pastes, and teflon (polytetrafluoroethylene — PTFE).

ON-CAR greases also use different carriers to match the requirements of different components, including mineral oil, polyalphaolefin (PAO), polyglycol (PAG), perfluoropolyether (PFPE), ester, and silicone.

Where To Use Castrol ON-CAR Greases:



eMotor

Thermal management actuators and coolant pump.



Body

Door hinges and seat adjustment motor.



Brakes

Callipers, pads and hydraulic system.



High voltage system

Traction motors and AC compression motor.



Electrical

Mirror motor bearings and starter motor bearings.



Steering

Rack and rod ends.



Transmission

Clutch and wheel bearings.

Engineered for electric

To meet the new challenges of electric vehicles, Castrol grease for electric motors and constant velocity joints (CVJs) are engineered with the following characteristics:

- Polyurea thickener/synthetic base oil
- Low particle size
- + Oxidative and shear stability
- Low base oil viscosity
- Additive composition
- PD technology
- Using non-polar components
- Compatibility with fluids and other components

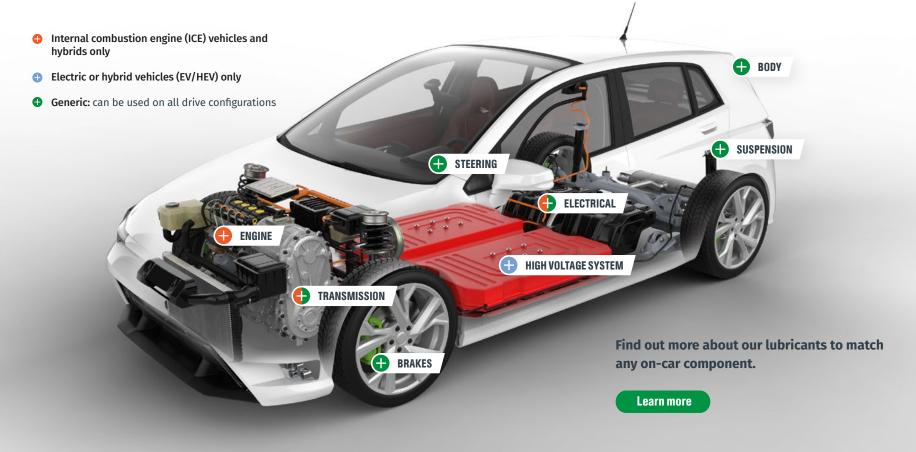


+ FEATURE | ELECTRIC FUTURE

The 50 system components that require lubrication are located across eight parts of a vehicle.

50 VEHICLE SYSTEM

COMPONENTS AND THEIR LUBRICATION









NASA CHOSE CASTROL FOR ITS MARS ROVER. YOU CAN CHOOSE US FOR YOUR VEHICLE HERE ON EARTH.

NASA has chosen Castrol to help keep its new Mars Perseverance Rover working smoothly in the unforgiving conditions on the Red Planet, when it lands in 2021.

Whether your world is cars, motorcycles, trucks or boats, discover why Castrol's range of oils, lubricants, technologies and services are the best choice to keep you moving too.

Discover how we helped make it happen. Visit castrol.com/industrial

Find out more

#makeithappen

