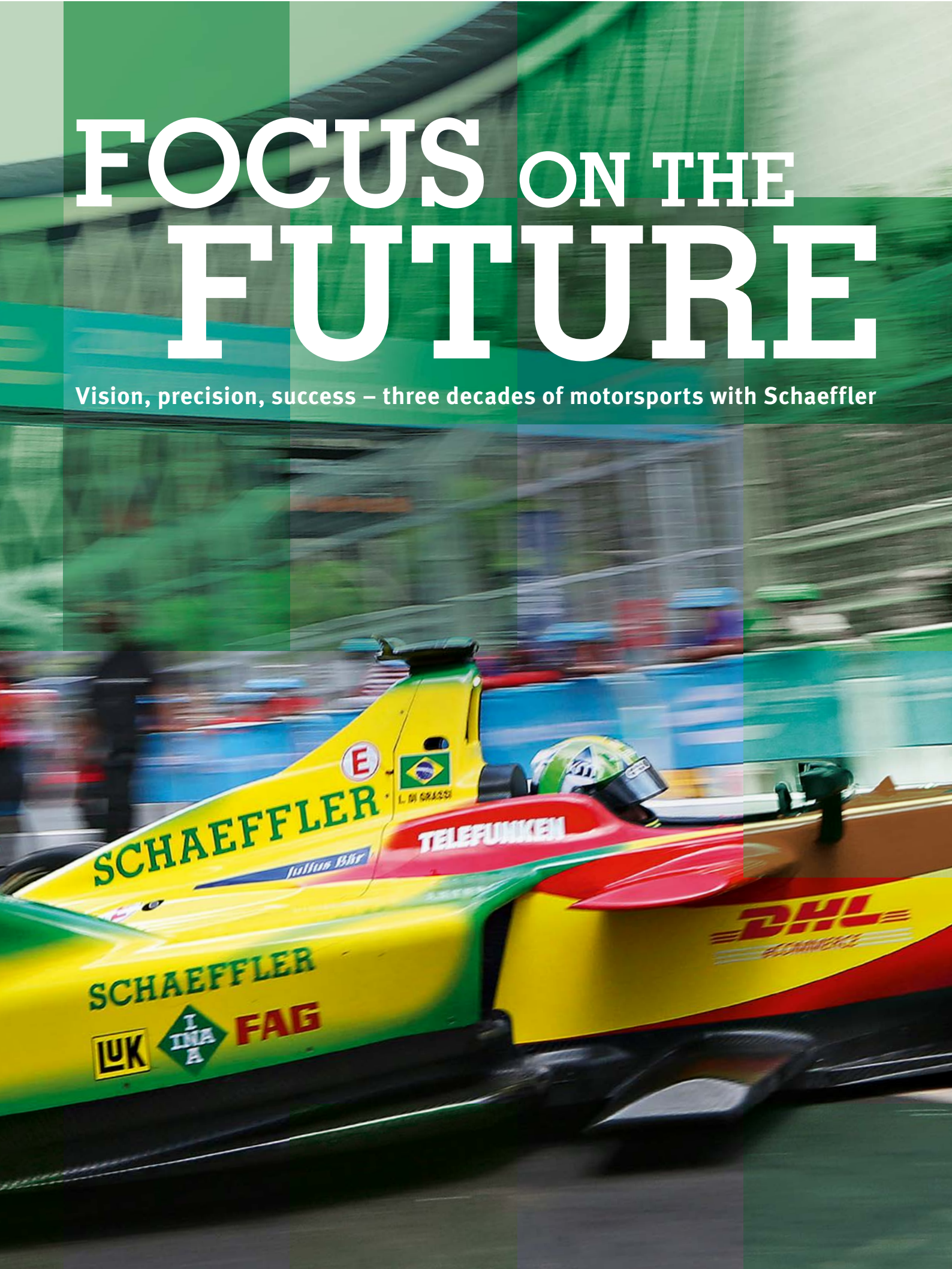
FOCUS ON THE FUTURE

Vision, precision, success – three decades of motorsports with Schaeffler



FOCUS ON THE FUTURE

Vision, precision, success – three decades of motorsports with Schaeffler

Jörg Walz
Lukas Stelmaszyk

FOREWORD
Prof. Peter Gutzmer

Dear Readers,

Mobility is a basic need, a need we all share. At Schaeffler, we are working day in day out on mobility for tomorrow – today. Motorsports assist us in this endeavor. Schaeffler's history on the world's race tracks now spans several decades. In motorsports, our precision products are put to the test in extreme conditions. The resulting findings make it possible for us to play an active part in shaping the present and future of the automobile.

Together, we move the world this way, with our customers, as well as through our interaction within the Schaeffler Group. Motorsports both pose a challenge and provide motivation. Meticulous preparation, teambuilding and leveraging technology with pinpoint accuracy and to perfection are all ingredients for success, just like intuition and the ability to extract the maximum from existing potential – while delivering supreme quality and reliability.

Even though many of our components may be small, they play a crucial part in determining success or failure. Our needle roller bearings, which we offer in 15,000 variants, are just one example. Proven in motorsports, they are used in automobiles, motorcycles, construction and agricultural equipment. Modern automotive transmissions would hardly be conceivable even in this day and age without reliable needle roller bearings. Plus, every third car in the world that leaves the assembly line today is equipped with a clutch by LuK.

The book you are holding in your hands, 'Focus on the Future,' is the second Schaeffler motorsports book. A lot has happened since the first edition, 'In Pole Position,' was published four years ago, not only in the racing series we had previously been active in. New commitments have been added, such as Formula E and the FIA World Endurance Championship (WEC), as Schaeffler moves with the times in motorsports as well. With a clear vision, we pursue our aim of delivering intelligent answers to the great challenges posed by mobility for tomorrow and beyond.

We are driven by this commitment. We achieve success through precision. On the following 158 pages, we will show you how in detail. Enjoy the read.

Prof. Peter Gutzmer
Chief Technology Officer

SUMMITEER

Mike Rockenfeller in the green-yellow Schaeffler Audi RS 5 DTM secures the title in the most popular international touring car series in 2013. The following year, he takes third place.


FAG
1st
1st

ELECTRIC RAPIDS

Formula E with its fully electric vehicles revolutionizes motorsports in 2014. Schaeffler is involved from day one and, with Team Abt, causes a sensation.

TEAMING UP

Porsche returns to the top international sports car stage with Schaeffler in 2014. In the FIA WEC, the two Porsche 919 Hybrid cars combined generate an electric power output of 3,592 kWh – as much as a German two-person household consumes per year on average.


adidas
SCHAEFFLER
FAG
919 hybrid
DMG MORI
HY
Mobil 1
CHOPARD
WEC
DHL
20
P1
PORSCHE
INTELLIGENT
PERFORMANCE

30 Formula E

44 DTM

76 WEC

90 Baja

100 Formula Student

MOTORSPORTS
IN OUR GENES

Competition, momentum, vehicle control at the limit – motorsports have many facets that make it unique. But they also sharpen the senses, and provide new ideas and motivation for routine tasks. All of these are reasons that motivate Schaeffler to be involved in motorsports.

Be it in Formula E, the DTM, the WEC, the Baja or in Formula Student: Success in motorsports is closely tied to the ability of each individual but in particular to teamwork as well. Innovative prowess and dynamism, determination and courage are essential. This applies to the endeavors of the Schaeffler employees as well and has resulted in Schaeffler successfully standing its ground as one of the world's leading automotive suppliers. The motorsports commitment has been a substantial element of the Schaeffler brand strategy for years and is anchored in the company's genes in Herzogenaurach – as well as around the globe where Schaeffler's more than 80,000 employees are active.

Why? Because motorsports are emotional and the highly diverse racing series in which Schaeffler is involved pose technological challenges and thus require a maximum of commitment and know-how. Take Formula E for example. The first-ever racing series for fully electric vehicles uniquely embodies the claim of mobility for tomorrow. At Schaeffler, helping to shape the electrification of the automobile is one of the central strategic topics for the future. Schaeffler is one of the innovation leaders in this field and frequently pioneers new ideas. This is the intended course for Formula E as well when, starting in the 2015/16 season, the previously restrictive development opportunities will be progressively opened up. For Schaeffler, this will result in possibilities to contribute its proprietary know-how even more intensively.

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In the DTM, the green-yellow Schaeffler Audi has been the eye-catcher since 2011. In addition to its striking colors, its sporting successes are remarkable too. In the first year of the partnership, Martin Tomczyk, in a previous-generation car, secured one of the most surprising title wins in DTM history. His successor, Mike Rockenfeller, followed suit when he became champion in 2013. Furthermore, as Schaeffler's brand ambassador, Rockenfeller impressively embodies the company's values. For the trained automotive mechanic, participating in events at the Schaeffler plants is not an unpleasant duty. He enjoys these events and asks employees to explain their jobs to him. For the employees, it is both an honor and motivation to familiarize the champion with the enormous breadth of the Schaeffler product range in direct exchange and to see him in action at close range.

2

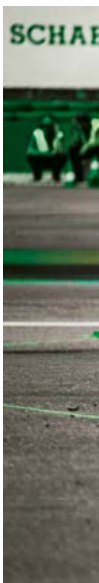
1 Visionary thinking – in Formula E, the slogan stands for the program

2 Prominent visitor – FIA President Jean Todt gets a first-hand impression of Formula E

3 Not an unusual sight – the Schaeffler Audi leading the entire DTM pack

1

Action at close range is something that Schaeffler experiences in the FIA World Endurance Championship (WEC) as well – together with Porsche. In 2014, the brand based in Weissach returned to the top category, LMP1, following a 16-year abstinence but has not only been relying on Schaeffler's expertise since then. The partnership has historically grown and in motorsports as well as in production dates back to the nineteen-seventies. The WEC provides Schaeffler with a perfect opportunity to demonstrate technological expertise. With a new set of Technical Regulations that limit the amount of usable energy while allowing substantial freedom in the areas of hybrid and powertrain technology, energy efficiency and forward-thinking technology are more important than ever – topics that drive Schaeffer in terms of automotive technology, as the reliability and quality of production vehicles are of major importance to Schaeffler. In the season's pinnacle event, at Le Mans, alone, the cars cover some 5,000 kilometers within a day – which nearly equates to a full Formula One season.



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1 Jointly through Eau Rouge – Schaeffler and Porsche in the WEC

2 There's no such thing as an obstacle for Armin Schwarz in the Trophy Truck

3 Formula Student – a development lab for engineers of tomorrow

More than 2,000 kilometers are covered by Armin Schwarz in his Trophy Truck in the Baja 1000 – on a single day. The wild off-road races through desert regions in California and Mexico number among the toughest motorsports challenges for 'man and material.' Schaeffler provides know-how and numerous products of the FAG, INA and LuK brands – suspension components, torque converters, wheel bearings and transmission bearings. The industrial bearings which are normally at home in bulldozers, tractors or excavators are put through their paces in the Baja races under extreme loads and, in some cases, have to resist forces that are a 100 times higher than those that normally occur. After the races, components that have been subjected to particularly high loads are carefully analyzed at the Schaeffler laboratories and, if necessary, modified to meet these specific requirements.

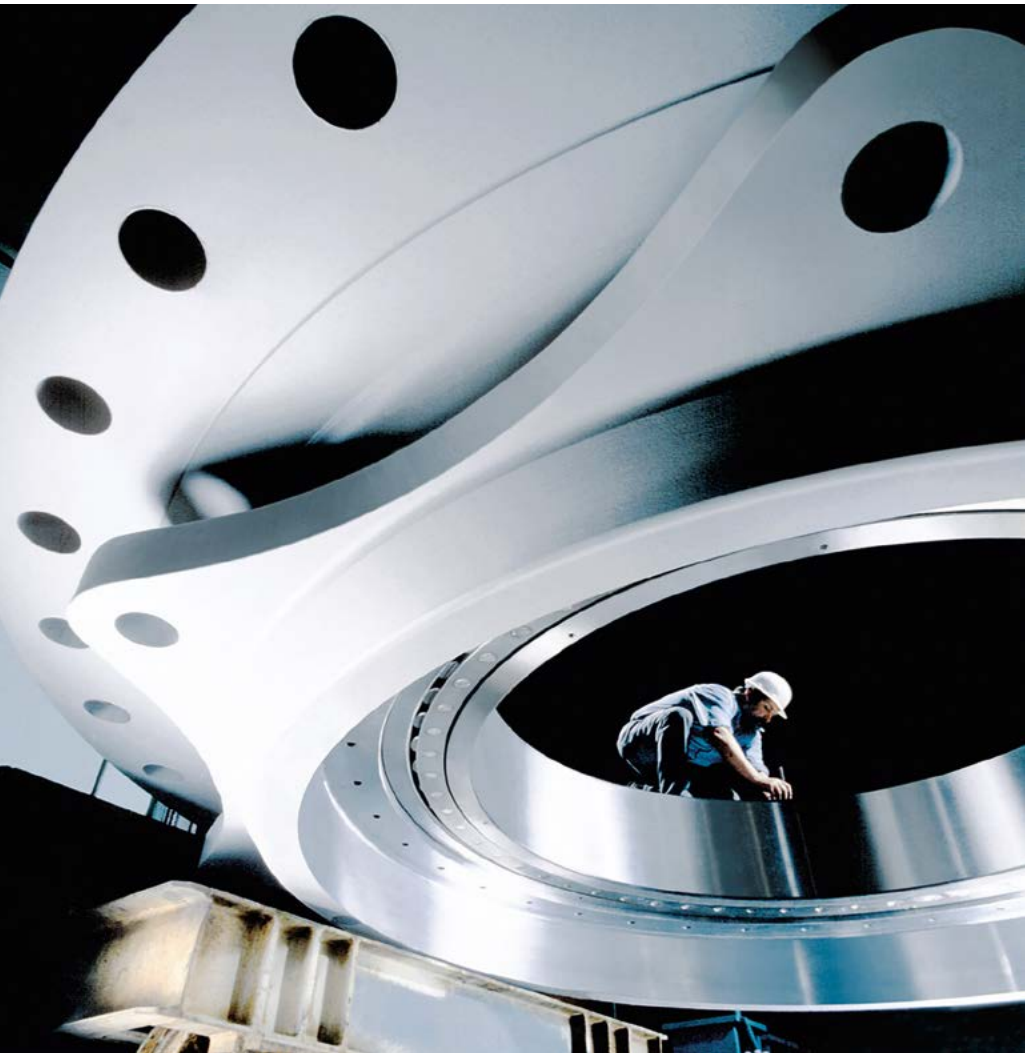
3

Formula Student challenges engineers of tomorrow to build a race car under high time pressure that will be pitted against other Formula Student cars in international competitions – the art of engineering performed by students. Providing hands-on experience in the use of state-of-the-art technologies and developing ideas for tomorrow's mobility – this is what Formula Student and its partner Schaeffler both stand for. But that's not all, as Schaeffler supports numerous other racing series and teams in motorsports, including club sport. This is where the company's know-how from the automotive sector is brought to bear. Among other things, the findings gained are used for application to its core business and other urban and inter-urban forms of mobility like rail and aviation, as well as innovative forms of energy production, such as wind power, solar power and hydropower. In this book, we would like to invite you to immerse yourself in the fascinating motorsports world of Schaeffler.


SCHAEFFLER
FAG
eWHEEL DRIVE
SCHAEFFLER
FAG
eMobility

WINNING WITH IDEAS

Schaeffler has been battling for leading positions with a passion for decades – not only on the race track. With a continuous flow of new developments and innovative ideas, the Group has been maintaining its top spot in the global marketplace as a supplier of pioneering technologies for mobility and industry.



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What does a rotor bearing for a wind turbine with a diameter of 3.5 meters and a weight of 15 tons have in common with Porsche's hybrid Le Mans sports car? Well, more than might be suspected at first glance. These two examples from the vast Schaeffler universe share three important items that are listed in their 'specifications:' durability, powerful performance and efficiency. These three characteristics are invariants across the widely ramified product portfolio of the Schaeffler Group with its three Group brands, LuK, INA and FAG, more than 80,000 employees and 170 locations in 49 countries.

Whether a high-speed train glides down a track, a mega freighter makes its way through the gates of the Panama Canal locks, an e-bike zips through the streets of a city, or a car travels from A to B, Schaeffler, no doubt, is on board. Even the Mars rover exploratory mission of the red planet is assisted by Schaeffler products. Schaeffler develops and manufactures precision products for anything that moves – for over 60 sectors around the world – the portfolio spanning the range of bearings for strip mining excavators with a 12-meter diameter to tiny 1-millimeter bearings used in dental drills.

1 Since 2000, a huge FAG rolling bearing has been operating in the ‘London Eye’ Ferris wheel

2 Some 60 Schaeffler components on average are installed in every new car. Schaeffler has a strong presence in the aftermarket as well

3 Race cars and production vehicles can be upgraded to feature four-wheel technology with the E-axle

Traditionally, Schaeffler’s position has been particularly strong in the automotive sector. Elements and systems of the Schaeffler product brands, LuK, INA and FAG, can be found in vehicles of practically all manufacturers, be they in Europe, Asia, North or South America. The automotive portfolio ranges from wheel bearings, suspension and steering components, transmission components and developments, to engine elements, electric drive and hybrid solutions, as well as valve timing systems. This breadth is reflected in an impressive figure: on average, some 60 components made by Schaeffler are installed in every automobile around the world.

Schaeffler’s outstanding position on the world market is the result of the hard work and diligence invested by generations of its people, as well as by numerous new ideas and solutions pioneered by the company. The number of patents filed per year shows the innovation prowess of Schaeffler’s engineers. In 2013, with 2,100 new patents filed, the globally active company was ranked in second place with the German Patent and Trademark Office. Energy efficiency, particularly in the field of mobility – and thus the minimization of fuel consumption and harmful emissions – is playing an increasingly important role, be it on land, on water or in the air. Even in motorsports energy efficiency is playing an increasingly important role.

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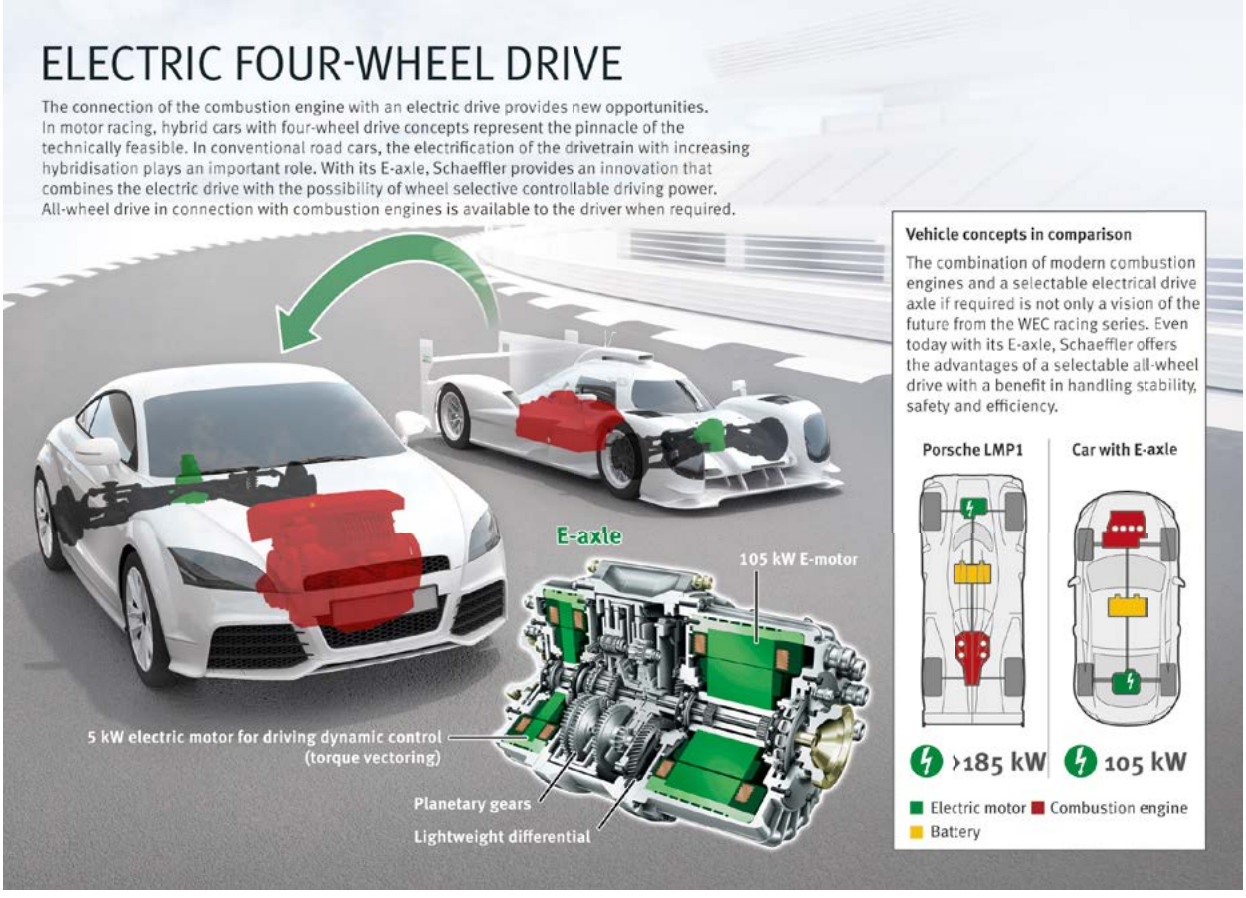

Two racing series in which Schaeffler is involved with particular intensity play a pioneering role in this context: the FIA World Endurance Championship (WEC), which includes the iconic Le Mans 24 Hours, and, obviously, Formula E, the world's first global racing series for fully electric vehicles.

The experience that Schaeffler's partners Porsche and ABT Sportsline are gathering in both championships assists Schaeffler's engineers in their development work for production vehicles. Conversely, Schaeffler's partners equally benefit from the comprehensive know-how the Group has been accumulating for decades. Schaeffler, for instance, is already offering a 'piece of the future' from the WEC, i.e. the combination of an internal combustion engine with a selectable electric drive axle, as a system that can be used in production vehicles today. The E-axle combines the efficiency advantages of an electric motor with the benefits that four-wheel drive offers in terms of vehicle dynamics and safety.

There is a long list of efficiency-enhancing components made by Schaeffler besides the E-axle, including UniAir, the world's first electrohydraulic valve timing system in gasoline and diesel engines, as well as camshaft adjusters, belt-drive systems and overrunning alternator pulleys. In addition, lightweight differential and balancer shafts, dual mass flywheels and basic components for manual, double-clutch, CVT and automatic transmissions help reduce fuel consumption and emissions. The same applies to electrified clutches, thermal management, low-friction bearings and components for hybrid electric and battery electric vehicles. A combination of elements from this extensive Schaeffler portfolio can improve fuel

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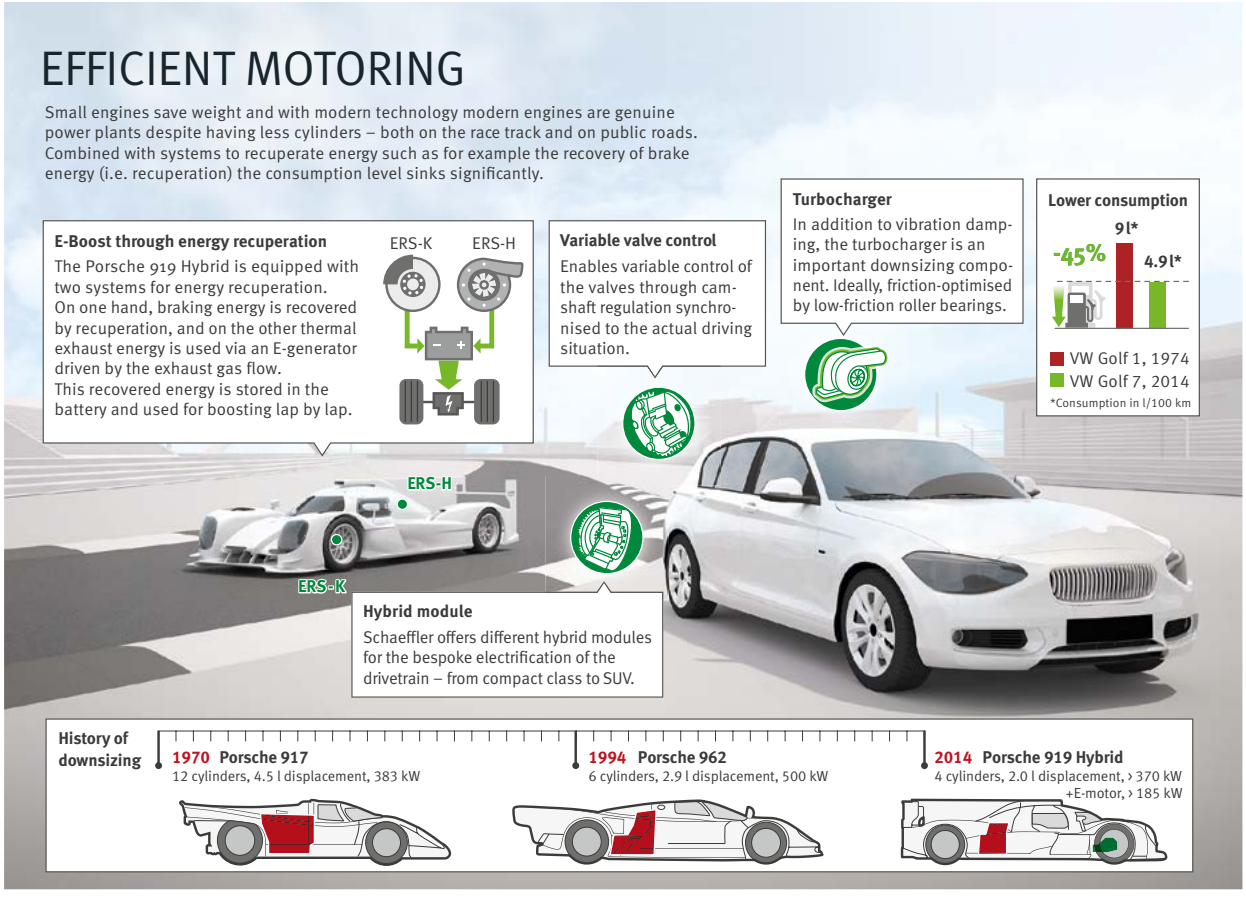

IN 1974
LuK celebrates a world premiere with its double clutch for tractors

IN 1949,
brothers Dr. Wilhelm and Dr. Georg Schaeffler develop the INA needle roller cage. Even today, automotive transmissions would be inconceivable without these bearings

37,435
is the number of the patent awarded for the world's first car. Bearings of the subsequent Schaeffler product brand FAG are on board of the 'Benz-Patent-Motorwagen' built by Carl Benz

economy by up to a fifth today, as various Schaeffler concept vehicles keep demonstrating. Below the automobile segment, Schaeffler's engineers are developing e-bike and micro-mobility vehicles in the motorcycle and moped segment that are positioned between e-bikes and automobiles. In the field of wheel hub motors now being tested on passenger cars, Schaeffler has already performed important preliminary work.

1 Better fuel economy – thanks to modern engines and energy recovery systems

2 Downsizing and hybridization – a success formula for the road and the race track

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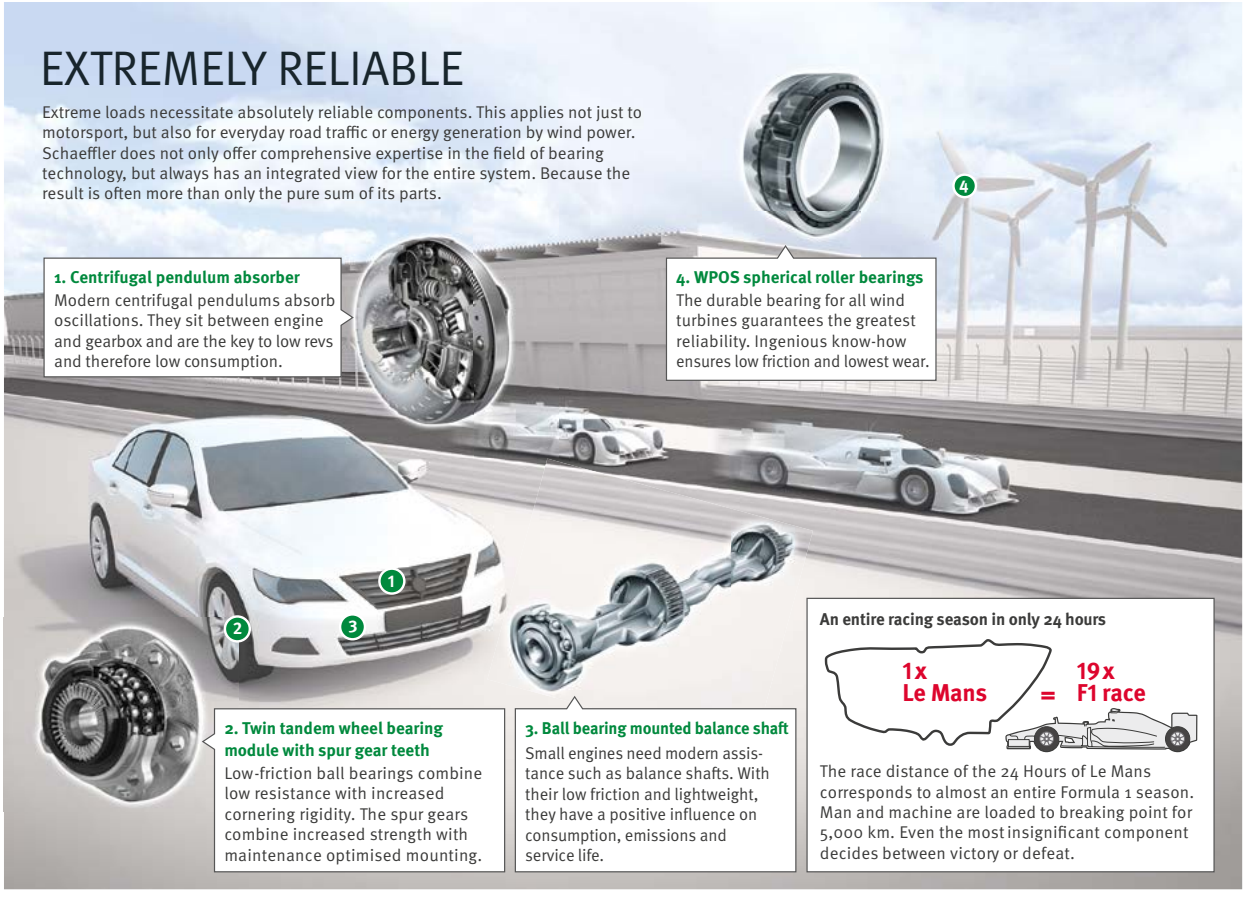
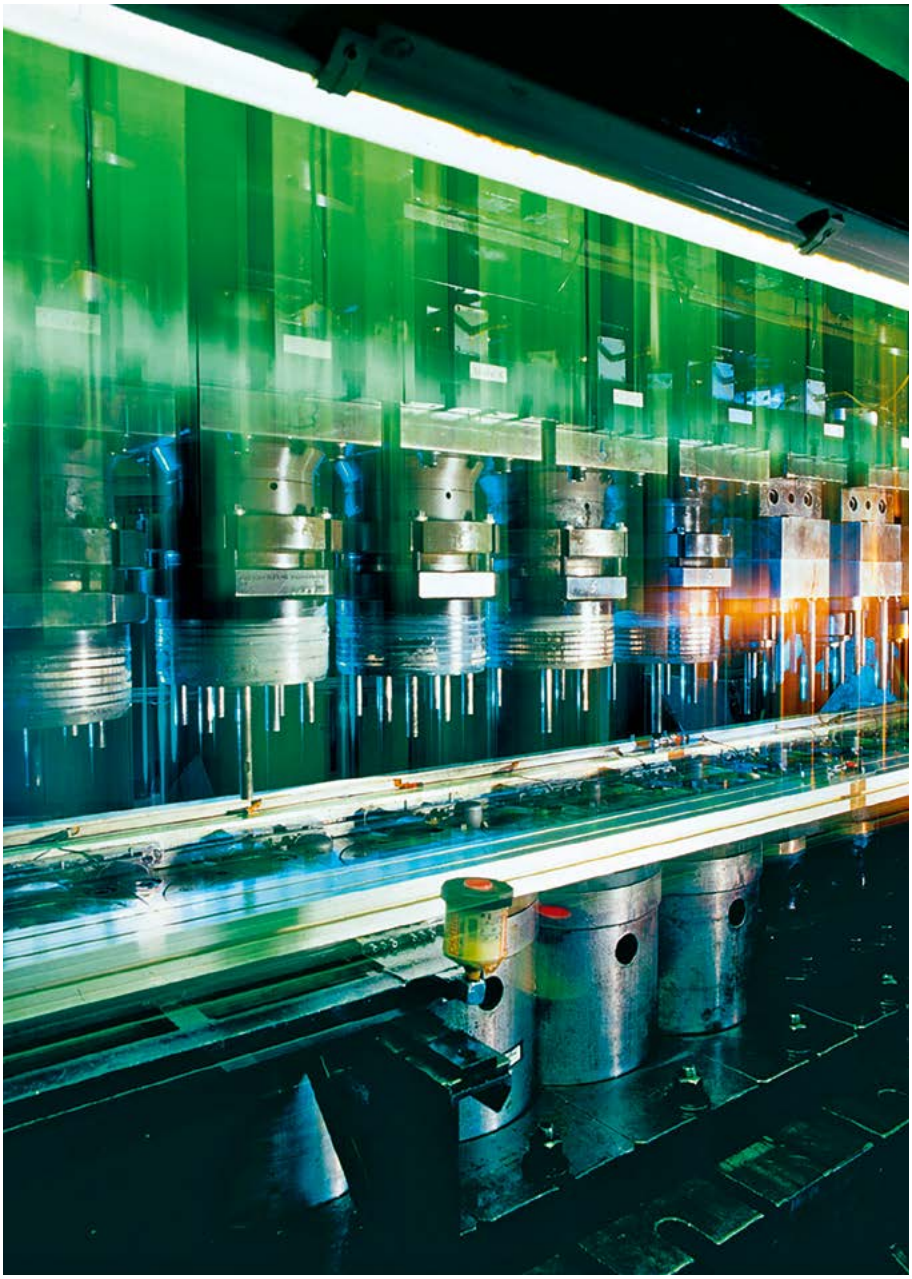


1 Fully automatic assembly lines – large volumes produced in a short time without compromising quality

2 Maximum precision in mass production using sophisticated technology – cold forming on deep drawing presses

1



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Traffic avoidance is another approach to reducing energy consumption. This is where an innovation by Schaeffler's Industry Division comes into play: wheel hubs with generators on rail car axles supply electric power to a GPS-controlled positioning system which helps optimize freight routes and reduce dead mileage. Even the 15-ton rotor bearing of a wind turbine – and this is where the loop is closed – helps make mobility of tomorrow more environmentally friendly, as it is an important element in efficiently generating the energy required for mobility.

CONCEPT CARS
EFFICIENCY MADE BY SCHAEFFLER

GASOLINE TECHNOLOGY CAR
1 + 1 = 3

Schaeffler's most recent concept car that was developed in collaboration with Continental demonstrates that through the skillful interaction of individual technologies (48V-Hybrid, E-Clutch, thermal management, etc.) more fuel can be saved than expected from the mere sum of the individual components ('1 + 1 = 3').

48 VOLT SYSTEM
Driving pleasure on a budget

Hybrid cars are in demand. But many customers are deterred by the prices of vehicles using high-voltage systems. Schaeffler offers an alternative: a 48-volt mild hybrid that is equally efficient and enjoyable. 12 kW (16.3 hp) of electric power are sufficient for even driving in fully electric mode in traffic jams or dense traffic.

EFFICIENT FUTURE MOBILITY INDIA
Low-cost fuel saver

Mobility has to remain affordable particularly in threshold countries. At the same time, efficiency is extremely important due the anticipated massive increase of newly registered vehicles. On this modified Suzuki, Schaeffler demonstrates how the utilization of low-cost technologies can reduce CO_2 emissions by 10 %.

EFFICIENT FUTURE MOBILITY NORTH AMERICA
Born for the USA

In the light of more stringent fuel consumption regulations, fuel economy is becoming increasingly important in the U.S. as well. This SUV-based demo vehicle shows how the standards for 2020 and 2025 can be met by using currently available technology (including AWD disconnect clutch, low-friction bearings, start-stop system, etc.).

ACTIVeDRIVE
Clever use of power

The ACTIVeDRIVE concept car is a fully electric vehicle with a total power output of up to 210 kW and a maximum range of 100 km. Active electric differentials on both axles with wheel-selective control of propulsion power significantly enhance vehicle dynamics, safety and comfort.


LUK
RS 5 DTM
Audi Sport
PITLANE STAFF

"THE PERFECT STAGE"

Motorsports are anchored in Schaeffler's DNA. In an interview, Chief Technology Officer Prof. Peter Gutzmer describes the mobility challenges of today and tomorrow and explains why Schaeffler components are even used in the desert.

Mobility is taken for granted by most people in everyday life today. How are you planning to secure mobility for tomorrow while ensuring its sustainability?

PROF. PETER GUTZMER *This is a central challenge we're rising to. It includes the development of alternative, efficient drive systems or the extension of renewable energy sources to generate electric power.*

How can your involvement in motorsports be of help in this context?

We regard motorsports as a perfect opportunity to test the evolution of new technologies in extreme conditions while working together with the manufacturers and other partners on innovations that play a pioneering role in mobility for tomorrow.

What powertrain concept will be the dominant one in the future?

It's difficult to clearly answer this question. Therefore, the manufacturers are pursuing a diversified development strategy heading in several directions. We're observing the market very closely as well and cover a broad spectrum. Ultimately, the aim is to develop energy-efficient, environmentally friendly and sustainable powertrains.

As Schaeffler's Chief Technology Officer you've put the commitment in the FIA Formula E Championship on track. Why is Schaeffler involved in the first-ever racing series for fully electric vehicles?

Helping to shape the electrification of the automobile is one of our central forward-thinking strategic aims. Schaeffler is an innovation leader in this field and frequently pioneers new ideas. Formula E is bold and visionary and therefore a perfect fit for us that ideally complements our other commitments such as the DTM, the WEC and Formula Student. Last but not least, motorsports charge the topic of electric mobility with emotions in a fascinating way.

What does the technical support for the team look like?

In the inaugural year, the Formula E regulations do not permit any proprietary developments of the teams and partners. We're planning to support the further development of the race car and its components by contributing the know-how and experience of our engineers.

1 Partners – Porsche's Head of Development Wolfgang Hatz receives support

2 Longtime companions – Phoenix team boss Ernst Moser and Prof. Gutzmer

3 Global interest – motorsports as a platform for important exchange

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Signed and sealed – Schaeffler and Abt team up in the Formula E series for electric vehicles

Schaeffler was also involved in Porsche's return to the top LMP1 category in the FIA World Endurance Championship (WEC) and the season's pinnacle event, the Le Mans 24 Hours. What are the reasons for this partnership?
Energy efficiency and forward-thinking technology play the central role in the new regulations. These are exactly the topics we deal with at Schaeffler day in day out. The parallels between motorsports and production make the WEC, and thus the collaboration with Porsche, an ideal platform for us.

Is the World Endurance Championship the toughest discipline in motorsports?
In terms of reliability it no doubt is. The cars cover some 5,000 kilometers at Le Mans, which roughly equates to the racing distance of a full Formula One season. This is an extremely high standard and perfectly fits the qualities that Schaeffler defines for its production technologies as well. This is where we can prove our technological expertise. Therefore, the WEC, and Le Mans in particular, are the perfect stage for manufacturers and suppliers.

Schaeffler, however, is not only involved in circuit racing but also deploys components and engineers to the desert. Why are you represented in off-road races in the United States and Mexico?
Baja 1000 as the pinnacle event of the Score World Desert Championship is the world's toughest off-road race and makes greater demands on the components than any other event in the world. From that perspective, Baja is an ideal test lab for our bearing solutions and various powertrain components. The Technical Regulations provide the teams with major freedom in building their race vehicles, which inspires the creativity of our engineers.

Are the experiences gained in Baja events fed into Schaeffler's products for non-motorsports use as well?
As in the case of any of our other motorsports commitments, we pursue the aim of all our products benefiting from the know-how we gather in racing – and this applies to Baja events as well. But aside from the testing opportunities and the development of new solutions and products, one of our key purposes is to provide our technicians and engineers with an opportunity to also apply their expertise to motorsports and, obviously, to successfully prove themselves.

What motorsports commitments can Schaeffler employees look forward to in the future?
As in the past, we're going to continue to be represented wherever we feel this makes sense, as the competition and time pressure in motorsports, not least, help develop personal creativity and the ability to focus on what's essential. It's about mastering concrete tasks in a specified time window. Therefore, pragmatic, yet systematic and expert approaches are crucial. To experience this and, above all, to share the experience of 'winning,' is good training for everyday tasks, in keeping with our motto: Vision, Precision, Success.


SCHAEFFLER
Julius Bär
D. ABT
TELEFUNKEN
Red Bull
SCHAEFFLER
FAG

A NEW ERA

No other current racing series embodies the ‘mobility for tomorrow’ claim more effectively than FIA Formula E. Schaeffler has been on board from day one – as the exclusive technology partner of Team ABT Sportsline.

September 13, 2014, Olympic Park, Beijing. Lucas di Grassi goes down in motorsports history. Shortly after 5 p.m., local time, the driver of Team ABT Sportsline in his green-yellow-red Formula E race car is the first to cross the finish line. The Brazilian is the first-ever winner of an ePrix, although he'd only been running in third place before entering the last turn. And if it hadn't been for Nicolas Prost's final-corner crash with race leader Nick Heidfeld, … if, if. Let's forget the 'ifs and buts' because it's the the old motorsport wisdom that counts: 'the race ain't over 'till the black-and-white checkered flag is waved.'

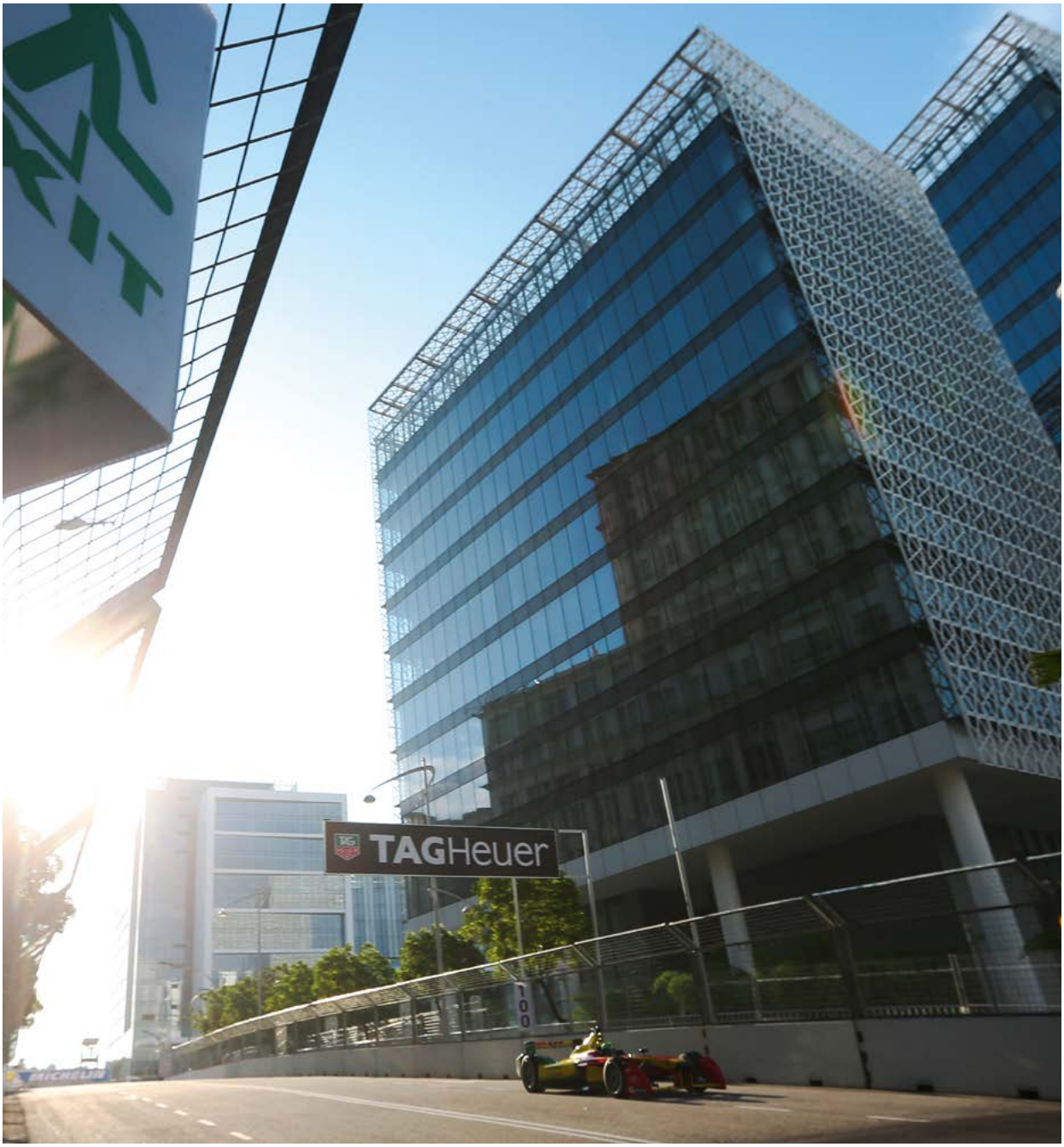
The statistics of the inaugural race speak a clear language. 75,000 spectators lined the track and 25.3 million TV viewers around the globe watched the race live. 2,628 printed articles were counted for the season opener, reaching 740.3 million readers around the world. In social media, Formula E was a hot top topic. 161 million posts, tweets and pins were allocated to the race in Beijing in various channels, expressing near-unanimous agreement: A new era in motorsports has been rung in. Not because of the inaugural race winner di Grassi but because, for the first time in history, an automobile race was held with fully electric race cars seriously battling each other on track.

The race format is both simple and spectator-friendly, as the whole program is delivered on a single day. Practice, qualifying and the race are held in quick succession. Qualifying is crucial, as every driver has only a single lap. Everything's got to fit in order to manage the fine line between taking a risk that's big – or perhaps too big. Even at this juncture, the drivers demonstrate that electric vehicles do not necessarily have to be slow. The specification formula race cars reach speeds of up to 230 km/h, accelerating from zero to 100 km/h in less than three seconds – a remarkable performance that makes many scoffers lapse into silence.

Bringing the races to people in urban areas by holding them in metropolises around the globe, such as Beijing, Buenos Aires, Miami, Los Angeles, Berlin and London, is one of the basic ideas behind Formula E. This has been working well in other types of sports, but the background in this case is a special one. In times of increasing environmental pollution, electric mobility in major conurbations is not just 'hip' but absolutely necessary. In the light of climate change and the scarcity of resources, people, today, are striving to adopt a more eco-conscious and sustainable lifestyle. Formula E shows how this can be done. The new racing series features greater environmental friendliness – with electric race cars on short, temporary city street circuits.

The grid made up of ten teams in the inaugural season features a glamorous and prominent mix. ABT Sportsline is the only German outfit in the international field. The French team, Dams, formed an 'electric branch,' with Formula One World Champion Alain Prost as team boss. His son, Nicolas, is at the wheel of a Formula E car. Andretti and Penske are other prominent names in international motorsports represented in Formula E. Virgin Racing, with billionaire and space pioneer Richard Branson, or Venturi GP, Leonardo DiCaprio's team, combine know-how with a touch of eccentricity and glamour befitting a movie script. The stars know what type of a horse they're betting on. In the United States, electric vehicles have long swung from the slow into the fast lane. Electric mobility has been gaining increasing importance with automobile manufacturers, automotive suppliers and the FIA. The battle for know-how and dominant positions is in full swing – which benefits Formula E as well.

In its inaugural season, the racing series is geared to cost efficiency and environmental friendliness based on clearly structured rules. Specification cars. No modifications. The tires – all-weather types with profiled tread intensifying the mechanical sound of the five-speed ▸



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1 Through the city with electric power at over 200 km/h – that's Formula E

2 Inaugural race winner – Lucas di Grassi cannot be beaten in Beijing

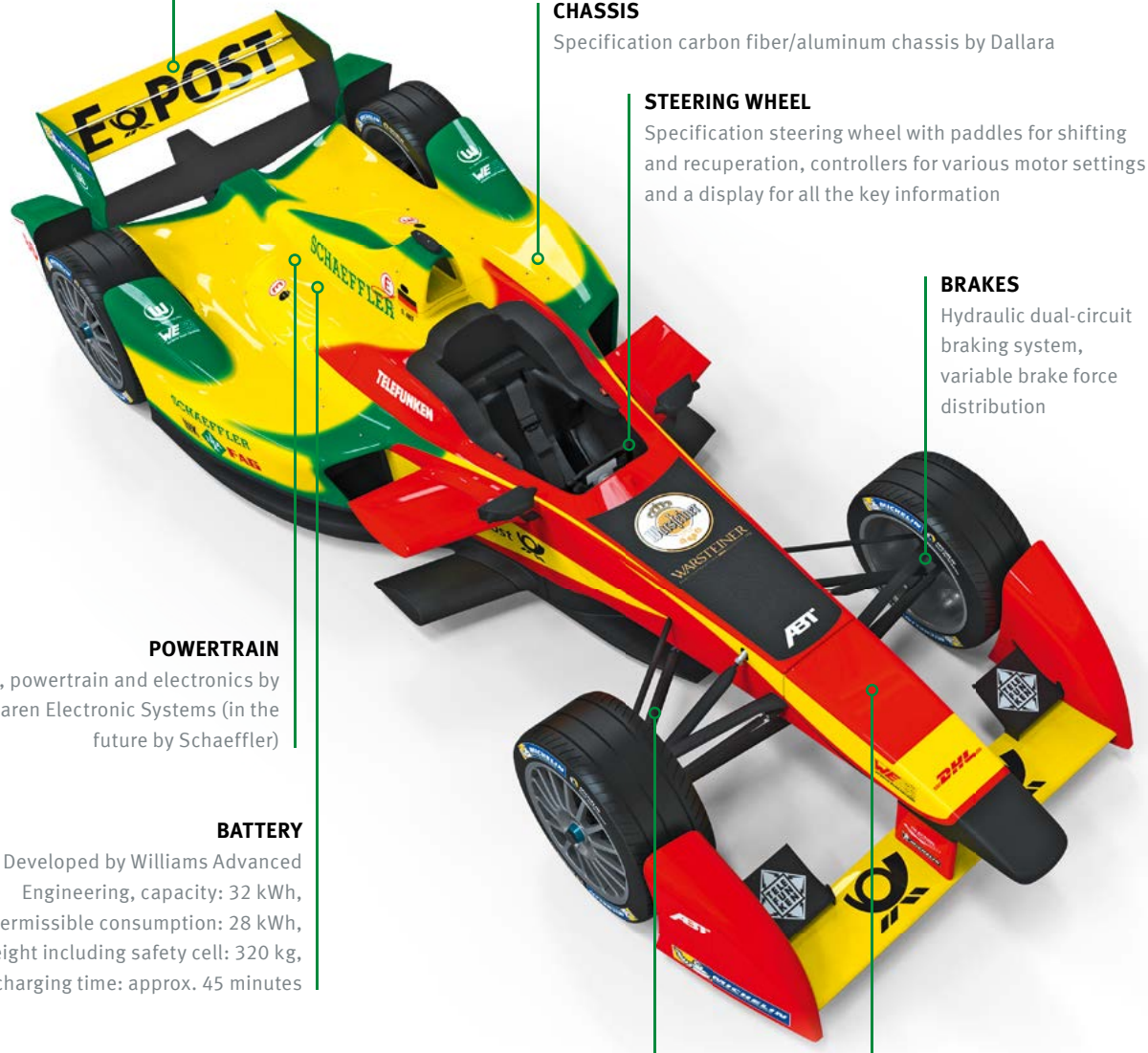
SPARK SRT_01E
FIA FORMULA E 2014/15

AERODYNAMICS
Developed by Spark Racing Technology, adjustable front and rear wing

CHASSIS
Specification carbon fiber/aluminum chassis by Dallara

STEERING WHEEL
Specification steering wheel with paddles for shifting and recuperation, controllers for various motor settings and a display for all the key information

BRAKES
Hydraulic dual-circuit braking system, variable brake force distribution



POWERTRAIN
Motor, powertrain and electronics by McLaren Electronic Systems (in the future by Schaeffler)

BATTERY
Developed by Williams Advanced Engineering, capacity: 32 kWh, permissible consumption: 28 kWh, weight including safety cell: 320 kg, charging time: approx. 45 minutes

SUSPENSION
Independent suspension front and rear with adjustable stabilizers and double A-arms (double wishbones). Adjustable ride height, camber and toe.Two-way adjustable (front) and four-way adjustable (rear) Koni dampers

TECHNICAL DATA
Output: up to 200 kW (270 hp), top speed: 225 km/h, minimum weight (including the driver): 896 kg

transmission and the powertrain – are specified as well. Opportunities for development are planned to be progressively opened up, starting in the 2015/16 season. Schaeffler will make use of them and, among other things, is involved in powertrain development. "We're delighted that in Schaeffler we have a perfect partner on board for the challenges in Formula E because we've seen the passion that drives all the employees involved in motorsports in the company's role in DTM," says team boss Hans-Jürgen Abt. Passion is one thing, innovative prowess another. Together, they are decisive factors in the competition. "Helping to shape the electrification of the automobile is one of our central forward-thinking strategic aims," says Schaeffler's Chief Technology Officer Prof. Peter Gutzmer. "Schaeffler is one of the innovation leaders in this field and frequently pioneers new ideas." Particularly the passenger car segment will be seeing a rapid electrification and hybridization of the powertrain – even though, according to the current state, the majority of the cars will continue to use internal combustion engines as the sole or primary source of propulsive power, at least in the medium run.

But Schaeffler is not the only company to have 'read the signs of the times,' as there is keen interest by other suppliers in joining Formula E. For the 2015/16 season, it is planned to have six to eight companies offer various components such as powertrains. The idea behind this is to promote the evolution of a technology contest alongside the on-track sporting competition. Formula E boss Alejandro Agag has even mentioned that twelve companies, including suppliers and automobile manufacturers, have indicated an interest in entering the series. At the same time, the series' organizers are working on a plan to specify the modifications that are desirable from a mid-range perspective and those that aren't. The latter, for example, include aerodynamics and the Dallara chassis, both of which are planned to be used for a few more years. In the areas of the powertrain and the battery, the situation is clear with respect to further development. In the second year, the teams will be able to use their own batteries and their own motors, according to Agag.

PROF. PETER GUTZMER
Chief Technology Officer, Schaeffler AG

»INVOLVEMENT IN THE ELECTRIFICATION OF THE AUTOMOBILE IS ONE OF OUR CENTRAL STRATEGIC FORWARD-THINKING TOPICS.«

1 The controls used by Lucas di Grassi and Daniel Abt in Formula E

2 Motor, powertrain and electronics ‘breathe down the drivers’ necks’

3 Every driver currently still needs two cars in the race

4 Schaeffler has been the technology partner of Team ABT Sportsline in Formula E from day one

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There is huge untapped potential particularly with respect to energy storage. “Our work will help double battery capacity within the space of two years,” says Agag. The aim is to counter critics saying that while Formula E is battling for acceptance of electric vehicles in everyday driving, the limited range of the cars displays an argument that speaks against their utilization.

Schaeffler CTO Gutzmer is convinced that it will soon be possible to run races on just one battery charge. At the moment, the drivers have to change cars once per race, as the energy stored in the batteries is insufficient for a whole race. 28 kilowatt hours are available per car. This is enough electricity to run a household dishwasher 35 times. The drivers and their teams have to pay very close attention to energy consumption. To keep viewers in the loop, the current charge state of the batteries is continually shown on TV – an element of suspense for everyone involved.

Not only Formula E is innovative and creative but so are its fans. Daniel Abt and Lucas di Grassi with spitting images of themselves

As soon as the energy level is nearing depletion the drivers have to drastically reduce speed. If they exceed the permissible limit, penalties will be imposed, as Daniel Abt can tell a thing or two about. The youngster had drawn 0.2 kilowatt hours of energy above the limit from his battery in the inaugural race in Beijing – power worth the trivial amount of five cents, based on current energy prices.

Lucas di Grassi was more cautious. The Brazilian was one of the drivers receiving a FanBoost in Beijing but chose not to use this advantage because his battery level was not correctly displayed. If he had used too much energy by activating the FanBoost, he would have been penalized, his victory gone down the drain. The old 'ifs and buts' again and, as we all know, di Grassi won the race – even without an energy boost.

FACTS AND FIGURES
2014/15 FIA FORMULA E

56

56 kilowatt hours of energy can be used by a driver per race

average consumption of a German 2-person household in six days

4,000

parts are contained in the battery of the SRT_01E

10,000

conventional AA batteries have the same energy as the battery of the SRT_01E

60

minutes is the maximum duration of a race

35

kilograms is the weight of the trophy Lucas di Grassi won in Beijing

+3

drivers scoring the largest number of votes in the FanBoost receive a 30 kW-boost for five seconds

SPARK SRT_01E

VEHICLE Formula car, carbon/aluminum monocoque chassis
DRIVELINE Rear-wheel drive, two motor generator units (MGUs)
TRANSMISSION Sequential 5-speed transmission with paddle shifters
OUTPUT (PRACTICE AND QUALIFYING) 200 kW (270 hp)
OUTPUT (RACE) 150 kW (202.5 hp), plus FanBoost 30 kW (40.5 hp) for three drivers
ACCELERATION 0–100 km/h in 2.9 sec
TOP SPEED 225 km/h
MINIMUM WEIGHT (INCL. DRIVER) 896 kg
LENGTH/WIDTH/HEIGHT 5,000 mm/1,800 mm/1,250 mm
TIRES Low-profile tires (front: 9R18, rear: 11R18)


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Arai
di Grassi
DHL
GEO
ELECTRONIC CIGARETTES
WE
WÜRTH ELEKTRONIK
TELEFUNKEN
SCHAEFFLER
LUK
INA
FAG
L. DI Grassi

A PIONEER MADE IN BRAZIL

Lucas di Grassi lives an eco-conscious lifestyle. The race driver rides his e-bike to buy his breakfast rolls in Monaco where he lives. When it comes to cars, the Brazilian opts for alternative powertrains as well – to curb environmental pollution in megacities like his native São Paulo.

Lucas di Grassi is a straight-forward character who says what he thinks and tackles any project with total commitment. This applies to Formula E as well. "I was involved in the project from day one," he says without exaggerating. Flashback: In 2012, di Grassi is the first test driver in the new racing series. In addition to testing, he's involved in the organizational aspects of the project, his efforts being rewarded by victory in the inaugural race in Beijing two years later. "Being on top of the podium in the first race following this long preparation has been one of my sweetest successes so far," says the former Formula One driver, flashing a radiant smile that fully exposes the white of his teeth.

Being upbeat is in his nature, but Lucas di Grassi is a Brazilian through and through, not only with respect to his cheerful disposition. He's proud of his country and, like his compatriots, isn't exactly a stickler for punctuality, but is always right on the dot when it comes to contesting – and winning – races. "Exciting, entertaining and eco-friendly," this is how he describes Formula E that to him is more than just a racing series. "First, I'm convinced that electric mobility will be playing an important role in the future – it's not a question of 'if' but of 'when.' And second, I'm a passionate racer, so what could be better than combining these two things."

Team-mates and pioneers – Lucas di Grassi and Daniel Abt jointly tackle the Formula E adventure

Probing into his motives brings out the racer's heart. Obviously, he'd always like 'sheer power,' which he feels exists in Formula E. Technical aspects and pure racing are in harmony, according to di Grassi, as the media have been discovering as well. "I'm happy about the great interest in the series. More than 250 journalists were on location at the inaugural round in Beijing and in my native Brazil Formula E is a huge topic as well." Plus, it's not only the media that show an interest in Formula E, as other drivers regularly quiz him about the series during his commitments as an Audi factory driver in the FIA World Endurance Championship (WEC). "Formula E's on everyone's radar."

However, racing and technology alone are not enough to make di Grassi feel totally contented – it's the special spirit that makes this racing series unique. "People from so many nations are working to make this series a success with all their passion – organizers, teams, the media ... It's the same thing as with a global player like Schaeffler where teamwork around the globe is one of the factors that guarantees success." The partnership between Schaeffler and Team ABT Sportsline plays into di Grassi's hands for another reason as well: "I love the Schaeffler colors because they're the same as Brazil's." So he enjoys climbing into his green-yellow single-seater to chase lap times at any of the events. "Winning is my aim – always. But that's difficult because at the moment all of us are still driving identical cars. Extracting the maximum from the car is great motivation for me." At the same time, it's a great honor for di Grassi to present sustainable technology that embodies mobility for tomorrow to millions of people. "Formula E may be the only discipline that closely links sports with the technological development that will soon improve the lives of billions of people."

4,836
Kilocalories were burned by di Grassi during the Dubai triathlon

9,296
kilometers separate São Paulo where di Grassi was born and Monaco where he lives now

148,000
people are following di Grassi on Twitter

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1 Proudly presenting … di Grassi – ambassador for efficient mobility

2 The first step's always the hardest – reconnoitering the track in classic style

Di Grassi has started to live the future today. "In Monaco, I almost exclusively use my e-bike." With innovations in the area of the sensor-bottom-brackets and the automatic gear-shift, Schaeffler contributes its share to establishing the e-bike as a forward-thinking means of transportation. Di Grassi is eco-conscious when it comes to cars as well. "People have to realize that alternative powertrains are the future. Hybrid electric vehicles have already initiated a change in thinking and I'm seeing more and more battery electric vehicles in the streets as well." A change that's absolutely necessary in the opinion of the Brazilian on thinking about mega-cities such as his native São Paulo. "Environmental pollution is a massive issue there. We all need to work together on protecting our environment, and politicians play a major role in this." The technology would have to be explained and made accessible to people, he feels. "I'm thinking about public transportation using eco-conscious drive systems, as well as government incentives for electric vehicles." In Formula E, di Grassi will continue to be in the spotlight as an ambassador for efficient mobility.

SHOWING THE COLORS

Schaeffler and its Group brands have become ‘permanent fixtures’ in the DTM. Small stickers marked the beginning and title wins have been some of the highlights to date – a green-yellow success story.

Suddenly it’s there: the Audi sporting the green-yellow Schaeffler graphics. It’s not only visually conspicuous, but conspicuously fast. Be it with the A4 DTM or the RS 5 DTM, with Martin Tomczyk or Mike Rockenfeller at the wheel – Schaeffler stands for success in the DTM. For pole positions, fastest race laps, for victories and for title wins.

2011 is the year that sees Schaeffler venturing a major step in the field of promoting motorsports. The globally active automotive supplier has started to sponsor a complete race car with its name: and in a major project at that, as the company has opted for a commitment in the tradition-steeped DTM – the most popular international touring car series with millions of fans throughout Europe. The front of the car is yellow, the rear green, with the Schaeffler name and logos of the Group’s brands, LuK, FAG and INA, emblazoned on the bodywork: an honor, no doubt, as well as a responsibility. From now on, the Schaeffler Group will be inevitably linked to the results of this car.


Audi Sport
Team Phoenix
Audi Sport
Team Phoenix
BOSCH
DTM
BOSCH
DTM
BOSCH
DTM
gratuliert
Martin Tomczyk
BOSCH
DEKRA
14
ADAC
DEKRA
FAG
LUK
Audi Sport
Audi Sport
FAG
SCHAEFFLER

The venture proves successful. The Schaeffler Audi A4 DTM, which the racing scene affectionately nicknames ‘caipirinha express’ at the time, soon evolves into the revered ‘Schaeffler Audi.’ Thanks to the outstanding work of driver Martin Tomczyk and his team, Audi Sport Team Phoenix, Schaeffler can call itself ‘champion’ right in the debut year of its DTM commitment, not only from a sporting perspective but from a business one as well. “Motorsports evoke emotions and promote bonding particularly when you’re successful,” says Schaeffler’s Chief Technology Officer Prof. Peter Gutzmer. “At Schaeffler and the Schaeffler brands, motorsports have traditionally been enjoying particular importance – as befits a technology company driven by innovation.”

The tradition dates as far back as the mid-nineteen eighties when the INA, FAG and LuK brands are first featured on the race cars in international touring car series for advertising purposes. Among others, in the 1986 DTM, the Rover Vitesse is on track sporting the LuK logo, with Kurt Thiim at the wheel. In the first event at Zolder, the Danish rookie races to victory from second place on the grid, marking Thiim’s first DTM success and the first triumph for a vehicle with LuK branding as the beginning of a long success story. Following two other victories that season, Thiim clinches the title. In the following DTM years, the INA and LuK logos are featured on many other cars of the Alpina, BMW, Ford, Mercedes-Benz and Opel marques, as well as on the racing suits of their drivers. The conspicuous presence and numerous race victories in the subsequent years enhance the level of awareness the company enjoys within the DTM scene with a lasting effect.

1 Team boss congratulates champion – Frieder Nickel and Kurt Thiim in 1986

2 Presence in the early DTM years – LuK is featured on perimeter advertising boards in 1987

3 LuK stickers are emblazoned on Mattias Ekström’s Audi A4 DTM from the 2007 season onwards

4 Martin Tomczyk becomes the 2011 DTM Champion under the Schaeffler banner

5 Schaeffler CTO Prof. Peter Gutzmer and ‘his’ 2013 DTM Champion, Mike Rockenfeller

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LuK celebrates its next outstanding success in 2007 when the young Swede Mattias Ekström clinches the title in an Audi A4 DTM. And that's just the beginning. In 2011, Martin Tomczyk becomes champion. In 2012, Mike Rockenfeller 'inherits' the Schaeffler driver's role from the title defender who has switched to BMW. In his Audi A5 DTM, on clinching fourth place overall, he achieves his best DTM overall result. In 2013, Rockenfeller contests the season of his life and clinches the title. For Schaeffler, it's the second triumph in its third year as the principal sponsor of a vehicle. And in 2014, Rockenfeller, on taking third place overall, again makes the Schaeffler colors shine in a bright light. "The Schaeffler Audi shows how powerful the integrative effect of motorsports can be," says Gutzmer. "The posters and stickers of our DTM race car are displayed in a large number of our production halls and offices around the globe, irrespective of whether our employees had previously tended to particularly identify with one of our brands, INA, LuK or FAG."

Schaeffler in the DTM – a story to be continued. The term of the agreement between Audi and the company will be effective until at least 2016. "The Schaeffler Audi has evolved into an absolute favorite with DTM fans and, in addition, has been our best-placed car three times in succession," says Dieter Gass, Head of DTM at Audi. "It's great that our partnership has been in existence for such a long time now and that the DTM will continue to have this dream team."


Rockenfeller
www.DTM.tv
Audi Sport
DEKRA
9
ADAC
E POSTBRIEF
www.epost.de

A GREEN-YELLOW FAIRY TALE

A near-unbelievable story: Schaeffler enters the DTM in 2011 and, thanks to Martin Tomczyk and Mike Rockenfeller, celebrates one success after another. A tour of of four victorious and title-winning years.

MARTIN TOMCZYK
2011 DTM Champion

»ELEVEN YEARS OF DTM WITH LOTS OF UPS AND DOWNS. THEN IT FINALLY WORKED OUT.«

HERZOGENAURACH – Winter break. Time to reflect on the past season and to plan the upcoming year of 2011 – also at Schaeffler. The previous sponsoring strategy is under close scrutiny. The days of the small-sized logo stickers on the Audi race cars of Mattias Ekström and Mike Rockenfeller are over. The aim, now, is to be featured across the full surface of a single car – with the same budget. The only opportunity to achieve this is a presence on the 'used car' of an underdog. The previous sponsoring arrangement for Rockenfeller's Audi has forged links with Team Phoenix. In the 2011 season, the squad of team boss Ernst Moser is fielding two previous-specification cars. Schaeffler decides to take the risk and acquires the naming rights for a Phoenix A4 DTM.

The 'used car' is merely an alleged disadvantage. Ever since the DTM's comeback in 2000, the simultaneous fielding of current and previous-specification cars has been common practice. But never before has a driver of an 'oldie' managed to clinch a title. At least, the older cars are 25 kilograms lighter than their younger counterparts due to the regulations. But only the boldest optimists believe that top positions can be achieved in them. To visually stand out in the field of cars that are predominantly black, white and carbon-colored, Schaeffler chooses not to feature its corporate CI visuals of white and green. The green-yellow Schaeffler Audi A4 DTM is born. Martin Tomczyk is the man at the wheel, one of the 'old hands' in the DTM. He's been on the DTM grid since 2001 and is 'disgruntled' before the start of the season. The 29-year-old has always driven a new model and now he's been 'demoted.' Following three average years, the Audi officials cleared the way at Team Abt for Rockenfeller.

1

1 2011 marks the last year of the manufacturers' duel between Audi and Mercedes-Benz

2 Perfect – Schaeffler driver Martin Tomczyk clinches the title early at Valencia

3 Tomczyk (right) and Audi brand colleagues

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HOCKENHEIM – The results of the winter tests: water under the bridge. The times set in the two free practice sessions of the season opener: not conclusive. Qualifying produces the first serious comparison of strengths. This is the acid test. A position at the front of the grid in the fiercely competitive DTM has always been half the battle in achieving a good race result. Well-known names stand out in the four-part qualifying contest: Bruno Spengler takes the pole position and the two-time champion Mattias Ekström joins him on the front row. Behind Abt's new member, Rockenfeller, Tomczyk clinches a surprising sixth place as the best driver of a 'year-old' car. At the front of the field, the race is relatively uneventful. The top four finish in the order they started in. Tomczyk manages one of the race's few overtaking maneuvers, setting an initial 'exclamation mark.'

SPIELBERG – Hello there: Austria is back again on the DTM calendar. After clinching third place at Zandvoort, his first podium since 2009, Martin Tomczyk arrives brimming with confidence. The Red Bull Ring is not a bad track for the Schaeffler driver, who is one of only four to have previously raced on the former A1-Ring with the DTM from 2001 to 2003. Experience plus a bit of fortune – there are several reasons why Tomczyk can't be beaten in the race against the clock on the track that's soaking wet. He takes pole – his first one in two years. "Being in the right place at the right time definitely wasn't easy – especially with the right tires and the right inflation pressures," says Tomczyk. But there are even better things to come, as Tomczyk is again the measure of all things in sunshine on race day. He keeps his rivals in check after the start, only briefly losing the lead during the mandatory pit stops. After 38 laps, the first DTM victory of a Schaeffler car has been bagged.

3

MAY

JUNE

KLETTWITZ – A curse is resting on the Lausitzring, an Audi curse. In eleven DTM races, the Ingolstadt-based brand has achieved only two victories, by Mattias Ekström, the last one dating back to 2005. Might this be the year to turn the tables? The situation augurs well for the Schaeffler Audi A4 DTM because the older cars have an advantage thanks to their lower weight. Tomczyk is determined to make use of this benefit and to show his strong form. And his strength is awesome. Thanks to two out-braking maneuvers and quick pit stops by his Phoenix crew he converts P4 on the grid into victory – his second one in succession. For the first time in four years, he's the leader of the DTM standings again. If not before, now it's definitely clear to everyone: Schaeffler and Tomczyk will be in serious contention for the title.

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OSCHERSLEBEN – A gripping duel has ensued at the top of the drivers' standings: Tomczyk versus Spengler. The lead keeps changing. Following his third victory of the season at Brands Hatch, the German is running in front again, with an advantage of just one point. Spengler, who in the first half of the season had clinched four pole positions but subsequently lost his strength in qualifying, comes up trumps at Oschersleben: grid position two, while Tomczyk has to settle for P14. An unusual result but one that can be explained: "We made some changes between free practice and qualifying," he says. "Afterwards, the car acted strange and was hard to drive. We're going to work overnight to limit the damage and finish the race in the points." An advantage for Spengler? Not really. On race day, rain pouring down on the flatlands around Magdeburg is flooding the track. Past experience in the DTM has shown that anything's possible in rain and Tomczyk goes to prove it. Right on lap one, he makes up eight positions. Awesome! His rivals do everything they can to assist in his recovery: braking mistakes, spins, pit stops, you name it – and Tomczyk is soon in third place. Spengler is leading the race, but then the Mercedes driver radios his crew that he's got a suspension problem. He pits and Tomczyk inherits second place. His crew tries to save Spengler, but to no avail. His car is out of balance, his race over. Tomczyk finishes as the runner-up behind his brand colleague Ekström, which puts the ball in his court for the next race.

JUNE

SEPTEMBER

3

1 Martin Tomczyk, comedian Atze Schröder and Mike Rockenfeller (from left) in the DTM spectacle at Munich's Olympic Stadium

2 Second win in succession – Tomczyk takes the lead of the standings following the Lausitzring race

3 An upbeat season for Head of Audi Motorsport Dr. Wolfgang Ullrich and Schaeffler driver Martin Tomczyk

VALENCIA – Great weather for a vacation, exactly the right atmosphere for a historic feat. Martin Tomczyk has a nine-point advantage over Spengler. There's every reason to believe that the Schaeffler driver will prevail. In qualifying, the two title candidates practice restraint: eleventh place for Tomczyk, 13th for Spengler. In the race, Tomczyk does what he's being doing all year long: making up ground. His solid position in the standings is less creditable to brilliant qualifying results than to his racing performance, which he again shows in Spain. He recovers eight places and finishes in third. Spengler has to settle for seventh and Tomczyk bags the title, his first one ever – and clinched in a 'year-old' car. The DTM sees the biggest title surprise in its history – as well as the first triumph for Schaeffler in the first year of this commitment.

FORAY INTO LE MANS

In the Le Mans 24 Hours, not only Schaeffler is represented in the race cars with special wheel bearings and alternator freewheel clutches. In 2011, the Audi factory team deploys Mike Rockenfeller. The subsequent Schaeffler driver does a night stint in the Audi R18. Between Mulsanne and Indianapolis, he's getting ready to lap a Ferrari when the Ferrari car changes the line too early. Contact at the rear, spinning at 300 km/h: the Audi hits the track barrier. 'Rocky' is able to free himself from the wreckage – with merely minor injuries, thanks to the car's high safety standards and his guardian angel. As a precaution, he skips a DTM race.

OCTOBER

1

HERZOGENAURACH – Feverish anticipation, pre-season. This time, it's even more intense than usual because the DTM grid is about to grow. Instead of two, there'll be three manufacturers. BMW's long-planned return is now becoming reality. The Munich-based brand is adding plenty of momentum to the 'driver carousel.' BMW, without a qualm, engages in a practice that's been more or less frowned upon for many years: enticing drivers to switch manufacturers – and lands a big catch: Spengler and Tomczyk – ouch! The people at Audi in particular have to recover from the shock. Their title defender is gone and the cockpit of the Schaeffler car vacant. Like all three manufacturers, Audi is allowed to build new cars for the new DTM era. The cockpit of the Schaeffler Audi A5 DTM goes to the driver of choice, Mike Rockenfeller, who had previously battled for DTM points with INA and is now returning to Phoenix from Abt Sportsline.

1 Highlight Norisring – Rockenfeller in the green-yellow Schaeffler Audi finds the gap

2 New team-mates – Mike Rockenfeller (left) and his Phoenix partner Miguel Molina

3 'Rocky' producing clouds of smoke

4 Looking ahead – for Rockenfeller, Schaeffler is a stroke of luck in terms of his career

5 'Rocky' in front of the 2012 champion, Bruno Spengler

HOCKENHEIM – Mercedes-Benz decides the eagerly awaited first on-track battle between the three manufacturers in its favor. Former champion Gary Paffett wins in front of his brand colleague Jamie Green. Mike Rockenfeller makes a solid start, finishing in fifth place. BMW is less fortunate. In sixth place, Andy Priaulx is the best driver of the brand on its return. A first assessment of relative strengths?

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NEW REGULATIONS

The decision that the 2012 DTM would be run under a new set of rules had been made a few years earlier. BMW had chosen this year for its comeback for good reason: equal opportunities for all manufacturers. The most significant change is immediately visible: the new cars – the Audi A5 DTM, BMW M3 DTM and DTM Mercedes AMG C-Coupé. Their exteriors: wider, longer, flatter – simply more muscular than the predecessor models. A larger rear wing increases downforce. Paddles on the steering wheel are now used to shift gears. The interior remains unchanged. Under the hood, the regulations continue to prescribe a 4-liter V8 engine delivering around 500 hp. Refueling has been eliminated. A victory is now worth a lot more than before: 25 instead of ten points.

BRANDS HATCH – Gary Paffett remains the measure of all things. With two victories and a second place, the Briton has delivered the best start of a season in the entire DTM history. Bruno Spengler is now his closest rival in the drivers' standings. Bruno Spengler? Yes, the BMW drivers have lived down their weak start of the season. The Canadian has given his new employer its first DTM victory in 20 years in round two at the Lausitzring. After finishing a race out of the points, Mike Rockenfeller scores again, in third place, and starts an impressive string of success, with points in the next seven races. This is the Schaeffler Audi's secret of success anyway. Within the four-year vehicle sponsorship, the green-yellow rocket scores in 34 out of 40 races. Schaeffler becomes a synonym for consistency in the DTM.

4

5

HOCKENHEIM – The finale. Audi's long been out of the battle for the title – an unusual situation for the brand with the four rings that's been spoiled by success in this millennium. Mike Rockenfeller, in fourth place overall, is the manufacturer's best driver – a tremendous year for him personally. Another good result would top his best one so far: sixth place overall in 2011. But there'll be no good result, as a collision forces Rockenfeller to retire after just two laps: one of only two retirements for the Schaeffler Audi in four years. But as his closest rivals in the standings don't cover themselves in glory either, 'Rocky' maintains fourth place, being lucky under the circumstances. At the very front, Bruno Spengler, on clinching his fourth victory this season, intercepts Gary Paffett and celebrates the 'triple' with BMW: the drivers', teams' and manufacturers' titles make everyone forget the brand's poor start of the season.

MAY

OCTOBER

FACTS AND FIGURES
SCHAEFFLER IN THE 2011–2014 DTM

334
laps saw the Schaeffler Audi running in front

40
times a Schaeffler Audi was on the DTM grid, scoring points in

34
races

0
retirements due to technical issues in four DTM years

4
times the race was started from the pole position,

18
champagne bottles were opened on the podium,

5
times the leap to the very top was celebrated

2
drivers' titles were clinched by Martin Tomczyk (2011) and Mike Rockenfeller (2013)

14
top spots in the drivers' standings

116 places were made up by Tomczyk and Rockenfeller in 27 races. Seven times they maintained their grid positions. Only six times, they lost positions before the checkered flag was waved

1
team title for Phoenix Racing was reflected on the 2013 tally

MIKE ROCKENFELLER
2013 DTM Champion

»WE SHOULD CELEBRATE AND ENJOY THE NIGHT.«

HERZOGENAURACH – Unofficial information that has been circulating behind the scenes for a while is now confirmed. This DTM season will see the addition of two exciting technical features. Tire supplier Hankook will be providing the drivers with slicks featuring various tire compounds: standard tires for which there had been no alternative in the years before and the new option tires, which are clearly softer. Their advantage: improved grip, enabling faster cornering, albeit not on long runs. Their disadvantage: softer compounds mean higher wear. Based on test results, the ITR estimates that the option tire will start to significantly degrade after just seven laps. The drag reduction system (DRS) is the second new feature. The driver can flatten the rear wing angle on the straights by pushing a button to reduce aerodynamic drag, benefit from the preceding vehicle's slipstream and, ideally, be able to overtake it in front of the next turn.

What's new at Schaeffler? Nothing. The successful combination of Mike Rockenfeller, Audi Sport Team Phoenix and the green-yellow car is retained. Never change a winning team. Only the name changes as the Schaeffler Audi A5 DTM now becomes the Schaeffler Audi RS 5 DTM. The reason? The Audi factory team has slightly modified its race car and, consequently, renamed it.

Mike Rockenfeller clinches one of his two wins in 2013 in the DTM's premiere at Moscow

HOCKENHEIM – Another season opener. But things are different this time, more entertaining than usual, thanks to option tires and DRS. The two innovations achieve exactly what's expected of them: they add plenty of momentum to the field. The option tire, however, turns out to be much more than a mere option. BMW driver Dirk Werner completes 31 laps on the softer compound, advancing by 18 places in the process. Seven laps, my foot! Mike Rockenfeller makes an impressive recovery as well. The Schaeffler driver has started from P14 and crosses the finish line in eighth place. The fans at Hockenheim get to watch an amazing 45 overtaking maneuvers, compared to 13 at the same venue the year before. With Augusto Farfus, Werner and Christian Vietoris on podium, it's fair to call the outcome of the race a surprise.

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1 Crowd puller – the opening round at the Hockenheimring has a tradition of outstanding attendance

2 Brand ambassador 'Rocky' gives Schaeffler employees some insight into DTM

3 Rockenfeller's green-yellow RS 5 DTM, pursued by Audi brand colleague Timo Scheider

BRANDS HATCH – The second race proves how much more valuable a DTM victory has become since the new points system has been introduced. For starters, ex Schaeffler driver Martin Tomczyk sets the first highlight in BMW livery on clinching the pole position. His joy, though, is only short-lived. Because his car is too light, the stewards of the meeting relegate him to the rear of the grid, an action that does not augur well for Tomczyk, who in 2013 experiences his worst DTM year by far. In contrast, Mike Rockenfeller is delighted about inheriting the 'place in the sun.' From start to finish, 'Rocky' doesn't miss out on any opportunity and goes on to celebrate his second DTM victory that suddenly propels him to the top spot in the drivers' standings. A premiere in his DTM career that also lets his employer, Audi, breathe a sigh of relief, now that one of its drivers is again ranked at the top for the first time since Tomczyk's 2011 title win.

MAY

3

MOSCOW – The DTM visits Russia, a ‘first’ in its 26-year history. Moscow Raceway, located 80 kilometers away from the capital city, is new territory for all the drivers. Exciting! Who’s going to do the best job of handling it? The answer: Mike Rockenfeller, albeit with a bit of a run-up. In the first part of qualifying, he sets the ninth-best time, the third-best in the second session, in Q3, he’s the fastest driver and in shoot-out of the four best drivers … he doesn’t even have to go out anymore. Russia’s president, Vladimir Putin, has decided to take a helicopter flight and has the air space blocked, including the sector above the race track. As a result, the DTM rescue helicopter that is required to be airborne at each event is grounded. The stewards of the meeting declare that the qualifying session is officially over and that the results of the third session count. Rockenfeller has the pole position and fittingly comments: “I’d say: when in Rome, do as the Romans do!”

The Schaeffler driver’s fiercest rival is an ‘old acquaintance:’ Bruno Spengler. Rockenfeller’s advantage over the Canadian in the drivers’ standings is merely two points. The race is started, Rockenfeller repeats his Brands Hatch feat and goes on to celebrate his uncontested second win of the season. Spengler’s race, in contrast, takes a dramatic course. After starting from position four, he loses four places on the first three laps. Then he has a collision with Rockenfeller’s Phoenix team-mate Miguel Molina and loses a lot of ground. On lap 27, he suffers maximum punishment on being lapped by Rockenfeller, the front runner. That’s what you’d call a slap in the face. Rockenfeller increases his advantage in the standings to 27 points.

SHARING NUMBER ONE

Race drivers never tire in praising their team following success, using words such as “Together we have ….” While statements like these may sound like empty phrases, they’re actually the truth. A driver would be nothing without his or her mechanics, engineers and team boss. Equally important as good work is a good atmosphere. Audi Sport Team Phoenix is a prime example of a squad with a family-like atmosphere. At least, this is what the drivers competing for the squad from Meuspath at the Nürburgring regularly report. Trust promotes performance. And performance has been at an all-time high now for three years. In 2011, champion Martin Tomczyk drove for Phoenix and in 2012, the best-placed Audi driver, Mike Rockenfeller, did. 2013 sees another win of the drivers’ title. As icing on the cake, Phoenix scores its first win of the official teams’ classification. The former ‘second-division team’ has evolved into a top-flight squad under Ernst Moser’s leadership – and Schaeffler has been on board as well.

Team boss Ernst Moser and Mike Rockenfeller win the drivers’ and teams’ titles with Audi Sport Team Phoenix in 2013

ZANDVOORT – Following his disastrous race at Moscow, Spengler has ‘completely lost it’ and doesn’t score a single point either at the Nürburgring, at Oschersleben or in the Netherlands. Augusto Farfus can be credited for the fact that Mike Rockenfeller, who has been scoring like clockwork, has not yet crowned himself champion. Besides ‘Rocky,’ the BMW Brazilian is the strongest driver in the second half of the season and, before the round on the dune circuit located directly on the North Sea coast, the only remaining rival for the title. But a 33-point gap speaks a clear language. The ball’s in Rockenfeller’s court. The race unfolds in storybook-style. At the start, Farfus and Rockenfeller dash to the front past pole sitter Marco Wittmann. Then, all the fans of the German freeze in a moment of shock when the stewards of the meeting investigate a possible jump start. The result is negative. Following the first mandatory pit stops, Timo Scheider has suddenly moved between Farfus and Rockenfeller, threatening ‘Rocky’s’ chances of bagging the title win early. But as Scheider, just like the leader of the standings, is at the wheel of a car with four rings on the grill, swapping positions again is just a question of time. It happens on lap 25. Rockenfeller is heading for the title again, with certainty provided when the checkered flag is waved. Trailing Farfus in second place is enough, as a 26-point advantage cannot be made up at the Hockenheim finale. Rockenfeller is at the pinnacle of his career and DTM title number two goes to Schaeffler in its third year as the vehicle’s sponsor: an amazing track record.

1 Schaeffler and the Group’s brands, LuK, INA and FAG, are featured on Mike Rockenfeller’s Audi RS 5 DTM

2 Typically ‘Rocky’ – highly concentrated before every race

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SEPTEMBER

3

4

3 Cool cowboys – before the 2014 season, ARD invites seven current and former DTM Champions to shoot footage. Mike Rockenfeller is one of them

4 At Zandvoort, Rockenfeller is headed for victory for a long time before a safety car period mixes up the entire field

HERZOGENAURACH – Title defense in the DTM is a big mystery. Only two drivers have managed to clinch the top spot overall twice in succession: Bernd Schneider and Timo Scheider. In the DTM, there are no 'perennial champions' such as Michael Schumacher and Sebastian Vettel in Formula One. Logically, any current title winner aims to repeat the feat the following year, and so does Mike Rockenfeller. For the first time, he's in the role of the hunted instead of the hunter.

OSCHERSLEBEN – Following a turbulent wet race, Rockenfeller crosses the finish line as the runner-up behind the surprise winner, Christian Vietoris, scoring 18 points in the process. In the Hockenheim season opener, he had previously gathered 12, which puts him at the top of the standings. The title defense mission is underway.

2014

JANUARY

MAY

PLEASURE, NOT DUTY

For some drivers, PR events are more of a duty than a pleasure. Mike Rockenfeller enjoys them, particularly when it comes to Schaeffler events. As the company's official brand ambassador, 'Rocky' represents its colors both on and off the race track. He visits the Schaeffler plants across the globe and asks employees to explain their jobs to him. "In Hungary, I visited a plant that produces clutches," says 'Rocky.' "Obviously, while being trained as a mechanic I replaced countless clutches. But watching how they're being made was a completely new experience." The large diversity of parts that Schaeffler manufactures impresses Rockenfeller as well: "They range from a one-millimeter mini bearing to a 12-meter bearing for strip mining excavators."

The Schaeffler brand ambassador on tour – Mike Rockenfeller tremendously enjoys plant visits with autograph sessions

MOSCOW – Title defense? Goodbye! Rockenfeller seems to be joining the long list of drivers who tried and failed. After scoring mediocre results at Budapest and on the Norisring, the 30-year-old is in fourth place of the drivers' standings. That doesn't sound too bad but the gap to BMW high-flyer Marco Wittmann has reached considerable dimensions. At Moscow, a year ago, 'Rocky' made a huge step forward toward the title win. Perhaps this could be a good omen to start a recovery at the same venue. Qualifying gives rise to hope. He clinches grid position four while Wittmann shows a weak performance in seventh place. In the race, Rockenfeller initially loses a few places, but there's no reason to panic, as he's running on standard tires. Compared to the option tires, their performance is even more inferior than it was in 2014. A recovery following his tire change is part of his plan, but he won't be able to carry it out. Halfway through the race, Rockenfeller's new Phoenix team-mate, Timo Scheider, causes a caution period. The race is released again after four laps behind the safety car. All the cars closely shoot through the corners. Suddenly, Audi driver Adrien Tambay spins and retires, his car showing clear signs of a collision, as does Rockenfeller's. The Schaeffler vehicle coasts onto the grass without the driver's door. No TV camera has captured the accident, but the subsequent scenes provide an idea of what happened. Obviously shaken, Rockenfeller gets out of his car, climbs behind the track barrier and collapses. With his hands covering his face, he lies on the ground, motionless. The scene is explained after the race: "All I can say is that I feel incredibly sorry for Adrien, Audi and my team, Phoenix. It was clearly my mistake and I didn't do it on purpose," says Rockenfeller. "Maybe my front wheels weren't hot enough. I was surprised that they locked and I slid into the rear of Adrien's car." The lowest low Mike R. has experienced in his DTM life to date.

JULY

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HOCKENHEIM – It's been a pretty one-sided season in practically every respect. Marco Wittmann has been determined as the drivers' champion and his team, RMG, as the teams' champion. Only the manufacturers' title is yet to be awarded. BMW vs. Audi. The points score: 361–340. "Our aim is to clinch the title of the best manufacturer – we're going to jointly battle for it," says Dieter Gass, Head of DTM at Audi. "Adrien Tambay's pole position in the Hockenheim season opener showed that our RS 5 DTM runs well on this track." It does so again in the finale, delivering a tremendous performance. Six 'Audians' occupy the first four rows of the grid. Mike Rockenfeller is one of them in position seven. In the race, Gass' squad converts the solid grid positions into Audi's best team result by far. Mattias Ekström, Mike Rockenfeller and Jamie Green celebrate a one-two-three victory. The manufacturers' title has been won. With a score of 18 points 'Rocky' leapfrogs from fifth to third place in the drivers' standings – a positive ending of a season with highs and lows.

1 Second place at Oschersleben temporarily propels 'Rocky' to the top of the drivers' standings

2 Ending on a positive note – in the thrilling season finale, Rockenfeller advances to third place overall

3 Phoenix Racing charmers – Timo Scheider and Mike Rockenfeller

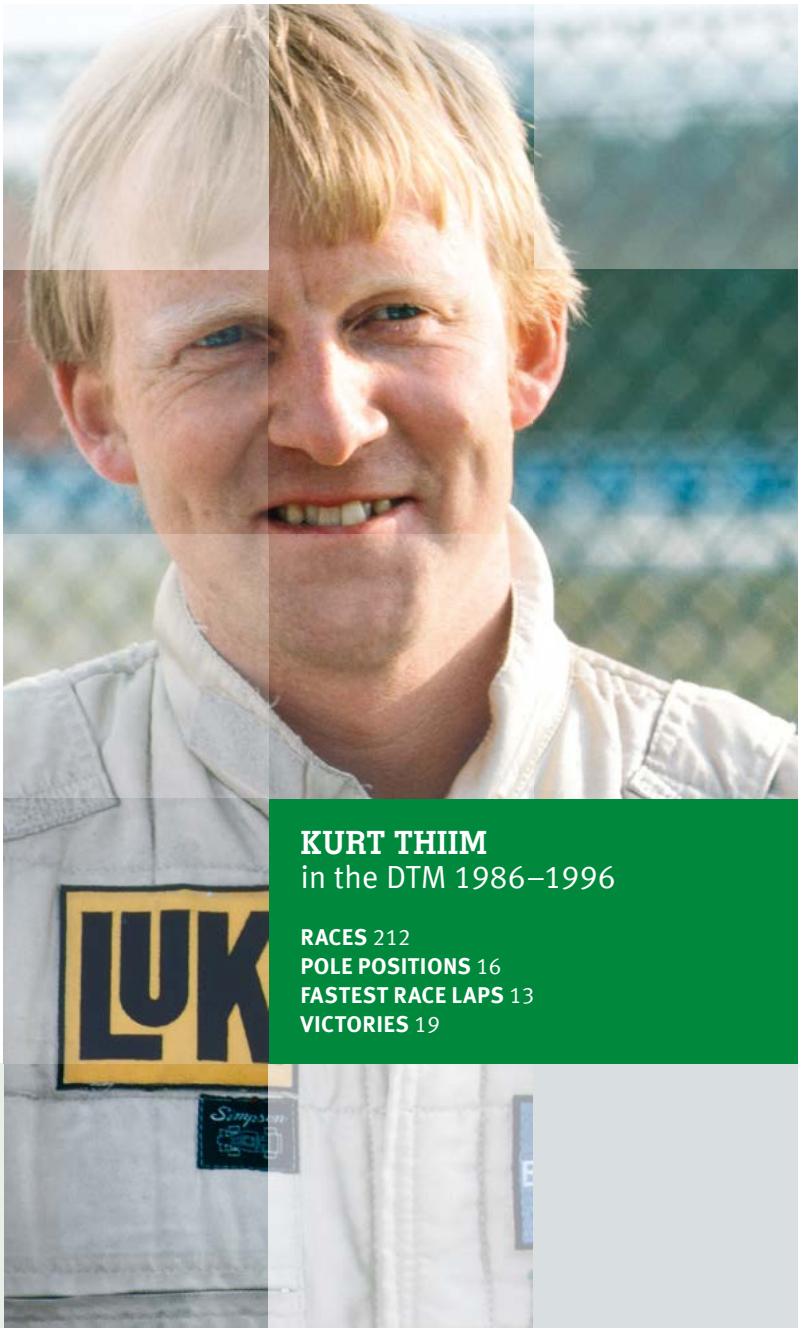
3

THE MAGNIFICENT FOUR

Proudly presenting: Kurt Thiim, Mattias Ekström, Martin Tomczyk and Mike Rockenfeller – DTM title winners under the Schaeffler banner.

1986 THIIM TOP

Back in the days of the DTM era of Kurt Thiim. When there were more than 40 cars in the field. Back in the days of … 1986. The DTM is only two years old and Kurt Thiim almost doesn't make it into the series. Two years earlier, he's won the German Formula 3 Championship. He's striving for promotion but lacks the financial means. For the 1985 season, he can't find a new job as a race driver. Assuming that his career is over, he plans to work as a car mechanic. Then an opportunity presents itself. His former Formula 3 team boss Malte Bongers arranges a meeting with Frieder Nickel, the boss of the atn DTM team. Nickel offers the cockpit of a Rover Vitesse to Thiim. "I wasn't able to make any money that way," Thiim recalls. "But it was better than nothing because I wanted to keep racing." A fortunate move, as time would tell. Thiim delivers a brilliant performance in his first year of touring car racing. The Rover is incredibly strong. The season ends in the title win. Almost three decades later, the Dane, who was born in 1958, still hasn't tired of motorsports, contesting five to six races per year. That's all the time he can spare for racing because his main job is working as a test driver for Goodyear in Luxemburg. Plus, he's got a big hobby: his four children. One of them is his son Nicki, a race driver as well. Nicki's greatest successes so far have been the 2013 Porsche Supercup win and a class victory in the 2014 Le Mans 24 Hours.



KURT THIIM
in the DTM 1986–1996

RACES 212
POLE POSITIONS 16
FASTEST RACE LAPS 13
VICTORIES 19

6 times from pole in 1994 – a DTM record

76
percent of his races in the points – no active racer has done better

MATTIAS EKSTRÖM
in the DTM since 2001

RACES 144
POLE POSITIONS 19
FASTEST RACE LAPS 13
VICTORIES 19

2004, 2007 EKSTRÖM WINS TWICE

Mattias Ekström is one of the 'real characters' in the DTM. When he's in a good mood he's never at a loss for a witty remark. When he's in a bad mood he doesn't mince his words. 'Eki's' sporting performance is beyond any doubt. His two overall DTM victories in 2004 and 2007, plus his four titles in the Race of Champions, are highlights of his career. And as if his life as a DTM driver weren't challenging enough, Ekström forms his own rallycross team, EKS, and races in the World Championship.

11
years to clinch the title – longer than anyone else

MARTIN TOMCZYK
in the DTM since 2001

RACES 142
POLE POSITIONS 8
FASTEST RACE LAPS 8
VICTORIES 7

2011 TOMCZYK SURPRISES EVERYONE

Actually, I made the wrong career choice, didn't I? I really come across cool," Martin Tomczyk once commented on a photo taken at a fashion shoot that shows him together with two female beauties. He won't pass up a chance to play a good game of poker or ride his Harley Davidson Chopper either. Tomczyk is the DTM's rock star, a ladies' man, but one who's already taken. His relationship with hobby racer and TV presenter Christina Surer dates back to 2008 and since 2013 they've been married. Together with daughter Grace and dog Rookie the couple leads a happy family in Rosenheim where Tomczyk was born. In contrast, Tomczyk's DTM career was less fortunate for a long time. In 2001, he joins Audi's privateer team Abt Sportsline at the same time as Mattias Ekström. In 2004, both are signed by the Audi factory team. While his buddy celebrates success, Tomczyk has to wait for a long time before achieving his breakthrough. The 'underdog' doesn't clinch his first victory until 2006. In 2011, he has to swallow a seemingly bitter pill on being transferred to Phoenix Racing within the Audi factory line-up. He tackles the season in a 'year-old car,' the Schaeffler Audi A4 DTM. The new team turns out to be a stroke of luck. Tomczyk finishes all races in the top five, a feat that only one other driver has achieved in DTM history: record champion Bernd Schneider. Tomczyk clinches his first title in commanding style and switches to BMW in the 2012 season.

2013 ROCKENFELLER AT THE ZENITH

Mike Rockenfeller and Schaeffler – an inseparable unit in the DTM. 'Rocky' initially drives the red Phoenix Audi with INA branding. In 2012, he takes the wheel of Martin Tomczyk's green-yellow Audi and continues the success story of the automotive supplier from Herzogenaurach. In a year that's weak from Audi's perspective, Rockenfeller is the driver that keeps the flags of the Ingolstadt brand flying high, while driving his personal DTM track record to new heights. Thanks to team orders and solid strategies he battles for the title for a long time and ultimately finishes in fourth place overall. A year later, he outperforms the entire field and becomes champion! Be it his title win, victories or defeats Rocky is not a man of profuse emotions. He's one of the quiet types and likes spending the hours before a race in his private motorhome. In the race, he relies on his driving skills. They usually suffice to put him pretty far at the front but "when I'm competing for 18th place there's really no need for me to ruin every corner of the car. Maybe I've just been brought up that way but I don't believe that constantly being entangled in collisions will do you any good in the long run."

MIKE ROCKENFELLER
in the DTM since 2007

RACES 81
POLE POSITIONS 4
FASTEST RACE LAPS 4
VICTORIES 3

8TH
on the grid on average – and champion nonetheless


SCHAEFFLER
LUK
Audi Sport
SCHAEFFLER
LUK
FAG
ADAC

ONE OF US

With his professional yet warm manner, DTM Champion Mike Rockenfeller is not only popular with motorsports fans but has made plenty of friends at Schaeffler as well.

How often does someone address you as Mr. Rockefeller?
MIKE ROCKENFELLER (laughs) *That does happen now and then. In the early years of my career, it would happen more often because people were more familiar with the name of the American dynasty than they were with my German family name. But the name is pretty common in the region I come from.*

So, it's inexcusable that you're called 'Mike Rockefeller' in an article on the homepage of your hometown Neuwied of all places.
(Laughs again) *Seriously? That's incredible. They really should know better. I'll have to talk to them about that.*

In the motorsports scene, you're also known as 'Rocky.' Where does this nickname come from?
I don't really remember. My father and my uncle were always called 'Rocky' too and at some point in time people also started it with me. But in racing, my nickname has actually become commonplace. 'Rocky' does look better on the pit board than Rockenfeller. But my close family and friends call me by my first name.

Since 2012, you've been driving an Audi with green-yellow Schaeffler branding in the DTM and are a brand ambassador of the company. How is the partnership between you and Schaeffler being lived?
The car is definitely the major touch point. I represent the name, the logos and the colors and try to make Schaeffler appear in the best possible light by being successful. In return, I receive a lot of affection, especially from the employees. Some of the apprentices drew a picture of my DTM car and gave it to me. That was very touching. Aside from the economic aspects, it's a partnership with an incredible human touch. I try to show the employees who the character is behind the wheel of their car so that they can tell: "Hey, this guy's one of us."

In 2013, you won the DTM for the first time with Schaeffler. Does a champion get more attention?
When you compete for the title and ultimately win it, you're in the fans' and the journalists' focus, especially in the DTM and the motorsports scene, but outside racing too. People who previously might have only known names like Bernd Schneider or Mika Häkkinen could suddenly relate to my name as well. The title win in an important series like the DTM is rewarding for any driver.

It's difficult to become a DTM Champion and even more difficult to remain a champion. Why didn't the title defense work out in 2014?
I think there were several factors involved. Following the first two races, I was at the top of the standings and it looked like the season would continue just like the previous one. But that didn't happen. We made a few mistakes as a team and as a driver I didn't manage a perfect season either. But, either way, it would generally have been difficult to beat Marco Wittmann, as strong as he was. That I finished in third place overall in the end is nice but my goal for the season had been different. In 2015, we're going to come back and give everything to have number '1' back on our car in 2016.

What's your relationship with Audi Sport Team Phoenix like?
I met the Phoenix team in the 2009 season. In 2010, I switched to Phoenix in the DTM. Team boss Ernst Moser took very good care of me and responded to my needs. It's been a family-like relationship from the beginning. After a year at Abt Sportsline, I returned to Phoenix in 2012. With the new regulations, BMW's return and the current car, that was ▸

my personal 're-launch' in the DTM. We've experienced all the lows but especially the highs together. That creates a close bond. You can depend on everybody in the crew.

As an Audi factory driver, in addition to the DTM, you've also been involved in the sports car program. Your major success?
I've had two. In 2008, I won the European Le Mans Series together with Alexandre Prémat. That was a very prestigious triumph because we beat Peugeot who, actually, were clearly better that year, plus, obviously, my victory in the 2010 24-hour race at Le Mans.

»THE BRAKES, LITERALLY SPEAKING, HAVEN'T BEEN PUT ON MY PASSION FOR MOTORSPORTS.«

A year later, again at Le Mans, you had to digest a serious crash that even forced you to skip a race in the DTM. Is such an experience a defining moment?
Absolutely, but not so much in terms of racing. Otherwise, I'd have to say, 'I'll never climb into a race car again.' But, literally speaking, the brakes haven't been put on my passion for motorsports. On the personal side, things did look a little different. My wife, my parents and I, as well, realized once more how quickly – and without warning – an accident like that can happen. We all know how lucky I was to climb out of the wreckage relatively unharmed. This accident is part of my life, but I've long gotten over it.

As a way of achieving some 'work-life-balance' in motorsports, you recently took up bicycle racing and competed in the 24-hour bike race at the Nürburgring with Phoenix Racing.
Actually, I've always been into running but because of a few minor problems with my knee or shin I looked at bicycle racing and soon started to like it a lot. Aside from my change of heart, Phoenix had the idea to participate in bike races, so I automatically became part of the squad. A marathon race like the Nürburgring 24 Hours promotes team spirit. In my free time, I regularly ride my bike as well. I've got a few former bike racing pros living in my neighborhood that I can fantastically train with.

You post photos of bike races and other events on your homepage and on various social media platforms. How important is wide-spread networking for someone who's in the public eye?
For me, it's not quite as important as it may be for others. Many of my colleagues are clearly more active in social media. I feel that personal contact is still more important than anything else. I like looking people in the eye when we're communicating. But it goes without saying that I cannot personally talk to every single fan. To reach a lot of people at the same time without investing a major effort, Facebook and company are definitely not bad.

In your personal life, 2014 was a very special year for you as well …
Yes it was – the most exciting one in my life so far. I married Susanne and our healthy son, Phil, was born. I feel tremendously comfortable as a father and really have to

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1 Mike Rockenfeller answers the questions of Schaeffler's communicator Jörg Walz

2 'Rocky's' equipment in 2014 – the green-yellow Schaeffler Audi RS 5 DTM

3 Pros meet Formula Student – Phoenix team boss Ernst Moser, Mike Rockenfeller, Schaeffler shareholder Maria-Elisabeth Schaeffler (front, from left) with Formula Student participants

thank Susanne. Whenever I was away for longer periods of time she really took great care of everything. Our life has changed. In the past, my parents were my family and now I've got a family of my own.

In 2014, you were a guest speaker at an information event hosted by Schaeffler about Formula Student. How did this come about?

The Formula Student participants are future engineers. I told them about what counts in professional motorsports, about my relationship with engineers and how important I feel the relationship between drivers and engineers is. But it wasn't a monologue on my part. The students gave me feedback on their ideas of a personal future as an engineer. It was a very interesting exchange of experiences.

You were trained as a car mechanic and in the early years of your motorsports career did some mechanical work on karts yourself. Are you interested in Schaeffler's highly specialized products?

Absolutely. Before my contact with Schaeffler, I didn't know exactly what they produce. You know that there are suppliers in motorsports and in the normal automotive business but it's not always clear who supplies what. Now – at least as far as Schaeffler is concerned – I'm totally in the know.

What does 'mobility for tomorrow' mean for you?

With respect to the automotive sector, which is the most relevant one for me both professionally and in my personal life, the thing that's most important to me is that, in spite of all the technological progress, cars continue to be fun to drive.

MIKES MASTERPIECE

In the Audi RS 5 DTM, Mike Rockenfeller clinched a dominant DTM title win in the 2013 season. Gregor Messer was allowed to do a few laps in the championship-winning car.


BOSCH
LUK
FAG
CHAEFFLER
HANKOOK

You approach this green-yellow thing with respect and the same good intentions you've got for yourself: whatever you do, just don't break anything. An off-track excursion, and worse yet a crash, are at the top of the not-to-do list. Consequently, the speech held by Audi's Head of Sport Dr. Wolfgang Ullrich grinds itself into the crevices of your auditory passage with the intensity of coarse emery paper: "This car is a championship-winning car. It's intended for our museum. Scratch-free." Ullrich says it in a calm tone but you can clearly sense the three exclamation marks in the Austrian's authoritative voice. But immediately afterwards, Ullrich goes on to issue encouragement: "Actually, our car is not difficult to drive."

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Just climbing into it belies the words of Audi's Head of Sport. Even if you've watched a DTM crack crawl into his sporting equipment a hundred times or more, it proves a lot more difficult in practice than in theory. The choreography of getting into the car is complex: right leg first, then, with legs apart, you dive deep into the dark interior towards the pedals. Anyone who has studied modern dance at the Bolshoi Theater clearly has an advantage. The right hand follows, clinging to the left upper tube of the cage, and then you worm your way backwards through the opening that suddenly is much too small into the seat that's hidden far, far behind the B-pillar. The left leg follows last while you've got to be careful not to pull off the ventilation tube that's so important for the driver. "Believe me, without air circulation in the car you won't be able to stand it," says Mike Rockenfeller. In addition, the temperature at head level, which is precisely measured by a sensor, must never exceed 45 degrees centigrade.

The seat fits superbly. Is this really the original 'chair' of champion Rockenfeller? I wonder because he's only 1.75 meters tall, weighs only 67 kilos, and is a lot slimmer in the hip area than I am. That I have to stretch a lot to depress the clutch pedal results in only a brief moment of discomfort. "Well you know, you only depress the clutch when you drive off," 'Rocky' explains. To start the eight-cylinder engine, two little levers have to be turned on the center console that's cluttered with all sorts of control knobs: first the one for the main power switch that's covered by a bright-red safety cap and then another flip switch right next to it that releases the ignition.

Meeting at the rear wing – DTM Champion Rockenfeller, Head of Audi Sport Dr. Ullrich, test driver Messer, Phoenix race engineer Jungklaus (from left)

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1 Adjustable rear wing for easier overtaking

2 Aerodynamics have been revised for the 2014 season

3 An eye-catcher from front to rear – the Audi RS 5 DTM

4 Clean lines and a rear diffusor for plenty of downforce

5 No more options – in 2015 only standard tires are used in DTM

6 An innovation of the 2014-spec RS 5 DTM – the exterior mirrors

Now things are beginning to get serious. You start the preheated engine by depressing a button. Due to the circulation of hot water the power-plant already has a temperature of 50 degrees centigrade. “The bearings are so tight that they’d get jammed in a cold engine,” Jürgen Jungklaus explains. Rockenfeller’s race engineer is in charge of the test. Almost in concert with the tire blankets, the RS 5 DTM drops down from the four posts of the built-in jack system. Jungklaus moves away from the front end – but wasn’t there something else? Right: engage the first gear. Keep the green button at the bottom right of the steering wheel depressed while pulling the paddle shifter on the right-hand side. The display immediately shows a ‘1.’

You don’t need a particularly sensitive touch with the clutch to set the race car in motion. “You can basically even drive off at idling speed,” I can still hear Rockenfeller say. Despite his advice, I try putting a little pressure on the gas pedal that can be depressed with ease. I’m also interested in the speed limiter. After all, the ‘cruise control’ system for the pit lane is often the reason for drive-through penalties. By means of the red button at the bottom left of the steering wheel the speed is electronically limited. Jungklaus has me set the default at 60 instead of 80 km/h. I go full throttle with the button depressed – and this ugly booming blare that’s so typical for all DTM eight-cylinders in the pit lane immediately sets in.

The champion’s car is fun to drive – and it’s exactly the way Head of Sport Ullrich said: The Audi can be moved without a lot of effort – at least if you’re crawling along like I am. Still, with every meter I move, my drive becomes more ‘fluid.’ It’s easy to develop confidence in the car. The brakes show overwhelming bite when you hit the perforated pedal full-force, applying about 80 bar or 1,200 psi. The blue light-emitting diodes on the dashboard will soon send you a warning that means caution: front wheels are locking. Other than that, I follow the light show that’s displayed for shifting into higher gear. The little lamps flicker in green first, then in orange and finally in red before upshifting all the way into sixth. Downshifting? It’s a snap. You just click the left-hand paddle. After five interesting laps, all I can say is, I wouldn’t have minded doing fifty. But the limits remain vague. Let’s face it, this is what the DTM cracks are really adept at: moving a relatively underpowered car with lots of aerodynamic downforce as efficiently as possible.

NEW DIMENSION

The FIA World Endurance Championship (WEC) is regarded as a technological pioneer in global motorsports. For the 2014 season and onwards, the philosophy of the competition has changed: instead of the most powerful engine the most efficient race car will win. Schaeffler is part of the program.

Endurance racer – in the WEC round in Bahrain, Webber, Bernhard and Hartley take a podium for the third time

Efficiency instead of power: When the Automobile Club de l'Ouest (ACO), the organizer of the FIA World Endurance Championship (WEC), sets the agenda for the future in 2012 it rocks the entire motorsports world. At Schaeffler, the potential harbored by this defining moment is recognized as well, as efficiency is more than a hot topic for the innovation leader – it is part of the Schaeffler DNA. The new Technical Regulations, starting in 2014, depart from previous practice by imposing limits on the energy consumption of the car instead of its power output – a world first. The power applied to the wheels, which has also been powering developments in motorsports for over a century, has now become 'old school.' The energy that flows into the tank and the batteries represents the present and the future. Through energy recuperation, the WEC propels itself to the top of all FIA World Championships in terms of technology. Efficiency now plays the lead. A paradigm shift. An evolution. A revolution. The beginning of a new era.

More than ever before, high tech, efficiency and reliability are decisive in the light of the visionary regulations. Efficiency had been a topic as far back as at the end of the nineteen-fifties, albeit a marginal one more or less. The so-called Index of Thermal Efficiency received a classification of its own. However, the importance of the ratio of weight, speed and consumption did not even come close to the significance of today's philosophy. Now, more than half a century later, the usable amount of energy is limited, whereas the rules allow major freedom in the areas of hybrid and powertrain technology. There are various engine concepts and even four-wheel drive is permitted. The regulations aim to promote developments in exactly the areas that are, and will be, in full focus in automotive engineering and, as a result, at Schaeffler as well, in the coming decades. In the WEC, the analogy between motorsports and production has come very close again to its original meaning. What works and wins in the world's toughest races proves its fitness for production at the very highest level. The premier category in the WEC, LMP1, provides the perfect stage for innovative hybrid technology.

PARTNERS FROM DAY ONE

The collaboration between the Stuttgart-based OEM and Schaeffler dates as far back as to the first Porsche in 1948, followed by more than six decades of automotive progress. During this period, Porsche's model history sees a fascinating development. A look underneath the body shell reveals equally exciting progress.

The innovation prowess of the development engineers and the know-how of the suppliers have major influence on the evolution of the automobile. Schaeffler is active as a global expert partner of automotive OEMs for sustainable mobility. The product range encompasses technologies for engine, transmission and suspension applications, plus hybrid elements and electric drive systems. The breadth of the portfolio ranges from single components to complex systems. Energy efficiency is the focal topic – also for the CO_2ncept-10% concept vehicle (photo).

In 2009, Schaeffler showcased the optimization potential harbored by modern automobiles in this technology demonstrator based on a Porsche Cayenne. Equipped with a large number of coordinated Schaeffler products, fuel consumption and CO_2 emissions were cut by ten percent.

Today, the relevant components – including electromechanical camshaft adjusters and roll stabilizers – have evolved into standard products. Progress never stops. Accordingly, modern cars are much more complex compared with their ancestors. As long as the road from the Porsche 356 to the Cayenne Hybrid may have been – it has always been one that Porsche and Schaeffler have traveled jointly.

WEC
The world's toughest test lab

DEVELOPMENT OF THE PORSCHE FLEET

PORSCHE 356
Early days

The invention of the cage-guided INA needle roller bearing by the Schaeffler brothers at the end of the forties is a game-changing innovation. Its advantages: reduced friction and speed stability. It is a prerequisite for making many automotive transmissions fit for freeway driving. Obviously, Porsche is one of Schaeffler's customers.

PORSCHE 911
Legend

In 1965, Schaeffler founds the clutch manufacturer LuK and launches the first diaphragm clutch on the market. This innovation marks the beginning of a successful career. Today, every third car around the globe is equipped with a clutch of the Schaeffler LuK brand.

PORSCHE 917
Success story

1970 sees Porsche evolving from a class to an overall winner at Le Mans. The twelve-cylinder unit of the 917 uses barrel tappets of Schaeffler's INA brand. For Schaeffler, the race serves as a test lab. Today, Schaeffler has long become THE specialist for valve train components and systems.

In the 6-hour race at Spa-Francorchamps, Dumas, Jani and Lieb in the Porsche 919 Hybrid take the pole position for the first time

This new future of the sports car – the development of reliable and efficient technology for future mobility – sparked Porsche's interest as well. In 2014, for the first time since its last victory in the Le Mans 24 Hours in 1998, the Stuttgart-based manufacturer competes in the top category again. Back then, the Porsche 911 GT1 even celebrated a one-two win in the epic race. Its successor, the Porsche 919 Hybrid that has specifically been developed for the new regulations, is designed to follow in its footsteps. In the WEC, a limit has been defined for fuel consumption. According to the regulations, the most complex race car that Porsche has ever built is permitted to consume 4.79 liters of gasoline per lap on the 13.629-km track. Otherwise, severe time penalties may be imposed. In addition, the organizers provide incentives for wasting less energy, assisted by energy recuperation systems.

Porsche goes a step further than its competitors in developing the new generation of sports prototypes on returning to LMP racing. The 919 features a combination of kinetic energy recovery at the front axle and conversion of thermal energy at the rear: a vehicle engineering concept with a futuristic touch that's being put through its paces in the WEC – and successfully so. On their way to clinching their first victory, the 919 Hybrid cars cover 23,232 kilometers in racing, producing and developing nearly 3,592 kilowatt hours of electric energy in the process. This is enough to cover the requirements of an average German household for more than a year (373 days). Therefore, the manufacturer's WEC entry is "absolutely the right decision" for Porsche's CEO Matthias Müller. Particularly in the light of mobility

PORSCHE 928
Comfort through technology

Schaeffler engineers introduce hydraulics in the valve train. Hydraulic barrel tappets of the type that Porsche puts on the road for the first time in the 928 that was unveiled in 1977 put an end to time-intensive garage service because the barrel tappets independently adjust valve clearance.

PORSCHE 959
High-tech lab

In the 959 that reaches speeds of more than 300 km/h Porsche puts the optimum of what is technically feasible on four driven wheels at the end of the eighties. One of the components on board is a hydraulic chain tensioner, a Schaeffler invention that Porsche drivers have come to appreciate in the 911 as well.

PORSCHE 911 (TYP 996)
Efficiency

With VarioCam Plus variable valve timing Porsche sets new benchmarks in terms of efficiency and performance. This technology supplied by Schaeffler makes it possible to perfectly adapt the engine's characteristics to the relevant driving mode.

PORSCHE CAYENNE S HYBRID
Double heart

This Cayenne marks the beginning of a series of hybrid electric vehicles made by Porsche. The hybrid module with an integrated electric motor sits between the internal combustion engine and the transmission. A hybrid clutch by LUK provides harmonious moderation between the individual components.

for tomorrow, the prototype program is justified in his view. "This highly challenging motorsports program is a direct investment in the development of future road-going sports cars. It's hard to imagine a tougher proving ground than the WEC tracks to develop and test future hybrid systems."

As a Porsche partner, Schaeffler joins the global competition at the beginning of 2014 as well – with good reason. Prof. Peter Gutzmer, who used to be a senior Porsche developer for many years himself, emphasizes that the appropriate impulses for the future of automotive development are provided in the WEC. "At Le Mans alone, we cover as many kilometers as Formula One does in a full season. This quality of motorsports is unrivaled," says Schaeffler's CTO. The WEC is well-suited for OEMs and automotive suppliers like Schaeffler that aim to demonstrate technology which is fit for standard production and the capabilities of their visionary designs in front of a large global audience.

Debut winners – Marc Lieb, Romain Dumas, Neel Jani and Fritz Enzinger, Head of the LMP1 program at Porsche

FACTS AND FIGURES
2014 FIA WEC

23,232
race kilometers were covered by the two 919 Hybrid cars in the season

1 model in the field that recuperates energy not only during braking but also during acceleration – the Porsche 919 Hybrid

230
racing experts worked on the 919 Hybrid

373 days is the time span for which the energy produced by the two LMP1 Porsche cars per season could supply a German household

PORSCHE 919 HYBRID LMP1

ENGINE V4 engine with turbocharger, 2,000 cc, › 500 hp
HYBRID SYSTEM KERS with motor generator unit at the front axle, › 250 hp, ERS for recuperation of thermal exhaust energy
HYBRID CLASS ‹ 6 MJ
DRIVELINE Rear-wheel drive, traction control (ASR), temporary four-wheel drive by KERS at the front axle
MINIMUM WEIGHT 870 kg
FUEL TANK CAPACITY 68.3 l
HEIGHT / WIDTH / LENGTH 1,050 mm / 1,900 mm / 4,650 mm

4,742.9
km were covered by the best Porsche in the Le Mans 24 Hours

3,592
kWh of electric power were generated by the two 919 during the season

2,323
leading kilometers were clocked by the two Porsche 919 Hybrid cars in the course of the 2014 season

Schaeffler underscores its technological expertise in eight events held in all globally relevant sales markets. In addition to Europe, the WEC presented its sophisticated technology in Asia as well as in North and South America in the 2014 season. In 2015, the German market is included as well, as the Nürburgring is on the race calendar for the first time. Through its presence and success on the WEC stage, the company achieves an even closer emotional bonding with its employees and partners around the globe.

Porsche doesn't leave anything to chance on this grand stage. 230 racing experts are working on the development of the highly complex Porsche 919 Hybrid. The driver team is growing as well and Porsche signs only the cream of the crop for its six-strong driver squad. On signing Mark Webber, the manufacturer lands a coup – the down-to-earth Australian is a star. Eleven years in Formula One, 215 Grand Prix events, 13 pole positions, nine victories. The debonair 38-year-old is an ideal ambassador and representative both on and off the track, as the officials at Porsche are well aware. Endurance racing rookie Webber can rely on his team. Together with Timo Bernhard, a factory driver of many years, and the up-and-coming New Zealander Brendon Hartley he forms a powerful line-up in 2014. During the course of the season, the trio clinches three podium places. In the sister car, sports car expert Neel

THE HOLY GRAIL OF ENDURANCE RACING

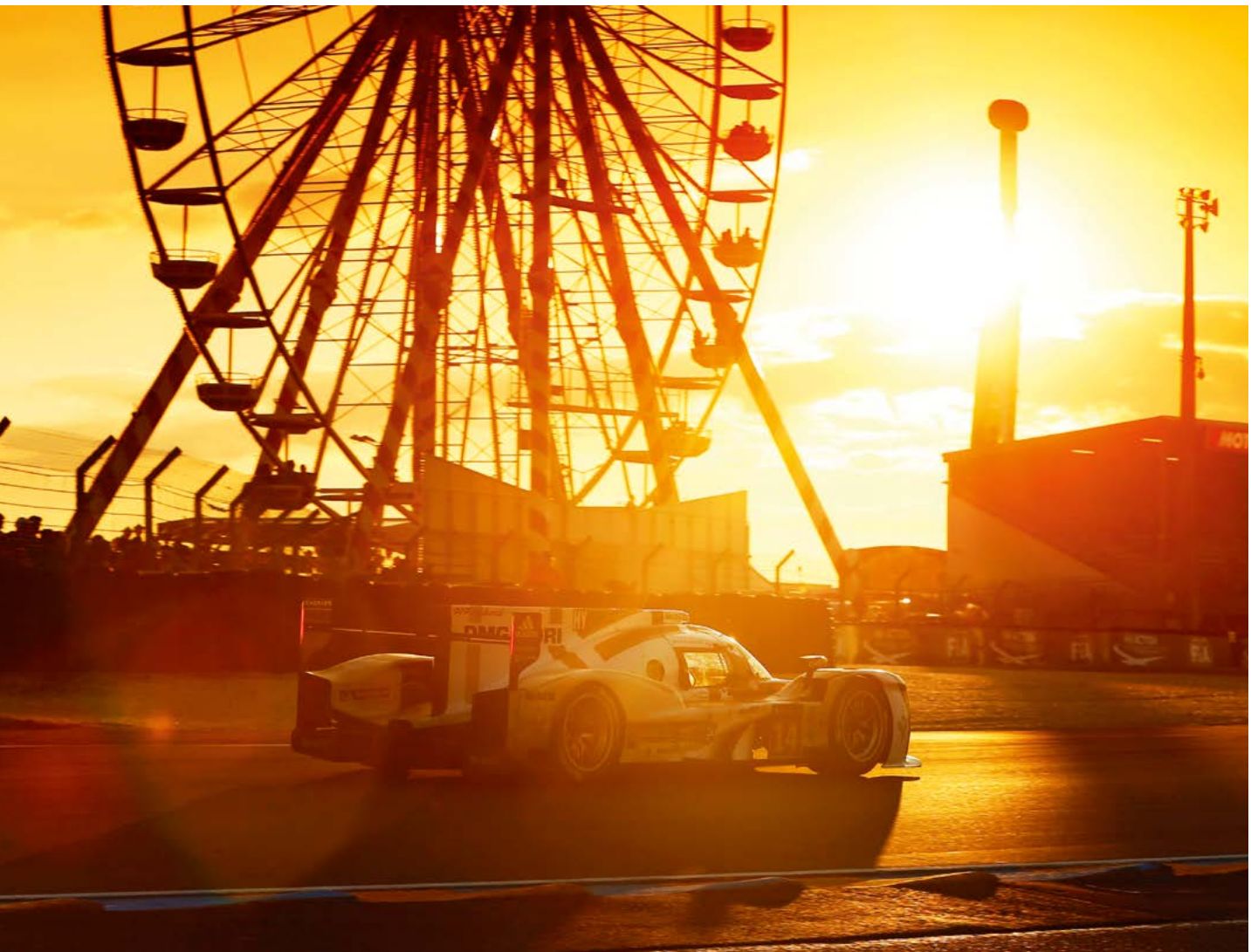
Tradition. Legend. Paradise. The Le Mans 24 Hours is regarded as the world's most important endurance race, and it is with good reason. In this tradition-steeped classic, 'man and machine' constantly operate at the limit, delivering maximum performance. Twice around the clock. 1,440 minutes. 86,400 seconds. Without a break.

For drivers and fans, this event is legendary. But manufacturers, suppliers and engineers find paradisiacal conditions in the heart of France as well because the regulations purposely allow plenty of freedom. Reliability is of particular importance in this context. "Consistency plays a major role," says Schaeffler CTO Prof. Peter Gutzmer. "The cars cover a distance of some 5,000 kilometers at Le Mans in 24 hours – this roughly equates to the racing distance of a Formula One season. It's an extreme challenge and therefore perfectly fits the qualities that Schaeffler defines for its production technologies as well."

Countless innovative technologies have passed their baptism of fire at La Sarthe. Aerodynamic bodies, light-weight design, hybrid systems – they all subsequently became firmly established in production for road-going vehicles. Take the valve train components used in the legendary Porsche 917 for example. The vehicle that the Stuttgart-based manufacturer was triumphant with at Le Mans for the first time in 1970 was the perfect technology demonstrator for Schaeffler and subsequently produced by the millions. Six years later, Porsche achieved its first victory with a turbo engine, which sparked the production development of the turbocharger – an important downsizing element that deploys its full efficiency only due to anti-friction rolling bearings based on Schaeffler's know-how.

Jani, seasoned campaigner Romain Dumas and Porsche's home-grown racer Marc Lieb, who claim the first victory of the Porsche 919 Hybrid in the season finale in Brazil, deliver a commanding performance. The results inspire confidence in Porsche's Management Board Member Wolfgang Hatz: "In 2014, we were immediately competitive with the most complex and most innovative race car built by Porsche to date and reaped the well-deserved reward on clinching victory in Brazil." Four podium places and an equal number of pole positions are added to the top result. Reasons enough for Hatz to set the agenda for 2015: "This commitment is not only successful on the race track but on the engineering side of the house as well. We're challenged to deliver top performance with maximum efficiency in ever new dimensions. That's why we're going to rise to the challenge with three Porsche 919 Hybrid cars in 2015."

The third car will be used at Spa-Francorchamps and at Le Mans. Earl Bamber and Nick Tandy will be at the wheel, as well as Formula One star Nico Hülkenberg, which boosts the competition within the factory line-up. Consequently, as well as momentum and innovation prowess, teamwork will be crucial for success. The same applies to the Schaeffler employees striving, day in day out, to stand their ground as one of the world's major innovation leaders.



„LE MANS IS SEXY"

In an interview, Mark Webber talks about switching to the World Endurance Championship, motorsports of the future and his unfinished business with one of the world's most important races.

Mark, your WEC rival Tom Kristensen has ended his career – at 47. You're 38. Can you imagine contesting top-caliber races at that age as well?

MARK WEBBER (laughs) *At the beginning of the season, I could have. But after an exhausting year like this one I could also imagine leaving the cockpit earlier. But seriously: for me, this scenario is not as likely because the cycle of a race driver is getting shorter and shorter. Ten years ago, you could drive in the top categories up to the age of 50. Today, people – like Tom – retire in their late forties. By the time I'm in my late forties, the retirement age will even be a bit lower.*

That won't be until ten years from now – what do you expect motorsports to be like in 2025? Will racing become greener, quieter, cleaner?

A lot is going to change. With motorsports developing faster and faster, ten years are a long time, especially since the development curve of technology is very steep at the moment. I'm hoping that we'll still have a racing atmosphere with plenty of emotions and engine roar. As drivers, we like that too.

What powertrain technologies will have been developed by that time? Also for the road?

Electric drive systems are going to play an even greater role than now in production technology. In motorsports, hybrid concepts and the transfer of their technology to production are already in high demand today. Of all the forward-thinking drive concepts the electric component has the greatest potential.

The WEC is closer to production with respect to technology. Does this also mean it's the 'motorsport of the future' and going to outstrip Formula One?
There are a lot of good reasons why manufacturers are involved in the WEC. They want to test their products and developments in a competition. F1 has always been a big playground for engineers, the biggest one in motorsports. Due to its extreme popularity F1 obviously is an incredibly effective marketing tool as well. But the WEC has caught up. Both competitions are as close to each other as never before. Their technological relevance is one of the factors that will determine how bright their future will be.

Let's fantasize a little: In 2025, the WEC could be dividing its classes by various powertrain categories: hybrid, electric, natural gas, solar power, plus a couple of noisy gasoline dinosaurs for nostalgia addicts. Which one would you sign up for and why?
(laughs) *I definitely wouldn't want to be in the shoes of the commentator – you wouldn't be able to pay him as much as he'd deserve to be paid. From today's perspective, I'd sign up for the hybrid class. It's focused on the future, plus it's the field I could bring the largest amount of experience to. Natural gas and solar power don't sound so exciting to me.*

»WEC AND F1 ARE AS CLOSE TO EACH OTHER AS NEVER BEFORE.«

Back to 2014: For a 38-year-old rookie you had a good season. What's your personal assessment?
Obviously, my accident in the season finale in Brazil wasn't a great way to end the season. But the overall result we achieved as a team was still positive because on balance we took three podium places and two pole positions. That involved a lot of work without which I wouldn't have learned so much this season. The leap from F1 into the World Endurance Championship is very big. You've got to be very flexible in the cockpit and do a good job of managing your race. I also share my car with two other drivers, plus we're driving at ▸

After a 15-year abstinence, Mark Webber is set on satisfying his hunger for success again in the Le Mans 24 Hours – in the Porsche 919 Hybrid

Race preparation – Webber studies the data on the Schaeffler Fact Sheet

night and have a lot more lapped cars on track to contend with. Compared with F1 the track conditions change a lot more in a WEC round. So, the job of a WEC driver has a lot of facets that I first had to become familiar with. But I do believe that I improved during the season and learned a lot in the process. Some of the tracks I immediately handled well and on others, such as Le Mans, I still have more potential.

Speaking of Le Mans, you raced there for the first time in 15 years this season. How has this iconic event changed?
Of course the cars are completely new, like from a different world. But the atmosphere is still as fantastic as it was back then. Le Mans is a huge crowd-puller, with a lot of hustle and bustle, and a little chaotic. But it's also very sexy. That's why – for decades – it's been one of the world's greatest and most important motorsports events. This is where 'man and machine' push their limits. No wonder that the world's major manufacturers and best drivers compete with each other at Le Mans.

What aims would you still like to achieve with Porsche? Win Le Mans?
That goes without saying. That's the big aim. As long as that hasn't happened, I don't consider my mission accomplished.

The WEC entered a new technological era. In what areas did you gather the most significant experience?
The greatest progress the Porsche team and I made was in understanding and handling the hybrid technology. Fortunately, the little brother of the Porsche 919 Hybrid for the road, the Porsche 918 Spyder, was already equipped with this technology. That's why we had some previous experience and a reliable benchmark throughout. Porsche had internally laid a valuable foundation with hybrid technology that we could build on as a team.

Now honestly, after more than a decade in F1 you've had to drive efficiently and save fuel since this season. That's not so sexy for a racer, is it?
That's part of 21st century motorsports, but it doesn't prevent real racing. Especially in the WEC season finale in Brazil, the field battled hard for every centimeter. In F1, the drivers are confronted with a very similar approach. Even though efficiency is required, we've got to drive through corners as fast as possible, brake as late as possible and complete a lap in as little time as possible. That's the way the FIA wants to see

3 Podium places were clinched by Webber in his first WEC season

500 Australian dollars was the price of his first car, a 1969 Toyota Corona

2003 was the year of the inaugural event of the Webber Tasmania Challenge, an outdoor sports event in Australia organized by Webber

60,000 U.S. dollars was the amount funded by Australian rugby star David Campese that allowed Webber to continue his motorsports career in Europe in 1997

8:31:56 hours was the time Webber needed to finish the Leadville Trail outdoor sports event after 165 km of mountain biking

40.805 people live in Webber's hometown Queanbeyan

motorsports. These are the boundary conditions, and for this stage the manufacturers want to develop and present their technological approach and transfer it to production.

Did it take you long to adjust your driving style?
Yes it did. Understanding the tires was the greatest challenge. But developing a feel for them was a lot of fun. Also, the Porsche 919 Hybrid weighs 200 kilos more than my old race car, which means it's different to drive and control. It took me a few months to get used to this new package.

Has efficient driving in the WEC affected your everyday driving style?
No, not at all.

How do you support sustainability?
I greatly appreciate nature, flora and fauna, and would like to conserve them. I'm absolutely an outdoor person and always careful not to leave any traces, whether onshore, offshore or riding my surfboard. But I'm just one person, a part of the big picture. Still, when I'm outdoors with my family and friends we're all conscious of the fact that we can't exploit nature.

Please complete the following sentence: Mobility of tomorrow, for me is …
… the use of drones.

THUNDERING DESERT LIZARD

The desert shakes when the powerful race trucks speed down the dust tracks in the Baja races in North and Middle America. Since 2006, Schaeffler brand ambassador Armin Schwarz has been flying across the ‘rough and smooth.’


SCHAEFFLER
DRW
REMUS
SPORTEXHAUST
K&N
FAG
Stammcut
EDM-Drähte . EDM-Wires

The moment when an 800-hp Trophy Truck appears on the horizon at Baja 1000, approaching you at racing speed in a cloud of dust is hard to put into words. The V8 engine produces a deafening roar, while the two-and-a-half ton truck races across the sandy ground, seemingly weightless. Thanks to suspension travel of up to a meter, the monster just swallows the awesome bumps that are up to 1.20 meters high while paving its way. Bearing a greater resemblance to a power boat than to a rocking horse, it proceeds at high speed: up to 230 kilometers per hour. Flat out on a track that in Europe wouldn't even qualify as a farm road. Treacherous grooves, boulders and dust beds lurk around every corner, spelling disaster for many drivers.

1

Armin Schwarz can tell a tale or two of this. The German has been competing in SCORE International events since 2006. The abbreviation stands for 'Southern California Off Road Experience,' an association founded more than four decades ago that organizes the world's toughest and most popular desert racing series. Five races held in California and Mexico, with Baja 1000 as the season's pinnacle event, make SCORE International one of the longest and toughest auto and motorcycle races in the world. Together with his co-driver Bryan Lyttle Schwarz in 2014 was well on his way to clinching a top result on the grueling 2,000-kilometer route. But on one of the fast straight sections, the rear wheel of the duo's truck caught a hard edge that was invisibly hidden underneath a dust bed. The incapacitated vehicle rolled over and landed on its roof, ending its race after 400 kilometers. Schwarz survived the crash unharmed and Lyttle suffered only minor bruises. The initial shock was soon followed by the disappointing realization that the duo's aim of finishing the season's pinnacle event in the top five had been missed.

2

Actually, the prerequisites at the end of a fair to middling season had been perfect. Not least thanks to the collaboration with Schaeffler the team managed to fix some of the initial bugs on the truck. "During the course of the season, the timing chain broke a couple of times," Schwarz recalls. "Together with Schaeffler, we looked for a solution and ultimately found one." The collaboration between Scharz, who hails from Neustadt an der Aisch in Germany's Franconia region, and the company headquartered in nearby Herzogenaurach has existed for decades. Development partner Schaeffler supports the Baja project with numerous components and technology know-how. In the United States, the team based in Escondido, California, is in constant dialog with the LuK branch in Wooster, Ohio, and there is a constant exchange with Herzogenaurach as well. "This is not extensively communicated externally," says Schwarz, "but various bearing solutions such as wheel, dry sliding and axle bearings are installed in the Trophy Truck." These industrial bearings which are normally at home in bulldozers, tractors or excavators are put through their paces in extreme conditions – in some cases having to hold up to ▸

1 Crowd puller – fans come in droves to watch Baja races

2 Popular with the crowd – Armin Schwarz is one of the top stars at Baja

3 No speed limit – full throttle, even in towns, turns up trumps at Baja

ARMIN SCHWARZ
DESERT ADVENTURER AND RALLY ICON

»WITH SCHAEFFLER, WE LOOKED FOR AND FOUND SOLUTIONS.«

3

FACTS AND FIGURES
2014 SCORE INTERNATIONAL

5 races were held as part of the series in 2014

3,757 kilometers were covered – 2,052 kilometers in Baja 1000 alone

431 virtual checkpoints were passed during the season GPS

1,670 meters above sea level was the highest elevation

1.20 meters is the height of the largest bumps to be crossed

80 meters is the distance covered in the longest jumps

AGM-JIMCO X6 SCORE TROPHY TRUCK

ENGINE V8 Prototype, 7,400 ccm, 780 Nm, 800 hp
TOP SPEED 220 km/h
ACCELERATION (0 – 100 KM/H) 6.5s road, 6.8s gravel
DRIVE rear-wheel
WEIGHT 2,500 kg
SUSPENSION TRAVEL 80 cm (front), 100 cm (rear)
WHEELBASE 325 cm
TRACK WIDTH 236 cm
FUEL TANK CAPACITY 380 liters
TIRES 39 inch

12 times as strong as in the DTM: the sidewalls of the Trophy Truck tires

1

forces that are a 100 times higher than those that occur in everyday use. “This puts enormous loads on the material,” Jeff Hemphill, Chief Engineer at Schaeffler in North America, confirms. “The powertrain is exposed to huge forces due to the constant grip and load relief reversals.” A torque converter developed by Schaeffler that is installed in the green-yellow desert lizard helps to efficiently put the power on the ground. The job of the Schaeffler engineers starts as early as in the planning stage. All the relevant components of the powertrain are carefully analyzed in Schaeffler’s laboratories and modified to suit the specific demands of these rallies as required – from the wheel bearing to the deepest depths of the transmission.

Following the races, Schaeffler carefully checks some of the components in order to gain new findings or to make further improvements possible. About 25 employees are directly or indirectly involved in the project. Schwarz views his role in the interaction as being more of a ‘motivator’ than a ‘development worker.’ “Anyone can drive a torque converter until it starts to glow but you’ve also got to be able to communicate and motivate,” the race driver says with a mischievous grin.

In 2015, quite a few things will change for Schwarz on again tackling the challenge of winning Baja 1000: a new team, a new truck – at least the co-driver will be the same. “The project involves a lot of work,” says the desert adventurer, “because there’s not just Baja 1000 but five races in total. I’ve been contesting the series since 2006 and didn’t find it difficult at all to establish myself as a European. The challenge is to become accepted by the Americans, which you can only do by performing. You need to be visible, successful, and have to adopt the culture or else you’ll stay on the outside.” Schwarz has managed to stay in.

1 Taking a dive – suspension travel of up to a meter makes the landings tolerable

2 Hot coals – dinner is served in typically American style

3 Ready for the car wash – at the finish, the Trophy Truck shows what it’s been through

2

3

UNEQUAL DUEL

Suspension travel vs. downforce, balloon tires vs. slicks, Trophy Truck vs. DTM car. A meeting of two fundamentally different racing machines on the Nordschleife, the ‘coolest stretch of road’ – under the Schaeffler banner.

The DTM visits the Nürburgring: just a little more than an hour to go until the start. Mike Rockenfeller walks through the paddock. He's already in a mental tunnel, fully concentrating on the race. He arrives at the garage of his Phoenix team – and meets Armin Schwarz. This is no coincidence because, like 'Rocky,' the German rally legend is a Schaeffler brand ambassador and has been invited to the Nürburgring by the automotive supplier.

They shake hands, briefly chat and then Rockenfeller has to leave again. "A cool character, we really get along well with each other," says Schwarz. "But that's just logical because both of us have been representing Schaeffler for years. The atmosphere in this company is simply very family-like." The two motorsports aces are not just exchanging a few words and tips this weekend but swapping their cars too. Even before their meeting, Schwarz took the first ▸

1

2

1 Schaeffler brand ambassadors among themselves – Mike Rockenfeller and Armin Schwarz

2 Door to door across the tradition-steeped Nordschleife

step and got into the passenger's seat of 'Rocky's' DTM race taxi. Sharp corners, hard braking maneuvers, acceleration as swift as an arrow – Schwarz enjoyed the ride in an unusual setting. "It's really exciting to find out what a real race car feels like because I only know the feeling you get in off-road vehicles. The movements are a lot softer there," says Schwarz. "The DTM car is practically glued to the track. Its handling is very direct."

The two racing cracks see each other again the next day: on the Nordschleife. Both drivers get into the race cars they normally drive and fight an unusual battle in brilliant Eifel weather. Sometimes Rockenfeller is in front, then Schwarz. Sometimes they drive door to door – across the Döttinger Höhe, through the Karussell and past the Schwedenkreuz. Obviously, the Audi RS 5 DTM has an advantage because it's at home on tarmac.

When the Trophy Truck heads for a nearby gravel pit that's off limits to the flat DTM flounder the time has come for Armin Schwarz to take revenge. Dust, gravel, hill jumps – he's now in his element. With 'Rocky' in the co-driver's seat, he chases the 800-hp AGM-Jimco X6 SCORE Trophy Truck across the circuit. Afterwards, Rockenfeller is almost at a loss for words: "I've never before experienced such long jumps in a race, over a distance of 20 meters or a distance that feels even longer. I hung on for dear life the whole time although that wouldn't have been necessary. The truck's landings are really soft. Imagining that guys like Armin do these jumps at 150 km/h is awesome. I wouldn't mind trying that myself."

Armin Schwarz promptly issues an invitation to Rockenfeller who doesn't have to be asked twice and climbs into the cockpit through the window opening. Schwarz gets into the passenger's seat. In spite of his awe of the jumps, the 2013 DTM Champion safely steers the off-road vehicle through the pit. "In the first jump, we dug our nose deep into the gravel," says a thrilled Rockenfeller. "The dirt splashed directly into the cockpit through the non-existent front window: a really cool experience. Armin is a perfect mentor. The only thing he kept saying was 'gas, gas, gas, gas,' which put me at ease."

YOUTH SCIENCE

Formula Student is not about pole positions, fastest race laps and champagne showers – it's about students practicing the art of engineering. Schaeffler has been involved in the international constructors' competition for years, the pinnacle event being the contest at the Hockenheimring – with Schaeffler as the main sponsor.

Building a race car under extreme pressure that competes with other cars of the same kind in international competitions – that sounds like Formula One but is Formula Student. Student teams from around the world design and construct a single-seater prototype within the space of twelve months. A normal motorsports fan wouldn't even know where to start – building a whole car, just like that. But the participants, most of whom are young people, are true experts who study electrical engineering, informatics, mechanical engineering, engineering management or business administration, for example. Each team is made up of 30 to 80 students, including team leaders and several drivers.

Is all this no more than a big hobby? Far from it – because practice is the best teacher. When asking the students what motivates them to participate in Formula Student, the answers are similar: enthusiasm for motorsports, making one's own ideas reality, competing with the best in the future automotive industry, developing personal skills and gaining insight into cross-functional tasks. But when answering the question of what they view as the greatest challenge, the teams' responses are almost unanimous: developing and building a competitive, low-cost, reliable, and, obviously, fast race car. But that's not all. The students also have to canvass for sponsors, initiate suitable marketing activities and stay within a budget that encompasses a six-digit euro sum in the case of the top teams. "This is exactly the same spirit of successful teamwork that is lived at Schaeffler," says Schaeffler's Chief Technology Officer Prof. Peter Gutzmer. "Therefore, the Formula Student participants precisely fit the requirements profile of our company. Experiencing new technologies, quite literally, and ultimately developing ideas for mobility for tomorrow in the process – that's what Formula Student and Schaeffler both stand for."

RWTH Aachen is one of the universities Schaeffler supports in Formula Student

FACTS AND FIGURES
2014 FORMULA STUDENT GERMANY

3,600
students participated

6,000
visitors

2,500
of whom were industry delegates

113
teams from

28
nations were on the grid

8 disciplines,
1,000
points (maximum)

Since
2006
FSG has been held annually at the Hockenheimring

1,000
officials, sponsors, judges and volunteers were involved

TWO-CLASS SYSTEM

FORMULA STUDENT COMBUSTION (FSC)
Class with internal combustion engines
Overview of the most important powertrain rules:
› 4-stroke gasoline engine
› 610 cc max. displacement
› Circular air restrictor behind the restriction system with a 20-mm diameter (gasoline engine) and a 19-mm diameter (E85-Motor)

FORMULA STUDENT ELECTRIC (FSE)
Class with electric motors
Overview of key elements:
› Alternating or direct current possible
› Optional number of motors
› Maximum voltage: 600 V DC
› Maximum output: 85 kW
› Energy storage devices: no high-temperature batteries or fuel cells

The example of Benedikt Locker proves that participating in Formula Student can actually be a springboard for starting a career with a company like Schaeffler. The 28-year-old Locker studied mechatronics at the Erlangen-Nuremberg University and, from 2008 to 2012, was a member of the 'High-Octane Motorsports e. V.' Formula Student team in the area of the suspension. His involvement in the project had a decisive influence on his subsequent career choice. "For me it was clear at an early stage that I'd like to work in the automotive sector one day. Formula Student intensified my wish and inspired my enthusiasm for suspension technology." Today, Locker works in Total Vehicle Development & Integration at Schaeffler. Looking back, he says: "When I joined Schaeffler I was able to bring extensive specialized knowledge in the fields of suspension and vehicle dynamics to my new role. In addition, my understanding of the total vehicle far exceeded the basic knowledge I acquired as a student."

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1 Interested observers – Schaeffler's Director of Labor Relations, Kurt Mirlach (left), and motorsports legend Hans-Joachim Stuck at Formula Student Germany

2 An enthusiastic crowd fills the grandstands at the Hockenheimring

Credit where credit is due – celebratory conclusion of Formula Student Germany

Several events around the globe, for instance in Italy, the United States, Australia and Japan, held throughout the year, in which the teams compete with each other, are highlights of Formula Student. In 2014, Schaeffler is the main sponsor of the German event, 'Formula Student Germany,' at the Hockenheimring for the first time. The 113 registered crews include 13 which – just like a few foreign teams hailing from Italy, Romania and Brazil for example – can count on Schaeffler's support. The automotive supplier assists with know-how and, obviously, with components.

Thanks to Formula Student's very liberal regulations the prototypes created by the teams not only visually differ from each other but feature enormous differences in technology as well. First of all, the teams have to opt for one of two categories: internal combustion engines or electric motors. The approaches used by the student teams roughly resemble the work of a professional race team. The process starts by canvassing for, selecting and onboarding team members in summer. In September, the various sub-teams such as suspension, bodywork and powertrain present their concepts, followed by the engineering design stage in October. The single components are created on computers by means of CAD. Following a brief winter break, the component production stage starts. Some of the parts are made by the teams themselves and others are outsourced to external producers based on the templates and molds provided by the student teams. All the parts are available by the end/middle of April when the assembly stage begins, followed by the rollout and various tests. The first competitions take place in June.

There are no limits imposed on creativity. The five-time Formula Student Germany winning team from Delft in the Netherlands, for instance, has discovered the interior of the wheel as the perfect place for assembling various technical components such as special brake discs, wheel hub motors and their gear ratios. All of this serves to achieve optimal weight distribution and lower overall weight. "It's like a ladies' handbag. You can stuff a lot more into it than you'd suspect," says team boss Marinus van der Meijs. "Unfortunately, we weren't able to fit our driver in as well, so we also had to build a chassis." Logically, hurdles have to be mastered too. The teams, for instance, mention issues they encounter with respect to having complex components produced on time, conflicts in synchronizing various process steps and compliance with efficient resource management.

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Following the long preparation stage, the ‘band starts playing’ in Formula Student Germany: a six-day marathon of registering, moving into the team garage, re-assembling the car that was dismantled for transportation, passing scrutineering, testing and much more. Nervous tension, permanent concentration, physical strain and lack of sleep – the Formula Student Germany participants heavily tax their bodies. To give them a chance to unwind and relax in between, main sponsor Schaeffler invites the students to stop at an ‘energy filling station’ where water dispensers, drinking bottles, mineral effervescent tablets, fruit and savory snacks unleash new energies.

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1 The Karlsruhe Institute of Technology takes fourth place in the acceleration test

2 Schaeffler also provides sustenance for the participants

3 A year of hard work drains the participants strengths

BENEDIKT LOCKER
Former Formula Student participant, now employed with Schaeffler

»FORMULA STUDENT STRENGTHENED ME IN MAKING MY CAREER CHOICE.«

Refreshed, the international teams from Germany, the Netherlands, Switzerland, Austria or Spain, tackle the tests. First, they have to convince a judging panel in three static disciplines. These disciplines are focused on presenting the design of the race car, budgeting and a theoretical business plan. Schaeffler is represented on the panel by three judges: Dr. Raphael Fischer, Head of the Wheel Hub Motor Product Group, Jürgen Remmlinger, Specialist for Mechanical Product Development, and Christian Betz, Head of eMobility Purchasing. "The ingenuity of the students is impressive," says Betz. "In addition, Formula Student's global approach makes an important contribution to understanding technological developments in an international comparison."

Subsequently, the race cars and the driving skills of the selected drivers are in focus in five dynamic disciplines: skid pad (skid pan), acceleration test, handling course, endurance test and fuel consumption. A maximum of 1,000 points can be scored. 6,000 visitors in total, including 2,500 delegates from the industrial sector, are thrilled by the performances delivered. The best teams in each discipline and powertrain categories, as well as the best overall teams, are appropriately celebrated in an official awards ceremony at the end of the event. In the combustion category, Oregon State University from Corvallis is the winner. The Zurich University wins in the category of teams having opted for electrically powered race cars. But the Stuttgart University that Schaeffler supports is very pleased as well, having taken second place in both categories. "Normally, our claim is to win," says Manuel Bühler, who heads up the team with an internal combustion engine. "But under the circumstances we encountered during the event, we're very happy with second place. On day one, we discovered cracks in the external carbon fiber shell and had to reinforce it in several night shifts."

The students look back on a year of hard work – and possibly forward to a successful future at Schaeffler. Manuel Bühler might be the next candidate. Following the Formula Student season, he completed his technical student internship at the Schaeffler Group's LuK brand. The link to Schaeffler was created … well, obviously, by Formula Student.

1 The winning vehicle in the electric category from Corvallis …

2 … and the counterpart with a combustion engine from Zurich

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OVERVIEW OF DISCIPLINES
2014 FORMULA STUDENT GERMANY

STATIC

DISCIPLINE	Design	Budgeting	Business plan
POINTS	150	75	100
TASK	Presentation of the engineering design solutions, understanding of the team's own construction and the demands of the fictitious target group	Defense of the budgeted production and assembly costs, presentation and discussion of possible alternatives	Presentation of a business model designed to convince potential investors to profitably manufacture the prototype in a mini series

DYNAMIC

DISCIPLINE	Skid Pad	Acceleration	Handling course	Endurance run	Consumption
POINTS	75	75	100	325	100
TASK	Aka skid pan. Determination of the achievable lateral acceleration in a steady-state circular test	Sprint from a standing start over a 75-meter distance	800-meter course consisting of straights, hairpin turns, chicanes and slalom sections	Tests the durability and reliability of the car over a 22-kilometer distance	Energy consumption is determined and evaluated in the endurance test

GREEN HELL, HEAVENLY RIDE

The 24-hour race on the Nordschleife: a racing highlight for pros and fascinating challenge for privateers, as a personal experience at the limit goes to show.

1,000 meters to go before the final tight right-hand turn: 300 meters, 250, start braking, put the car in third, turn the wheel late. Wehr, that's exit # 33 on highway 61: the eagerly-awaited corner. There may be a few lost souls raving about Rovereto Sud, prosecco and 'Lago' lakeside pasta. My 'thing,' for years, has been Wehr, the exit sign that kick offs the 24-hour race on the legendary 25,378-meter Nordschleife for me.

The really hard-core types have been in their rubber boots for a week, building tent cities in the fields and erecting bizarre architectural structures. In the end, over 200,000 spectators will have flocked to the circuit to provide one of the world's biggest motorsports events with a worthy setting. Meanwhile, the other protagonists have been practicing the art of optimum space utilization in the paddock. Nearly 200 starters mean endless rows of tents, trucks, team buses, outdoor kitchens and tire stacks, side by side …

After arriving in the paddock, I almost feel like kneeling down. All the hustle and bustle, all the faces, many of them familiar ones, the first cars – the 'drug' kicks in: Submit your papers, show your helmet and suit and get on the scales. "Hey, last year you had a few kilos less," I can hear a voice shouting from the back: a new 24-hour race, an old joke, for a new family member of Bonk Motorsport – stressing the word family. Because Conny, Micha and Peter Bonk have been permanent fixtures in the 24-hour community for decades, have plenty of victories and titles under their belts, but never lost sight of one thing: there's nothing you can hope to achieve here without a strong team spirit.

The team's line-up is impressive: five cars, 20 drivers, some 50 mechanics and assistants. Actually, the 24 hours of racing are just the icing on the cake for the squad, considering the feat it's mastered in the pre-race weeks: complete rebuilds of all the cars. Taking all the parts out and putting them back in, everything renewed, everything refreshed. "You can easily spend 80 to 100 hours on a vehicle," team boss Michael Bonk says, huffing and puffing. Now the cars are lined up spick and span, densely packed in the pits, including # 58, one of the two GT4-specification BMW M3 cars, that competes in the SP 10 class sporting yellow-green Schaeffler motorsports graphics. It has a clear mission: "We're battling for class victory," says Michael, without a trace of humor in his voice.

Free practice: the first contact between 'man and machine.' Seating position: check. Radio: check. Vehicle: check – the car runs fast and reliably in spite of fog and rain. By the time of the second qualifying session, the weather, the drivers, the lap times and the mood have revved up. The newly composed driver quartet is in agreement about how to approach the race: let's start out by driving defensively and then we'll just take it from there.

Suddenly, it's time for the race. Seemingly without advance warning, I find myself in the middle of the grid, surrounded by fans, team members, photographers and other drivers: an electrifying scenario and heaven on earth for a motorsports hobbyist. The temperature rises during the formation lap, the time of hope and fear begins. Number 58 is now racing, has survived the first chaotic laps unscathed and is among the front runners in class. Alright, calm down, slow your heart rate. As the third driver, you've got some time to relax – if you can. Of course you can't. So, back to the pits for a chat with race engineer Achim, who, totally unruffled, reports: "Everything's under control, car's going to pit on the next lap," which translates into: "Put on your racing gear, so the next driver's standing by, just in case …"

Another hour of waiting follows before, finally, I can hear the announcement that comes as a relief: "Car's coming in to pit in five minutes," followed by the typical sound of the horn at the pit lane entrance. Number 58 is approaching. The mechanics get busy: refueling, changing wheels, cleaning windows – driver out, driver in. The car plops from the air jack system. "Engine on," the radio blares. "Pit lane's clear!" And finally, it's quiet again – just me and my car – well, not counting the other 170 entrants.

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1 Formation lap – the temperature's rising. The time of hope and fear begins

2 Emotional and visual sensory overload during the Nordschleife ride

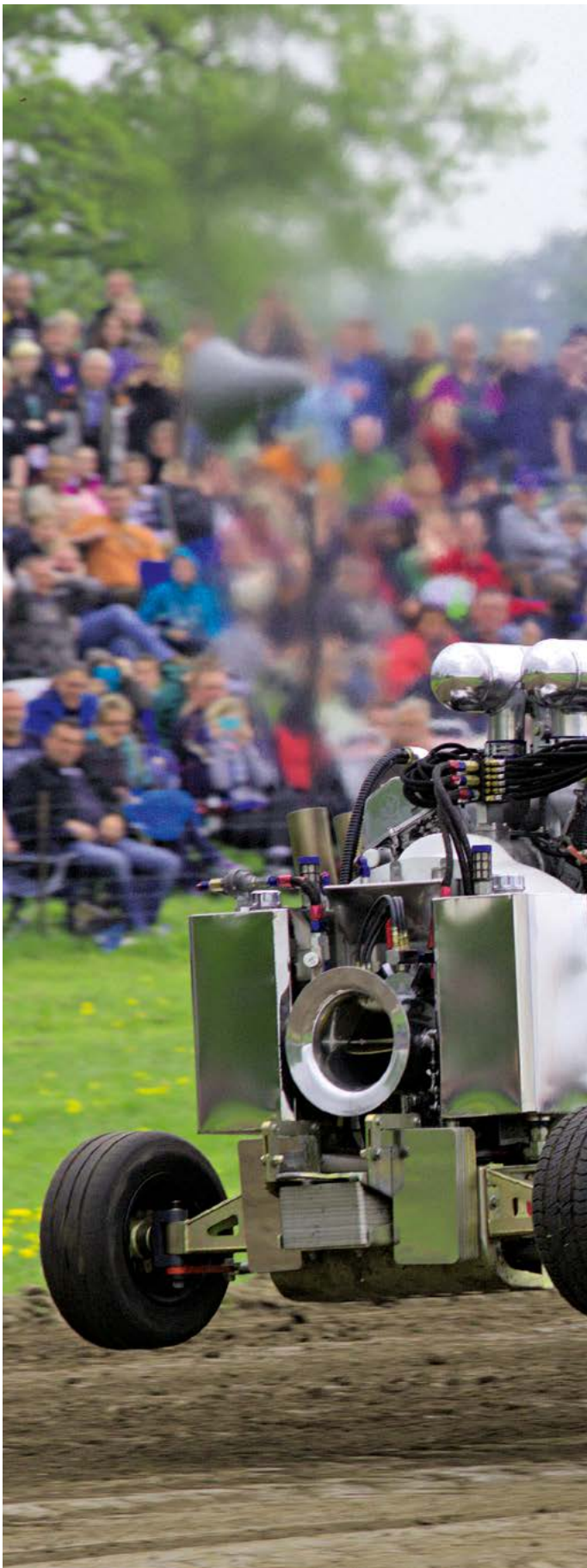
3 Spick and span – the Bonk BMW sees the checkered flag unscathed

Now I've got to quickly find my rhythm on the Grand Prix circuit and then, finally, turn onto the Nordschleife. A grin of joy flashes across my face. 'Hatzenbach': left, right, left, right. 'Flugplatz:' pressing the buttocks together. A brief look into the rear-view mirror reveals: none of the GT3 flyer's in sight. Downhill into the 'Fuchsröhre' gorge. 'Green Hell?' A heavenly ride! Up 'Kesselchen' to 'Hohe Acht,' braking at the entrance to the 'Klostertal' corner. As always, time seems to stop here for an instant. There's a surreal smell of barbecue wafting into the car and if you listen closely you can even hear the beat of the music from the sound systems. Fast forward on to 'Hohe Acht' and back on another nose dive heading for 'Brünnchen' where the sea of flags and motorhomes briefly makes for an overwhelming sight. You keep 'zooming' on across the hills at 'Pflanzgarten,' perfectly aware of the fact that now a couple of photos are going to be shot. 'Döttinger Höhe,' a good two kilometers of flat-out driving that provide the chance to take a sip from the drink tube and to send the obligatory radio message to the pit crew that's simmering with excitement: "Number 58 on 'Döttinger Höhe,' everything's under control." Then through the 'Hohenrain' chicane, the female marshals from T13 waving as always, and finally heading for the start-finish straight. This was the initial trick, with eight more laps to follow, some of them with dramatic heights and emotional sensory overload because darkness starts to fall upon the 'Ring' and the fan community makes the scenario even more surreal. A flickering flashlight here, a glimmering light tape there and a bright red rocket flare suddenly being sent off a kilometer further south, until a message telling you to pit jolts you out of this real-world dream. What's left now is the challenge of heading for the right pit crew in the commotion of mechanics, lights and pit boards. You unbuckle your harness, the car is jacked up, the next driver tears open the door – the quiet is over.

Later, drained and tired out, revved up and happy, following the obligatory tears of joy that are still flowing after the car has finished the race, there'll be a lot to talk about: the interruption of the race during the night due to fog, the lap-long battle with the sister car, the torturous maneuvering on slicks on a wet track, the class victory that ultimately wasn't one because the car was underweight, the intensity of the four days and nights that couldn't be topped. Saying goodbye to my 'second family' is hard. 500 meters to go: Wehr – see you again next year.

FULL PULL

They're the horsepower kings in motorsports. Some of the tractors used in the modified unlimited tractor pulling classes have more than 8,000 hp. These forces have to systematically be put to the ground – Schaeffler clutches help achieve this feat.



Monaco and Füchtorf have little in common at first glance. One is famous for being a sophisticated city state with illustrious celebrities, outrageously expensive yachts and sparkling luxury cars, and the other is a quaint district of the town of Sassenberg in Germany's Münsterland with an asparagus festival being its claim to fame. But there's one thing they do have in common: once a year, motorsports enthusiasts take control, albeit they're hardly the same kind of motorsports enthusiasts. Compared with Formula One in the principality, the style of the events at Füchtorf is pretty informal. Every year on the last weekend in April, Füchtorf plays host to round one of the German Tractor Pulling Championship. This is not the place to go if you're expecting to see people in fine feather sipping champagne. Instead, more than 10,000 spectators in rubber boots and rain jackets flock to the Hörstkamp Arena every year. And they're in seventh heaven when the tractors weighing over 20 tons and pulling a set weight on sleds plow across the track. Hot dogs and beer, a power party at night and camping directly alongside the arena add the finishing touches. Plus, there's free parking.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FAG
Le Coiffeur
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METALLBEARBEITUNG
EXIDE
DOMEX

In the modified unlimited classes of 2.5 to 4.5 tons, as well as in the Pro- and Super-Stock categories, the diversity of powerful engines is nearly unlimited. In addition to large, souped-up piston engines from tanks or race boats and methanol units with multi-stage turbochargers, tuned V8 dragster engines and helicopter turbines unleash their respective power potential – with several engines installed on a single tractor in some cases. That's better than watching a movie plus, it's smokier and, above all, noisier. The rattle of the tuned power-plants exceeds 100 decibels, with 25 kilograms of methanol being swallowed in the process – per engine and minute.

The aim of all this is the full pull, which means that a sled with a movable weight has to be pulled across a 100-meter distance – flat out! Sounds easy, but isn't. If you think sheer power separates the wheat from the chaff, you're wrong. Without clever driving techniques, there's no chance of clinching the winner's trophy. But there's a guaranteed winner at the end of each event: the sled, a skid pan that's purpose-built for the requirements in tractor pulling: two axles at the rear and a skid at the front. And, most importantly, there's a movable weight box called the 'back.' It's loaded with units of weight up to a total of 24 tons, as required. Initially, the weights sit on top of the axles as though they had nothing to do with the action. The skid bears no load at this time and the pulling resistance is correspondingly low. When the tractor starts moving the back 'becomes alive' and slides forward on rails, increasing the pulling resistance and decreasing the tractor's speed.

Schaeffler supports the British Bear Essentials team based in Shropshire that competes in the Pro-Stock class. More than ten years ago, Team Manager Andy Miller got in touch with the company while working for the Finnish tractor brand Valtra that uses LuK clutches. For Miller and his team that was formed in 1996, the subsequent development was positive, also thanks to support by LuK. "For me, tractor pulling is the ultimate test of brute force that has to be skillfully put to the road," says Miller. "I grew up with farm machinery and the fact that a normal tractor with a diesel engine and 2,500 rpm can be brought up to the level of a machine that still has a diesel engine but that has a turbo, 6,500 rpm and 2,000 hp still fascinates me." Miller goes into raptures about the vibrations a driver feels when covering the 100- meter distance in ten seconds with the wheels rotating at 90 km/h. "Absolutely awesome," the Briton raves about the machines.

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1 ‘Letting off steam’ – the Ice Bear of Team Bear Essentials

2 A 4,000-hp eye-catcher – the Coiffeur VII

3 Serving a new purpose – the aircraft engine boasts 36.7 liters of displacement

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These enormous forces, however, require strong material as well. “We offer a test laboratory in harshest conditions with our tractors,” Miller explains. Clutches, connecting rods or the countless ball, needle and tapered roller bearings in the tractors are put to an acid test in the competitions. “The parts are loaded as much in one season as they would be in 10,000 hours in normal conditions,” says Miller, proudly adding that he hasn’t met engineers anywhere else that are as gifted and clever as those in tractor pulling. This regularly pays off for Bear Essentials. In 2014, the team entered two tractors in the Euro Cup. The Ice Bear took sixth place, the Baby Bear ninth. In the invitation race held in Füchtorf, a Mecca of tractor pulling, the team finished as the runner-up.

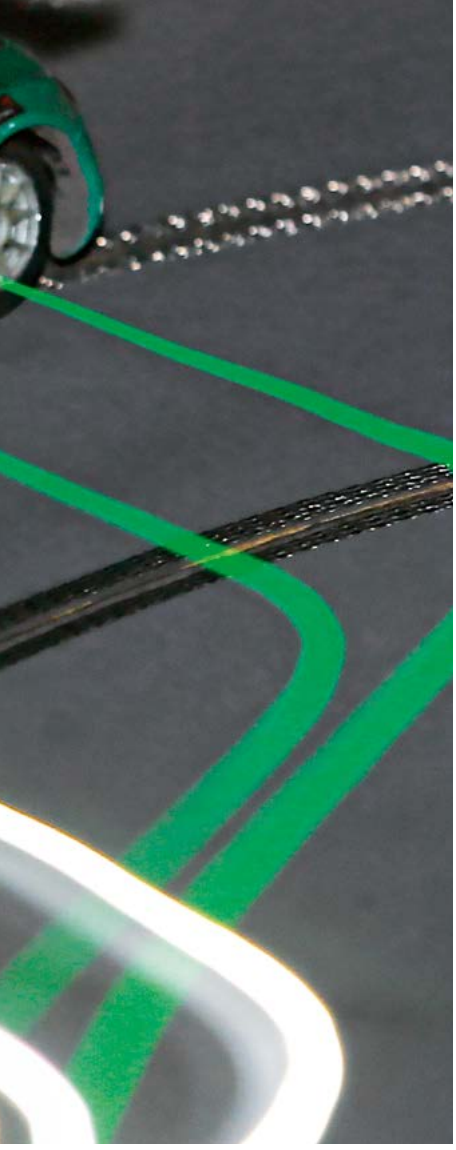
The Le Coiffeur Tractor Pulling Team from Bad Iburg has regularly been scoring wins, its track record by now reflecting five German Championship wins and a European Championship title, plus a victory in the Euro Cup. Team founder Frank Bartholomé and Bodo Otte, a former Schaeffler employee, rely on a 4,000-hp tractor in the 2.5-ton class. Schaeffler has been supporting the team for more than ten years. In 2012 and 2013, the squad even competed sporting the Schaeffler colors, clinching one success after another thanks to continuous further developments and powerful components from the Schaeffer Group that make it possible to put the incredible power of the 36.7-liter aircraft engine to the track. The power-plant in the Le Coiffeur tractor, by the way, was made by Rolls-Royce – a brand that rings a bell not only in Füchtorf but is likely to do so with a few people in Monaco as well.

LIKE THE ‘GROWN-UPS’

Le Mans winners, DTM stars and speedy motorsports aficionados aplenty meet in the RCCO. Schaeffler has found its place in the slot car racing series as well.

It’s November 22, 2014, an overcast, foggy Saturday in Hamburg’s Harburg district. The streets in the south of the metropolis are empty as most of the residents are apparently spending their day as couch potatoes. In contrast, Harburg’s Schlossstrasse plays host to a nerve-wracking motorsports event this weekend: the rallye racing Carrera Cup Organisation (RCCO) is staging the 23rd Hamburg 24-hour slot car race.

A look at the outside of the office building of TuTech Innovation GmbH, a Hamburg-based technology firm, reveals very little, if anything, about the venue of what’s arguably the world’s craziest endurance race. The setting bears no resemblance to the typical motorsports glamour found elsewhere. But inside, the building is bustling with activity, there’s a palpable tension in the air and a unique racing atmosphere – a parallel universe on a digital slot car track. Six highly motivated teams are preparing for hot wheel-to-wheel duels of their 1:24 scale slot cars.



Shortly before 12 noon, the drivers are lining up around the shiny gray track, fully concentrated. Everyone is taking the competition very seriously. This event is by no means ‘just for fun.’ “Compared with ‘real’ motorsports, a lot of things in the Hamburg 24 Hours are not on a 1:24 but 1:1 scale,” says Frank Biela, who is holding the controller of the green-yellow Schaeffler R8 LMS for Audi Team tv racing in his hands. “You don’t get a lot of sleep, have to be fully focused all the time and can’t afford to make any mistakes,” Biela explains. He knows what he’s talking about. The five-time winner of the ‘real’ Le Mans 24 Hours has triumphed five times in the iconic Hamburg endurance race as well.

Together with RCCO record winner Thomas Voigt and PR consultant Jan Hennen, Biela is set on clinching his next triumph: “I’m hoping to take my sixth consecutive victory but everything’s got to fit for that.” The successful squad is completed by DTM driver Miguel Molina. The Spaniard is fired up about his first run in the ‘little big’ 24 Hours: “I’m really excited about the race. I’ve always wanted to compete here and am happy that it’s finally worked out now.” Besides the R8 LMS, other racing icons have lined up on the grid: a BMW Z4 GT3, a Porsche 911 RSR GT3, a McLaren MP4-12C GT3, plus Team Volkswagen Motorsport with a Polo R WRC – made of polyethylene and carbon. Jürgen Jungklaus, a driver of the VW team, is wearing the wrong uniform in this battle. In ‘real life,’ Mike Rockenfeller’s race engineer is engaged in the chase for points in the DTM for Schaeffler but in the RCCO is a turncoat aiming to dethrone the green-yellow serial winner.

Le Mans winner Frank Biela (left) and DTM driver Miguel Molina are thrilled by the ‘little big’ racing series

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High noon: the race starts. Audi soon takes the lead but loses the top spot after four hours. At a top speed of 25 km/h, the initial stints have left their mark on the material: threadbare tires, battered chassis and the worn pick-up shoes have to be replaced. A tire change performed too late costs valuable lap time. The teams lose up to three seconds if they fail to handle their tires with care. Instead of a pit lane as in ‘big’ motorsports, the slot car racers have a workplace with wrenches, grinders and a spare parts stock that’s filled to the brim. Among other things, two spare motors are available to each team. A well-practiced mechanic exchanges the unit in less than a minute – unthinkable in the case of the ‘big’ cars. “This goes to show that this is real racing on the highest level,” says an enthusiastic Biela. Schaeffler has been on board in the ‘little big racing series’ since 2011. The miniaturized precision and technology impresses the people at the global Group based in Herzogenaurach as well.

At nightfall, the favorites at the front pull clear of the field, but the leading teams are never separated by more than 20 laps. Volker Paulun, team boss of the Joest-Bentley squad, explains why slot car races are not ‘just-for-fun’ events: “The races are extremely competitive and require tremendous concentration. All the drivers are running at similar speeds. That makes overtaking maneuvers very strenuous. Nobody can be at the controls here for more than an hour.” Folding cots, an opulent buffet dinner prepared by Shell’s chef Dieter Renk and French live music provide the drivers with some diversion during their breaks, while the race continues to call for maximum concentration of those with driving duties. At midnight, the Bentley is leading, with the Polo and the R8 LMS on its heels. The drivers race through the night in total darkness. Only the light cones of the slot car headlights illuminate the track that’s littered with rubber laid down by the cars’ tires.

At sunrise, there’s no telling yet who will be the winner in the end. It looks as though this race will be seeing the closest finish in the history of the Hamburg 24 Hours. One hour before the end of the race, Audi and Volkswagen are running side by side. “It’s extremely exciting and extremely tough,” Jungklaus says, describing the head-to-head duel. A preliminary decision is produced shortly before the end when the Schaeffler R8 LMS that has previously recaptured the lead is entangled in several collisions. This helps the Polo to win. After 24 hours, the Schaeffler team was only four laps or 230 meters short of taking victory. Biela shakes his head in disbelief: “I’ve never seen anything like this before in my racing career.” Jungklaus on the other hand triumphs – and, as a result, so does Schaeffler in a way. In contrast, second place motivates rookie Miguel Molina for next year: “In 2015, we’re going to attack again, that’s for sure.”

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1 The lights of the slot cars make for a fascinating picture at night

2 DTM driver Miguel Molina watches the pit stop with interest

304.4
kilometers were covered by the 2014 winning team

50,000
braking maneuvers in 24 hours

100,000
times power supply is adjusted in the cars

CLASSIC CAR BUG

The success story of the Kitzbühel Alpine Rally has been written for nearly thirty years by now. Illustrious examples of technological progress achieved in past decades compete in the annual event. Since 2002, Schaeffler has been partnering with the automobile exhibition on the road.

The story of the Kitzbühel Alpine Rally is also the story of Josef 'Hasi' Unterberger. In 1988, the haute cuisine restaurateur and passionate classic car enthusiast originated this meeting of historic cars. Skeptics were quick to come out and voice their concerns: a classic car meeting in Kitzbühel – and in connection with a rally at that? No way, this could attract anyone's interest. Unterberger, however, was not deterred by his critics, vigorously pursued his project and, as so often before in his life, was successful. Over 70 participants answered Hasi's beckoning in the first year and traveled to Tyrol in their historic treasures. Marvelous classic and vintage cars traveling on the most beautiful Alpine roads: what more could anyone wish for?

While the skeptics went into hiding Unterberger's idea became increasingly popular, attracting ever more participants to Kitzbühel. Thousands of spectators would line the streets, marveling at the historic vehicles in the town center. By 1998, the Alpine Rally had evolved into Austria's major classic and vintage car meeting and, besides the Alpine Hahnenkamm Race and the ATP Tennis Tournament, the third large-scale event hosted by the sports town Kitzbühel. By now, far over 200 enthusiasts have been making the rally the largest one of its kind across Europe. Hundreds of historic vehicles from all eras and marques can be marveled at, from a 1922 Hispano Suiza H6 Chapron, to a 1925 Bentley Mother Gun, to a triumph TR4 that was built in 1966 and is driven by Schaeffler's executive board member Norbert Indlekofer.

Competing in the rally at the wheel of the 100-hp British car is a matter that's 'near-and-dear' to Indlekofer's heart – just like it is for Prof. Peter Gutzmer, who drives a 1980 Porsche 911 Turbo in the rally that leads through green pastures. In harmony with nature, Schaeffler's Chief Technology Officer even finds parallels with everyday work. "The field of entrants features plenty of illustrious examples of technical progress that's been achieved in the past decades," says Gutzmer. "Engineers are always striving for something better to optimize a previously sound solution. This is what drives the engineers at Schaeffler as well. As a result, numerous innovations by the Schaeffler brands, INA, LuK and FAG, have been helping to write important chapters of automotive history." The list of classic models in which Schaeffler products contributed to success is long: the Volkswagen Beetle, Citroën DS, Porsche 917, Mercedes-Benz 450 SEL or the BMW 525 and the Porsche 959. Since 2002, Schaeffler has been a sponsor of the Alpine Rally and through this commitment underscores its affinity with historic vehicles that keep reminding us that the continuous evolution and improvement of the automobile poses a permanent challenge to and motivation for automobile manufacturers and suppliers, and that the automobile has been unleashing enormous powers of innovation throughout the past decades.

Besides Indlekofer and Gutzmer, numerous other prominent participants from racing, show business, business and politics have been infected with the classic car bug. Ski ace Maria Riesch, extreme athlete Felix Baumgartner, star chef Johann Lafer, as well as the Schaeffler brand

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1 Prof. Peter Gutzmer tremendously enjoys driving the Porsche 911 Turbo …

2 … and Norbert Indlekofer the Triumph TR4

3 Looking good – Rockenfeller and Schwarz with the Audi Sport quattro

4 All-rounder – Hasi Unterberger is the inventor of the Alpine Rally

5 Old meets new – nearly eight decades of motorsports assembled in a small space

ambassadors Armin Schwarz and Mike Rockenfeller, are just some of the renowned personalities that have competed in the rally in recent years. The spectators not only get to enjoy the historic vehicles but, thanks to the partnership between the Alpine Rally and Schaeffler that was started in 2002, the fans have the opportunity to experience modern racing at close range as well. In 2013, Schaeffler presented two current race cars in the paddock that, sporting their green-yellow graphics, are real eye-catchers: Armin Schwarz's AGM Jimco X6 Trophy Truck and Mike Rockenfeller's Audi RS 5 DTM were coveted photo subjects.

Hasi Unterberger was deprived of the opportunity to witness these developments. In 2002, the inventor of the Alpine Rally died after a brief, severe illness. But the entrepreneur's spirit lives on – in every new edition of the event.

5


Dem Sieger
Mainzer Automobilclub
Tourenwagen Festival 1986
RIFLE
JEANS AND JACKETS
LUK
VALVOLINE

DEFINING FACES

From B as in Biela to S as in Schneider – many racing stars have defined Schaeffler's long history in motorsports.

Schaeffler in motorsports – this has always been 'green-yellow,' you'd think, because the conspicuous color combination has become indelibly stamped on everyone's mind. But this notion is way off the mark as the 'chameleon' look was born only at the beginning of this decade. Schaeffler has been involved in racing with its Group brands for a long time. Clutch specialist LuK has been playing the key role in this involvement for obvious reasons. Schaeffler Automotive Aftermarket offers garages an efficient solution for LuK products with its modular tool system, while the INA and FAG portfolios are essentially intended for use by B-to-B customers only. LuK forms one of its first partnerships – with Ford – in the mid-nineteen-eighties. Until the early nineteen-nineties, the brand is the series sponsor of Formula Ford, a junior racing series in which youngsters having switched to single-seaters can gather experience in formula race cars on renowned race tracks. The yellow square with the striking LuK logo is emblazoned on all the cars and driver suits.

But in motorsports the LuK brand is not only associated with various racing series and events but, above all, with individual personalities. For the 1987 season, LuK and Ford officials breathe life into a DTM team of up-and-coming drivers: Frank Biela (pictured left), Bernd Schneider and Manuel Reuter. By delivering strong performances, they ensure that Ford's Sierra model is in contention in the DTM. In 1988, their brand colleague Klaus Ludwig clinches the title in the Sierra Cosworth. In the nineteen-nineties, the former Ford juniors attract attention again. In 1991, Frank Biela takes the title in the Audi V8. The driver who hails from Neuss, Germany, goes on to achieve even greater success in sports car racing. Between 2000 and 2007, Biela wins in the Le Mans 24 Hours five times with Audi, which makes him the third-most-successful driver in the iconic endurance race. In 1995, Bernd Schneider 'ascends the DTM throne' for the first time, followed by four more titles between 2000 and 2006 that have justly earned the driver from Germany's Saarland the accolade of being called 'Mr. DTM' to this day. In 1996, Manuel Reuter decides the ITC, the international version of the DTM, in his favor. Three DTM Champions with LuK roots.

KLAUS NIEDZWIEDZ
Former DTM driver and Nürburgring enthusiast

»EVEN TODAY, I DRIVE WITH MY PERSONAL LUK STICKER ON MY HELMET.«

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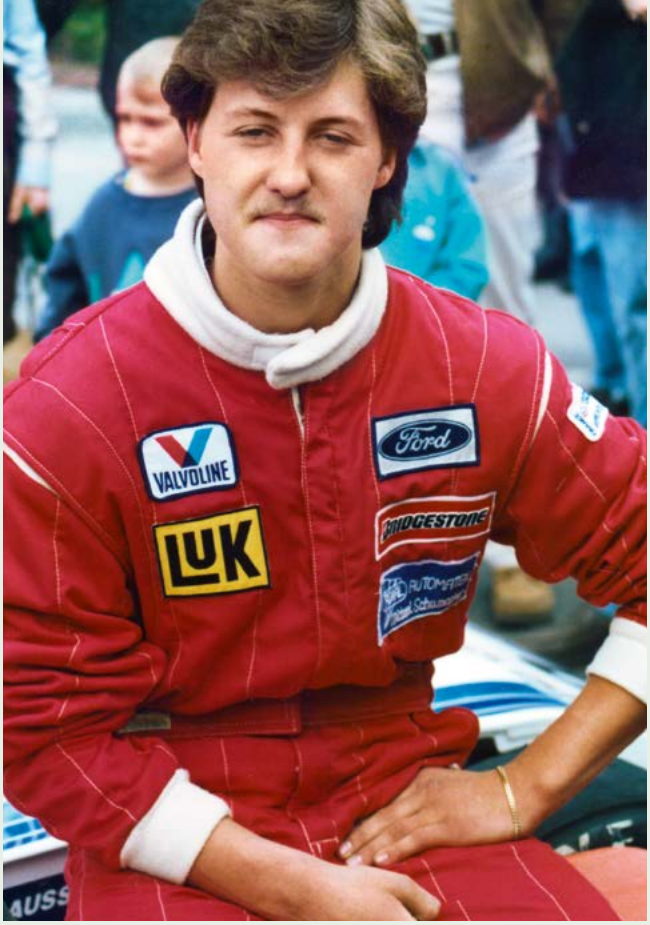

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1987 marks the first year of a partnership with LuK for Klaus Niedzwiedz. “And it was to become one with world championship honors,” says the driver from Dortmund, Germany. “I finished the World Touring Car Championship as the runner-up in the drivers’ classification and in the manufacturers’ championship we took the title with Ford. Walter Demel was responsible for Schaeffler and motorsports sponsoring at the time and distributed the funds from a relatively limited budget to the drivers. Even today, I still drive with a personal LuK sticker on my helmet” – preferably on the Nordschleife. The legendary track, which by now has grown to a length of 20.832 kilometers, is ‘Niedze’s’ home turf. In 1971, he contests races in Formula Vee, a junior formula racing series using a 1,300-cc Volkswagen engine. More than four decades later, he’s still on the grid of the 24-hour race in the ‘Green Hell’ every year. From 1985 to 1991, Niedzwiedz races in the DTM. In 1988, like champion Klaus Ludwig, he’s at the wheel of a Ford Sierra Cosworth. During the round on the Nordschleife, Niedzwiedz has a tire blowout at near-300 km/h in the Tiergarten section and breaks a shoulder and an arm in the crash that follows. “Thank god, that’s the only thing that happened. The racing suit with the Luk logo I was wearing at the time is still hanging in my office as a ‘good luck charm.’” A year later, Niedzwiedz, still driving for Ford, achieves his best DTM overall result on trailing champion Roberto Ravaglia as the runner-up.

1 Manuel Reuter (left) and Bernd Schneider (right) – pictured here with Walter Mertes – are members of the junior team formed by LuK and Ford

2 LuK is Formula Ford’s series partner for many years – Michael Schumacher advertises the automotive supplier on his racing suit …

3 … and on his Van Diemen RF 88

4 Klaus Niedzwiedz – one of the defining LuK faces

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1 LuK has been involved in club sport from the beginning

2 Foreign mission – the German company is represented in the British Touring Car Championship as well

3 Augusto Farfus and Andy Priaulx with INA and LuK branding in the World Touring Car Championship


2

Wolfgang Kaufmann has been wearing yellow – LuK yellow – since 1990. The company supports the German race driver in formula and sports car racing series. The collaboration is off to a good start. ‘Piranha,’ as Kaufmann will subsequently be nicknamed by his rivals, contests the German Formula 3 Championship for Team Schübel that uses engines from F3 newcomer Opel. Kaufmann clinches an immediate victory in front of his team-mate Eduar Neto. A certain Michael Schumacher takes fourth place. “Obviously, that was an overwhelming success for me as well as for Opel,” says Kaufmann.

The 2000 season shows that he’s a man for special premieres. The FIA GT Championship visits the newly opened Lausitzring together with the DTM. The weekend is extremely wet and the DTM races are canceled. The GT race has been started beforehand. Kaufmann and his team-mate Hubert Haupt clinch the first ever Porsche overall victory in the series’ history. Like LuK’s prominent racer Klaus Niedzwiedz, Kaufmann develops a zest for racing on the Nürburgring-Nordschleife, highlighted by the lap record of 7m 32s he sets in 2001 at the wheel of a Gemballa Porsche that’s approved for road use and fitted with production tires. This record will not be broken until 2004.

Timo Scheider proves that, in addition to solid on-track performances, doing well off-track is important with respect to representing sponsors. In his years as a Schaeffler brand ambassador, the two-time DTM Champion is an in-demand star being booked for autograph sessions and appears on television shows such as Stefan Raab’s Stock Car Crash Challenge. At the same time, he uses his popularity to support various charities. The German who resides in Austria raises funds for needy people, organizes charity events and even finds time to train young racers in his own kart team.

Biela, Schneider, Reuter, Niedzwiedz, Kaufmann, Scheider – the list of Schaeffler faces could be extend by many more names. Read on and enjoy other exciting stories centered on the motorsports involvement of Schaeffler and its Group brands.

Two Schaeffler brand ambassadors congratulating each other – Mike Rockenfeller (left) and Timo Scheider

AUTOMOTIVE ADVENTURE

From Mexico to Alaska – in the early days of the automobile, this route is truly an adventure. In 1910, Dr. Charles G. Percival embarks on this journey.

Freeways? Don't exist yet. Paved roads? Fat chance! A traveler embarking on a motor car trip in the nineteen-tens has to cope with bumpy cobblestone, large potholes or deep mud. Roads built specifically for automobiles are still few and far between. Instead – at least outside major cities – the bumpy roads from the days of the horse-drawn carriage still prevail.

But that's not all. Considering that the first cars weren't as reliable as today's automobiles by a long shot and that filling stations and garages can rarely be found, the magnitude of the challenge tackled by Dr. Charles G. Percival in 1910 when he embarks on a more than 80,000-kilometer (50,000-mile) trip from Monterrey, Mexico, to Alaska in his 50-hp Abbott Detroit Bulldog becomes clear. On his tour, Percival also relies on products 'made in Germany.' His vehicle is equipped with FAG ball bearings that survive the grueling two-year trip through North America without the slightest problem. This is all the more remarkable as the driver and car not only have to contend with the rudimentary roads but with water passages and temperatures ranging from desert heat to freezing cold. Percival's travel reports are published in numerous newspapers and magazines. After his return, he even publishes a book about his adventures.

Percival is so thrilled by the reliability of the FAG bearings that he sends a thank you letter to the company's management board in September 1912, enthusing about the 'marvelous way' in which the bearings resisted all the adversities encountered on the trip. FAG thanks Percival for his achievement in 1913 with a special stamp set issued on the occasion of the company's 30th anniversary.

1 Percival covers more than 80,000 kilometers on his tour to Alaska

2 FAG honors Percival's pioneering achievement with a stamp set in 1913

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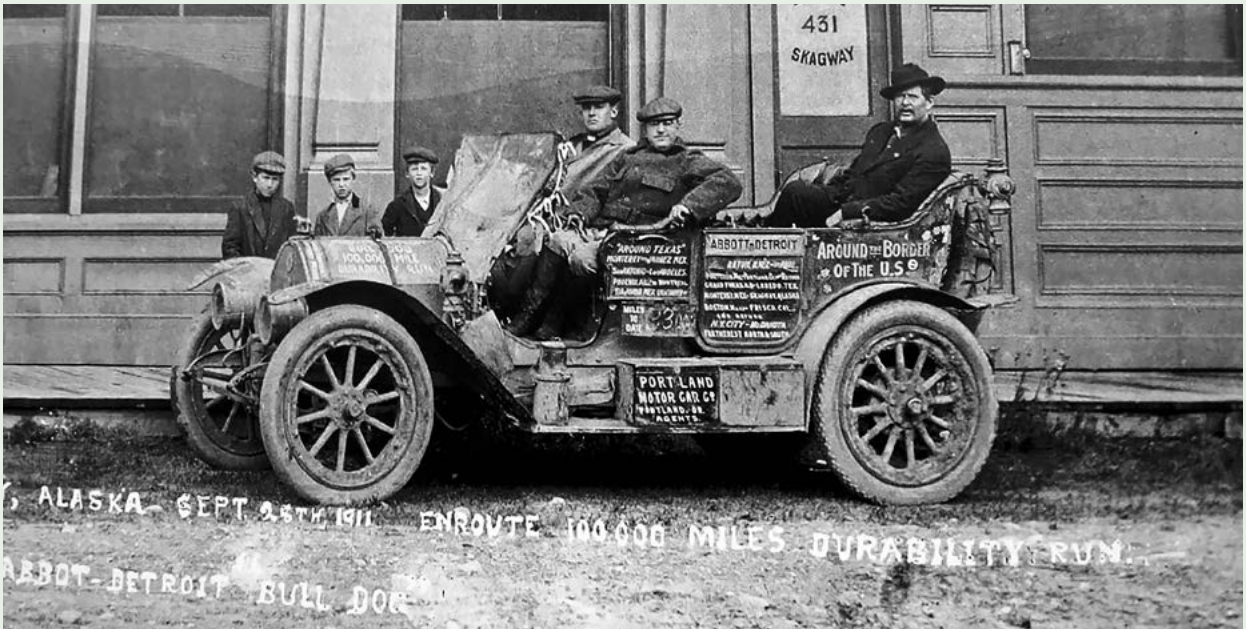


80000 km d. AMERIKA AUF FISCHER KUGELLAGERN MARKE F*AG
KUGEL-FABRIK FISCHER SCHWEINFURT
ZUM 30 JÄHRIGEN GESCHÄFTSJUBILÄUM 1883-1913
Die Fischer-Kugellager F*AG in der Praxis.
Meine Herren!
New York, 14. September 1912.
Bezüglich der Verwendung von Fischer-Kugellagern F*AG, montiert in dem Motorwagen, der von mir während 2 Jahren bei seiner 50000 Meilen-(über 80000 Kilometer) Reise gefahren wurde, bestätige ich, dass während der ganzen anstrengenden, beschwerlichen Tour über den ganzen nordamerikanischen Kontinent und von der Stadt Monterey (Mexiko) nach Garmack (Yukon Gebiet im Klondike) die Lager uns nicht einen Augenblick Schwierigkeiten bereiteten, und wenn wir dieselben nicht gelegentlich einmal mit Schmiermaterial versehen hätten, würden wir überhaupt nicht gewusst haben, dass wir solche Sachen, wie Kugellager hatten.
Wenn Sie berücksichtigen, dass wir tausend Meilen nördlicher fuhren, wie jemals zuvor getan wurde, bis 62 Grad, und über arktische Sümpfe und Hundewege, über Tausende von Meilen feinen Wüstensandes, und setzten über Hunderte von Flüssen mit dem Wasser bis über die Trittbretter gehend, nicht zu erwähnen die über tausend Meilen über stossende, rauhe Eisenbahnschwellen, so ist es wundervoll, wie diese importierten deutschen Lager aushielten. Trotz all diesen Stossens und der Extra-Beanspruchung durch 1500 Pfund Ueberlastung hatten wir niemals ein gebrochenes Lager oder eine Kugel zu ersetzen. Die Lager, die bei der Ausfahrt im Jahre 1910 montiert waren, sind jetzt noch in dem Wagen.
Ergebenst
gez. Dr. Charles G. Parcival.
Deshalb verlangen Sie in Ihrem Wagen Fischer-Kugellager F*AG.
Kugelfabrik Fischer, Schweinfurt
Begründerin der Schweinfurter Gusstahlkugel-Industrie.

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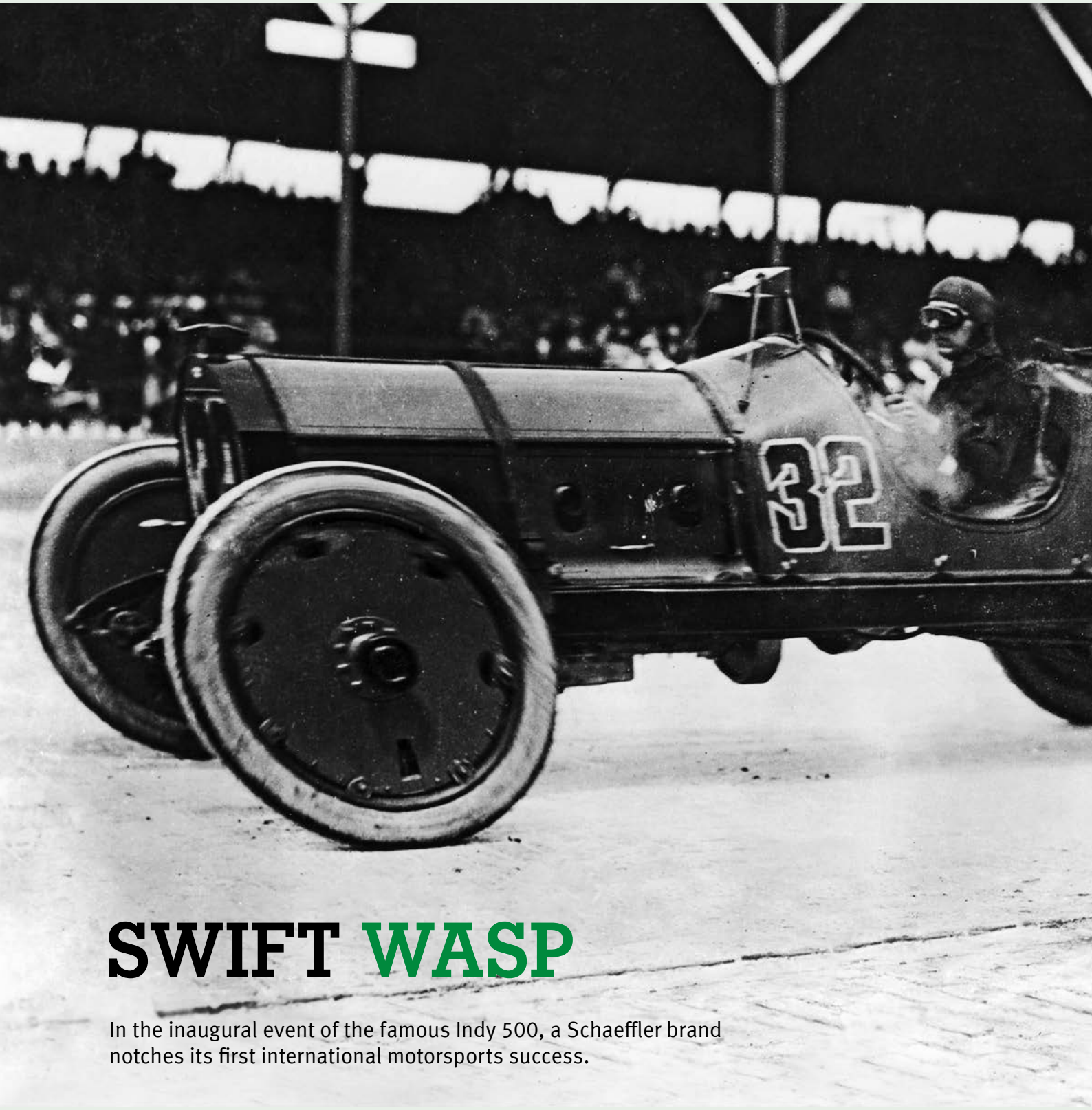


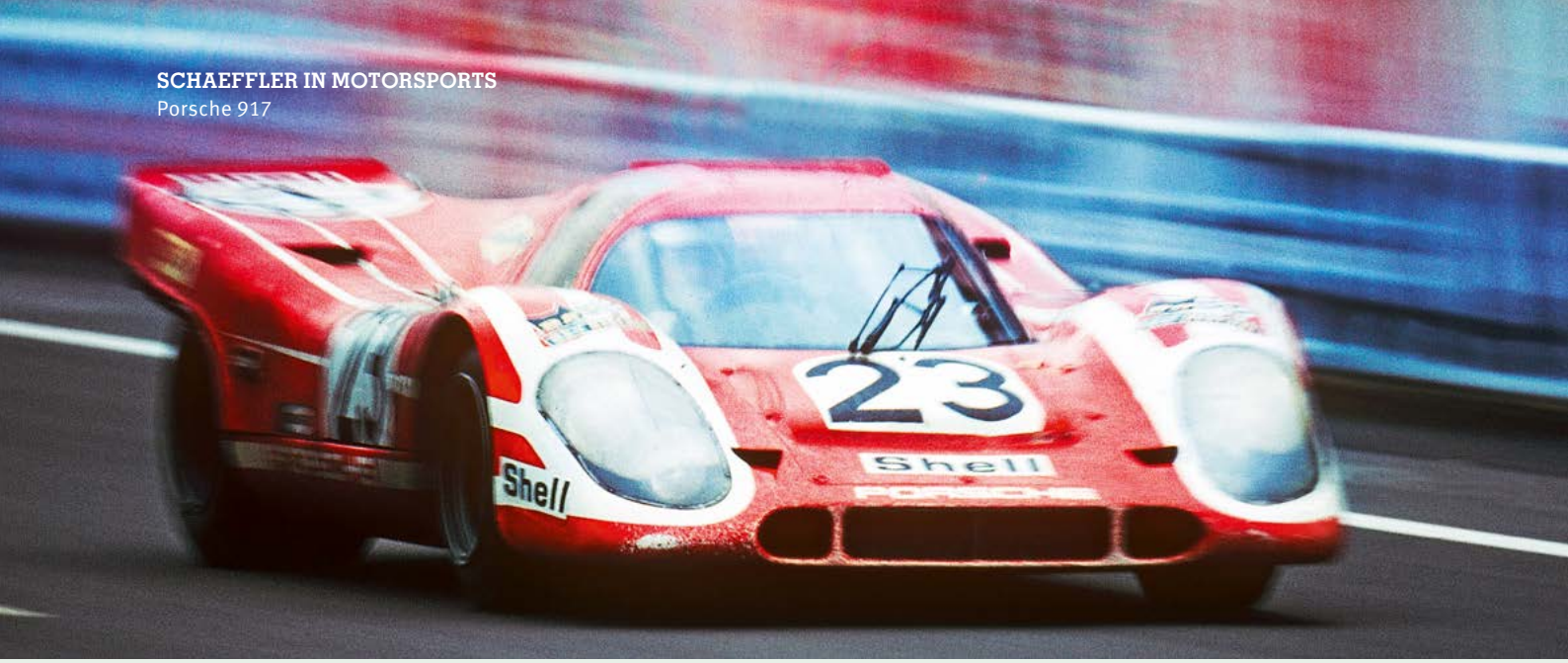
SWIFT WASP

In the inaugural event of the famous Indy 500, a Schaeffler brand notches its first international motorsports success.

It's the world's most tradition-steeped auto race. The legendary 500-mile race has been held in Indianapolis, a city with a population of 800,000, since 1911. On the oval track, also known as the 'brickyard,' drivers are pitted against each other in a veritable flat-out chase at the end of May. Today, the 33 entrants reach speeds beyond 370 km/h. After more than 800 kilometers, which are covered in just roughly 3.5 hours, the winners can not only celebrate joining the circle of motorsports' really big names but receive an impressive payout from the event's overall purse as well. The 2014 winner, the American Ryan Hunter-Reay, earns a healthy 2.5 million U.S. dollars for his success.

The payout for the inaugural race 100 years ago is clearly less. After six hours, 42 minutes and eight seconds, driven at an average speed of 120.06 km/h, Ray Harroun, the inaugural winner of the most important auto race in the United States, receives 14,250 U.S. dollars – equating to the value of 21 Ford T-Models at the time. The race car he's built himself, nicknamed the 'Marmon Wasp' due to its yellow-black paint being reminiscent of a wasp, is equipped with FAG ball bearings. The vehicle attracts attention due to another technical innovation. Harroun has fitted his car with a rear-view mirror to save weight. This allows him to race without the riding mechanic specified in the rules, who is supposed to keep an eye on what's happening behind the car so the driver won't have to turn his head. Harroun's invention goes down in history and has long become standard equipment for all cars as an important safety factor.

Ad celebrating the 1911 win – Rear-view mirror inventor Ray Harroun wins at Indianapolis, thanks also to FAG ball bearings



SUPER SPORTS CAR

Porsche fans are still raving about the 917 today with good reason. In 1970 and 1971, the Stuttgart-based brand clinches its first overall victories at Le Mans with the legendary race car.

All bets placed on victory. This is Porsche's motto for tackling the Le Mans 24 Hours starting in the late nineteen-sixties. Although the brand has regularly been notching class victories at La Sarthe since 1951 the leap all the way to the top has not been achieved yet. As the influence of Porsche-grandson Ferdinand Piëch as head of development in the nineteen-sixties keeps growing the aims become more ambitious. When the FIA finally reduces the minimum number of units for Group 4 sports cars (up to five liters of displacement) to 25 for 1969, ideal prerequisites have been created for Porsche to forcefully tackle the 'overall victory mission' anew. The company invests millions in developing the 917 model of which the required 25 cars are ultimately built.

Nearly 600 hp, a V12 with up to five liters of displacement and top speed in the neighborhood of 400 km/h – these are the impressive key data of the 917, making the muscular sports car the fastest and most powerful Porsche to date. To achieve this performance, Porsche relies on INA know-how as well. The company based in Herzogenaurach supplies the bucket tappets for the 180-degree V engine, gathering important experience in the process that make it one of the world's leading suppliers of valve train components. The involvement, however, not only pays off for INA, as Porsche benefits from it as well. In 1970 (large picture) and 1971, the Stuttgart-based manufacturer is victorious at Le Mans with the 917 and scores two wins of the World Sports Car Championship. In 1971, Porsche additionally sets a distance record in the iconic 24-hour race that won't be broken for 39 years.

Gijs van Lennep and Helmut Marko (right) celebrate their Le Mans record victory in the Porsche 917 in 1971

DESERT ADVENTURE

The Dakar Rally is the world's toughest cross-country rally – a challenge to which Schaeffler rises as well.

Dunes, mountains, dry riverbeds, extremely high temperatures, sand and salt deserts: and all this across a distance of more than 10,000 kilometers. The Dakar Rally makes the most grueling demands on the participants and their vehicles for about two weeks. The tour debuted in 1979. Just a year later, the Schaeffler Group is involved in a victory for the first time. Freddy Kottulinsky and Gerd Löffelmann triumph in the VW Iltis ahead of their team-mates Patrick Zaniroli and Philippe Colesse. The engineers of the Schaeffler Group have a reason to celebrate as well. The rally marks the birth of the INA throttle valve bearing that has since been awarded multiple patents and produced over 450 million times and without which modern engines would be inconceivable.

21 years later, Jutta Kleinschmidt causes a sensation in the 'Dakar.' The German whose red Mitsubishi Pajero is emblazoned with the yellow LuK logo is the first ever woman to win this legendary event. One of the secrets of her success: the prudent driving style of the physicist and her co-driver Andreas Schulz. In 2003, VW returns to the Dakar Rally to demonstrate TDI technology know-how. A year later, the Race Touareg is fielded for the first time. It uses turbochargers equipped with Schaeffler rolling bearings. Jutta Kleinschmidt in 2005 manages the first leap of the VW Race Touareg onto the podium. From 2009 to 2011, the Wolfsburg-based brand is the first manufacturer in Dakar history to win the rally with a diesel engine.

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1 Sensation in Dakar – Jutta Kleinschmidt is the first woman to triumph in the cross-country rally

2 Dakar icons among themselves – the VW Iltis and the VW Touareg

A FAMILY MEMBER
SWIFT AS AN ARROW

Armin Schwarz and Schaeffler: a combination that has existed for 25 years. The German from Franconia has worked hard for his success, with blood, sweat and tears, awesome will power and clear aims

The year is 1985. Armin Schwarz, who was trained as a vehicle mechanic, has a job repairing cars in the Fiat garage of the Stadie car dealership in Aurachtal. Cars are his life, the Franconian realized at an early age. But he has higher aims than just working in a garage. Schwarz is dreaming of a career as a rally racer. Thanks to Walter Röhrl there's wide-spread enthusiasm for the sport in Germany at the time. Schwarz would like to follow in the footsteps of the two-time world champion or, better yet, leave his own for others to follow in. The first tests in a Fiat 131 that has been prepared for rallying in a makeshift way provide an initial taste of his talent but the young hopeful from Neustadt an der Aisch is lacking the required financial means. Schwarz musters all his courage and visits Schaeffler in nearby Herzogenaurach. In a euphoric monolog, the youngster talks about his goals and the fire that's burning in his heart sends off a spark that catches Schaeffler's top management. The (then) CEO, Wolfgang Falk, is thrilled by the energy of the (then) 22-year-old and concludes the 'marriage vows' exchanged between Schaeffler and the aspiring young racer by saying: "Alright then, go ahead and do it."

Thanks to Schaeffler's promise to support him Schwarz can park his ageing Fiat in the garage. The switch to Audi is a done deal and the body-in-white of an Audi 80 quattro already available. The youngster is to come up with the components needed to build a veritable rally vehicle together with Schaeffler's chief developer, as Schaeffler and Audi have an outstanding working relationship. The mechanics that help Schwarz build the car work in development or productions in Herzogenaurach during the day. The required parts are ordered from Audi. "Every part had its own number and was an item on a list printed on continuous paper with pale dot matrix print," Schwarz recalls. "When the list arrived at Schaeffler I was asked to make an appointment with management because all the individual nuts, bolts and parts totaled an amount that would buy a respectable sedan."

In the end, the team gets an Audi 80 quattro off the ground in which Schwarz and his close-knit squad teach the meaning of fear to the competition in the 1986 Mitropa Cup. The car has 'plenty of Schaeffler' on board: wheel bearings, rolling bearings and hydro tappets that have not yet made their breakthrough in the automotive industry at the time. Schwarz assists in the development as well. "These were wild and fantastic days," Schwarz says, looking back. "I instantly felt comfortable within the Schaeffler family circle." Dr. Georg Schaeffler contributes to his feeling of comfort as well. The company's founder follows the activities with interest and has the team show him the car from time to time. Before the final race of the 1986 season, rally rookie Schwarz is a candidate for the title. A second place in the 'Three-City-Rally' would be enough for him to clinch the title in his first full season. This is no mean feat as Michèle Mouton in the Peugeot 205 T 16 is practically matchless. Worse yet, his fiercest rival in the battle for the title, Mathias Moosleitner, arms himself with new equipment, now driving a Lancia Rally 037 instead of an Opel Manta 400. Suddenly, Schwarz in his 190-hp Audi is fighting with dull weapons, but he has an idea. He can rent an MG Metro 6R4 for the showdown via a tuner named Konrad Schmidt. The car is a 420-hp powerhouse but lacks reliability now and then. Schwarz again meets with CEO Falk. "Can it win? An English car?" Falk asks skeptically but then, reluctantly, approves the proposal. The car won't win the rally but the result suffices nonetheless. Trailing a more than dominant Mouton, Schwarz finishes as the runner-up and secures the title – the starting signal for his professional career.

In 1987, Schwarz becomes an Audi factory driver. Together with his co-driver Hans-Joachim Hösch he enters the German Rally Championship. His Audi Coupé, fitted with a near-210-hp engine, is not overwhelmingly powerful but he instantly steers it to the title win. In 1988, Schwarz changes co-drivers and cars. With Klaus Wicha in the navigator's seat, he again crowns himself champion in the more powerful, albeit more unwieldy Audi 200 quattro. Alongside his rallying commitments, Schwarz spends a large part of his time as a test and development driver for Audi's fledgling circuit racing program. Schwarz assists in the preparations for the brand's DTM entry and in doing so indirectly prepares his departure from Audi, as Ingolstadt has decided to become in involved in circuit instead of rally racing in the future. But Schwarz is unwilling to turn his back on his passion.

With three titles clinched in three years, he has a ticket for factory-backed commitments in the World Rally Championship. Toyota, Mitsubishi, Ford, Hyundai and Škoda are the names of his employers in the following years. The WRC sees him compete in 121 events and finish in the top ten 46 times, his 1991 win of the Rally Spain being the highlight. Schaeffler is always on board. "I've been a member of the Schaeffler family for more than 25 years, so by now I'm part of the inventory," Schwarz says today, with a certainty in his voice that suggests there will be a few more chapters added to the success story of this partnership.

RALLY
ON THE DOORSTEP

1985 marks the birth of the ADAC-Rallye Herzogenaurach. On the doorstep of Schaeffler's headquarters, the drivers battle for the INA trophy – with a prominent visitor in attendance.

No other form of motorsports captivates a larger crowd in the eighties than rally racing. More than 150,000 spectators alone flock to the German Championship rounds on two days. Germany has been infected by rallying fever, and so have Hans Wormser, the owner of a hauling company, and Dr. Georg Schaeffler. The two businessmen are in the process of forging out great plans: a rally in Herzogenaurach, on the company's doorstep. No sooner said than done, the first ADAC-Rallye Herzogenaurach for the INA trophy is held on August 3, 1985. AC Herzogenaurach with Co-chairman Hans-Joachim Hösch heads up the project. The inaugural event becomes a small-scale fun fair. The rally features six special stages, with start and finish in the 'Weihersbach' park and festival grounds. Interest is huge – the roads are lined with motorsports enthusiasts.

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The euphoria is palpable at Schaeffler as well. Countless employees have volunteered to make the event a success. 85 rivers from across Germany start in the rally, sometimes going a little overboard: twelve retirements right on stage 1. At the end of the event, 20 cars have 'fallen by the wayside' – but there are no losses other than fender benders. The ultimate winners, Norbert and Brigitte Walter in a VW Golf GTI, take the spoils. The rally's patron, Dr. Georg Schaeffler, insists on making a personal appearance at the awards ceremony held at the automobile club's clubhouse in the evening – despite having visitors at home.

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1 Speedy course opener – youngster Armin Schwarz assumes the 'road sweeper' role in 1985

2 Right in the middle instead of just standing by – patron Dr. Georg Schaeffler knows the roadbook

GREEN FIELD

In 1988, the two Alpina BMW M3 cars become a talking point in the DTM not only because of their color.

Like Schaeffler's LuK brand, Alpina is founded in 1965. From the beginning, Burkard Bovensiepen's company is focused on tuning various BMW models. To increase awareness of its name on an international scale, the company based in Buchlohe, Germany, enters touring car racing in 1968 – and achieves success. In 1970, it claims victory in the Spa 24 Hours and from 1971 to 1973 in the Nürburgring one-day races as well. Following the European Championship title win in 1977, Alpina ends its racing commitments in order to concentrate on the development of road cars. This pays off as the company is awarded the status of an automobile manufacturer in 1983.

Christian Danner won two races in the Alpina-BMW M3 in 1988

Following the launch of the BMW M3, Alpina returns to the race tracks with a DTM commitment in 1987. With Fabien Giroix and Ellen Lohr, the company clinches a victory and several podium positions in the year of its comeback. The following year, the team is supported by LuK. Formula One racer Christian Danner and touring car specialist Peter Oberndorfer, who has been sponsored by the German automobile manufacturer for quite some time, are the squad's drivers. Danner notches two commanding victories on the second DTM weekend of the year. Oberndorfer finishes on the podium during the season as well. But Alpina not only causes a sensation due to these race results. Starting in the rounds at the Salzburgring, the team equips the two green BMW M3 cars with catalytic converters, pioneering this technology in the DTM, as they only become mandatory in 1990. Alpina leaves the DTM at the end of the season to concentrate on road cars again for the time being.

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AMERICAN DREAM

In 1989 and 1990, LuK is the title sponsor of a touring car championship in the United States.

The series has a tradition. When LuK enters the IMSA International Sedan Series in 1989 it's being held for the 20th time. With the company's sponsorship commitment, it is renamed LuK Clutch Challenge. LuK uses racing to further increase customers' awareness of the brand and its products in the United States where a plant was opened in Wooster, Ohio, in 1977.

The touring car series is held as part of the supporting program of IMSA GTP, the top U.S. sports car category, on legendary race tracks such as Road Atlanta, Watkins Glen and Lime Rock. The Challenge participants keep stealing the show from the 'big cars.' In the rounds which, depending on the track, last 30 minutes or cover a 100-kilometer distance, they frequently battle each other in nail-biting duels. The fact that vehicles from eight manufacturers such as BMW, Mazda, Nissan and VW, as well as up to four tire brands, compete for victory additionally spices up the series.

Two champions, Dave Jolly (1989) and Garth Ullom (1990), are each rewarded with a payout of more than 50,000 U.S. dollars from the purse at the end of the season. Other drivers in the LuK Clutch Challenge include the subsequent IndyCar driver Parker Johnstone, who finished the championship as the runner-up in both years, and the subsequent sports car star and three-time winner of the Daytona 24 Hours, Butch Letzinger.

1 Dennis Shaw, Dave Jolly and Scott Hoerr are on podium at Road America in 1989

2 Gripping races – lights-to-flag suspense was a hallmark of the LuK Clutch Challenge

QUICK GIANTS

Unique atmosphere – more than 200,000 fans flock to the season's pinnacle event at the Nürburgring

1,160 hp in action – when the race trucks thunder down the tracks, the ground starts shaking.

Race trucks are the largest, heaviest and most powerful race vehicles to be found in circuit racing. With more than 1,100 hp, 5,600 Newton meters and a weight of 5.5 tons, they set best marks which are unique in the current motorsports landscape and pose a huge challenge to the technical crews. Nowhere else in circuit racing do higher mechanical forces occur that stress the components accordingly.

No wonder that Schaeffler starts tackling this challenge in 2003. Two top-caliber race teams, Team Buggyra and subsequently MKR Technology, rely on LuK know-how. Their trucks are equipped with clutches for racing, power steering pumps and release bearings from Schaeffler. The components help achieve success, as the Buggyra drivers Markus Bösiger and David Vršecký with LuK as their supplier become European Champions. MKR Technology wins the teams' classification in 2010 and 2012 before the Czech squad leaves the truck scene in 2013.

¡VIVA MÉXICO!

Schaeffler's successful involvement in the Mexican NASCAR Series spans four years, culminating in the title win in 2012.

Since 2004, NASCAR, the most popular racing series in the United States, has had a 'spin-off series' in Mexico, with championship rounds having been held on ten different oval tracks in the Middle American country ever since. As in the big U.S. 'sister series,' the events are contested with stock cars. They consist of a rugged tubular frame to which sheet steel body panels are attached. Naturally, the Mexican race cars use powerful V8 engines as well that produce near-400 hp from 5.7 liters of displacement.

The series quickly evolves into one of the most popular ones in the country, providing the Schaeffler Group with its three locations in Mexico with an ideal platform to showcase its know-how. From 2009 to 2012, Schaeffler with its LuK, INA, FAG and Ruville brands supports the well-established squad of TeamGP, a commitment that soon pays off. The driver duo of Jorge Goeters and Rafael Martínez immediately claims a total of six podium places and a victory in the first year. In 2010, TeamGP, having notched four victories that season, is even the most successful squad of the year, with Martínez just barely missing the drivers' title in third place overall. His team-mate Goeters finishes the following season in third place as well before upping the ante in 2012 to crown himself champion in the fiercely competitive championship with two victories – a successful conclusion of Schaeffler's four-year partnership with TeamGP which, in addition to the title win, reflects eleven race victories, 33 podium places and twelve pole positions.

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1 Jorge Goeters wins the Mexican NASCAR Series in 2012

2 Full house – NASCAR races attract large crowds to the race tracks in Mexico

ONLY FLYING IS BETTER

Tomasz Kuchar has been LuK brand ambassador in Poland for over a decade. Rally racing has a long tradition in this country and attracts countless fans – even a highflyer.

Motorsports may not be as exciting as jumping from outer space but for Felix Baumgartner they're at least just as electrifying. No wonder that the stratosphere jumper can't resist his Polish friend Tomasz Kuchar beckoning him to participate in the 2014 Barbórka Warszawska Rally in the blue-yellow Ruville-Subaru Impreza. Eight special stages across tarmac and gravel, jumps over meter-high ramps, Baumgartner has done this before. Back in 2005 and again in 2012, just a few weeks after his jump from an altitude of nearly 40 kilometers, the Austrian participated in the event held in the Polish capital. The rally that has traditionally been staged at the end of the season since the nineteen-sixties is a meeting of the best Polish drivers with guest entrants from around the world. Over the years, the 'Barbórka' has absolutely acquired cult status with the fans in the country that loves motorsports.

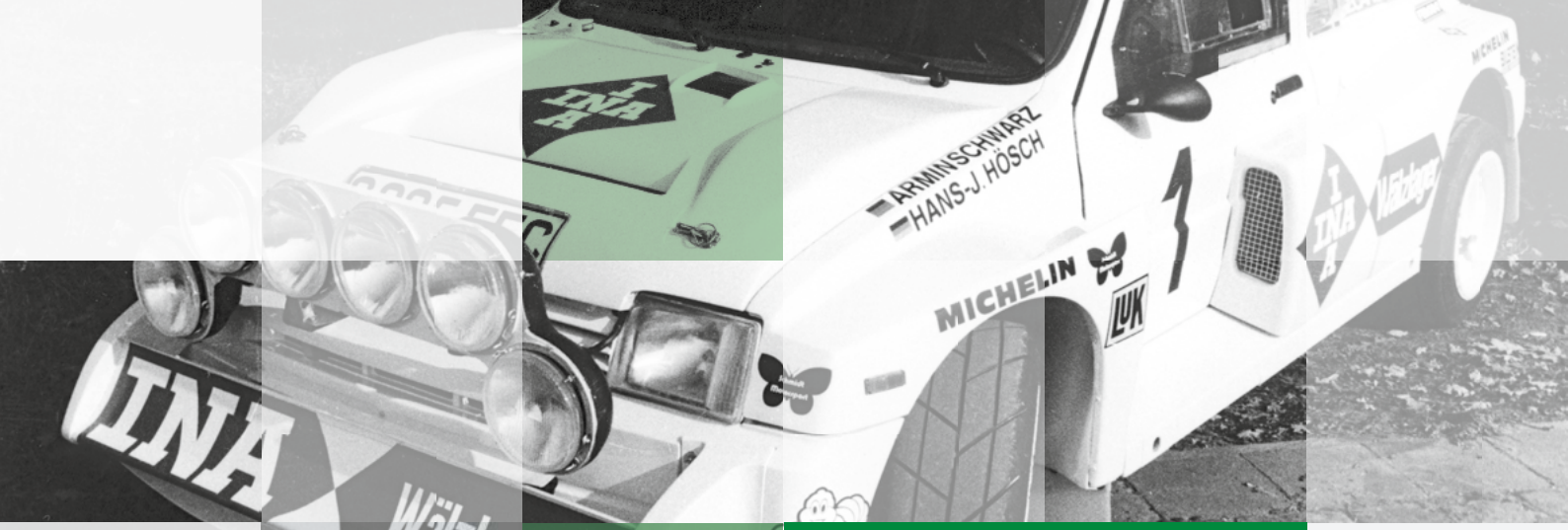
This is true for Tomasz Kuchar as well. The six-time Barbórka winner is well-established in Polish motorsports. Kuchar has runs in the World Rally Championship under his belt, is a four-time Polish champion and has been a brand ambassador for over ten years for LuK and Ruville, a member of the Schaeffler Group specializing in the OEM segment. In the 2014 Barbórka, the crowd-pleaser in his Schaeffler-LuK-Subaru wins the spectacular final stage on the 'Karowa,' a main street in the heart of Warsaw. 20,000 spectators witness the spectacle on location under floodlights. Around a million people watch the event with bated breath live on television. "Circuit racing doesn't have a tradition in Poland but people flock to rally events," says the beaming winner Kuchar. Baumgartner qualifies for the finale of the top 30 in the field of 120 starters as well. In the end, the newcomer finishes in a remarkable 20th place – for him, it's heaven on earth.

TIMELESS BEAUTIES

Schaeffler and its Group brands, FAG, LuK and INA, have helped to shape and define motorsports. The legendary race cars that have become icons bear witness to this.

AUDI 80 QUATTRO
Rally 1986

ENGINE inline four
CUBIC CAPACITY 2,149 cc
OUTPUT 118 kW / 160 hp
WEIGHT 1,060 kg



MG METRO 6R4
Rally 1986

ENGINE V6
CUBIC CAPACITY 2,991 cc
OUTPUT 331 kW / 450 hp
WEIGHT 1,000 kg

BMW M3
DTM 1987

ENGINE inline four
CUBIC CAPACITY 2,332 cc
OUTPUT 232 kW / 315 hp
WEIGHT 1,000 kg

RALT RT32 ALFA ROMEO
Formula 3 1988

ENGINE inline four
CUBIC CAPACITY 1,998 cc
OUTPUT 125 kW / 170 hp
WEIGHT 455 kg

SWIFT FORMULA FORD 2000
Formula Ford 1988

ENGINE inline four
CUBIC CAPACITY 1,998 cc
OUTPUT 103 kW / 140 hp
WEIGHT 420 kg

AUDI 200 QUATTRO
Rally DM 1988

ENGINE inline five
CUBIC CAPACITY 2,144 cc
OUTPUT 177 kW / 240 hp
WEIGHT 1,250 kg

FORD SIERRA COSWORTH RS 500
DTM 1988

ENGINE inline four
CUBIC CAPACITY 1,993 cc
OUTPUT 425 kW / 580 hp
WEIGHT 1,200 kg

REYNARD-VOLKSWAGEN 893
Formula 3 1989

ENGINE inline four
CUBIC CAPACITY 1,998 cc
OUTPUT 125 kW / 170 hp
WEIGHT 455 kg

RALT RT 34 OPEL
Formula 3 1990

ENGINE inline four
CUBIC CAPACITY 1,998 cc
OUTPUT 125 kW / 170 hp
WEIGHT 455 kg

VOLKSWAGEN GOLF KIT-CAR
Rally-DM 2000

ENGINE inline four
CUBIC CAPACITY 1,984 cc
OUTPUT 177 kW / 240 hp
WEIGHT 970 kg

MITSUBISHI PAJERO EVO
Dakar Rally 2001

ENGINE V6
CUBIC CAPACITY 3,497 cc
OUTPUT 191 kW / 260 hp
WEIGHT 1,790 kg

VOLKSWAGEN POLO CUP
VW Polo Cup 2005

ENGINE inline four
CUBIC CAPACITY 1,984 cc
OUTPUT 110 kW / 150 hp
WEIGHT 1,060 kg

LE COIFFEUR VI

European Tractor Pulling Championship 2006

ENGINE V12
CUBIC CAPACITY 36,710 cc
OUTPUT 2,942 kW / 4,000 hp
WEIGHT 2,500 kg

PORSCHE 911 GT3 CUP

VLN 2007

ENGINE 6-cylinder boxer
CUBIC CAPACITY 3,797 cc
OUTPUT 293 kW / 400 hp
WEIGHT 1,200 kg

AUDI A4 DTM
DTM 2011

ENGINE V8
CUBIC CAPACITY 4,000 cc
OUTPUT 338 kW / 460 hp
WEIGHT 1,045 kg

BMW M3 GT4
VLN 2012

ENGINE V8
CUBIC CAPACITY 3,999 cc
OUTPUT 309 kW / 420 hp
WEIGHT 1,380 kg

AGM-JIMCO X6 SCORE TROPHY TRUCK
Baja 2014

ENGINE V8 small block
CUBIC CAPACITY 7,400 cc
OUTPUT 588 kW / 800 hp
WEIGHT 2,500 kg

AUDI RS 5 DTM
DTM 2014

ENGINE V8
CUBIC CAPACITY 4,000 cc
OUTPUT 340 kW / 460 hp
WEIGHT 1,110 kg

PORSCHE 919 HYBRID
WEC 2014

ENGINE V4
CUBIC CAPACITY 2,000 cc
OUTPUT 552 kW / 750 hp
WEIGHT 870 kg

SPARK SRT_01E
Formula E 2014

ENGINE electric
CUBIC CAPACITY –
OUTPUT 200 kW / 270 hp
WEIGHT 896 kg

INFERNALLY GOOD

Schaeffler's involvement in customer sport is more than a cherished tradition. The VLN Endurance Championship at the Nürburgring puts extreme strains on the drivers and their cars. The 24-hour race is the highlight of the year. The 'Green Hell' and the green-yellow Schaeffler-BMW make a perfect match.


DUNLOP


LIQUI MOLY

DESERT FLY

Schaeffler and Armin Schwarz have been partners for over 25 years. Following successes in international rally racing, the German is now flying through the desert in the spectacular 800-hp Trophy Truck at the Baja events in the United States and Mexico.


DHL
ABT
GEO
ELECTRONIC CIGARETTES
TELEFUNKEN
SCHAEFFLER
LUK

FUEL FOR WINNERS

Lucas di Grassi electrifies the masses in the first Formula E season. The Brazilian's victory in the inaugural race in Beijing is followed by further podium places.

AUTHORS

Jörg Walz
Lukas Stelmaszyk

PRODUCTION, PUBLISHING & DISTRIBUTION

Speedpool GmbH
Bernhard-Nocht-Straße 99
20359 Hamburg
Germany

Tel +49 40 300682-0
Fax +49 40 300682-22
E-mail info@speedpool.com
Internet www.speedpool.com

EDITORS

Marco Kraft
Lars Krone
Volker Paulun
Sonja Schmidt
Torben Schröder
Tom Teßmer
Roland Zumsande

DESIGN AND ARTWORK

Gökhan Agkurt, Oliver Breilmann, Tilmann Fabel, Jana Herbst, Manuela Mrohs, Thomas Wildelau

PRE-PRESS

Julien Gradtke
Anke von Lübken
Mathias Mayer

COPY EDITORS

David Feist
Christoph Kirchner

COORDINATION

Carina Chowanek
Benjamin Hoffmann

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people involved in creating this book

ENGLISH TRANSLATION

Helga Oberländer

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JÖRG WALZ is an author of numerous motoring and motorsports books – including the first Schaeffler motorsports book 'In Pole Position' and the first official DTM and ITC yearbooks. As a journalist and communicator he has experienced the activities in international motorsports at close range in the past 30 years and put them into words.

LUKAS STELMASZYK supports various racing series, such as the FIA Formula E Championship, the DTM, the Audi Sport TT Cup and the FIA World Rallycross Championship, for Speedpool GmbH. As an editor and press spokesperson he has been on location at numerous national and international race tracks during the past decade.

PHOTO CREDITS

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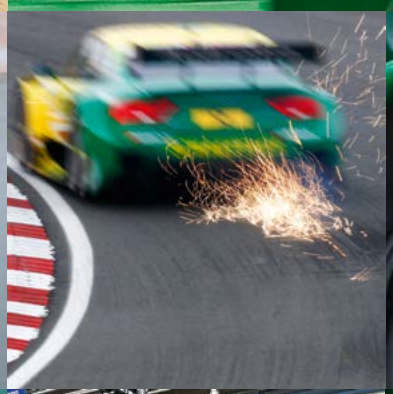
PRINTING & PROCESSING

Blattwerk Hannover GmbH
Lägenfeldstr. 8
30952 Ronnenberg
Germany

Telefon +49 511 4755790
Telefax +49 511 47557929
E-Mail hallo@blattwerk-hannover.de
Internet www.blattwerk-hannover.de

SCHAEFFLER – MOTORSPORTS IN OUR GENES

Schaeffler and its Group brands, LuK, FAG and INA, have been involved in motorsports for decades. With tremendous enthusiasm, unconditional commitment and a wealth of technological know-how, our employees play an active part in writing the success stories of Schaeffler's partners day in day out – because motorsports are deeply rooted in our company. Schaeffler puts the pedal to the metal for tomorrow's mobility and motorsports are the best test lab for this purpose. This book will provide you with an up close experience of the fascinating green-yellow motorsports world – past, present and future.



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