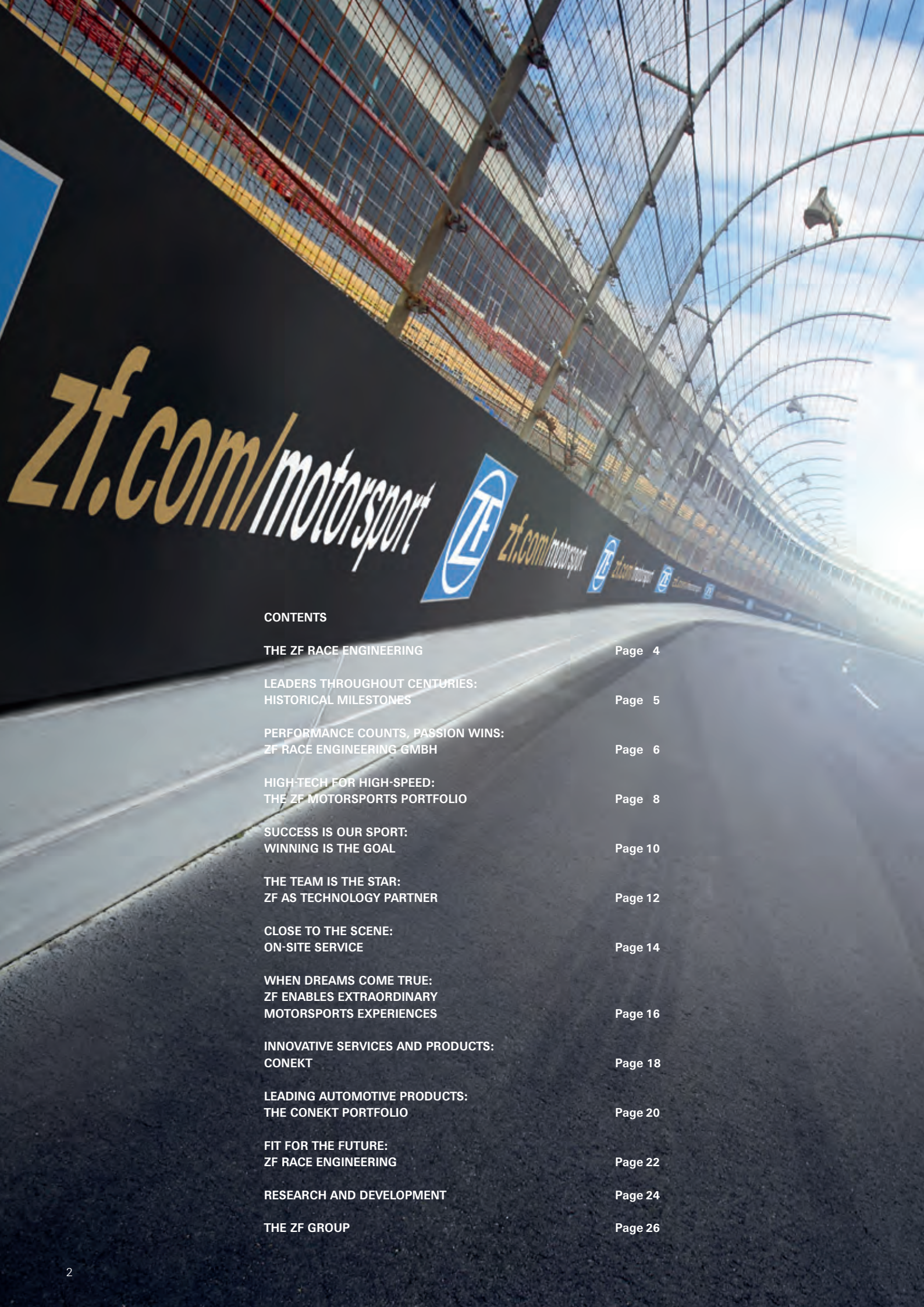


# THE BEST FOR THE BEST

ZF RACE ENGINEERING







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**THE BEST FOR THE BEST.** That's the claim of ZF Race Engineering, a developer, manufacturer and distributor of core drive-line and chassis products specially for race car applications in motorsports. From Formula 1, Formula E, WRC and DTM to amateur race series and tuning vehicles, famous motorsports teams from all over the world rely on ZF's innovative technology and first-class service. Spectacular sports successes underline the technical competence and reliability of ZF products. The integration of Conekt enables ZF Race Engineering to provide customers in various industries with a full range of engineering services, from product development and testing to small volume production.



# THE ZF RACE ENGINEERING

Both ZF and the Active and Passive Safety Technology Division do not only operate with global automotive customers with large-scale volume production, but they also have business units that focus on developing and manufacturing niche products. Made up of ZF Race Engineering GmbH and Conekt, the business unit ZF Race Engineering bundles ZF's business in the fields of motorsports applications, small volume production applications, engineering, consultancy and testing, thus acting as a one-stop supplier of all ZF products for special requirements in the market

## **ZF Race Engineering GmbH**

Headquartered in Schweinfurt with currently around 90 employees, ZF Race Engineering GmbH is a wholly owned subsidiary of ZF Friedrichshafen AG. ZF Race Engineering develops, produces and distributes shock absorbers, clutches, transmissions and other ZF products for all kinds of applications in motorsports worldwide.

Racing series such as Formula 1, the World Rally Championship, DTM, 24 Hours of Le Mans, or even the innovative, all-electric Formula E series, among others, rely on high-tech products made by ZF.

ZF Race Engineering GmbH also specializes in developing and manufacturing small production orders.

## **Conekt**

Headquartered in Solihull, UK, Conekt currently employs around 115 engineers. The company's main strength is the provision of complete engineering services, from product development and testing to small volume production in various industries, e.g., aerospace, automotive or the energy sector.

# LEADERS THROUGHOUT CENTURIES: HISTORICAL MILESTONES



-   
**2016**

**FIA Formula E is world wide the first full electric race series.**  
**ZF has signed a contract as official technology partner of the team Venturi.**
-   
**2015**

ZF celebrates the 100 year anniversary after founding the company in the year 1915.  
 Merge and intergration of the company TRW into the ZF company group
-   
**2014 - 2016**

In the FIA-World Championships (WEC & WRC) again cars which use ZF products drive on podium positions
-   
**2013**

All FIA World Championships (WEC, WTCC, F1, WRC) are obtained with products from ZF
-   
**2012**

**ZF provides the Audi R18 at the 24h race of Le Mans with clutch and a special racing steering**
-   
**2012**

All three DTM teams are equipped with ZF clutches;  
 ZF partner BMW wins the manufacturer ranking of the DTM
-   
**2011**

Volkswagen wins the Rally Dakar for the third time in a row with shock absorbers and clutches from ZF
-   
**2009**

The newly founded Team Brawn GP is equipped with rotational dampers from ZF Sachs; Brawn wins the world championship
-   
**2007**

"Official Supplier" relationship with the BMW Sauber F1 Team (rotational dampers)
-   
**1999 - 2004**

**Ferrari and Michael Schumacher win a total of six constructors' championships with ZF Sachs shock absorbers**
-   
**1998**

Foundation of Sachs Race Engineering GmbH
-   
**1997**

ACC (Autonomous Cruise Control) Fully automated vehicle longitudinal control system using radar headway measurement
-   
**1994**

ICC (Intelligent Cruise Control) Full automated vehicle longitudinal and lateral control system using radar headway measurement
-   
**1993**

Debut of Sachs in the Formula 1 with Mercedes and Sauber
-   
**1992**

BBW (Brake by Wire) Software, developed an algorithms for initial BBW system vehicles demonstrator
-   
**1986 - 1987**

Crash gear box, developed electronically control non-synchro shift system for heavy goods vehicles
-   
**1985 - 1986**

The Porsche-Team of Joest Racing wins the 24h race of Le Mans with Sachs products, and defends the title in the following year
-   
**1969 - 1975**

Engine Management, original developers of "mapped memory" fuel injection and ignition systems
-   
**1966**

**Opening of the Motodrome and the new Sachs curve at the Hockenheimring**
-   
**1964**

Jim Clark wins the Grand Prix in the Formula 1 with the Lotus 33 R9, provided with ZF transmissions
-   
**1937**

**The first Mercedes "Silver Arrows" are equipped with Sachs shock absorbers and clutches**
-   
**1915**

Foundation of ZF Friedrichshafen AG
-   
**1895**

Foundation of "Schweinfurter Präzisions-Kugellagerwerke Fichtel & Sachs" by Ernst Sachs and Karl Fichtel

# PERFORMANCE COUNTS, PASSION WINS: ZF RACE ENGINEERING GMBH



Since the foundation of ZF, components, shock absorbers and clutches have been used in standard and motorsports vehicles. Both areas have been and will stay inseparably connected – with success. This holds true for the legendary Mercedes Silver Arrows of the 1930s as well as for the Formula 1 cars of today, for national and international long distance and circuit racing events as well as for rally championships.

## **Flexibility and experts**

Having new materials, technology and expertise is not all – you also have to know how to apply them. Especially when top performance is required like in motorsports. For this purpose, experts are needed. Experienced employees who cooperate in small teams, find solutions and implement them. This requires a flexible company. The logical consequence was to establish ZF Race Engineering GmbH. Operating on an international level, ZF Race Engineering develops, designs, produces and distributes racing clutches and shock absorbers for top-class sports and national racing series as well as for renowned automotive manufacturers, tuners and specialist vehicle retailers.

## **One face to the customer**

Approximately 90 employees work at ZF Race Engineering GmbH in Schweinfurt and deal exclusively with motorsports issues. Their mission is to provide individual support with a focus on the customers' wishes. One face to the customer is the philosophy. One employee is in charge of the complete process – from the technical specification, which is developed together with the customer, and the implementation of all required process steps to the completed product including on-site service.



### **ZF motorsports developments**

ZF is an innovation-driven company that develops volume production-ready products based on its own research and development efforts and thus invests in the future in a targeted way. This also applies to motorsports. ZF Race Engineering's development objectives for all product segments encompass installation space optimization, weight reduction and performance enhancement. ZF Race Engineering distinguishes itself from its competitors thanks to OE standards, FMEA, project transfer and process management and the expertise from ZF Friedrichshafen AG's volume production business.

# HIGH TECH FOR HIGH SPEED: THE ZF MOTORSPORTS PORTFOLIO

Again and again, professionals in motorsports all over the world celebrate their successes thanks to ZF products and rely on our technological expertise. Our products offer excellent connection and installation options, optimal functions and a long service life – perfectly designed for applications at the technical limit.



## F1 CARBON CLUTCH

- Special clutch developed according to customer requirements
- 97 mm pull type clutch
- Applicable for speeds of up to 22,000 rpm
- Transmittable torque > 800 Nm
- Carbon friction material for optimized starting behavior
- Diaphragm spring with higher thermal stability
- Clutch housing: high-strength titanium



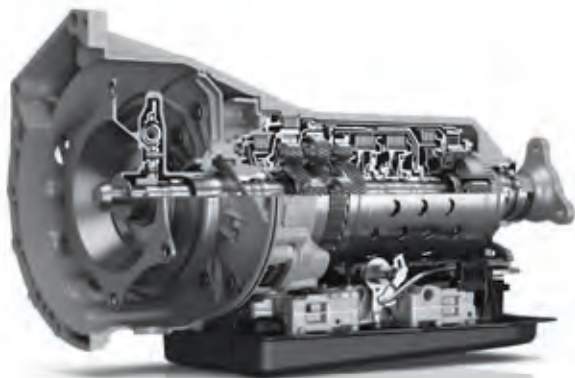
## WRC SINTER CLUTCH

- 184 mm push type clutch for high torque capacity
- 2-disc sinter/steel-version
- High maximum transmittable torque of 1,300 Nm
- Diaphragm spring with higher thermal stability
- FEM-optimized structure, thereby optimized weight and MOI
- Supply with release system for push type clutches possible
- Optimized heat transfer due to special pocket design
- High-temperature-resistant aluminum alloy



## RX CLUTCH

- 184 mm push type clutch for high torque capacity
- EPR (Elastic Pressure Ring) for better modulation
- High maximum transmittable torque of 1,240 Nm
- Carbon friction material for optimized starting behavior
- FEM-optimized structure, thereby optimized weight and MOI
- Supply with release system for push type clutches possible
- Wider wear range of 1.00 mm



## AUTOMATIC RACING GEARBOX

- Elimination of torque converter
- Adjustment of gear ratios
- Reduced shift times
- Increased safety, avoidance of shift errors
- protection of entire powertrain
- Weight reduction of 15 %





### F1 DAMPER

- Through-rod damper
- Piston rod made of titanium
- Housing made of high-strength aluminum
- Piston diameter < 30 mm
- Weight < 300 gr



### FORMULA EVOLUTION DAMPER

- Versions: 2-way, 3-way, 4-way, 5-way adjustable
- Height adjustable monotube damper technology
- Drop off adjustment
- Light-weight aluminum housing with integrated reservoir;
- Through-Rod-Technology as an option

### CIRCUIT RACING DAMPER

- Height adjustable monotube damper technology
- 2-way adjustable
- Light-weight aluminum housing with integrated reservoir
- Latest STTV-technology (Single Tube Twin Valve)



### RALLYE/OFFROAD DAMPER

- 3-way adjustable
- Height adjustable monotube strut technology
- Steel housing with separate reservoir
- Adjustable hydraulic bump stop as an option available
- Non adjustable rebound stop as an option available



## SACHS PERFORMANCE powered by ZF Race Engineering



### SACHS PERFORMANCE CLUTCH

- Chip tuning, turbocharger and supercharger conversions
- 1/4 mile-, hill climbs-, circular tracks such as endurance racing, club sports, autocross, rally racing, slaloms, and drifts
- Vehicles with maximum payload or subject to high load



### SACHS PERFORMANCE GEWINDEFABRWERK

- German TÜV certified, "ready-to-install" solutions for sportive or tuned road vehicles
- Adjustable in height, bump- and rebound
- Upside-down-design
- Best response behaviour by friction optimised sealings and proven valve parts



# SUCCESS IS OUR SPORT: WINNING IS THE GOAL



Be it Formula 1, Formula E or 24 Hours of Le Mans, DTM or European Truck Racing Championship and further international racing series like Super GT or V8 Supercars, ZF's shock absorbers and clutches contribute to achieving the decisive head start. We congratulate the teams supported by us on their outstanding successes.

## **Formula 1**

In the royal league of motorsports, the racing cars of Scuderia Ferrari – the most successful team in Formula 1 history – and Red Bull, Sauber, Toro Rosso and Haas feature shock absorbers and clutches from ZF.

## **WEC/24 Hours of Le Mans**

The LMP1 cars from Audi, Porsche and ZF technology partner Toyota finished in the first eight places at the legendary sports car event, all crossing the finish line with a ZF clutch. In the last 17 years, cars equipped with ZF technology secured the overall win 16 times.

## **DTM**

In the past, ZF Race Engineering had already contributed to many individual DTM race victories and title victories as highly sought-after supplier. In the most popular, international touring car race series, the three premium manufacturers Audi, BMW and Mercedes-Benz rely on ZF's clutch systems. They are characterized by high-quality materials, great reliability and extensive durability. In 2016, Marco Wittmann, racing for ZF partner BMW Motorsport, clinched the DTM driver's title.



#### **24 Hours at Nürburgring**

Over 60 percent of cars competing in the „green hell“ regularly rely on ZF products. Twelve of the top 20 cars in the 2016 overall ranking were equipped with ZF technology.

#### **World Rally Championship (WRC)**

In the 2016 World Rally Championship, the Polo R WRC of ZF partner Volkswagen Motorsport secured both the driver's title and the manufacturers' championship for the fourth time in succession. The ZF clutches and shock absorbers specially developed for the WRC contributed to the Polo R WRC's success.

#### **FIA European Truck Racing Championship**

Jochen Hahn and his MAN team were able to take the driver's title four times in the last six years and always finished on the podium in the overall championship in the other years. The MAN truck of the Hahn Racing Team has a ZF-Ecosplit 3 transmission and a ZF clutch on board.



# THE TEAM IS THE STAR: ZF AS TECHNOLOGY PARTNER



ZF Race Engineering GmbH is the technology partner of many famous motorsports teams, from Formula 1 and DTM to different brand cups and the most important premium vehicle manufacturers. ZF maintains a particularly close cooperation with some teams in order to develop products for special applications. ZF has supported the teams of the international Formula Student competition for many years in order to promote talented new engineers

## **Venturi Grand Prix**

Since the 2016/2017 season, ZF has been the official technology partner of the Monaco-based Venturi Grand Prix Team in the fully electric FIA Formula E. The medium-term objective of the partnership is the development of an all-electric driveline for the 2018/2019 season.

## **BMW Motorsport**

Since 2002 already, ZF Race Engineering has been the technical partner of BMW Motorsport. In racing series such as DTM or endurance racing like the 24 Hour race at the Nürburgring, BMW relies on technology from Schweinfurt.

## **Porsche**

As the official partner of Porsche Motorsport, ZF supports in particular the young trainee drivers who will be the future factory drivers of Porsche Motorsport. In addition, all international cup vehicles use shock absorbers and clutches from ZF Race Engineering in Schweinfurt.

## **Toyota Motorsport**

Since the 2013 season, ZF has been the technical partner of TOYOTA Racing in the FIA World Endurance Championship (WEC), developing high-performance components for the 24 Hours of Le Mans.



#### **Super GT**

Since the 2013 season, ZF has been an official supplier of Super GT, the most popular touring car racing series in Asia. The cars of the GT500 class have exclusively been using clutches from Schweinfurt since the 2014 season.

#### **Volkswagen Motorsport**

Since 2003, ZF Race Engineering has been official motorsports partner of Volkswagen Motorsport. ZF develops shock absorbers and clutches for the Polo R WRC competing in the World Rally Championship.

#### **DTM**

The three premium brands Audi, BMW and Mercedes-Benz have been relying exclusively on ZF clutch systems for all DTM cars since the 2012 season.

#### **Honda Performance Development**

Since 2014, ZF has been the technical partner of Honda Performance Development (HPD), supporting their development of shock absorbers and clutches for American motorsports, e.g. the IRL, the World Challenge or GT racing.

#### **IMSA WeatherTech SportsCar Championship**

Since the 2014 season, ZF has been an official partner of the IMSA WeatherTech SportsCar Championship, equipping many of the competing GT cars and prototypes with ZF products.

# CLOSE TO THE SCENE: ON-SITE SERVICE



Excellent support – the claim of ZF Race Engineering. However, it is not limited to technological developments. Thanks to the extensive support system, ZF motorsports technicians are available around the globe for motorsports applications and small volume production development.

## **Comprehensive service at the race track**

ZF Race Engineering is using two service trucks with modern shock absorber test benches. A workshop area makes it possible to implement specific requirements. Here, shock absorbers can be re-calibrated, repairs can be performed immediately, clutches can be checked and examined, and they can even develop complete vehicle setups.

## **Quality assurance at every race**

During the race season, ZF Race Engineering supports customers at motorsports events in 24 countries on four continents. This extensive service significantly contributes to the many worldwide victories supported by ZF.





### **Warranty and guarantee**

If you have questions, complaints, warranty or guarantee issues, the service and consultancy team will gladly support you anytime.

# WHEN DREAMS COME TRUE: ZF ENABLES EXTRAORDINARY MOTORSPORTS EXPERIENCES



After the immense success of the "ZF Race Reporter" communication project, which was implemented at DTM events in Europe from 2012 until 2014, ZF has now launched an ambitious and exciting follow-up project: "ZF Dream Jobs".

ZF Dream Jobs focuses on the motorsports fans. At exciting racing events, such as DTM, the Nürburgring 24 Hour race, the WRC or the Truck Grand Prix at the Nürburgring circuit, racing fans get an exclusive chance to have a go at their dream jobs at the race track. Fans can apply for jobs as mechanic, race director, race caller, race engineer, junior driver, motorsport marshal, TV producer or team manager, among others. If they are picked, they spend a weekend at a race event, gaining an insight into the responsibilities of the exciting jobs at the race track and the time pressure that mostly comes with them.

For some years now, ZF has also been using international racing series as venues for their communication projects. For instance, international adaptations of the ZF Race Reporter have been implemented at Super GT events in Japan and the IMSA WeatherTech SportsCar Championship in the US. In 2016, ZF Dream Jobs will be launched in Japan for the first time; the project start in North America is scheduled for 2017.

Racing fans can watch the produced videos and coverage on the "ZF Motorsport" Facebook profile, at [www.zf.com/motorsports](http://www.zf.com/motorsports), or on the ZF YouTube channel.



[twitter.com/zf\\_konzern](https://twitter.com/zf_konzern)  
[facebook.com/zfmotorsport](https://facebook.com/zfmotorsport)  
[youtube.com/zffriedrichshafenag](https://youtube.com/zffriedrichshafenag)



For more information:  
[www.zf.com/motorsports](http://www.zf.com/motorsports)



# INNOVATIVE SERVICES AND PRODUCTS: CONEKT



Conekt, the engineering service provider at ZF Race Engineering, offers consultancy and technical test services and contributes new ideas as well as a scientific and technical approach to the development, production and validation of products.

Their specialist engineers' expertise combined with the in-house UKAS-accredited test equipment gives Conekt a unique position to provide full engineering services, from design, development, prototypes and evaluation tests to small-volume production and system integration.

## **Product portfolio**

As part of ZF Friedrichshafen AG, Conekt benefits from the availability of tried and tested mass-produced systems, such as the electric park brake or electronic stability control systems which can be used for applications in market niches and small-volume production.

## **Product development**

The product development know-how has helped leading companies in many different industries to launch tremendously successful products. Focusing on the entire product development cycle, Conekt efficiently combines core competencies in engineering with excellent project management skills and guaranteed confidentiality.

## **Product testing and evaluation**

State-of-the-art product evaluation equipment accredited to ISO 17025, for instance for environmental tests, EMC tests and instrumentation, support the development of new products as well as application engineering.

## **Product reliability and failure analysis**

In-depth technical knowledge of reliability and failure analyses enables Conekt to address a number of quality issues in product design and manufacturing. These analyses permit customers to further improve the operational performance and integrity of their electronic and electro-mechanical products.



## INDUSTRIES AND FIELDS OF APPLICATION

### **AUTOMOBIL**

The roots of many common driver assistance systems, such as the Lane Keeping Assist or rain sensors, go back to Conekt. Conekt has supported many renowned companies in the automotive industry in implementing their products – from concept development and testing procedures to small volume production and vehicle integration.

### **COMMERCIAL VEHICLES/OFF-HIGHWAY**

Conekt's expertise goes beyond the automotive industry, extending to the application of advanced driver assistance systems in trucks, mining vehicles or military logistic vehicles as well as the supply of steering products and sensors.

### **AEROSPACE**

Conekt offers a variety of accredited testing procedures and has supported leading aerospace companies in verifying the environmental integrity of their products and developing new product generations.

### **ENERGY**

Conekt implements testing and validation procedures for the most varied of products to verify conformity with industry standards. The broad range of engineering services can help companies looking to evaluate the impact of new technologies make sensible investment decisions in product development.

### **INTELLIGENT TRANSPORT SYSTEMS**

Having participated in numerous European and British government projects, Conekt has vast experience in the field of advanced technologies. Applying the system know-how to the fields of electronic embedding, sensor technology and data fusion, Conekt is able to support companies in the development of intelligent recording and control systems for vehicles and infrastructure.

# LEADING AUTOMOTIVE PRODUCTS: THE CONEKT PORTFOLIO

Conekt vehicle components are available both as unique products for prototype vehicle development and for volume production. On top of that, Conekt offers expert product application and test support to help customers effectively integrate components into new vehicles.



## BRAKE ACTUATION

### BENEFITS

- Tuneable performance
- Remote reservoir
- High efficiency
- Low hysteresis
- Reduced threshold force with and without vacuum

### TANDEM BRAKE BOOSTER

- Size 8" and 9"
- Stroke 36 mm
- Boost ratio 5.5

### DIMENSIONS

- Outer Diameter 246.5 mm
- Adjustable Rod Length 156 – 172 mm
- Shell Length 141.8 mm

### MASTER CYLINDER

- Bore 25.4 mm
- Stroke 36 mm (18/18)
- Port pitch 38 mm

### RESERVOIR

- Capacity to Maximum 395 cc
- Compensating Volume 52 cc
- Switching Volume 230 cc



## ELECTRIC PARK BRAKE

### ADVANTAGES

- Automatic apply and release functions available
- Removes need for cable, greatly simplifying installation
- Greater freedom for interior styling
- Leaves centre tunnel free for other features
- Self diagnostics
- Independent dynamic braking (maximum 0.3 g)

### OPTIONAL FEATURES

- Drive Away Assist – upon vehicle acceleration the park brake releases
- Hill Hold – prevents vehicle rollback on a hill until the driver accelerates

- Brake wear sensing – alerts the driver to worn pads
- Interface between the EPB switch and accelerator pedal – prevents false-apply
- Automatic parking brake function when driver's door is opened

### TECHNICAL SPECIFICATION

- Load Cycles 100,000
- Apply Time < 1 s
- Release Time < 0.6 s
- Voltage Range 9 to 16 V DC
- Maximum Clamp Force 20 kN
- Current Consumption: Sleep mode 100  $\mu$ A, Standby mode 195 mA, At maximum clamp force 2 x 19 A





## ELECTRONIC STABILITY CONTROL

### ADVANTAGES

- Help OEMs meet CO<sub>2</sub>, regulatory and NCAP compliance for active safety systems
- Applications from very small vehicles up to light truck segments
- Several additional versions available:
  - ESC high dynamic delivers faster apply speeds to help meet increasing Euro NCAP and automatic emergency braking (AEB) requirements.
  - The ESC premium system utilizes a six piston pump architecture and provides a higher level of performance through increased pressure apply build rates for emergency braking situations (automatic emergency braking) and driver assistant systems
  - ESC hybrid enables brake blending of up to 0.25 g deceleration within the EBC460 architecture. It uses a conventional actuation system with the ability to detect travel sensing
- in order to provide excellent cost, weight and package characteristics.
- Cost-optimized by modular system design and standardization
- Compact design, low weight and small package size with industry standard interface
- High integration capability with other vehicle safety systems
- New microprocessor generation with significantly extended RAM / ROM size and speed
- NVH reduction and increased motor lifetime by high frequency motor speed control



## ELECTRICALLY POWERED HYDRAULIC STEERING

### ADVANTAGES

- Multi-speed steering assist based on steering rate and vehicle speed
- Reduced steering effort at dry park and low speed
- Improved controllability at high speed
- Reduced vehicle fuel consumption (typically -0.2 litres / 100 km ECE-cycle)
- Reduced development time and cost
- Compact dimensions, easy to package and install
- Electric Motor Brushless PMAC rotor with inner rotor, sinusoidal commutation
- Pump Outer gear pump with constant displacement volume
- Pump Flow 12.0 l/min
- Maximum System Pressure 120 bar
- Speed Control Multi-speed, steering rate and vehicle speed (with sensors)
- Hydraulic Power 1000 W
- Maximum Current @ 13.5 V 115 A
- Stand-by Current < 2.5 A
- Operating Temperature Range -40°C to 105°C
- Weight (dry) 5 kg

### TECHNICAL SPECIFICATION FOR TYP 100-C \*

- Motor Pump Unit Integrated unit comprising an electric motor, a hydraulic pump, an electronic control unit (ECU), and reservoir

\* Other motor pump units are available depending on application requirements



## ELECTRICALLY POWERED STEERING

### TECHNICAL SPECIFICATION

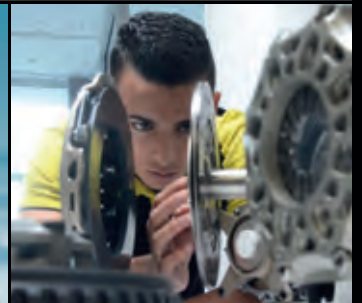
- Max torque rating: Scalable 40 – 100 Nm
- Travel range: +/- 1600 degrees
- ECU: ASIL D Compliant
- Signal interface: CAN (500kBits/s)
- Sensor data available: Column torque, position & velocity
- Power supply: 12 V DC
- Dimensions: Approx. 164 x 277 x 511 mm
- Weight: Approximately 9 kg

# FIT FOR THE FUTURE: ZF RACE ENGINEERING

Made up of ZF Race Engineering GmbH and Conekt, the business unit ZF Race Engineering bundles ZF's business in the fields of motorsports applications, small volume production applications, engineering, consultancy and testing, thus acting as a one-stop supplier of all ZF products for special requirements in the market









# RESEARCH AND DEVELOPMENT TO SECURE MOBILITY

Innovations are not an end in themselves, they must pay off: For manufacturers, fleet owners, and drivers, but also for the environment and society. Each new development must prove itself among the conflicting priorities of these criteria.

The ZF Group draws on an international network of more than 100 development centers. Approximately one fifth thereof are main development locations for certain products and technologies. These can be found at several locations in Germany and Europe as well as in the USA and China. Corporate Research and Development at the Corporate Headquarters in Friedrichshafen coordinates and supports the activities of the development centers. Every year, ZF invests approximately five percent of its sales in Research and Development. With success, because innovative products from ZF set the standards for state-of-the-art technology – again and again.

Development work at ZF is organized according to decentralized and corporate functions. The divisions and business units focus on markets and product expertise, ensuring customer-centered, competitive technological product development. Corporate R&D works with a strong emphasis on basic research and theory, and supports the operational development departments in the divisions.

## **Groundbreaking innovations**

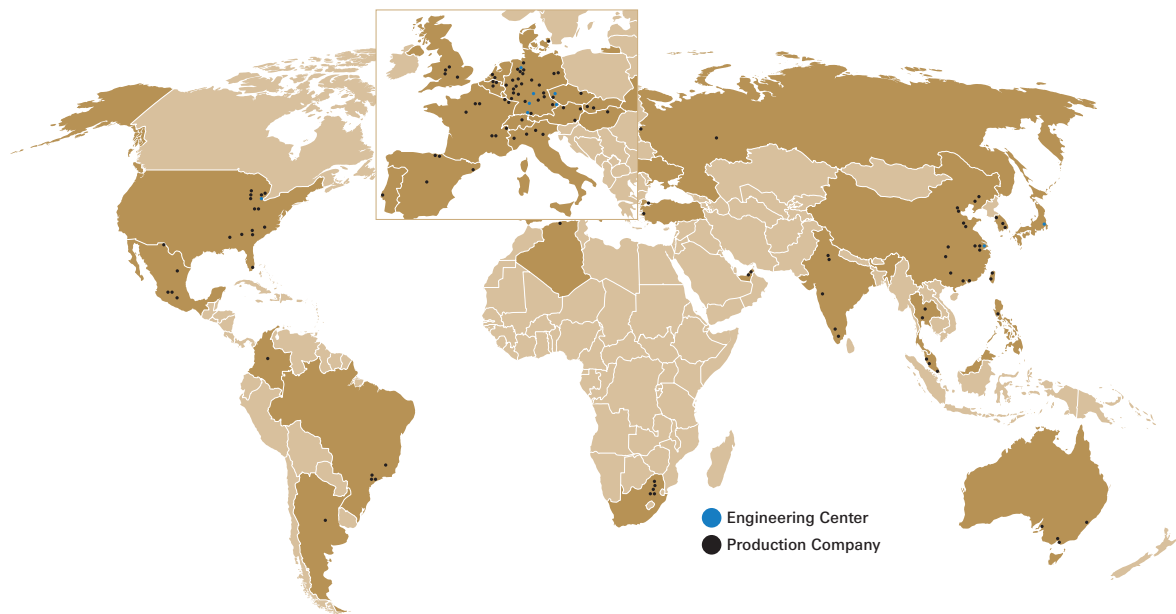
Over the past years, this partnership has produced product innovations that have since become benchmarks in the industry: Just some examples are the

9-speed automatic transmission for cars as well as hybrid transmissions and hybrid management for cars and commercial vehicles, or the modular TraXon transmission system for commercial vehicles. Ground-breaking innovations from ZF are in use today not just in passenger cars and commercial vehicles on the road, but also in all kinds of craft on the water and in the air.

What's more, the innovative power of ZF is set to increase in the future. Proof of this is already provided by the number of patents pending: A look at the statistics of the German Patent and Trademark Register shows that ZF is among the top ten applicants for patents – at eye level with many large automotive manufacturers. Each year, the research departments successfully complete more than 10 000 projects, covering the full range from basic research to product applications. This high project volume is necessary to ensure mobility in the future. The trend toward hybrid solutions already shows that green drive technology is very complex. The same goes for pure electric drives and lightweight design engineering. Currently, ZF engineers are conducting pioneering work on alternative materials, broader approaches in design and testing, and new production processes.



## DEVELOPMENT LOCATIONS WORLDWIDE



Learn more about  
Research & Development  
at ZF.

# THE ZF GROUP

## Shaping the future responsibly

Our enthusiasm for innovative products and processes and our uncompromising pursuit of quality have made us a global leader in driveline and chassis as well as active and passive safety technology. We are contributing towards a sustainable future by producing advanced technology solutions with the goal of improving mobility, increasing the efficiency of our products and systems, and conserving resources.

Our customers in the automotive and industrial sectors welcome our systematic orientation towards products and services which provide great customer value. Improvements in energy efficiency, cost-effectiveness, dynamics, safety, and comfort are key to our work. Simultaneously, we are aiming for continuous improvement in our business processes and the services we provide. As a globally active company, we react quickly and flexibly to changing regional market demands with the goal of always providing a competitive price/performance ratio.

Our independence and financial security form the basis of our long-term business success. Our profitability enables us to make the necessary investments in new products, technologies, and markets and we thus secure the future of our company on behalf of our customers, market affiliates, employees, and ZF owners.

Our tradition and values strengthen our managerial decisions. Together, they are both an obligation and an incentive to maintain a reliable and respectful relationship with customers, market affiliates, and employees. Our worldwide compliance organization ensures that locally applicable laws and regulations are adhered to. We accept our responsibility towards society and will protect the environment at all of our locations.

Our employees worldwide recognize us as a fair employer, focusing on the future and offering attractive career prospects. We value the varied cultural backgrounds of our employees, their competencies, and their diligence and motivation. Their goal-oriented dedication to ZF, beyond the borders of their own field of work and location, shapes our company culture and is the key to our success.





Get a new or better  
view of ZF – a  
technology-based  
company.

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