

Fact Sheet XXL

SCHAEFFLER

DTM Budapest

June 2/3, 2018

Races 5 & 6

#DTMBudapest

With two points-finishes packed in his bags Schaeffler ambassador Mike Rockenfeller is traveling to the DTM's round in Hungary



i

Touring car elite +++ Budapest +++ All races +++ Team +++ Driver
+++ Car +++ Partner Audi +++ This is the DTM +++ Interview with
executive board members +++ History: Schaeffler in the DTM +++
Schaeffler and the IC engine +++ Strategy: mobility for tomorrow +++
Facts and figures +++ Race track +++ Schedule +++ Contacts

Editorial

Following the brilliant DTM season opener at Hockenheim with a second-place finish, Mike Rockenfeller most recently experienced a difficult weekend at the Lausitzring. As the best Audi driver in race one, our brand ambassador just barely missed scoring points. In race two, he took eighth position in his green-white Schaeffler

Audi RS 5 DTM. At Schaeffler, we obviously hope for Rocky to be back in contention at the very front of the field in the next event in Hungary. In his five previous races at the Hungaroring, he finished fourth twice, missing the podium by just a very narrow margin. I can only warmly recommend that you visit a DTM event. We have summarized information, facts and figures for you in this brochure.



Jörg Walz
Vice President Communications &
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The touring car elite

Some of the world's most notable drivers fight gripping duels in high-tech race cars with more than 500 horsepower on race tracks throughout Europe

The internationally most popular touring car series has been captivating fans since 1984 with a mix of attractive motorsport and a program featuring a variety of entertainment. Three German premium manufacturers pitted against each other in high-caliber racing, an enhanced event calendar, two races per weekend, six different countries hosting the DTM – the overall conditions for the 2018 season could not be better.

Even in the DTM's early years, Schaeffler supported drivers and teams with its motorsport and technical know-how, emphasizing its passion for technology. Since 2011, the company has been giving its name to the Schaeffler Audi and has celebrated major successes including two title wins. This season, Schaeffler, Audi, Phoenix Racing, the Schaeffler Audi RS 5 DTM and driver Mike Rockenfeller are again forming a unit that promises to deliver success.



#DTMBudapest

Budapest–Herzogenaurach

767 km

One of the most impressive places on Earth due to its exceptional architecture, but with a firm focus on the future – that's Budapest

Country and people

In all the rankings of Europe's most beautiful cities, Budapest appears in the top ten. Not surprisingly, because due to its location on the Danube River, its old town and the Castle District, Hungary's capital offers breathtaking sites galore. Founded in 1873 by the incorporation of the previously independent towns of Buda, Óbuda and Pest, Budapest – now home to over 1.7 million people – is the tenth most populous city in the European Union.

E-mobility is gaining ground

Budapest, above all, is known for its historical grown wealth of culture. The city, however, embraces modern life as well. In the course of the implementation of the "Budapest 2030 Long-Term Urban Development Concept," a strategy paper for the long-term improvement of Budapest's urban conditions, a new car sharing concept with 300 vehicles, a third of which are currently electric, was launched. The fleet is planned to be expanded by 100 electric cars per year and by 2021 to consist exclusively of them.

Race track

The Hungaroring is located about a half hour's drive north-east of Budapest. Since it was opened in 1986, the circuit has been the annual host of a Formula 1 Grand Prix race. The record holder is Lewis Hamilton with five victories. The DTM raced on the Hungaroring for the first time in 1988. Venezuelan Johnny Cecotto won both races. Following a long break, the track did not celebrate its DTM comeback until 2014. The Hungaroring is a challenging circuit with fast turns and many directional changes. Due to the tarmac still being new, the race cars have good grip.

1,752,000

inhabitants

525 km² of area

Majestic The buildings of the Hungarian parliament are located directly next to the Danube



Budapest
in June

24 °C
Daytime temperature

12 °C
Nighttime temperature

8
Hours of sunshine/day

10
Days of rain/month

More *racing action*

20 races in six European countries – the 2018 DTM calendar is more extensive than it has ever been since the 1996 season

1 & 2

Rocky in contention at the front

May 5/6, 2018

With his second place clinched in race two Mike Rockenfeller was the best Audi driver in the season opener at Hockenheim. In the drivers' standings he is in third position tied on points with another contender.

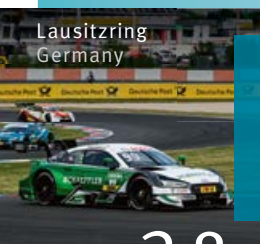


Hockenheim
Germany

Damage limitation

May 19/20, 2018

On a weekend that was difficult for Audi across the board, Schaeffler driver Mike Rockenfeller still managed to stand out. In race two, Rocky took eighth position.



Lausitzring
Germany

3 & 4

Zandvoort
The Netherlands

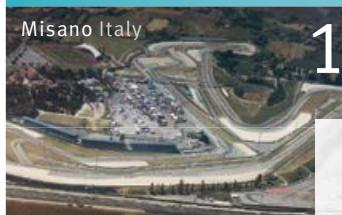


9 & 10

Rocky's turf

July 14/15, 2018

On Circuit Zandvoort located directly on the North Sea coast, Schaeffler driver Mike Rockenfeller has previously celebrated two victories.



Misano Italy

13 & 14

Double premiere

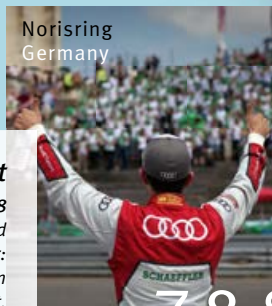
August 25/26, 2018

Misano World Circuit, usually a venue for motorcycle racing, is celebrating a premiere in the DTM. In addition, the track will host the series' first night races (each starting at 10.20 PM).

Highlight

June 23/24, 2018

City circuit feeling at the Norisring – and painful memories for Mike Rockenfeller: Last year, he broke his midfoot in an accident that was not his fault.



Norisring
Germany

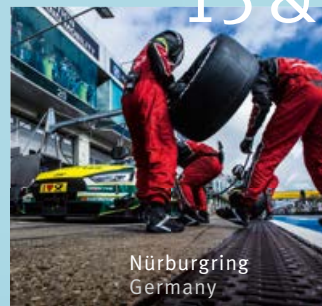
7 & 8

15 & 16

Long runner

September 8/9, 2018

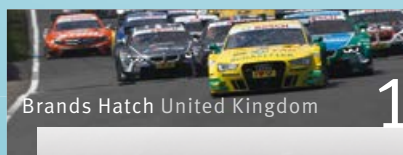
The Nürburgring is the only track to have continuously appeared on the calendar ever since the DTM's 1984 inaugural season. The races are held on the short version of the Grand Prix circuit.



Nürburgring
Germany

11 & 12

Brands Hatch United Kingdom



Comeback

August 11/12, 2018

Following a four-year break, the DTM is returning to the motherland of motorsport. The races will not be held on the short version as before, but on the full Grand Prix circuit.



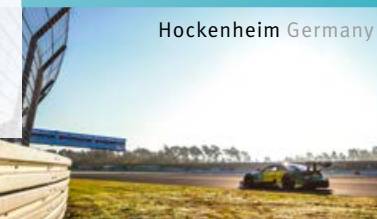
Spielberg Austria

19 & 20

Showdown

October 13/14, 2018

The grand finale not to be missed: In nine of the past 15 seasons, the DTM title was only awarded on the last race weekend.



Hockenheim Germany

Nostalgia

June 2/3, 2018

The DTM debuted at the Hungaroring as far back as in 1988, in the days of the Iron Curtain. In 2018, the circuit near Budapest is represented on the calendar for the fifth time.



Budapest Hungary

5 & 6

Drivers' standings

Pos.	Driver	Manufacturer	Points
1	Timo Glock (D)	BMW	72
2	Gary Paffett (GB)	Mercedes-Benz	71
3	Pascal Wehrlein (D)	Mercedes-Benz	39
4	Edoardo Mortara (CH)	Mercedes-Benz	37
5	Lucas Auer (A)	Mercedes-Benz	33
6	Paul di Resta (GB)	Mercedes-Benz	28
7	Marco Wittmann (D)	BMW	26
8	Philipp Eng (A)	BMW	26
9	Bruno Spengler (CDN)	BMW	23
10	Mike Rockenfeller (D)	Audi	22

Teams' standings

Pos.	Team	Points
1	Mercedes-AMG Motorsport PETRONAS	110
2	BMW Team RMR	98
3	SILBERPFEIL Energy Mercedes-AMG Motorsport	70
5	Audi Sport Team Phoenix	33

Manufacturers' standings

Pos.	Manufacturer	Points
1	Mercedes-Benz	212
2	BMW	164
3	Audi	52

Congenial *quintet*

Premium partner **Schaeffler**, manufacturer **Audi**, fielding team **Phoenix Racing**, driver **Mike Rockenfeller** and the **Schaeffler Audi RS 5 DTM** race car – these players are jointly battling for points and trophies in the 2018 DTM

Titles and victories

Schaeffler has celebrated triumphs in series such as:
DTM, Formula E,
WEC, 24 H Le Mans,
24 H Nürburgring,
Dakar Rally and
endurance rallies

SCHAEFFLER

Innovative technology group +++ Motorsport as a platform for technology between road and race track +++ Has been supporting DTM teams and drivers since the 1980s +++ Has been naming sponsor of the Schaeffler Audi since 2011 +++ Responsible for the powertrain technology of the championship-winning team in Formula E



PHOENIX
RACING

Formed in 1999 +++ Home base in Meuspath located directly at the Nürburgring +++ Active in DTM since 2000, as official Audi factory team since 2006 +++ Phoenix provided the DTM Champion in 2011 and 2013 +++ GT racing is second pillar – major successes: four victories in 24 Hours of Nürburgring



Active in motorsport with factory commitment since the 1980s +++ Initially active in DTM in the 1990s +++ Factory-backed comeback in 2004 season +++ Also involved in Formula E, rallycross, GT and TCR racing +++ Long-standing partnership with Schaeffler in production car sector +++ Left: examples of Schaeffler technologies at Audi



Auto Union DKW F89 1950
Cage-Guided INA Needle Bearing



Audi A4 from 1995
Overrunning Alternator Pulley



Audi A5 Sportback from 2007
Thermal Management Module



Audi SQ7 from 2016
Electromechanical Roll Stabilizer

Formula E

1 x drivers' champion

WEC

2 x drivers' world champion

2 x manufacturers' world champion

13 x 24 H Le Mans winner

DTM/Super Touring Cars

10 x drivers' champion (DTM)

4 x manufacturers' champion (DTM)

12 x drivers' champion (STW)

8 x manufacturers' champion (STW)

Rally

2 x drivers' world champion

2 x manufacturers' world champion

Mike Rockenfeller

Date of birth October 31, 1983

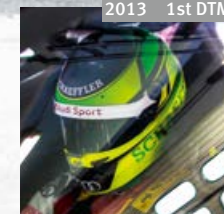
Place of birth Neuwied (D)

Residence Landschlacht (CH)

Height 1,75 m

Weight 68 kg

2004 1st Porsche Carrera Cup
2006 1st 24 H Nürburgring
2008 1st Le Mans Series
2010 1st 24 H Le Mans
2013 1st DTM



Chassis

CFRP monocoque with integrated fuel cell

Engine

Gasoline V8 aspirated,
4 valves per cylinder

Drivetrain

4-plate CFRP clutch,
Semi-automatic 6-speed transmission

Suspension

Independent front and rear, double wishbones, pushrod system

Schaeffler Audi RS 5 DTM

1,115 kg
Weight including driver

5,010 mm Length

1,950 mm Width

1,150 mm Height

> 500 hp
Power output

275 km/h
Top speed

This is the DTM

The DTM has been thrilling its fans for more than three decades, thanks to the organizers and the governing body who keep working on making the popular touring car series even more attractive and exciting with ever new ideas.
A summary of sporting and technical aspects that define the DTM

Aerodynamics

2017



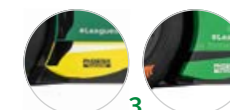
2018



One flick less at front wheel well



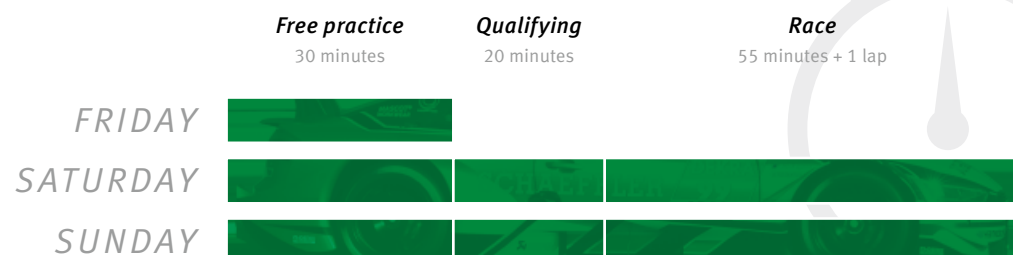
Side channel and floor plate modified



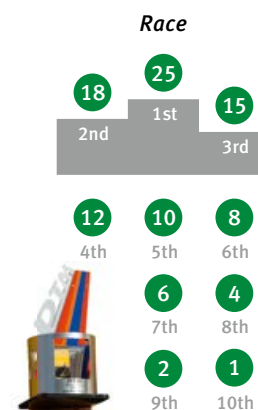
Flick at rear wheel well omitted

→ 25 percent less downforce resulting in greater spectacle for fans

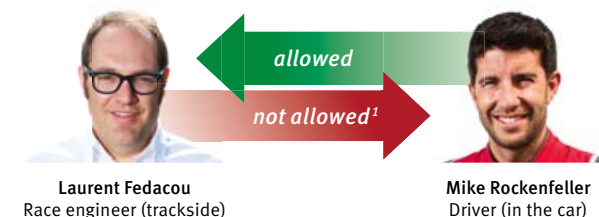
Race format



Points



Radio



¹ exception: safety-relevant reports, in the pit lane and during caution periods

Pit stop



1 pit stop per race

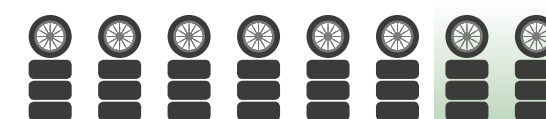
Driver decides when to pit

mechanics (max.),
1 impact wrench per side

4 tires are changed

Tires

8 sets of new slicks for entire weekend
(+ 6 sets of wets)



Tire warmers
banned for slicks

2 sets returned after free practice on Saturday
→ intended to prevent teams from saving tires



Prof. Peter Gutzmer (right), Deputy Chief Executive Officer and Chief Technology Officer of Schaeffler AG, and Matthias Zink, CEO Automotive of Schaeffler AG, in an interview

3 questions for ...

... Prof. Peter Gutzmer and Matthias Zink

As far back as in the 1980s, DTM cars were racing with stickers of Schaeffler's LuK brand and since 2011, an Audi fully wrapped in Schaeffler's colors has been attracting attention. What's the objective that drives this commitment?

Peter Gutzmer: "Schaeffler has always been an innovation driver. About three decades ago, we extended our commitment from the factories to the race tracks in a manner of speaking in order to present our brands in the competitive environment of motorsport. Many cars not only in the DTM but also in other motorsport disciplines such as rally racing were emblazoned with logos of Schaeffler's LuK, FAG and INA. Today, we're communicating our brand values in motorsport under the 'One Schaeffler' theme. In addition, motorsport not only reflects the competitiveness of our products, but also strengthens the skills of our young engineers who increasingly often join us with experience from the Formula Student engineering design competition."

Talking about technology transfer: The technologies in race cars and production automobiles are frequently not so far apart from each other. How do these two fields benefit from each other?

Matthias Zink: "The complexity and speed in motorsport commitments sharpen the focus on what's essential and require our engineers to deliver feasible solutions at a fixed point in time. In addition, motorsport promotes team spirit. All this is beneficial for Schaeffler's daily work as a globally active automotive and industrial supplier as well."

As an official technology partner of Team Audi Sport ABT Schaeffler you are active in the Formula E electric racing series as well. This is a totally different field particularly in terms of the type of powertrain. IC engines and electric mobility – how do these two fit together in a portfolio in your case?

Peter Gutzmer: "Electric mobility is our future but, this said, electric mobility is the future of the IC engine as well. As many studies have shown, we're not going to achieve the envisioned targets by 2050 with purely battery-based electrification. Looking at it from the perspective of total systems, this will only be possible if we create CO₂-neutral energy carriers using renewable energy sources which can ideally be achieved in an IC engine system. The future of our personal mobility will be defined by a sound mix of hybrids, efficient IC engines and electric powertrains."

Champion makers

From small stickers to full vehicle branding – Schaeffler has been progressively extending its DTM commitment over the past 30 years. Success in racing has proved the company right



The beginnings

The logo of Schaeffler's LuK product brand is featured on Kurt Thiim's racing suit and car, among others. In the first event, at Zolder in 1986, the Danish rookie races from second on the grid to victory. At the end of the season, Thiim even wins the title. In the following DTM years, the LuK, INA and FAG logos can be seen on many other cars of the Alpina, Audi, BMW, Ford, Mercedes-Benz and Opel marques and on the racing suits of their drivers.



2011

Triumph in Schaeffler's colors

For the 2011 season, Schaeffler concentrates its commitments and becomes the naming sponsor of a full race car of Audi Sport Team Phoenix. The Schaeffler Audi A4 DTM sporting conspicuous colors and dubbed "Caipirinha express" in the hands of campaigner Martin Tomczyk turns out to be a guarantee for points. In all ten races of the season, the Bavarian driver claims a place in the top five, celebrating three victories in the process. At the end of the season, he scores the title win. The whole Schaeffler Group is the champion in its DTM debut year.

2013

Repeating the feat

In the 2013 season, the Schaeffler campaigner's name is Mike Rockenfeller. In just his second race, at Brands Hatch, he celebrates his first victory that season and takes the lead of the standings. Victory number two, at Moscow, produces an early decision in Rocky's favor in the title race with BMW driver Bruno Spengler. After the penultimate event at Zandvoort, Rockenfeller can no longer be bumped from the top spot in the overall standings.





Efficiently into the future

In the medium term, 70 percent of all newly registered vehicles – hybrid models included – will have an IC engine on board, according to a forecast by a Schaeffler scenario for 2030. In the light of future climate and emission targets, it is all the more important to make established powertrain technology fit for the future

For the globally active automotive and industrial supplier, it is clear that an either-or philosophy will not be sufficient on the road toward mobility for tomorrow. “Important keys to success lie in the ability to think systematically and in ambidexterity, the gift of acting with ‘both hands.’ This means continuing to develop the things that haven proven viable while breaking new ground at the same time,” explains Prof. Peter Gutzmer, Schaeffler’s Chief Technology Officer.

The further development of things that have proven viable include, for example, rolling bearings for engines and transmissions with particularly low friction, as well as mechanically and electronically optimized control systems such as the UniAir fully variable electrohydraulic valve control and electromechanical camshaft

adjusters or VCR systems enabling variable compression ratios. Another highly attractive and effective technology: Schaeffler is testing three-cylinder engines with so-called rolling cylinder deactivation where a different combustion chamber is shut off after every four cycles. This is where Schaeffler’s patented dual-mass flywheels with pendulum-type absorbers for vibration absorption are utilized as well – an invention that for many years has been responsible for perfectly smooth running of ICE powertrains in a wide variety of configurations. In addition, it enables driving in particularly low engine speed ranges and thus yields additional savings potential.

45 percent efficiency realistic

In spite of continuous improvements, it is also clear that without additional electrification of the

powertrain the IC engine will not be able to comply with future emission limits. Schaeffler has developed a large number of production solutions in this context, ranging from the thermal management module derived from the internal combustion engine to electric clutch systems to 48-V and hybrid technologies.

In 2030, Schaeffler expects that annual production just of so-called P0 hybrid drives, in which the electric motor is connected with the crankshaft of the IC engine via a belt, will amount to some 20 million units. These belt-driven starter-generators make it possible to recuperate braking energy to be stored in small, cost-effective lithium-ion batteries. The recovered energy can be used to restart the engine in start-stop or in coasting modes and to boost acceleration. To enable the dynamic alternation between various operating modes, Schaeffler, among other things, developed an electrically operated active belt tensioner. With these technologies Schaeffler expects that an efficiency increase of gasoline engines to 45 percent is realistic. That would raise it to the level of modern diesel units.

An important aspect of looking at efficiency is that Schaeffler goes beyond the consumption of the powertrain, instead considering the entire energy chain of mobility, from well (source) to wheel. In terms of emissions, the IC engine no longer compares so poorly with its electric competition if the analysis is based on the current electricity mix in which fossil fuels throughout the EU account for 44 percent. But even a complete switch to electricity produced from renewable sources would not necessarily mean the end of the IC engine. The combustion of synthetic fuels produced with green electricity is low in emissions and CO₂-neutral. Synthetic fuels achieve a vehicle range comparable to that of fossil fuels and can be easily sold via existing filling station networks.

“Crucial for success is a holistic view of the powertrain and the interaction of the electric motor, the internal combustion engine and the related infrastructure,” explains Matthias Zink. “With its expertise in electric mobility as well as in engine and transmission systems and chassis Schaeffler is superbly positioned.”

More efficiency – innovative technologies from Schaeffler



With the **rolling cylinder deactivation** of a three-cylinder engine a different cylinder is shut off every four cycles



Electromechanical camshaft adjusters offer higher adjustment speeds than hydraulic systems



Electromechanical belt tensioners enable dynamic variation of the engine’s operating modes



The **UniAir** fully variable valve train system delivers the optimum amount of air to the combustion chamber for every operating point

Mobility for tomorrow

For Schaeffler, innovation has been part of its corporate DNA ever since the company was founded. Lateral and interdisciplinary thinking is part of the program

“Progressive climate change, increasing urbanization and globalization, as well as digitalization will have a substantial impact on our lives and work. This particularly applies to the field of mobility”

Klaus Rosenfeld,
Chief Executive Officer Schaeffler

Schaeffler is known as an innovation leader delivering a wealth of technologies that make automobiles more fuel-efficient, environmentally friendly and safer. Additionally, the company offers products for trains, aircraft, wind turbines and many other industrial sectors. Schaeffler can be found wherever things are in motion. And motion means mobility as well. The challenges facing mobility of the future are immense. That's why Schaeffler is committed to its holistic “Mobility for tomorrow” strategy concept geared to finding sustainable solutions for the world of tomorrow.



Energy chain



Eco-friendly powertrain technologies

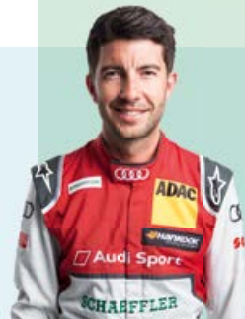


Urban mobility



Interurban mobility

Compact info



Mike Rockenfeller

🌐 mike-rockenfeller.de
📘 mikerockenfeller
🐦 @m_rockenfeller
📧 mike_rockenfeller



Schaeffler Audi RS 5 DTM

Chassis
CFRP monocoque with integrated fuel cell, CFRP crash elements at the sides, front and rear

Engine
Gasoline V8 aspirated engine, 4 valves per cylinder, 4,000 cc, more than 500 horsepower

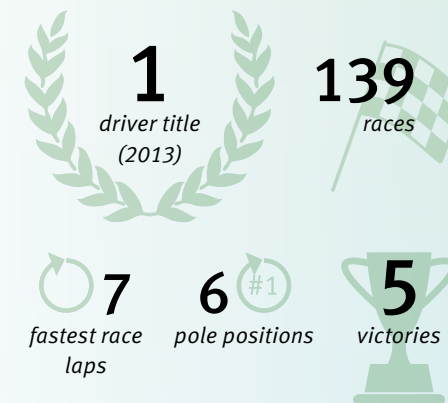
Driveline
Rear-wheel drive, 4-plate CFRP clutch, Semi-automatic 6-speed transmission with paddle shifters, adjustable plate-type limited-slip differential

Suspension
Independent front and rear, Double wishbones, Pushrod system with spring/damper unit

Basic weight
1,115 kg (including the driver)

Dimensions
Length 5,010 mm, width 1,950 mm, height 1,150 mm

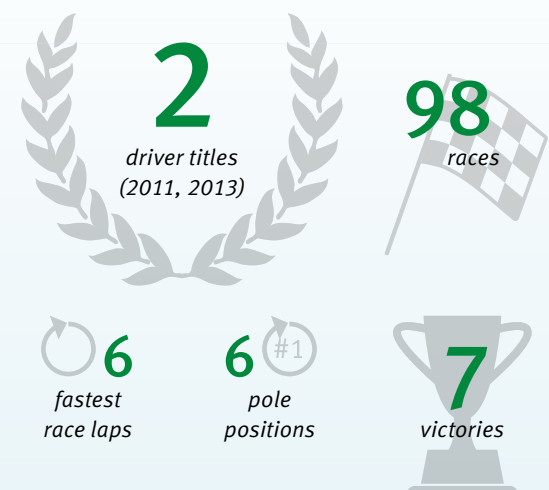
Rockenfeller in the DTM



Schaeffler facts

> 90,000 employees worldwide
14 bn euros of sales in 2017
2,400 patent applications filed in 2017
26,000 active patents and patent applications
170 locations in 50 countries
75 plants worldwide
60 Schaeffler components in automobiles worldwide (average)
18 research and development centers worldwide

Schaeffler in the DTM (2011–2018)



The *race track*

Hungaroring

SCHAEFFLER



185 km/h
Fastest turn

75 km/h
Slowest turn

240 km/h
Top speed
(250 km/h with DRS)

4,381 m

Track length

- 1 Start/Finish
- 2 Pit lane
- 3 Media Center
- 4 Audi Hospitality

Schedule (local time)

FRIDAY, JUNE 1

12:40 – 14:05	FIA Formula 3 European Championship	Free practice 1 & 2
14:20 – 14:50	Audi Sport Seyffarth R8 LMS Cup	Free practice 1
16:05 – 16:35	DTM	Free practice 1
16:55 – 17:25	Audi Sport Seyffarth R8 LMS Cup	Free practice 2
17:40 – 18:00	FIA Formula 3 European Championship	Qualifying 1

SATURDAY, JUNE 2

08:35 – 09:05	DTM	Free practice 2
09:25 – 09:55	Audi Sport Seyffarth R8 LMS Cup	Qualifying 1
10:25 – 11:00	FIA Formula 3 European Championship	Race 1
11:20 – 11:40	DTM	Qualifying 1
13:33 – 14:28	DTM	Race 1
15:25 – 15:55	Audi Sport Seyffarth R8 LMS Cup	Race 1
16:15 – 16:35	FIA Formula 3 European Championship	Qualifying 2

SUNDAY, JUNE 3

08:30 – 09:00	DTM	Free practice 3
09:25 – 09:55	Audi Sport Seyffarth R8 LMS Cup	Qualifying 2
10:25 – 11:00	FIA Formula 3 European Championship	Race 2
11:20 – 11:40	DTM	Qualifying 2
13:33 – 14:28	DTM	Race 2
15:10 – 15:40	Audi Sport Seyffarth R8 LMS Cup	Race 2
16:10 – 16:45	FIA Formula 3 European Championship	Race 3



Schaeffler

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Audi Sport

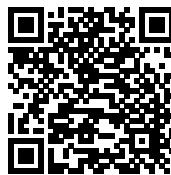
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Phoenix Racing

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Learn more about
mobility for tomorrow