Fact Sheet XXL

SCHAEFFLER

DTM Nürburgring

September 8/9, 2018

Races 15 & 16

Touring car elite +++ Nürburgring +++ 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

With the first two night races in the series' history the DTM at Misano impressively showed that it is able to thrill fans with innovative ideas even after more than 30 years. *Our Schaeffler driver, Mike Rockenfeller, after having scored four top-ten results in succession following a slight low, returned to good form halfway through the season. Races number 15 and 16 of the season will be held at a classic DTM venue: the Nürburgring. Rocky has previously clinched two podiums on the tradition-steeped circuit in the Eifel. We at Schaeffler keep our fingers crossed for him. I can only warmly recommend that you visit a DTM event. We have summarized information, facts and figures for you in this brochure.*

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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.

#DTMNuerburgring

Nürburg–Herzogenaurach

294 km

The Nürburgring is world-famous, but hardly anyone knows anything about Nürburg, the small town in the Eifel that has given its name to the circuit

Country and people

Nürburg is a community and officially recognized climatic health resort in the county of Ahrweiler. Besides Breidscheid, a district of the town of Adenau, Herschbroich and Quiddelbach, Nürburg is one of four villages located within the Nordschleife section of the Nürburgring. Towering above it is the Nürburg, a ruined hilltop castle with a more than 800-year history. Many service providers and testing departments from the automotive sector reside in this area.

179 *inhabitants*

3.63 km² *of area*

Familiar ground

For Schaeffler driver Mike Rockenfeller's team, Phoenix Racing, the event at the Nürburgring is a home round. The Audi squad's base in Meuspath is located just a few kilometers away from the race track. "I'm already looking forward to racing in front of my home fans," says Rocky. "There are two long straights on the Nürburgring where, thanks to DRS, you have good overtaking opportunities." The DTM events are held on the 3.6-kilometer short configuration of the Grand Prix circuit that was inaugurated in 1984. In both 2011 and 2014, Rockenfeller clinched a podium there.

The "Green Hell"

Nearly 21 kilometers long, 73 turns, uphill gradients of up to 18 percent, inaugurated back in 1927 – these are the impressive facts of the most well-known Nürburgring track configuration: The Nordschleife is also called the most challenging and awe-inspiring race track in the world for good reason. Or, as three-time Formula One World Champion Jackie Stewart dubbed it: the "Green Hell." Up until 1993, the DTM raced on the Nordschleife as well. Today, for safety reasons, it is no longer approved for all racing series.

Historic The Nürburg was first mentioned in a document in 1166

Nürburg in September

18 °C *Daytime temperature*

9 °C *Nighttime temperature*

5 *Hours of sunshine/day*

15 *Days of rain/month*

Mehr Rennaction

20 Rennen in sechs europäischen Ländern – der Kalender der DTM 2018 ist so umfangreich wie seit der Saison 1996 nicht mehr

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.

1 & 2

Rocky mischt vorn mit

5./6. Mai 2018

Mit seinem zweiten Rang im zweiten Rennen war Mike Rockenfeller bester Audi-Pilot beim Saisonauftakt in Hockenheim. In der Fahrerwertung belegt er den geteilten dritten Rang.

Schadensbegrenzung

19./20. Mai 2018

An einem für Audi insgesamt schwierigen Wochenende stach Schaeffler-Pilot Mike Rockenfeller noch heraus. Im zweiten Rennen belegte Rocky Platz acht.

3 & 4

7 & 8

Keine Punkte

23./24. Juni 2018

Zum ersten Mal in dieser Saison geht Rockenfeller an einem Wochenende komplett leer aus. Highlight: seine Bestzeit im zweiten Freien Training.

Speerspitze

2./3. Juni 2018

Mit einem vierten Rang im vom Wetter geprägten zweiten Rennen auf dem Hungaroring behauptete Rocky seine Audi-interne Topposition.

5 & 6

13 & 14

In good form

August 25/26, 2018

Mike Rockenfeller finishes both of the first night races in DTM history in the points. His performances in the qualifying sessions are impressive as well.

9 & 10

Pech für Rockenfeller

14./15. Juli 2018

Im zweiten Rennen erleidet das Auto von Mike Rockenfeller auf Rang fünf liegend einen Reifenschaden. Mit der schnellsten Rennrunde aller Fahrer zeigt Rocky jedoch sein Potenzial.

17 & 18

Natural spectacle

September 22/23, 2018

Formerly having hosted races under the name of Österreichring and subsequently A1-Ring, the Red Bull Ring has been part of the DTM program since 2011. It is famous for its idyllic surroundings.

11 & 12

Zählbarer Erfolg

11./12. August 2018

Nach zwei Veranstaltungen ohne Punkte fährt Mike Rockenfeller in England zweimal in die Top Ten. In beiden Rennen addiert macht er vom Start aus elf Plätze gut.

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.

Drivers' standings

Pos.	Driver	Manufacturer	Points
1	Paul Di Resta (GB)	Mercedes-Benz	186
2	Gary Paffett (GB)	Mercedes-Benz	177
3	Edoardo Mortara (CH)	Mercedes-Benz	138
4	Marco Wittmann (D)	BMW	112
5	Lucas Auer (A)	Mercedes-Benz	110
6	Timo Glock (D)	BMW	107
7	René Rast (D)	Audi	93
8	Pascal Wehrlein (D)	Mercedes-Benz	92
9	Philipp Eng (A)	BMW	87
10	Daniel Juncadella (E)	Mercedes-Benz	58
13	**Mike Rockenfeller (D)**	**Audi**	**48**

Teams' standings

Pos.	Team	Points
1	Mercedes-AMG Motorsport PETRONAS	269
2	SILBERPFEIL Energy Mercedes-AMG Motorsport	248
3	Mercedes-AMG Motorsport REMUS	244
9	**Audi Sport Team Phoenix**	**88**

Manufacturers' standings

Pos.	Manufacturer	Points
1	Mercedes-Benz	761
2	BMW	442
3	**Audi**	**295**

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

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

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

DTM
2 x driver champions
1 x team champion
GT victories
4 x 24 H Nürburgring
2 x 24 H Spa
1 x 12 H Bathurst

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

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

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

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

#99

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

Mike Rockenfeller

Date of birth *October 31, 1983*
Place of birth *Neuwied (D)*
Residence *Landschlacht (CH)*
Height *1,75 m*
Weight *68 kg*

Schaeffler Audi RS 5 DTM

5,010 mm ***Length***
1,950 mm ***Width***
1,150 mm ***Height***
1,115 kg ***Weight*** *including driver*
›500 hp ***Power output***
275 km/h ***Top speed***

Chassis
CFRP monocoque with integrated fuel cell

Engine
Gasoline V8 aspirated, 4 valves per cylinder

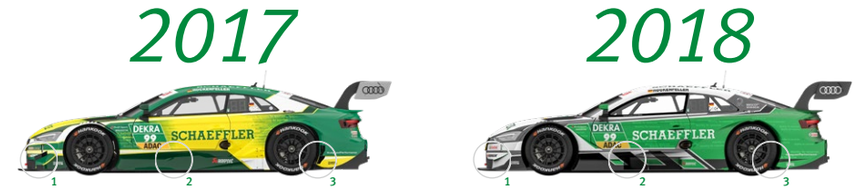
Drivetrain
4-plate CFRP clutch, Semi-automatic 6-speed transmission

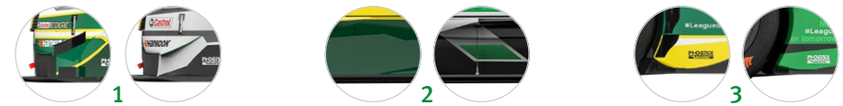
Suspension
Independent front and rear, double wishbones, pushrod system

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





1 One flick less at front wheel well

2 Side channel and floor plate modified

3 Flick at rear wheel well omitted

*25 percent less downforce resulting in **greater spectacle for fans***

Race format

	Free practice 30 minutes	*Qualifying* 20 minutes	*Race* 55 minutes + 1 lap
FRIDAY	■		
SATURDAY	■	■	■
SUNDAY	■	■	■

Points

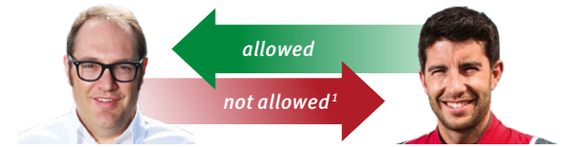
Qualifying

1st 3 · 2nd 2 · 3rd 1

Race

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
25	18	15	12	10	8	6	4	2	1

Radio



Laurent Fedacou
Race engineer (trackside)

Mike Rockenfeller
Driver (in the car)

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

Pit stop

1 *pit stop per race*

9 ***mechanics (max.),*** *1 impact wrench per side*

4 ***tires*** *are changed*

Driver ***decides*** *when to pit*

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

Interview

3 questions for ...

... Prof. Peter Gutzmer and Matthias Zink

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

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 CO_2-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

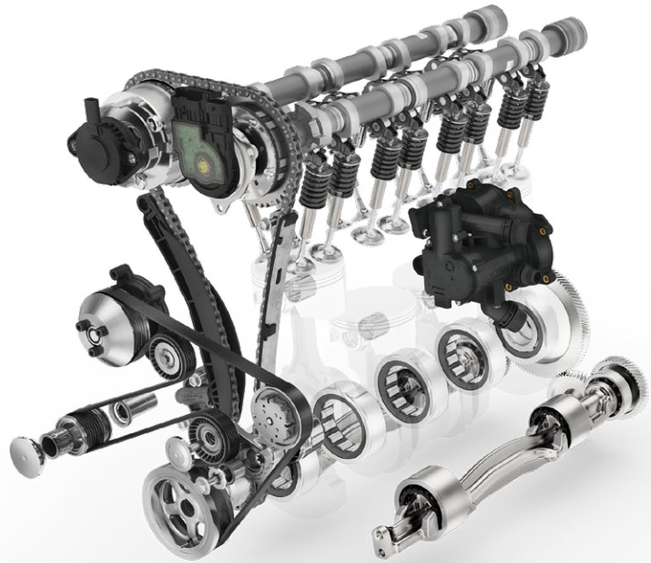
Triumph in Schaeffler's colors

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

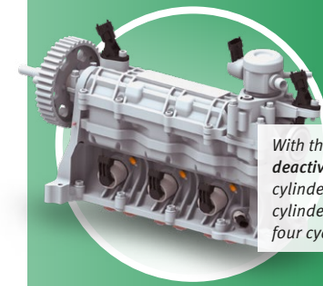
In spite of continuous improvements, it is also clear that without additional electrification of the powertrain the IC engine will not be able to comply with future emission limits. Schaeffler has developed a large number of production solutions in this context, ranging from the thermal management module 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 CO_2-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*

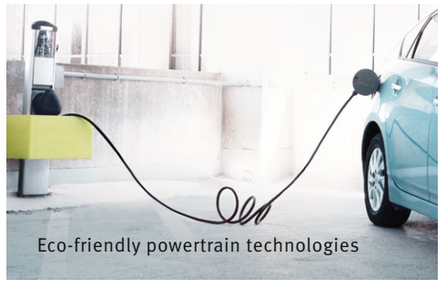
For Schaeffler, innovation has been part of its corporate DNA ever since the company was founded. Lateral and interdisciplinary thinking is part of the program

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.

"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


Energy chain


Eco-friendly powertrain technologies


Urban mobility


Interurban mobility

Compact *info*

Mike Rockenfeller

#99

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- @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

1 *driver title (2013)*

149 *races*

8 *fastest race laps*

6 *pole positions*

5 *victories*

285 *km/h top speed*

3rd *generation 1st 2013, 2nd 2014, 3rd 2017*

2.8 *seconds in sprint from 0 to 100 km/h*

Schaeffler facts

> 92,000 *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)

2 *driver titles (2011, 2013)*

108 *races*

7 *fastest race laps*

6 *pole positions*

7 *victories*

The *race track*

Nürburgring

1 Start/Finish
2 Pit lane entrance
3 Media Center
4 Main grandstand
5 Audi Hospitality

3,629 m
Track length

Schedule (local time)

FRIDAY, SEPTEMBER 7

12:20 – 13:45	FIA Formula 3 European Championship	Free practice 1&2
14:00 – 14:30	Audi Sport Seyffarth R8 LMS Cup	Free practice 1
15:55 – 16:25	Audi Sport Seyffarth R8 LMS Cup	Free practice 2
16:45 – 17:15	**DTM**	**Free practice 1**
17:40 – 18:00	FIA Formula 3 European Championship	Qualifying 1

SATURDAY, SEPTEMBER 8

08:30 – 09:00	**DTM**	**Free practice 2**
09:20 – 09:50	Audi Sport Seyffarth R8 LMS Cup	Qualifying 1
10:20 – 10:55	FIA Formula 3 European Championship	Race 1
11:15 – 11:35	**DTM**	**Qualifying 1**
13:33 – 14:28	**DTM**	**Race 1**
15:15 – 15:45	Audi Sport Seyffarth R8 LMS Cup	Race 1
16:05 – 16:25	FIA Formula 3 European Championship	Qualifying 2

SUNDAY, SEPTEMBER 9

08:30 – 09:00	**DTM**	**Free practice 3**
09:20 – 09:50	Audi Sport Seyffarth R8 LMS Cup	Qualifying 2
10:20 – 10:55	FIA Formula 3 European Championship	Race 2
11:15 – 11:35	**DTM**	**Qualifying 2**
13:33 – 14:28	**DTM**	**Race 2**
15:50 – 16:25	FIA Formula 3 European Championship	Race 3
16:45 – 17:20	Audi Sport Seyffarth R8 LMS Cup	Race 2

SCHAEFFLER

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Learn more about mobility for tomorrow