

FACT SHEET XXL ROUND 5

FORMULA E MIAMI

MARCH 14, 2015

SCHAEFFLER



WELCOME TO MIAMI!

The race in Florida marks the beginning of the 'hot stage' of the Formula E season. Running in front: Lucas di Grassi from Team ABT sporting the Schaeffler colors



INNOVATION
FIA Formula E
technology

p. **8**



MOBILITY FOR TOMORROW
How Schaeffler successfully tackles
the challenges of the future

p. **10**

Editorial



Following races in Asia and South America, Formula E is traveling to the United States. For Schaeffler, the North and Middle American market has major importance – not least underscored by 16 locations in the United States, Canada and Mexico. The success of the series and our team whets our appetite for more – now and in the future. As an innovation leader and the exclusive technology partner of the German team our engineers develop the ideas for tomorrow’s mobility – for the road and now for the race track as well. Enjoy the race weekend here at Miami.



Jörg Walz
Head of Communications and Marketing
Schaeffler Automotive



Teaming up for a new era of motorsport

Schaeffler is on the FIA Formula E grid as the exclusive Technology Partner of Team ABT Sportsline and featured with its logo on the cars of Daniel Abt and Lucas di Grassi

Formula E marks the start of a new generation of motorsport. For the first time, car races are held with race cars powered strictly by electricity. The identical single-

Contact



Schaeffler AG
Communications and Marketing
Schaeffler Automotive
Industriestr. 1–3
91074 Herzogenaurach
presse@schaeffler.com
www.schaeffler.com

Contents



Schaeffler and FIA Formula E 2
 Schaeffler in international motorsport..... 4
 The Schaeffler Group 6
 FIA Formula E technology 8
 e-mobility innovations 10
 Team ABT Sportsline..... 12
 The drivers: Lucas di Grassi and Daniel Abt 14
 Event Guide: Facts about the race at Miami 16



seaters reach a speed of up to 230 km/h, accelerating from zero to 100 km/h in less than three seconds. During the near-60-minute race there is one pit stop at which the car is changed.

▶▶ SCHAEFFLER AND ABT FORM GERMAN TEAM

ABT is the only German team in the international field that includes squads from the USA, India, China and Europe. The former Formula One stars Alain Prost and Jarno Trulli are entering their own teams, as well as adventurer Richard Branson and actor Leonardo DiCaprio. More than ten drivers have experience in Formula One. Formula E races are not held on permanent race tracks but on street circuits in

the heart of major cities. Following the inaugural race in Beijing, where the track also circled the Olympic Stadium, Kuala Lumpur (Malaysia), Punta del Este (Uruguay) and Buenos Aires (Argentina), the next stops will be Miami and Long Beach (both USA), Monaco, Berlin (Germany) and Moscow (Russia) as well as London (Great Britain), where the finale will take place on June 28, 2015.

▶▶ FORMULA E: RACES AS SPECIAL EVENTS

Free practice, qualifying and the race all take place on a single day at the events, so the drivers don't have much time to home in on the completely new race tracks – which makes for ad-

ditional suspense. The inaugural race in China on September 13 was won by Lucas di Grassi who achieved two other podium positions at the following races. ■



Powered by electricity even outside the cockpit: Lucas di Grassi and Daniel Abt jointly explore the track on e-bikes

At home in the motorsport world


FIA Formula E is the new element in Schaeffler's portfolio of motorsport commitments. The company has a successful track record in other categories spanning several years – in top-flight racing as well as in promoting young talent

- 
- 02./03.05. Hockenheim (D)
 - 30./31.05. Lausitzring (D)
 - 27./28.06. Norisring (D)
 - 11./12.07. Zandvoort (NL)
 - 01./02.08. Spielberg (A)
 - 29./30.08. Moscow (RUS)
 - 12./13.09. Oschersleben (D)
 - 26./27.09. Nürburgring (D)
 - 17./18.10. Hockenheim (D)

WEC

Covering 5,000 kilometers on a single day – in the pinnacle event of the FIA World Endurance Championship (WEC), the Le Mans 24 Hours, maximum demands are made on the cars – a standard that Schaeffler equally applies to its production technologies.

That's why the WEC commitment with races in Europe, South America, the USA and Asia is such a perfect fit. Schaeffler's partner is the sports car manufacturer Porsche that in 2014 celebrated its return to the top category of what is arguably the world's most famous auto race.

- 
- 12.04. Silverstone (GB)
 - 02.05. Spa-Francorchamps (B)
 - 13./14.06. Le Mans (F)
 - 30.08. Nürburgring (D)
 - 19.09. Austin (USA)
 - 11.10. Fuji (J)
 - 01.11. Shanghai (CN)
 - 21.11. Bahrain (BRN)



DTM

Schaeffler has been involved in the most popular international touring car series for years. In 2011, the company extended its presence and began to give its name to one of the cars of Audi Sport Team Phoenix. The success was overwhelming: Martin Tomczyk (2011) and Mike Rockenfeller (2013) in the green-yellow Schaeffler Audi each celebrated winning the drivers title, which makes them the company's fastest ambassadors.

FORMULA STUDENT*

The world is becoming increasingly complex, and so are solutions for future challenges. That makes it all the more important for tomorrow's engineers to learn how to transfer ideas and innovations during their student days. Therefore, Schaeffler is involved in Formula Student as a partner. The things being practiced here on a small scale are exactly the same as those that Schaeffler does on a large scale.



- 13.05.–16.05. FSAE Michigan
- 17.06.–20.06. FSAE Lincoln
- 08.07.–12.07. FS United Kingdom
- 28.07.–02.08. FS Germany
- 10.08.–13.08. FS Austria
- 20.08.–23.08. FS Hungary
- 27.08.–30.08. FS Spain
- 01.09.–05.09. FSAE Japan
- 11.09.–14.09. FS Italy
- 01.10.–04.10. FSAE Brasil

* Selection



Shaping mobility for tomorrow

Sustaining mobility for the future and helping to successfully shape it – this is the strategy pursued by Schaeffler. Alternative drive systems or the continuous development of renewable energy sources are just two key words in this context

Environmental pollution, global warming, traffic gridlocks and the finite nature of fossil fuels – the challenges posed to future mobility are massive. Therefore, Schaeffler has been committed to the ‘Mobility for Tomorrow’ growth strategy that aims to find sustainable solutions for tomorrow’s world.

The Schaeffler success story begins more than 130 years ago when in 1883 Friedrich Fischer designs the ball grinding mill and thus not only lays the foundation for FAG but also for the entire modern rolling bearing industry. In 1946,

INA is founded by the brothers Dr. Wilhelm and Dr. Georg Schaeffler in Herzogenaurach, where the Schaeffler headquarters is still located today. The Schaeffler subsidiary LuK in 1965 introduces the first diaphragm clutch in Europe, causing a sensation immediately after the company was founded. In 2003, the Schaeffler Group is formed from the three brands INA, LuK and FAG.

▶▶ 170 LOCATIONS IN 49 COUNTRIES

Since then, Schaeffler has evolved into a true global player represented on all continents.

More than 80,000 employees at 170 locations in 49 countries ensure Schaeffler’s proximity to customers and the resultant development of market-specific products, short lead times and fast support.

▶▶ 225,000 PRODUCTS IN THE PORTFOLIO

Today, Schaeffler’s portfolio includes about 225,000 products – from tiny high-precision bearings for dental drills, to rolling bearings and linear guides for machine tools, to heavy-weights for roadheaders or wind turbines. The customer base covers 60 sectors. ■

“Formula E perfectly fits us”

As the Chief Technology Officer, Prof. Dr.-Ing. Peter Gutzmer put the FIA Formula E commitment on track and personally watched the action during the inaugural race at Beijing. The member of the board in a brief interview



Forming a strong team: Chief Technology Officer Prof. Dr.-Ing. Peter Gutzmer with the two Formula E drivers Lucas di Grassi (left) and Daniel Abt

► **Why is Schaeffler active in Formula E?**

PETER GUTZMER “Helping to shape the electrification of the automobile is one of our central forward-thinking topics. Schaeffler is an innovation leader in this field and frequently pioneers new ideas. The FIA Formula E is bold and visionary, which makes it a perfect fit for Schaeffler, and an ideal complement to our other commitments.”

How does the motorsport commitment affect Schaeffler’s routine business?

“Motorsport is not only ideally suited to accelerate the further development of new technologies but also energizes the topic of electric mobility with emotions in a fascinating way.”

What does the technical support of the team look like?

“In the first year, the Formula E regulations sensibly do not permit any proprietary developments. It is planned that we will support the subsequent further development of the race car and its components with the know-how and experience of our engineers.” ■



Large bearings with a diameter of up to 3.5 meters for wind turbines can be tested on the world’s only test rig for large-scale bearings Astraios – one of many forward-thinking solutions by Schaeffler

SCHAEFFLER FACTS

- › 80,000 Employees
- 170 Locations worldwide
- 60 Schaeffler components in automobiles worldwide (average)
- 12 m Diameter of largest Schaeffler bearing (surface mining excavator)
- 1 mm Diameter of smallest Schaeffler bearing (dental drill)

AERODYNAMICS

Front and rear wing adjustable

BATTERY

Developed by Williams Advanced Engineering, charging time: approx. 45 minutes

STEERING WHEEL

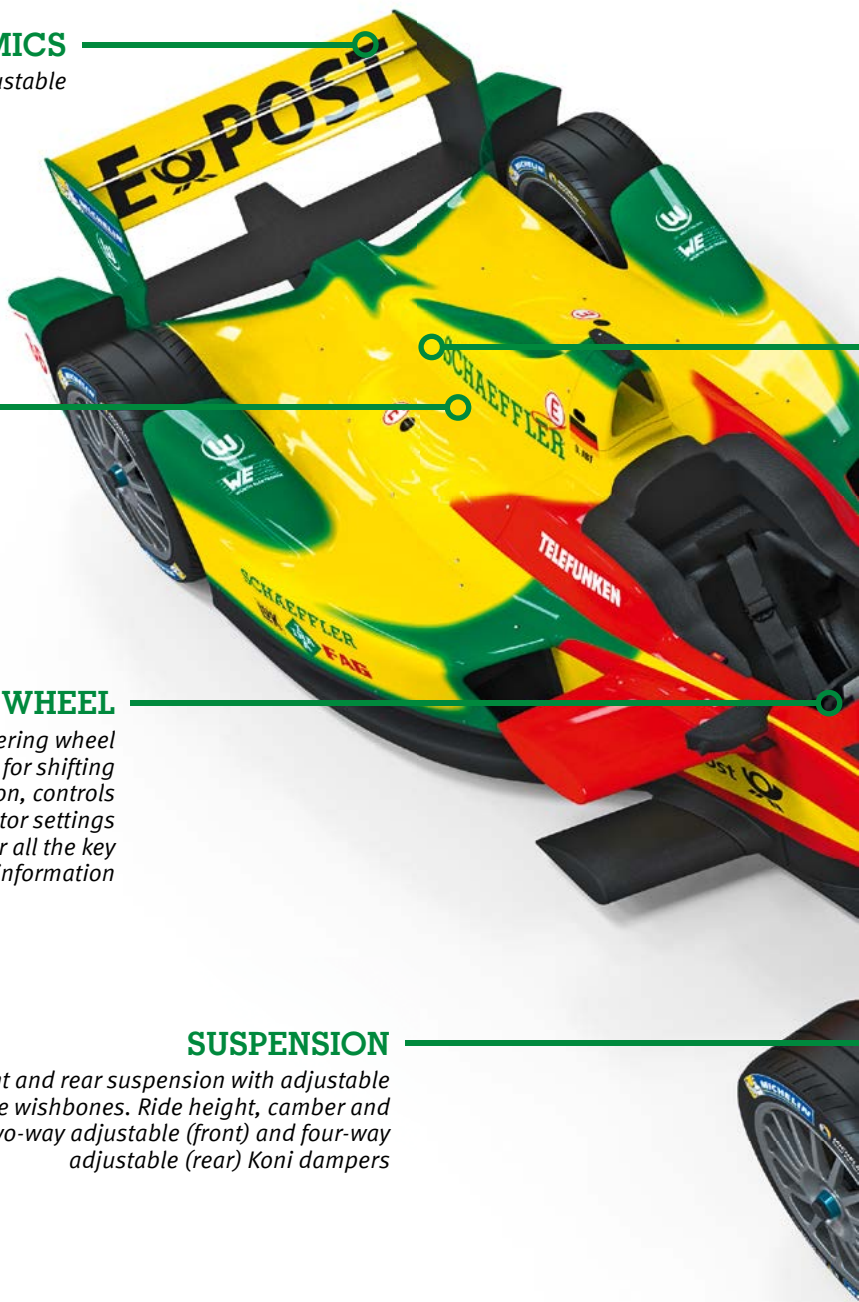
Specification steering wheel with paddles for shifting and recuperation, controls for various motor settings and display for all the key information

SUSPENSION

Independent front and rear suspension with adjustable stabilizers and double wishbones. Ride height, camber and toe are adjustable. Two-way adjustable (front) and four-way adjustable (rear) Koni dampers

TIRES

18-inch wheels with Michelin specification tires (same tread as for production cars)



High-tech for the race track

The Spark SRT_01E is a 'pedigree' race car packed with high technology. While the teams are still using identical technology in the inaugural season, it is planned to open up development opportunities step by step from the second year on

POWERTRAIN

Power unit and electronics by McLaren
Electronic Systems

CHASSIS

Specification carbon fiber/
aluminum chassis by Dallara

BRAKES

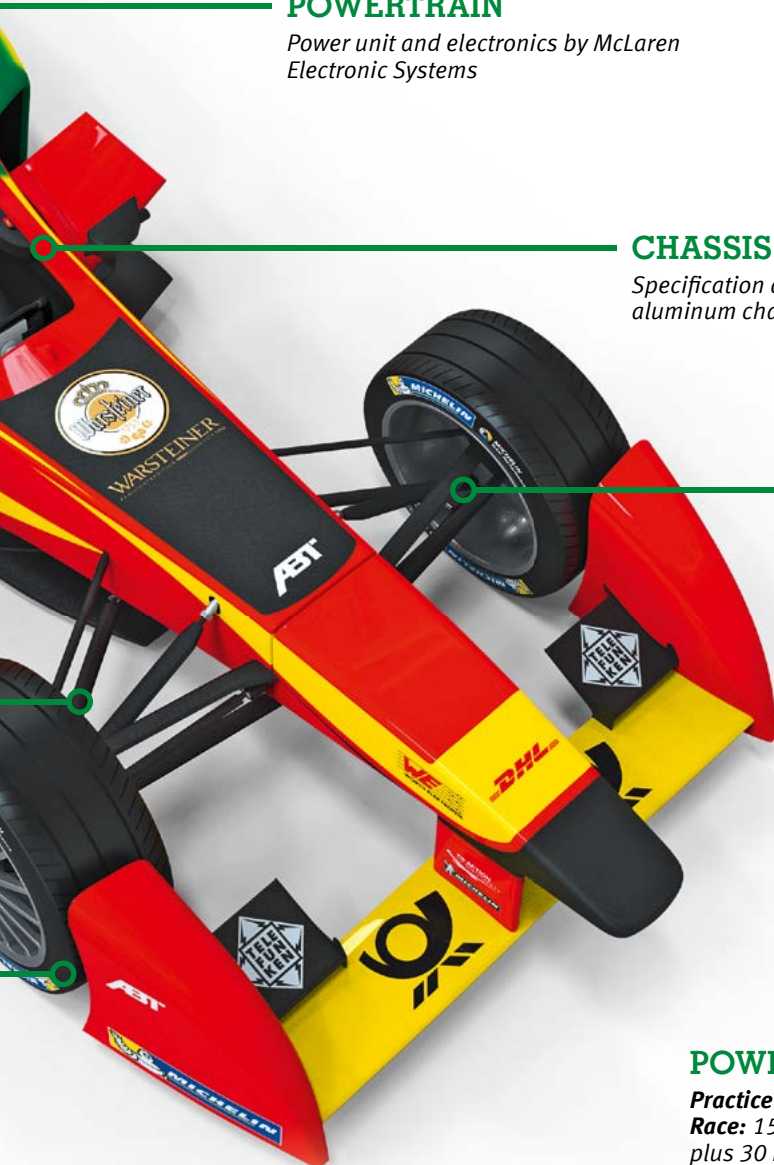
Hydraulic dual-circuit
braking system,
adjustable brake force
distribution

DIMENSIONS

Length: 5,000 mm
Width: 1,800 mm
Height: 1,250 mm
Weight: min 896 kg
including driver

POWER OUTPUT

Practice and qualifying: 200 kW (270 hp)
Race: 150 kW (202.5 hp)
plus 30 kW (40.5 hp) FanBoost



e: a small letter with a big effect

Full speed ahead – using electric power. Schaeffler demonstrates its flair for forward-thinking technology not only with its commitment in the world’s first all-electric racing series. Factually, the company has long moved from the development lab stage on to testing innovative technologies – from mass production vehicles through to bicycles

‘Mobility For Tomorrow’: The German technology corporation Schaeffler demonstrates exceptional expertise in innovative automotive technologies with various concept cars. For instance, in the case of hybrid vehicles, i.e. the combination of a conventional internal combustion engine and an electric motor, the company covers a very broad base, testing the entire range of what is technically conceivable and feasible at the moment, from the 12-volt micro-hybrid, to the 48-volt mild hybrid, through to the plug-in hybrid that can cover long distances.

▶ 100-PERCENT ELECTRIC DRIVE RESEARCH FIELD

Even though the potential of the conventional internal combustion engine is far from having been exhausted and Schaeffler keeps achieving potential savings in the double digit percentage range through numerous revolutionary details, the Schaeffler engineers have obviously been dedicating their research to 100-percent electric drive systems as well.

Various systems are being designed and tested, just like in the field of hybrid drives. It starts with the conventional

central drives, the so-called Schaeffler e-axles. A central e-module (EZM), where the mid-mounted electric motor is combined with a light-weight differential, marks the next evolutionary step. Near-wheel motors are even more technically sophisticated and on Schaeffler’s research agenda as well – for instance in a joint project with BMW and the German Aerospace Center (DLR) called ‘FAIR.’

▶ WHEEL HUB MOTORS AS THE TOP TECHNOLOGY

eWheelDrive, in other words in-wheel e-motors, marks the pinnacle of



Schaeffler STEP²: A consumption improvement of six percent can be achieved thanks to the combination of an electric motor and a two-speed transmission. The permanent system output is 50 kW and can even reach a peak of 70 kW

the art of engineering, and Schaeffler has already distinguished itself with several evolutionary steps in this field. In 2010, in an Opel Corsa, a prototype was created with a permanent development of 200 Newton meters and a peak torque level of 530 Nm per wheel. In 2013, a pure system in which permanent torque of 350 Nm per wheel and a maximum of 700 Nm were possible debuted in a Ford Fiesta. The next objectives are permanent torque of 500 Nm and a prototype in an 18-inch wheel. However, due to limitations in terms of top speed, wheel hub motors are primarily suitable for city cars.



eWheelDrive wheel-hub motors: Schaeffler presented the innovative system in a converted Ford Fiesta in 2013

► ANALOGY TO FORMULA E

For higher speeds above 130 km/h even electric motors require transmissions with several gear ratios – exactly the way in which this has been implemented in

the Formula E race car. In the STEP², an electric concept vehicle, Schaeffler publicly presented this technology with a two-speed transmission for the first time in mid-2014. ■

Ready to go: bicycle technology of the future



Schaeffler's 'Mobility for Tomorrow' strategy encompasses more than the development of innovative automotive technology. For bicycles, as well, Schaeffler has set a forward-thinking agenda and presented two advanced systems.

FAG-VELOMATIC Based on pedal frequency, energy, speed and inclination the FAG-VELOMATIC (pictured above) always finds the optimum gear and perfect shifting point. It is compatible with all gearing systems, in other words derailleurs or hub gears, and obviously with e-bikes.



VELODAPTIC The complementary app (pictured below) captures all motion-related data such as speed, pedal frequency, energy, torque, up-/downhill gradients, distance and position, which makes it the perfect bike computer.



A tradition of innovation

The world's leading tuner of vehicles of the Volkswagen Group and a successful motorsport team: with the commitment in FIA Formula E ABT Sportsline takes up one of the greatest motorsport challenges – and does so with passion

ABT Sportsline is one of the most successful motorsport teams in Germany and Europe. Its history in racing dates back more than 60 years and began with initial victories scored

by Johann Abt in the 1950s. The first recorded success took place in a dirt track race, followed by victories and titles in touring car, sports car and formula racing. 2009 has gone down

in the company's history as the most successful one to date: Timo Scheider won the DTM, Christian Abt the ADAC GT Masters in the Audi R8 and youngster Daniel Abt was victorious in the ADAC



Formel Masters. Previously, in 2007, Schaeffler and ABT had jointly celebrated success as well: with the logos of LuK, INA and FAG on his A4, Mattias Ekström won his DTM title number two.

Founded as a smithy in 1896, the ABT company has been continually developing ever since. Just one thing has never changed: the family still runs the

company with about 170 employees and partners in 50 countries around the world. CEO Hans-Jürgen Abt now represents the fourth generation at the helm. For ABT, the commitment in Formula E also marks a return to the roots, as the team celebrated success in formula racing as far back as in the early 90s – among others, with Ralf Schumacher in the cockpit back then. ■

Moments

1970



Johann Abt († 2003), father of Hans-Jürgen and Christian Abt, becomes European Touring Car Champion

1999



The STW Championship marks the first major title for Christian Abt and the team

2007



Sporting the logos of the Schaeffler Group, Mattias Ekström becomes champion

2009



Christian Abt, Daniel Abt and Timo Scheider clinch three titles in a single year

2014



ABT and Schaeffler win the first Formula E race

A strong team in the cockpit

In Lucas di Grassi (30) and Daniel Abt (22) the squad of Hans-Jürgen Abt has its dream team filling the cockpits of the two Formula E race cars. The experienced Brazilian and youngster Daniel Abt are not only fast and technically adept but perfectly harmonize with each other off the race track as well

#11 LUCAS DI GRASSI (BR)

VITA

Date of birth 11 August 1984
Place of birth São Paulo (BR)
Domicile Monaco (MC)
Height / weight 1.79 m / 75 kg

HIGHLIGHTS

2005 1st in GP Macau
2006 Formula 1 test
2007 2nd in GP2 series,
 Formula 1 test driver
2008 3rd in GP2 series,
 Formula 1 reserve driver
2009 3rd in GP2 series,
 Formula 1 reserve driver
2010 Formula 1
2013 3rd in Le Mans 24 Hours
2014 2nd in Le Mans 24 Hours,
 4th in WEC

SOCIAL MEDIA

🌐 lucasdigrassi.com.br
 🐦 @LucasdiGrassi



With his personable nature, experience from Formula One and other categories, as well as his long association with FIA Formula E, Lucas di Grassi was the team's declared driver of choice. As an Audi factory driver who was released for the commitment by his employer he has known the ABT Sportsline squad for a long time. The 30-year-old Brazilian has demonstrated that he feels at home in single-seater racing by finishing GP2 as the runner-up and winning the city street race in Macau.



Sideline: Lucas di Grassi is an Audi factory driver and competes in an R18 e-tron quattro in the WEC and at Le Mans. And he does so with great success: In 2014, he took second place in the legendary 24-hour race. For the Formula E project, Head of Audi Motorsport Dr. Wolfgang Ullrich 'loaned out' the Brazilian to ABT Sportsline.

#66 DANIEL ABT (D)



VITA

Date of birth 3 December 1992
Place of birth Kempten (D)
Domicile Kempten (D)
Height / weight 1.79 m / 70 kg

HIGHLIGHTS

2007 2nd in ADAC Kart Championship
2008 8th in ADAC Formula Masters
2009 1st in ADAC Formula Masters
2010 2nd in ATS Formula 3 Cup
2011 4th in FIA Formula 3 International Trophy, 7th in Formula 3 Euro Series
2012 2nd in GP3 series
2013, 2014 GP2 series

SOCIAL MEDIA

danielabt.de
[abtdaniel](https://www.facebook.com/abtdaniel)
[@Daniel_Abt](https://twitter.com/Daniel_Abt)

Daniel Abt numbers among the most successful German talents in formula racing. Following his title win in the ADAC Formel Masters and a foray into Formula 3, he celebrated second place in the GP3 Championship in 2012, where he became familiar with the Formula One environment. He regularly appears on TV as an expert for the sports channel Sky. After a year of learning in GP2, the 22-year-old youngster competed the series again for Hilmer Motorsport in 2014 and starts for ABT Sportsline in FIA Formula E.

EVENT GUIDE

FACTS ABOUT THE RACE AT MIAMI

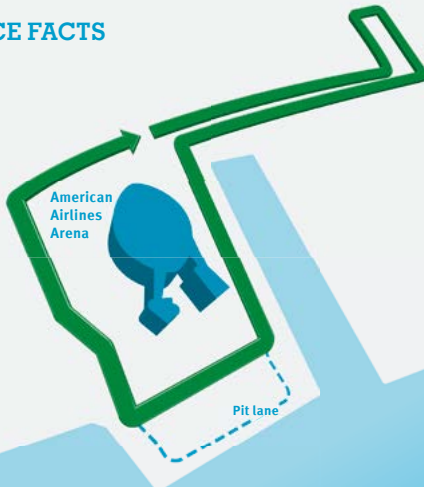
SCHAEFFLER



CALENDAR

13.09.	Beijing (CN)
22.11.	Kuala Lumpur (MAL)
13.12.	Punta del Este (ROU)
10.01.	Buenos Aires (RA)
14.03.	Miami (USA)
04.04.	Long Beach (USA)
09.05.	Monaco (MC)
23.05.	Berlin (D)
06.06.	Moscow (RUS)
27./28.06.	London (GB)

RACE FACTS



- Formula E Miami ePrix, Biscayne Bay
- Track length: 2,169 m
- Best overtaking possibilities: turns 4, 5, 7 and 8

DRIVER/TEAM STANDINGS

1	#11	Lucas di Grassi	ABT Sportsline	58
2	#2	Sam Bird	Virgin Racing	48
3	#9	Sébastien Buemi	e.dams-Renault	43
4	#8	Nicolas Prost	e.dams Renault	42
5	#99	Nelson Piquet jr.	China Racing	37
6	#55	António Félix da Costa	Amlin Aguri	29
7	#3	Jaime Alguersuari	Virgin Racing	26
8	#7	Jérôme d'Ambrosio	Dragon Racing	22
9	#27	Franck Montagny	Andretti Formula E	18
	#5	Karun Chandhok	Mahindra Racing	18
	#21	Bruno Senna	Mahindra Racing	18
<hr/>				
1		e.dams-Renault		85
2		Virgin Racing		74
3		ABT Sportsline		62
4		Andretti Formula E		41
5		Dragon Racing		38
6		China Racing		37
7		Mahindra Racing		36
8		Amlin Aguri		31
9		Trulli Formula E Team		12
10		Venturi Formula E Team		8

SCHEDULE SATURDAY, 14.03.2015

08:15–09:00	Free practice 1
10:30–11:00	Free practice 2
11:10–11:40	Pit Walk
12:00–12:55	Qualifying (4 groups)
13:30–14:00	Pit Walk
13:50–14:30	Autograph session (eVillage)
14:40–14:55	Parade
15:50	Winners of FanBoost announced
16:00	Race
17:10–17:25	Press Conference (Media Center)

TEAM ABT

@abt_formula_e
 abt.fiaformulae.com

FORMULA E

@FIAformulaE
 fiaformulae.com



Learn more about mobility for tomorrow

SCHAEFFLER

@schaefflerpress
 schaeffler.com