



PORSCHE

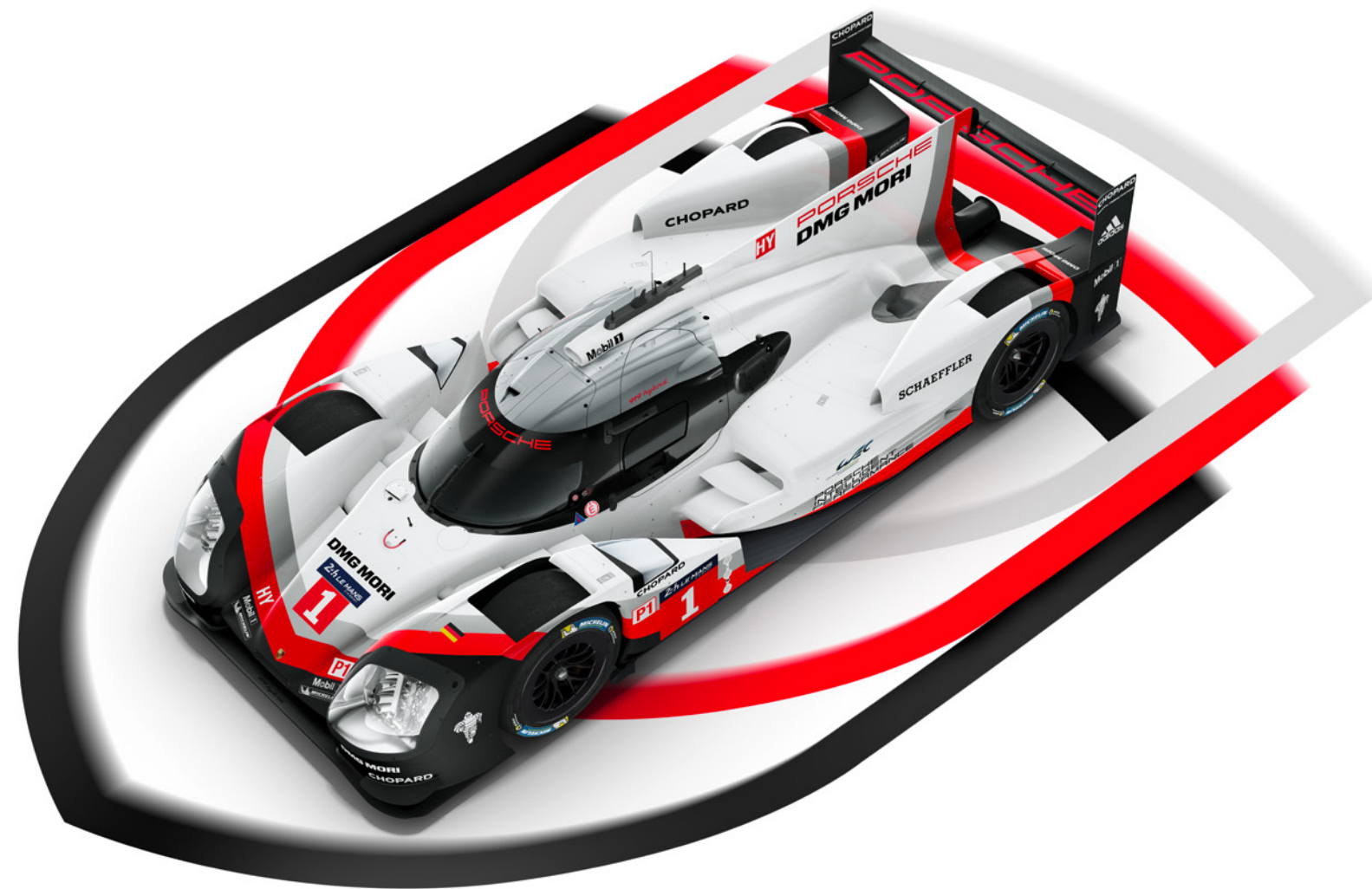


The 919 Hybrid

Trailblazer

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**Legends cast long shadows.
Into the future.**



Mission: Future Sportscar

I am the 919 Hybrid. Winner at Le Mans, world champion and title defender. I am the racing lab for visionary ideas. I am not a prestige object – I emerged as a matter of principle. A principle that Porsche Motorsport has been pursuing for over 60 years: battling for success on the race track in order to gain insights for the sports car of tomorrow.

Again and again I have been subjected to the toughest tests. Until all ideas melded to become a large, cohesive whole – an intelligent overall concept. From race

to race, from lap to lap I delivered new results. Until I became what I am: a trailblazer. Equipped with one of the most efficient, hybrid drive concepts in motorsports history. Built to prove myself in the world's toughest long-distance races. And to fulfil my own standards in every race. Over and over again.

This is the road that I am predestined to follow. Thereby ensuring that, in future, a Porsche will continue to be what it has always been: a genuine sports car worthy of bearing the crest. A principle that is

worth fighting for. I will go to the edge to generate new knowledge from my experiences at the limits of performance. So that my winning racing technologies find their way into series production. For every drive. Every day. And over every metre. Because Porsche Motorsport is where every Porsche is born.

All this makes me the trailblazer of our never-ending mission: to build the sports car of the future.

An aerial, black and white photograph of a racetrack. The central feature is a large, oval-shaped track with multiple lanes. To the right of the track, there is a complex of several modern, multi-story buildings, likely a grandstand or administrative center. The surrounding area includes fields, trees, and a residential neighborhood in the distance. A prominent red and white diagonal graphic element is overlaid on the left side of the image.

**Only by knowing where you came
from can you follow your destiny.**

The development centre in Weissach.

A place where thinking like an engineer and dedication have always been one and the same thing. Where visions are created. From the idea through to the completed design. From step one to the final test drive. From racing-capable sports car to thoroughbred race car.

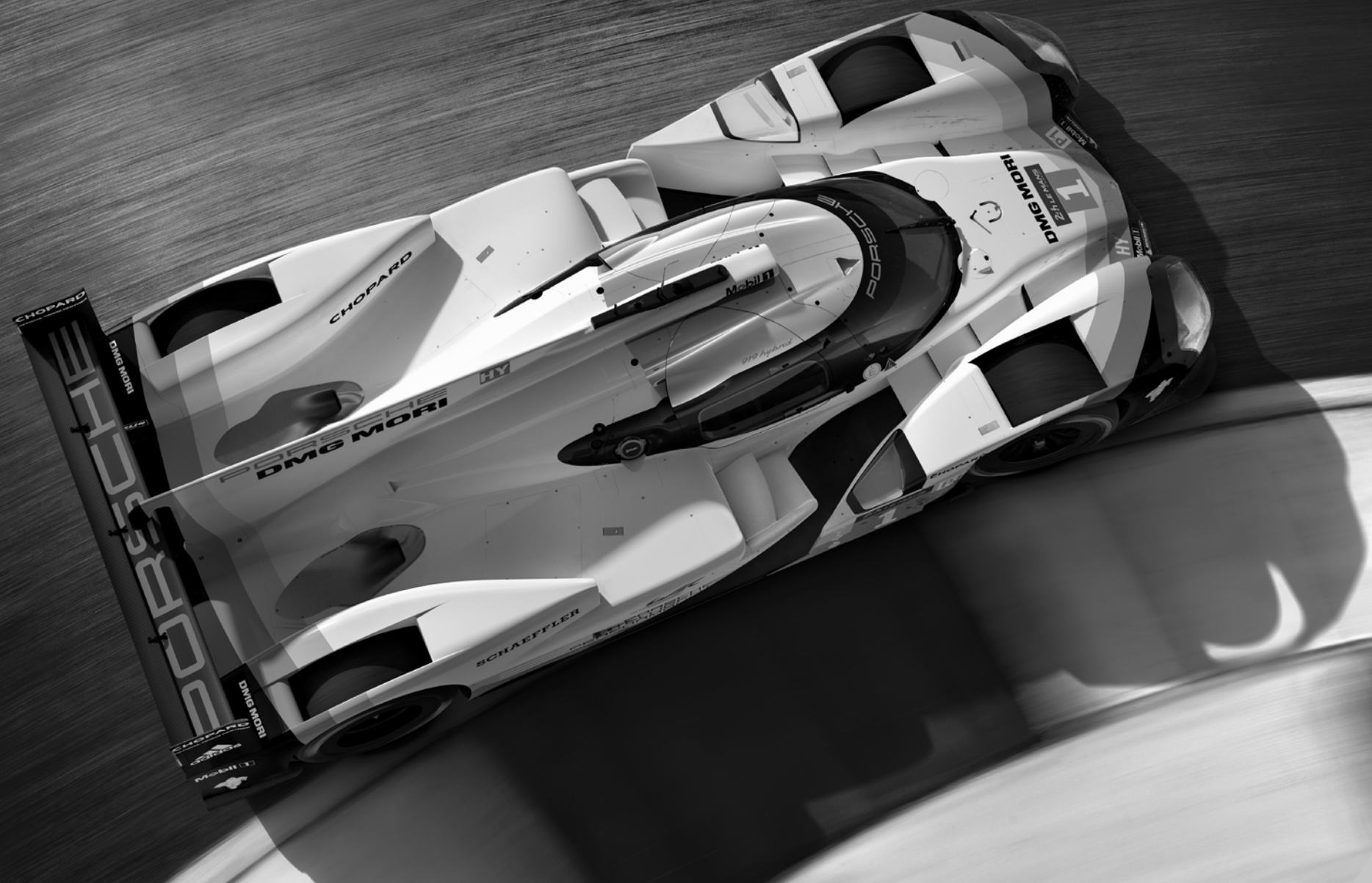
The sports cars of the future are created in the midst of a rural idyll – just 25 kilometres from our main factory. And have been since 1971. The development centre at Weissach in Germany brings together all the elements of the initial design phase: design studio, concept building, wind tunnel and test stands. We have our own test track right next door. Which is where every Porsche is put through its paces. This applies to sports

cars and race cars alike. Because the latter are developed just a few hundred metres away on the other side of the test track: in the Porsche motorsports centre in Flacht. This state-of-the-art facility gives birth to some of the most technically complex race cars in the world. Such as, among others, the new 911 RSR. And the 919 Hybrid – it steered us to our 17th and 18th overall victories in the 24h of Le Mans. This is not just the place where the engine, transmission and chassis are put together. On more than 12,000 square metres of space within our construction halls, vehicles are developed from the ground up. From the initial sketch to the final lap on our in-house test track. Everything is in close proximity: the LMP1 headquarters, for example, unites

all the development departments under one roof. There is even a dedicated area for pit stop training. This is where teams test their plans in case of emergency and as part of the battle for every hundredth of a second.

It's scarcely possible to imagine a closer connection between series production and racing. Thus, we ensure that every Porsche is developed with the experience and efficiency gained from over 60 years in motorsports and from more than 30,000 race victories. All this makes the development centre in Weissach and the motorsport centre in Flacht the cradle of Porsche racing. The birthplace of each of our race cars. The source of new technologies.





**What shapes
a strong character?
Its history.**



Identity.

First encounters with the 919 Hybrid often elicit astonishment, because at first glance, it doesn't look how you imagine a typical Porsche to look. That's a result of the strict FIA World Endurance Championship (WEC) regulations, which largely determine the vehicle's design. Thus our latest race car has the typically futuristic look of a Le Mans prototype.

But what really makes the 919 Hybrid stand out is where it comes from. This origin is a strong symbol for us and so we chose the Porsche crest as a key design element for our race cars in works entry. The contours of the crest stand out on the vehicle's surface in the typical Porsche Motorsport colours: black, red, grey and white.

Our crest reflects more than 30,000 race victories achieved during over 60 years of motorsports history. It adorned the legendary Porsche 356 SL, which gave us our class victory at Le Mans in 1951. Due to that vehicle's exceptional light-weight construction it was affectionately known as the 'aluminium can'. All the other race vehicles which drove to a total of 18 overall victories on the legendary race track also bore the Porsche crest. It's an unmistakable symbol of our identity. It expresses the expertise that flows from the race track into series production. The fighting spirit. And the dedication shown by our fine teams.

The spirit in which we have always built our sports cars manifests itself in the

design. It's the way we strive to look at apparent opposites as challenges, and bring them together in every vehicle: efficiency and power. Safety and light-weight design. And to ensure that this core concept can be found in everything we do, we channel what we learn from motorsports into our standard-production vehicles. So what results do we see in the 919 Hybrid? The carbon incarnation of all that we stand for. A thoroughbred sports car with a clear Porsche identity.

**The most successful
drive concept:
belief in our ideas.**



Technology.

FIA WEC regulations impose high demands on the areas of efficiency, safety and sustainability. Technological innovations must pass punishing endurance tests on the track before they can be deployed in conformity with the rules. Our key to success: an efficient concept of downsizing the combustion engine combined with one of the most powerful hybrid systems in motorsports. With it the 919 Hybrid appears repeatedly in the LMP1-H class – the top class in long-distance racing. But a world championship title is not won by pure power alone. In fact, the real aim is maximum performance with minimum consumption.

How do we achieve this objective?
By implementing an intelligent overall

concept: the fourth-generation 919 Hybrid is powered by a turbocharged four-cylinder, two-litre petrol engine delivering almost 500 hp that drives the rear axle. Its ally is an additional electric motor delivering more than 400 hp to the front axle. The latter is fed by two energy recovery systems. Converted braking and exhaust energy is temporarily stored in a liquid-cooled lithium-ion battery.

The maximum reduction in system weight was achieved using components made of carbon, high-strength aluminium, magnesium and various titanium alloys. Increased overall rigidity and optimisations made to the chassis and aerodynamics improve both the efficiency and driving characteristics of the new 919 Hybrid.

Why are we continually optimising the 919 Hybrid? Starting with the tiniest detail through to the finished overall concept? Because the highest demands in long-distance motorsports are our benchmark for the road. The 919 Hybrid is the racing lab for our visions – for intelligent drive concepts, now and in the future. Key insights for series production have been obtained from the LMP1 prototype project: examples include the cooling for the battery and electric motor, the connection technology for extreme high voltage as well as the battery management and the systems' design.

Panamera Turbo S E-Hybrid: combined fuel consumption (in l/100 km) 2.9; combined CO₂ emissions 66 g/km; electricity consumption 16.2 kWh/100 km





**The ultimate
endurance test:
our safety requirements.**



Safety concept.

In endurance motorsports, man and machine are driven to their limits over many hours. That is precisely why it's important not only to weigh up risks but to minimise them ahead of time. Just like your safety when you climb into a Porsche series-produced car, the safety of our works drivers is our highest priority. In the latest regulations for the LMP1 class this is an even more important factor. We wouldn't be Porsche, however, if we didn't always go a step further than conforming to the obligatory regulations. Our engineers are working continually to ensure that the 919 Hybrid provides a maximum degree of safety at all times as a top priority.

The prototype has a closed monocoque to enlarge the safety space around the driver. It is also reinforced on all sides with extra panels made of a similar material to that used to make bulletproof vests. This measure is intended to protect the driver from a side impact. The panels also prevent the steering from penetrating the cockpit if a wheel comes loose.

All materials are selected in accordance with strict safety criteria. Long before the driver takes their seat in the cockpit, the chassis must prove its reliability in crash tests. At Porsche's instigation, other safety measures have been incorporated into the regulations to improve the driver's seating

position: more headroom and a clearly defined helmet position. Due to a higher eye position and lower wheelhouses, drivers have a better view of the track. This ensures that sight is never lost of the most important thing: the safety of all concerned.

**Tomorrow's trailblazer.
On today's test stands.**



The FIA World Endurance Championship.

The FIA WEC is considered to be one of the toughest race series in the world. This is where the international stars of motorsports pit themselves against each other on renowned endurance racetracks around the globe. Strict criteria in the areas of efficiency, safety, and sustainability quickly make clear that the focus of the racing series is firmly on aspects of future viability.

In 2017, Porsche is returning to the top class to defend its title as FIA WEC World Champion from 2015 and 2016 with the 919 Hybrid. There at its side: the new 911 RSR. The absolute highlight of the nine world championship races is the legendary 24h of Le Mans.

Classes:

LMP1: Le Mans prototype class for works teams. This is where the Porsche 919 Hybrid will be competing.

LMP2: Le Mans prototype class for private teams. Only petrol-driven race cars will be competing in this class.

LM GTE Pro: Production-based GT race cars with professional racing drivers. This is where the Porsche 911 RSR (2017) will be competing.

LM GTE Am: Production-based GT race cars with at least one amateur driver. Several customer teams will be competing in this class with the 911 RSR (2016).

2017 FIA WEC races	Date	Location
6h of Silverstone	16 April 2017	Towcester, GB
6h of Spa-Francorchamps	06 May 2017	Stavelot, BE
24h of Le Mans	17–18 June 2017	Le Mans, FR
6h of Nürburgring	16 July 2017	Nürburg, DE
6h of Mexico	03 September 2017	Mexico City, MX
6h of Circuit of the Americas	16 September 2017	Austin, Texas, US
6h of Fuji	15 October 2017	Oyama, Suntō District, JP
6h of Shanghai	05 November 2017	Jiading, Shanghai, CN
6h of Bahrain	18 November 2017	Sakhir, BH





**Where motorsports history is
rewritten over and over again.**



Le Mans.

Porsche and Le Mans. Two names that are inextricably linked with one another. And that is why 2014 was a very special year for us. It was the year we returned to the top level of long-distance racing with the 919 Hybrid. Twelve months later, our greatest dream was fulfilled. And twice more in succession when we achieved overall victory in the 24h of Le Mans in 2015 and also successfully defended our title in 2016.

In more than 60 years of motorsports, Porsche has already achieved 18 outright victories in the famous 24-hour race – an absolute record. But it isn't the trophies that are the most important thing to us. It is the insights into new technologies and ideas that we gain and can channel back into the design of Porsche sports cars. And we'll fight for this again in 2016. With dedication, passion and the utmost respect for our opponents. For this is

where we belong. And this is where we'll continue to write the stories that make sports car fascination come alive time and time again. Because we also have a tradition to uphold. As a matter of principle. As part of our never-ending mission.

Drawing strength from intelligence.



DMG MORI

CHOPARD
OFFICIAL TIMING PARTNER
SCHAEFFLER

MICHELIN Mobil 1 YELLOX

adidas VELTINS SCANIA
Red Bull HOKAY uvex
WALTER KNOLL

Technical specs.

The vehicle

Model	Porsche 919 Hybrid (2017)
Vehicle type	Le Mans Prototype, class LMP1
Monocoque	Composite fibre construction made of carbon fibres with a honeycomb aluminium core.
On-board system battery	Lithium-ion battery

Performance

Höchstgeschwindigkeit	> 340 km/h
Beschleunigung 0–100 km/h	2.2 seconds
Beschleunigung 0–200 km/h	4.8 seconds

Engine

Combustion engine	V4 engine with turbocharging, 4 valves per cylinder, DOHC, a Garrett turbocharger, direct fuel injection, aluminium cylinder crankcase, fully load-bearing
Engine management	Bosch MS5
Engine lubrication	Dry-sump lubrication
Displacement	2,000 cm ³
Power	< 500 hp

Hybrid system

Accumulator type	Lithium-ion battery with A123 Systems cells
Engine Generator Unit (EGU)	EGU on front axle, power > 400 hp

Drive/Power transmission

Drive type	Rear wheel drive, traction control (ASR), all-wheel drive via KERS on the front axle
Clutch	CFRP clutch
Transmission	Hydraulically activated 7-speed sequential racing transmission
Differential	Rear differential lock
Transmission housing	Hybrid construction in CFRP with titanium inserts and cast aluminium housing
Drive shafts	Constant-velocity sliding tripod universal joints

Chassis/Steering/Brakes

Steering	Hydraulically assisted rack-and-pinion steering
Chassis	Front and rear pushrod independent wheel suspension with adjustable shock absorbers
Brakes	Hydraulic dual-circuit brake system, light-alloy monobloc brake callipers, internally vented carbon fibre rear and front brake discs, brake force distribution settings can be set progressively by the driver
Rims	Forged magnesium wheels
Tyres	Michelin Radial, front and rear: 310/710-18

Weight/Volume

Length/Height/Width	4,650 mm/1,050 mm/1,900 mm
Minimum weight	875 kg
Tank capacity	62.3 l



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