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REDEFINING THE ART AND CRAFTSMANSHIP OF ROADSTER AERODYNAMICS



It is one of the automotive industry's greatest engineering balancing acts: delivering a roadster that can travel 400km/h, deliver a truly luxurious experience for its occupants and one that celebrates the aural majesty of a legendary engine like never before. Embodying Bugatti's distinctive spirit of adventure and sense of freedom, the W16 Mistral has been meticulously honed to skillfully harness the full power of the wind, resulting in a roadster that is the perfect symphony of high speed, unrelenting performance and acoustic perfection.

2026 BUGATTI AUTOMOBILES S.A.S.

The aerodynamic journey undertaken by Bugatti has been intrinsic in shaping the development of the W16 Mistral[1]. It's a journey that commenced in the realm of simulation, where digital development allowed engineers and designers to create pioneering airflow designs that could then be perfected in the real world. At such high speeds and with such lofty standards, only empirical and meticulous experience can provide the necessary levels of performance required by Bugatti.
Following highly detailed engineering analysis embedded in advanced Computational Fluid Dynamics (CFD) software, the critical wind tunnel phase awaited the W16 Mistral. The virtual development phase paid off, with the carefully honed aerodynamic body performing almost exactly as expected; a balance of beauty, thermodynamics and a stability between lift and downforce at incomparable speed.

> "Effectively mastering aerodynamics is absolutely critical in developing a roadster that can surpass speeds of 420km/h while at the same time ensuring the driver and passenger are cocooned in a space of absolute luxury and comfort. And this is especially the case when you take into consideration the extraordinary 1,600 PS generated by the iconic quad turbo W16."
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> FRANK HEYL
> BUGATTI DIRECTOR OF DESIGN

For Bugatti, a roadster's maximum speed — in this case in excess of 420km/h — should never compromise interior comfort and luxury. Instead, these two core attributes must unite seamlessly to create the ultimate roadster.

As such, the Bugatti team faced this critical challenge head-on by successfully crafting a sophisticated aero-inspired design in combination with highly advanced technical additions. The intelligent design circumnavigates air away from occupants while ensuring the iconic 16-cylinder powertrain breathes freely — it is a delicate ballet of action airflow in real-time and at high-speeds.

Conducting this airflow symphony is the W16 Mistral's roof spoiler, a central feature fusing the art of aerodynamics with the science of aero acoustics. The spoiler, positioned at the top of the windshield, seamlessly channels airflow away from the driver and passenger whilst at the same time ensuring it efficiently reaches the rear wing to maximize full downforce.

Should the driver or passenger desire, the interior of Bugatti's ultimate roadster can be transformed into a place of total visceral emotion, in perfect step with the legendary W16 Bugatti powertrain unleashing its incomparable sound — a symphony that many customers desire. Yet for those more serene adventures, the W16 Mistral's cabin can be a calming space, with a high-tech sound system delivering orchestral-quality audio.

The revered Bugatti horseshoe grill has been re-imagined for the W16 Mistral, featuring wider proportions to force feed air into the central radiator, to provide critical cooling despite the newly designed front end. Meshes within the air ducts are 3D-printed and have been designed specifically to be aligned with airflow direction, ensuring that there are minimal losses.

Staying true to Bugatti's 'form follows performance' ethos, beautifully sculpted air scoops located behind the occupants draw air in to feed the mighty W16 engine. The air passes through the air filters directly onto the four turbochargers of the 8.0-liter 16-cylinder engine; a sophisticated arrangement that helps to establish optimal conditions for the powertrain.

With the intakes mounted directly behind the occupants' heads, the inner-workings of the W16 engine — one of the industry's greatest ever powertrains — make themselves heard in a more visceral way than ever before. As the driver takes their foot off the accelerator, the turbos pop and hiss, and the rumbling exhaust note echoes into the cabin, unfiltered. It is an aero acoustic engineering masterpiece that only W16 Mistral customers can experience; an unrestricted celebration of the legendary W16 Bugatti heart. At the same time, the scoops also serve as a critical safety feature for the occupants, embedded with a carbon fiber crash structure.

Intelligent air inlets, located on the side panels of the roadster — tucked within the famous Bugatti C-line — serve to further maximize the W16 Mistral's outstanding dynamic pressure levels. The inlets simultaneously process air and pressure at the same time to cool down oil for the engine, gearbox and rear axle. The hot air that exits these radiators is funneled through ducts to the rear, where the negative pressure draws the hot air through the rear lights, just as smoke is sucked up through a chimney.

A larger and enhanced 'ramp' design integrated within the diffuser further aids the removal of hot air from the car and the W16 Mistral's overall downforce, underscoring the roadster's outstanding stability at high speeds. At the rear, the W16 Mistral's unique X-taillight arrangement not only adds to the aesthetic allure of the new Bugatti model but serves a vital function — venting side oil coolers through carefully designed ducts, thereby managing the mid-temperature cooling circuit with precision.

Having been inspired and informed by its rich heritage and deep technical expertise in crafting performance-defining aerodynamic automobiles across the last century, the development of the W16 Mistral fully lives up to its namesake, resulting in the creation of Bugatti's most aerodynamic and emotional roadster to date.

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[1] W16 Mistral: WLTP fuel consumption, l/100 km: low phase 40.7 / medium phase 21.9 / high phase 18.3 / extra high phase 17.6 / combined 21.8; CO2 emissions combined, g/km: 495; efficiency class: G