MOLSHEIM
10/8/2026

MASTERING THE HEAT: THE BUGATTI TOURBILLON IN SOUTHERN SPAIN

From the frozen expanses of northern Sweden to the searing heat of southern Spain, the development of the BUGATTI TOURBILLON[1] is driven by an uncompromising commitment to the art of perfecting the driving experience. Wherever in the world its owners choose to experience it, every element must perform with the precision and refinement expected of a BUGATTI.

In the latest episode of the documentary series 'A New Era', the development team heads to Seville to put the brand's latest hypercar creation through its paces in the heat of southern Spain. A program conducted in a place where temperatures rise well beyond 40°C (104°F), placing the TOURBILLON development prototypes under an entirely different form of pressure. In this place, intense ambient heat combines with the immense thermal loads generated by one of the most advanced powertrains ever created for a road car — providing the environment in

2026 BUGATTI AUTOMOBILES S.A.S.

which BUGATTI's engineers can validate the complex cooling systems that make extraordinary performance possible.
The TOURBILLON represents an entirely new technical foundation for BUGATTI, its naturally aspirated V16 working together with three electric motors to produce 1,800 hp. Two independent principles of propulsion driven by emotion and precision thus come together, combining a work of mechanical art with an advanced hybrid architecture. Two electric motors power the front axle, while a third complements the V16 at the rear; at the heart of the system sits an 800V battery.

Such an architecture brings exceptional capability, and yet simultaneously also an extraordinary thermal challenge.

"The main task here was to be able to cool down these temperatures inside the cabin, but also the engine bay, while maintaining such an outstanding and sleek design on the car. In order not to compromise the shape and the design, we have very clever cooling circuits and cooling systems inside the car to make sure that all the systems remain under controlled temperatures."

DANIEL RÍOS HIDALGO
VEHICLE DEVELOPMENT ENGINEER AT BUGATTI RIMAC

The hot-weather validation program in Spain focuses on three principal areas, namely the performance of the cabin climate-control system, temperatures across the TOURBILLON's critical components and vehicle areas, and validation of its wider cooling architecture.

To understand precisely how the TOURBILLON behaves as temperatures and loads increase, more than 200 thermocouples are installed throughout the prototype. They continuously measure the thermal state of the vehicle, allowing engineers to observe how individual areas respond as the car moves between different environments and driving conditions.

Protection of the machinery in motion is one critical component of this process, but above all, a BUGATTI must remain an exceptional place for its occupants — irrespective of what is happening outside, or how hard the car itself is working.

"When you have a lot of power but you don't feel comfortable on the track or on the road, it's very difficult to be precise. So it's very important to keep the comfort in the cabin and the temperature in the cabin quite fresh to allow the customers as well to enjoy the car at its best."

PAOLO MAGRONE
VEHICLE DEVELOPMENT DRIVER AT BUGATTI RIMAC

It is an essential part of the philosophy that extremes of performance cannot come at the expense of usability or refinement; an ethos that has guided BUGATTI development for generations. The TOURBILLON has been carefully designed from the wheels up to be capable of deploying its immense potential, while maintaining the composure and comfort expected from a hyper sports car conceived to cross continents as naturally as it attacks a circuit.

Hot-weather validation began long before the TOURBILLON arrived at the race track in Seville. Approximately 15 months earlier, the development program had already ventured to Dubai, where an earlier XP vehicle encountered temperatures exceeding 50°C (122°F). In Spain, the work continues with the more advanced validation prototypes — moving the project progressively closer to its final validation targets.

The TOURBILLON is thus tested across both public roads and the racetrack, at high and low speeds, each environment placing fundamentally different demands on the car.

On the open road, temperatures can reach approximately 45°C (113°F), replicating the conditions that owners may encounter in some of the world's hottest regions. Yet a public road cannot reproduce the sustained loads possible on a circuit. On track, tires, brakes, powertrain and cooling systems are pushed simultaneously and repeatedly, creating a complete thermal stress test for the car.

For BUGATTI, both are necessary to ensure that the character and reliability of the car remain consistent as its environment changes. As, after all, it is expected by those who pilot it to excel in and master all tarmac-bound environments it encounters.

> ''We are delivering cars all over the world. We have customers from lots of places that are going to drive the cars in different conditions. We need to make sure that these cars perform properly in all these varieties of conditions.''
>
> DANIEL RÍOS HIDALGO
> VEHICLE DEVELOPMENT ENGINEER AT BUGATTI RIMAC

The program therefore manifests itself as a natural counterpart to BUGATTI's winter validation in Sweden, where temperatures as low as -30°C placed the TOURBILLON's systems under the opposite extreme. In Arjeplog, engineers focused extensively on low-grip dynamics, braking, stability systems and the ability of the cabin and vehicle to operate in severe cold; in Seville, the program ultimately ensures heat can be managed even as performance reaches its peak.

This physical validation represents the final complement to the immense amount of simulation that precedes it. Digital development can provide an extraordinarily detailed understanding of how the TOURBILLON should behave, while the road and racetrack reveal whether theory and reality align.

> "Nowadays with the simulations, you already get a lot of information of how the car will behave in certain conditions. What we are doing here is to make sure that what we saw on the simulations is actually happening on track."
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> DANIEL RÍOS HIDALGO
> VEHICLE DEVELOPMENT ENGINEER AT BUGATTI RIMAC

The results in southern Spain come together to underscore the work of the teams that have developed the TOURBILLON over preceding years. The required data was collected and the systems targeted for the session were successfully validated. Even under sustained load, at the limits of performance, a cabin remaining consistently pleasant with stable HVAC airflow and temperature is the only acceptable outcome.

From temperatures far below freezing in Scandinavia to more than 40°C beneath the Andalusian sun, the TOURBILLON's journey through extreme conditions continues to prove that a new era of BUGATTI must be complete in every detail — its extraordinary performance available wherever its owners choose to explore its majesty.

Watch the latest episode 'A New Era: Extreme Conditions pt. 2' on the official BUGATTI YouTube channel.

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[1] Tourbillon: This model is currently not subject to directive 1999/94/EC, as type approval has not yet been granted.