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A SPARK OF GENIUS: ELECTRIFYING THE BUGATTI TOURBILLON

In the latest chapter of the Bugatti 'A New Era' documentary series, the intricate engineering behind the Tourbillon's[1] groundbreaking hybrid powertrain takes center stage. Episode 08, now available on the Bugatti YouTube channel, offers an unprecedented glimpse into how the union of cutting-edge electric technology with naturally aspirated V16 power creates an entirely new paradigm for hyper sports car performance.

The philosophy driving this innovation challenges conventional thinking about electrification in high-performance cars. Rather than electric motors serving as a replacement for the combustion engine, the approach here sees them as enablers; sophisticated tools that unlock the full emotional potential of a high-revving naturally-aspirated V16 engine.

"The electric powertrain, being very high tech, very high performance, is actually enabling this very emotional combustion engine. That's possible only because we have such a tight integration between the electric and hybrid powertrain with the combustion engine."

MATE RIMAC
CEO OF BUGATTI RIMAC

The episode reveals the complete powertrain system in extraordinary detail; a technological masterpiece comprising the naturally aspirated 8.3-liter V16 engine, eight-speed double-clutch transmission with torque-vectoring differential, and a 250-kilowatt electric motor capable of reaching 24,000 rpm. This entire assembly weighs just 430 kilograms, remarkably matching the weight of the Chiron's engine alone.

Complementing this is the front electric axle, featuring two independent electric motors and dual inverters housed within a single unit. When combined with the battery pack, the complete hybrid system demonstrates a mastery of intelligent integration, adding capability without compromising on design, weight or packaging.

Perhaps most impressive is how this increased complexity achieves the seemingly impossible: despite its advanced hybrid architecture, the Tourbillon weighs less than its predecessor while delivering superior performance, higher top speed, and greater luggage capacity. This achievement reflects a holistic approach to engineering with every component and design decision scrutinized from the very beginning. Notably, the Tourbillon incorporates innovations such as 3D-printed, topologically optimized suspension components that are 45% lighter than previous cutting-edge units.

A time-consuming, meticulous and expensive engineering process but, ultimately, completely worth it. Where traditional naturally aspirated engines might require multiple downshifts to access their peak performance window, the Tourbillon's electric motors provide instantaneous response.

"Where the combustion engine isn’t able to deliver its full power, the electric motor can with the roar of a V16 naturally aspirated engine."

MATE RIMAC
BUGATTI RIMAC CEO

The multifunctional nature of the Tourbillon's electric motors adds another layer of sophistication. Operating at 800 volts, they serve simultaneously as starter motors, generators,

and performance enhancers, eliminating traditional 12-volt starting systems while providing the flexibility to charge the battery from the engine during operation. The Tourbillon's innovative 25kWh T-shaped battery pack represents another breakthrough in integration and efficiency. Comprising over 1,500 individual cells and featuring advanced oil cooling technology, the battery is seamlessly integrated into the car's chassis structure rather than simply being installed within it. This architectural approach not only contributes to the vehicle's structural rigidity but also optimizes weight distribution and enables an electric range of more than 60km.

This clever engineering doesn't just help to reduce weight, but it helps to reduce the Tourbillon's footprint, too. The Tourbillon's elegant, low-slung silhouette is compact, while also still incorporating the trademark short overhangs. That's despite accommodating the longer V16 engine, dual front electric motors, enhanced cooling systems, T-shaped battery pack and increased luggage space — all made possible by an uncompromising approach to perfection in every detail.

"When I see this complete powertrain system together, I feel immense pride in what our teams have achieved. We haven't simply added electric motors to a combustion engine; we've created a harmonious synthesis that brings out the best qualities of both worlds. The V16 provides the soul and emotion that only naturally aspirated power can deliver, while the electric motors offer the precision and instant response that modern performance demands. This is how electrification should enhance, not compromise, the driving experience."

MATE RIMAC

BUGATTI RIMAC CEO

This latest episode, as well as every previous episode of the 'A New Era' documentary series is available exclusively on the BugattiYouTube 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.