BUGATTI'S HYPER SPORTS CARS OF EXTREMES FROM A DESIGNER'S POINT OF VIEW

Bugatti designer Frank Heyl talks about the Chiron Pur Sport and Chiron Super Sport 300+.

Extremely fast and extremely agile. With the Chiron Super Sport 300+[1] and the Chiron Pur Sport[2], Bugatti is offering two entirely distinct and extreme hyper sports cars: for breathtaking longitudinal dynamics and extraordinary lateral dynamics. Both vehicles are unique in their own way — not just in terms of technology, but visually too. The right vehicle for every purpose — entirely in line with the philosophy of company founder Ettore Bugatti.
Frank Heyl, Deputy Design Director at Bugatti, explains the key elements of his work and his creations. ''When designing the Chiron Pur Sport and the Chiron Super Sport 300+, the focus was on technical principles to such an extent that it was crucial to establish a symbiosis between design and technology. There were huge demands in terms of what the hyper sports cars had to be capable of,'' says Frank Heyl. Design and technology are unmistakably combined

in the two extreme vehicles. ''You can't talk about one area without mentioning the other. That's why we designers had to work closely together with the engineers during the development process.''

CHIRON PUR SPORT

In the Chiron Pur Sport, Bugatti has consistently pursued the goal of lateral acceleration. It is a radical and extreme development approach. The Chiron Pur Sport is the perfect hyper sports car for drivers who want to achieve total harmony with a bend when cornering. Thanks to a weight reduction of 50 kilograms combined with increased downforce and its uncompromisingly sporty suspension, the Chiron Pur Sport offers incredible road grip. Added to this, it offers sensational acceleration figures and extremely precise handling thanks to a shorter gear ratio. For Bugatti, it was a major step to limit the top speed to 350 km/h.

The enlarged air intakes on the front provide for an improved airflow through the radiators even at low speeds. The front splitter has been drawn strikingly towards the front and generates maximum downforce while also visually supporting the broad effect at the front. The ridge lines through the air outlets on the front wings are stretched like tendons on a muscle. ''The colour separation of the paint finish on the upper half and black exposed carbon on the lower half makes the Chiron Pur Sport appear flatter and wider. This matches the sporty appearance of the vehicle,'' explains designer Heyl.

In order to compensate at the rear for the aero balance and the greatly increased downforce at the front axle, the 1.90 metre wide rear wing and a generously dimensioned and long diffuser ensure massive downforce at the rear axle. The angled rear wing mounts together with the rear apron form a large X, inspired by science fiction and motorsports elements. The final touch is provided by the extremely light and high-temperature-resistant exhaust tailpipes made of 3D-printed titanium. This manufacturing process makes for a very thin-walled and lightweight component. ''3D printing frees us from the limitations of shapes and radii. We can use it to produce very specific components,'' says Frank Heyl. In order to achieve perfect weight distribution, it was advantageous to save as much weight as possible behind the rear axle. The weight saving achieved by eliminating the Chiron wing kinematics and the extremely light tailpipe trim cover shift the weight balance further into the centre of the vehicle.

For the first time in series production, Bugatti offers a horizontal split paint finish. Here the exposed carbon of the body is partially painted, so the side is visually split horizontally. The lower, darker section of the Chiron Pur Sport visually blends with the road in terms of colour tone, producing an even flatter and more dynamic appearance. Optional, highly aerodynamic wheels with aero blades ensure improved cooling of the brakes and minimise drag. The aero blades produce air suction, draw the heat from the brakes outwards and route the airflow closely along the bodywork, which discharges it towards the rear. In addition, the very light magnesium wheels also dissipate heat so the brakes cannot overheat even during very sharp manoeuvres. The weight of the four wheels, each of which has ten spokes, has been reduced by a total of 16 kilograms. Bugatti is due to start production of the Chiron Pur Sport, which is limited to 60 units in the second half of 2020. The net price is around 3 million euros.

CHIRON SUPER SPORT 300+

Related and yet completely different: the Chiron Super Sport 300+ is a Bugatti hyper sports car with record-breaking genes. In the summer of 2019, Bugatti was the first manufacturer to break the 300 mph barrier with this car: the world-record vehicle reached a magical speed of 304.773 mph (490.484 km/h). The output of the 8.0-litre W16 engine was increased by 100 PS to reach 1,600 PS. ''With the Chiron Super Sport 300+, it was clear to us from the start that we needed to greatly reduce wind resistance. A vehicle that can go over 300 miles per hour has to be extremely streamlined,'' explains Frank Heyl. But there isn't just one big aerodynamic solution: a multitude of small details go together to achieve the desired result. ''For me, this was the fulfilment of a long-cherished dream: to design a high-speed vehicle with an extended rear end — a so-called longtail,'' says Frank Heyl.

The use of the longtail dates back to motorsports in the 1960s. Cars at events such as the 24 Hours of Le Mans reached a top speed of initially 300 km/h only with an extended rear end, and in the early 1970s they even achieved around 400 km/h on the famous Hunaudières-Straight. The fact that the longtail is back in the limelight today is not just a throwback to the heroic racing cars of bygone days: there are also sound technical reasons. For the Chiron Super Sport 300+, the design team reduced the size of the stall region at the rear end. In order to achieve this, they extended the downward sloping surfaces coming from the roof and upward sloping surfaces coming from the diffuser. This considerably reduces the stall region at the rear, thereby minimising the effect of the suction created there which brakes the car. The Chiron Super Sport 300+, of which production will be limited to 30 units, is lengthened by about 25 centimetres in total.

''With the Chiron Super Sport 300+, the aim is to keep the laminar flow against the body for as long as possible,'' explains Frank Heyl. The rear wing remains retracted at top speed, in order to achieve neutral and balanced handling at 490 km/h. The diffuser is crucial here: in order to attain the smoothest possible air flow in the middle of the diffuser, Bugatti has shifted the exhaust system — otherwise located at the centre — to the sides, so instead of being positioned next to each other, one is now on top of the other. This creates more space for the diffuser and is stylistically based on the legendary English Electric Lightning F6 with its twin afterburners. The advantage of the diffuser is that it produces zero drag downforce, while a rear wing creates drag. That's why the air flow is important at the front, too. ''The influence that the front section has on airflow can't be corrected later on, so it has to be perfect,'' explains Frank Heyl.

In addition to a more dynamic appearance, the design of the front section is primarily aimed at routing the air around the corners of the vehicle. The air curtains on the side next to the air intakes have a key role to play here: they guide the air from the front around the corner and keep it up against the side of the vehicle. ''This reduces resistance while at the same time improving the flow of air onto the side radiators,'' explains Frank Heyl. They also look authentic. In addition, nine exhaust-air holes on each wing prevent air pressure from building up in the wheel arches as a result of wheel rotation, which would create unwanted lift. The developers have dispensed with additional spoilers so as to achieve the smoothest possible air flow — true to the Bugatti motto: form follows performance.

The colour combination of exposed carbon with orange on the bonnet, roof and rear follows a tradition: this was the colour combination used for the world-record vehicles Veyron Super Sport World Record Edition and Veyron 16.4 Grand Sport Vitesse WRC Edition. The orange elements represent the stripes of a US road surface.

Bugatti will produce only 30 of the Chiron Super Sport 300+ at its Molsheim Atelier, at a net unit price of 3.5 million euros. Breathtaking and extraordinary. Like all hyper sports cars built by Bugatti.

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[2] Chiron Pur Sport: WLTP fuel consumption, l/100 km: low phase 44.56 / medium phase 24.80 / high phase 21.29 / extra high phase 21.57 / combined 25.19; CO2 emissions combined, g/km: 571.64; efficiency class: G

[2] Chiron Super Sport 300+: WLTP fuel consumption, l/100 km: low phase 40.31 / medium phase 22.15 / high phase 17.89 / extra high phase 17.12 / combined 21.47; CO2 emissions combined, g/km: 486.72; efficiency class: G