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SPECIFICATION

Lamborghini Aventador
Engine: 6490cc V12, 690bhp, 9000b ft
Performance: 0-100mph in 2.9secs
Transmission: 7F
Transmission: Seven-speed Independent
Shifting Rod, mid-engined, all-wheel drive
Weight: 1579kg

If the car's design is the stuff of strong publishers, the technical story simply manifests all corners. According to Maurizio Reggiani, Lamborghini's director of R&D, "We reduced the weight of every component, we increased power but reduced consumption and CO₂ emissions, we introduced the world's fastest-shifting gearbox, we have an active all-wheel drive system, pushrod suspension to reduce unsprung mass and improve kinematics... and for us the only possibility was to do the entire monocoque in carbon fibre, not just the tub. The new car is 30 per cent lighter than the Murciélago but 150 per cent stiffer. What lies beneath the dress is as beautiful as the parts you can see."

In an increasingly competitive arena, Lamborghini definitely thinks it has the edge when it comes to carbon fibre. While McLaren's 12C has a carbon tub, and Ferrari insists that carbon fibre remains uneconomical for all but its lowest-volume supercars, Lambo has forged ahead with a complete CFRP chassis on the Aventador while readying a wholly carbon-fibre successor for the Gallardo.

That's two years away, though. Today, Lamborghini already has its own extensive in-house carbon-fibre production facility in Sant'Agata, and – as it demonstrated on the Seno Elemento – it's mixing a variety of composite disciplines within that. The new car's load-bearing structure – tub and roof – effectively functions as an incredibly strong single item. The passenger cell that forms the heart of the

car weighs just 147.5kg, and with its front and rear aluminium sub-frames added, it's just 229.5kg (overall weight is 1,579kg). Should you feel so inclined it would take 26,000lb of force to twist the shell by one degree, pretty solid, even on the worst day.

As we explored in issue 210, Lamborghini has been working closely with Boeing's materials experts (the new Dreamliner features 23 tonnes of carbon fibre) and the boffins at the University of Washington in Seattle. One of the big breakthroughs is in the different processes it uses to construct the Aventador's monocoque; Resin Transfer Moulding (RTM), prepreg and braided or woven elements all have a part to play. There's a foam layer within the chassis to improve stiffness, but it also dampens the noise and vibrations that can plague carbon structures.

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