



The New Lexus ES Takes Cabin Quietness to a Higher Level

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The Lexus ES has a long-established reputation for a calm and quiet cabin, but with the new generation model – the first to be offered in the UK – the development team wanted to push the standard even higher. Their challenge took three years of innovation, creativity and painstaking attention to detail to achieve.

Their intention was not to secure the kind of silence that isolates the individual from the outside world, like that experienced in a soundproofed recording booth for example, which can be unnerving rather than relaxing. Rather, they looked to create a quiet environment where you can enjoy the full quality of the car's audio system or share a conversation without the intrusion of unwelcome external noise.

Hiroataka Tsuru was responsible for designing the noise and vibration control features, taking as a benchmark the performance of the Lexus LS flagship limousine and other prestige models. He explained: "Quietness isn't a quality that can be improved simply by blocking noise. For example, we developed a test model which greatly suppressed noise bandwidths at or around 1kHz – the range that's most readily picked up by the human ear. But in doing so the air density inside the car increased, creating an unpleasant effect that wasn't at all relaxing."

He divided his task into three phases, first eliminating noise sources. The ES underwent wind tunnel testing to pinpoint every source of wind noise and tiny adjustments were made to the position of the door mirrors, wipers and other external parts to reduce the volume of airflow, even if only by a few millilitres.

Next he turned to noise insulation to reduce the level of noise entering the car, blocking off potential routes, filling openings in the floor and inner bootlid, or sealing them with sheet metal. In the third phase he concentrated on noise absorption, adding absorbent materials to the suspension towers, wings, underfloor and other areas.

"Thanks to our use of wind tunnel testing, we were quickly able to reduce the level of wind noise," said Tsuru. "The advantage of using the Lexus wind tunnel is that it is a lab-designed for testing low noise levels, which means we can quantitatively measure the wind noise level while controlling interior noise levels and sources at the same time."

The team also had to take into account variable factors, such as road conditions which change moment to moment when driving. Although it's impossible to account for every variation, failing to deal with sounds across certain bandwidths can make them more noticeable than usual – in simple terms, creating a noisier car.

“If you look at other transport modes, planes for example have a sound pressure level of 80 decibels,” Tsuru said. “In cars, that figure is usually between 60 and 70 decibels. Generally speaking, people find higher sound pressure levels to be more irritating to the ears.

“However, despite the level being higher in planes, most people wouldn’t consider planes to be particularly noisy. When you’re in a car, though, the environment through which you travel constantly changes. Depending on the circumstances, you might find the ride to be noisy, even if the sound pressure level isn’t that high.

“Changes in the environment are most often caused by natural elements such as the wind and changes in road conditions. In the end, we needed to incorporate these factors into the design as well, in order to produce a pleasing aural environment in which every type of sound– both good and bad– is precisely adjusted. It was a difficult process that required a lot of patience.”

The new self-charging ES 300h hybrid saloon will be launched in the UK early next year. Lexus retailers are accepting orders now.

ENDS