

EXTREME MEASURE

Mazda Crash Testing

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Hurricane-force winds, desert heat, and blasts of microwave energy are just a few of the intense tests Mazda's cars go through to get them ready for the road. We take a rare look inside the vast chambers where the quest for driveability and reliability takes place.

WIND TUNNEL

"My job is to reduce the noise level caused by the wind. If we can create a silent, relaxing, sophisticated atmosphere, drivers will be able to focus more on the driving."

TAKUYA FUJITA

Engineer working at the Thermal & Fluid Function Development Gr., Vehicle Testing & Research Dept.

Mazda made great strides in the [refinement of the Mazda CX-5](#). And much of that comes down to time spent in the wind tunnel. Here, in the path of a 140 mph blast of air, the car's aerodynamics were fine-tuned to improve high-speed stability, while increased insulation and improved window and door seals were developed to reduce wind noise and improve fuel efficiency by reducing air resistance. Since 1983, when Mazda built the aerodynamic testing facility at its Miyoshi proving ground just north of Hiroshima, every production model has passed through its doors. Typically, the aero testing program lasts two years from first concept to finished model. This test chamber's fan is 26 feet in diameter, spins at 223 rpm and its first subject, back in 1983, was the Mazda 323.

CLIMATE TESTING LABORATORY

"I aim to deliver products that perform perfectly, without any malfunctions caused by climate factors, in all markets around the globe."

SHO SHIMAMOTO

Engineer working at the Drivability & Environmental Performance Development Gr.

At the flick of a switch the sun appears. Row upon row of huge halogen bulbs turn night into day with a Death Valley intensity of light and an accompanying barrage of heat. In a matter of minutes, the temperature will reach 130°F and an array of endurance tests will begin on this [Mazda MX-5](#). During development, all new Mazdas spend up to 30 days in here, tested for performance and emissions in the most extreme conditions. Cars are driven at speeds of up to 124 mph on the rolling road or simply left under the lamps to examine the effects of heat soak. A matching chamber sits on the other side of the control room; this one a giant refrigerator that chills to -40°F ensuring that all temperature extremes are covered. This is one of Mazda's newer chambers (having opened in 2012) and, with a lighting power of 880 kW, it is one of the brightest. The first car tested in here was the [MX-5 ND](#).

SAFETY CENTER

“I will continue to pursue safety, until we develop a completely accident-free car.”

DAISUKE TSUJI

Assistant manager of Side & Rear Crash Safety Development Group

Several times a day, the Mazda Safety Testing Laboratory echoes to the sound of deploying airbags and tortured metal. Every new model goes through more than 100 different crash tests to ensure that it meets the very highest safety standards. A special truck is slammed into test vehicles at different angles at speeds of up to 55 mph, while cars are also thrust into solid concrete walls and metal posts to simulate the most common collisions. Mazda's use of high-tensile steel in its [SKYACTIV](#) body design has made its cars safer than ever before, but the quest for safety continues. By developing ever-stronger cars with unsurpassed agility and intuitive handling alongside i-ACTIVSENSE driver aids, Mazda has set its target on ultimately achieving an accident-free world. The Mazda Familia was the first model to face the remorseless crash test when the center first opened in 1965.

ANECHOIC CHAMBER

“I think 99% of the people don't realize what we do here, and its importance—but if you're driving, your car is going to be exposed to various electromagnetic waves.”

YASUSHI HAMADA

Staff manager leading the Electro-magnetic field test, and Electric CAE technology at the Integrated Control System Development Div.

With Wi-Fi, cell phones, GPS, digital radio, and television all competing for space, our airwaves are a constant buzz of broadcasts on an increasing number of frequencies and wavelengths. Modern cars are packed with electronic systems—typically up to 100 computers—that need to be protected from potential malfunctions. That's where this striking anechoic chamber comes into play. Inside the huge space, insulated with carbon tubes and polystyrene, sealed off from the outside world, Mazda engineers bombard vehicles with radio waves—powered by a transmitter that's more powerful than a national radio station. After testing here, all Mazdas are guaranteed to be totally safe from harmful electromagnetic waves, anywhere in the world. Much like the climate testing laboratory this chamber opened in 2016, but unlike its colleague, the anechoic's first subject was a CX-5.

NVH TEST CHAMBER

“You hear various sounds when you are in a car; for example, the sound of the engine, tires, wind... we want to harmonize all of these sounds, and fine-tune them so that they will turn into sounds that are enjoyable to listen to.”

TAKAYA KATSURAGAWA

Assistant Manager, and team leader of Quietness Development

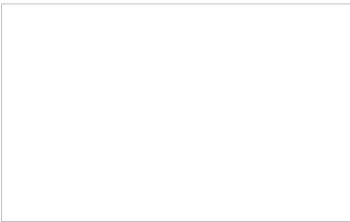
You could hear a pin drop in here. The vast chamber is absolutely silent to allow Mazda engineers to evaluate what's known in the industry as Noise Vibration and Harshness (NVH). A rolling road lets a car run at speed to assess exterior noise, while individual body panels are instrumented to measure sound transmission. Even the sound of the doors closing and opening can be measured, and then adjustments made to make it more appealing. Cars spend months inside the chamber during their development, but there's ultimately no substitute for the open road, and many thousands of miles of road testing will also be used to fine-tune how your next Mazda will sound from inside and out. The NVH Test Chamber opened in 1989, and features a rolling road that replicates speeds of up to 137 mph. The Mazda 323 Familia was the chamber's first customer.



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