

2012 Tesla Model S Electric Sedan - Auto Shows

As Tesla shows a deconstructed Model S at Detroit, we get a report on the pure electric super-sedan's progress.

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January 2011

Tesla Motors let the visuals do the bragging for a change. At its stand at the [Detroit auto show](#), a prominent sign reported 8,825,532 miles logged by the 1500 [Tesla Roadsters](#) delivered to customers in 30 countries. Video screens portrayed a svelte [Model S](#) hatchback sedan accumulating test miles on public roads. But the centerpiece on display is a completed Model S body-in-white, battery pack, and powertrain standing tall for all the world's skeptics to study.



Instead of the usual incredible future prognostications by Tesla Motors chairman Elon Musk, the dialogue was more of a progress report by chief engineer Peter Rawlinson with backup provided by key members of his technical team.

Rawlinson stated that alpha prototypes of the Model S are running and body design is frozen in anticipation of meeting the previously stated target: deliveries commencing next year. A \$5000 refundable deposit will reserve a place on Tesla's Model S customer list. Prices start at \$49,500 for a base model (assuming that all federal/state tax credits and rebates will still be applicable).

Inside the Model S

The Model S's unibody is an assembly of aluminum stampings, eight castings, and extrusions joined with an assortment of adhesives, rivets, and welds. High-strength boron-steel reinforcements are also used in key areas: the bumpers, the cross-car steering-column support, and inside the B-pillars to enhance side-impact performance. According to Tesla's (and ex-Ford body chief) Rick Haas, the company expects to handle metal stamping, plastic molding, and body-framing tasks at its Fremont,

California, assembly plant with casting and extruding responsibilities farmed out to appropriate suppliers.

The Model S is an unusually roomy sedan in large part due to its architecture and the density of its energy-storage and power-delivery systems. A four-inch-deep aluminum box running most of the car's length and from sill to sill houses 7000 cylindrical lithium-ion laptop batteries. Coolant circulates through this electrical storehouse and the box makes a significant contribution to the car's rigidity and collision performance. The body sills consist of full-length aluminum extrusions that provide ample structural stiffness and convenient attachment points for the battery box.



A cast-aluminum crossmember supporting the front suspension and electrically assisted rack-and-pinion steering gear is rigidly attached to the body structure. At the rear, there's another cast subframe connected to the body through four rubber-isolated mounts. The AC drive motor, single-speed transaxle, and power inverter are integrated into a single cylindrical assembly attached to the subframe through three rubber isolation mounts. The front suspension is a two-control-arm design while the rear is a multilink arrangement with an air spring at each corner of the chassis. This show chassis was equipped with Brembo disc-brake components.

Energy Density

Engineer Nick Sampson revealed that the total energy capacity is 80 to 90 kWh, or more than three times the [Nissan Leaf](#)'s capacity. Three battery options will be offered to provide a claimed operating range of 160, 230, or 300 miles. Both the number of batteries and the individual cell capacity will be varied to achieve this impressive range,

not to mention a claimed 0-to-60-mph acceleration time of 5.6 seconds. Recharge time varies from 45 minutes for an 80-percent boost using a high-voltage outlet to 18 or more hours on a typical 120-volt tap.



The seating array is two adults in front, three in back, plus a provision for two small children in rear-facing safety seats located in the forward portion of the rear cargo compartment. A large hatch provides access to the voluminous rear trunk and in base form, the Model S provides 30 cubic feet of luggage between its two trunk compartments. Since the heavy components of the driveline are positioned behind the rear-axle centerline, the Model S has a front-to-rear weight distribution of 46/54 percent.

Last year's initial public stock offering, buy-ins by Daimler-Benz, [Toyota](#), and Panasonic, and a \$465-million loan provided by the U.S. Department of Energy have Tesla Motors charging toward its ambitious goals. The engineering department is well-staffed and experts responsible for finance, marketing, and publicity are in place. The ex-NUMMI manufacturing plant, which is where this sedan will be built, is a beehive of activity. While hopes are high for a smooth Model S introduction, we'll need several more progress installments to know whether the world's first pure-electric premium sedan will succeed.

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