

Guiding Air Helps with Fuel Efficiency

The 2014 Sierra full-size pickup truck has spent more development time in a wind tunnel than any GMC pickup before it, resulting in design changes that benefit both fuel efficiency and interior quietness.

To achieve improved airflow, aerodynamic engineers like Diane Bloch examined every millimeter of the truck to find areas of improvement, debunking some popular myths along the way.

To study the way air passes over, under and around the Sierra, engineers used General Motors' Aerodynamics Lab, a 750-foot-long tunnel through which a 43-foot-diameter fan powered by a DC electric motor with the equivalent of 4,500 horsepower can generate winds of up to 138 mph. Aerodynamic advancement is one reason why the 2014 Sierra will be the most fuel-efficient V8 pickup on the market, according to GM officials.

"We can't stop air; we can only guide it through the path of least resistance. It's like electricity, without the shock," said Bloch, GM aerodynamic performance engineer. "The biggest misconception is that it's all about single components. But a certain side mirror design doesn't create a certain amount of drag – its interaction with the rest of the vehicle does."

For example, a new air dam below the 2014 Sierra's front bumper successfully reduces drag because it directs air toward the ground and away from the truck's rough underbody. And Sierra's ducted flow path between the grille and radiator prevents air from swirling inside the truck's front cavities. Even the top of the Sierra's tailgate and the center high-mounted stoplight are optimized to guide air cleanly around the truck. Be-



The 2014 Sierra undergoing wind tunnel tests.

cause Bloch's team saw unwanted airflow between the cab and bed, new sealing has been added.

"We discovered that in the computational analysis we perform," said Bloch. "The most harmful air between the cab and bed was coming over the cab and down through the gap, so we paid the most attention to that specific area."

The pickup market has a great number of available aftermarket accessories, and Bloch said those have a varying impact on aerodynamics. Add-ons like bug deflectors on the hood or wider tires can raise the drag coefficient, which is the measure of how air pushes on a vehicle as it moves down the road.

The result: added noise and increased fuel consumption.

A long-disputed topic among truck owners is whether a tailgate raised or lowered is better for aerodynamics, but Bloch says a tailgate in the up position is more aerodynamically efficient.

As air flows over the truck, it falls over the cab and pushes forward on the rear of the truck. With the tailgate down, the benefits of that airflow are diminished.

"Replacing the tailgate with an aftermarket net is worse than having no tailgate at all," Bloch said. "Imagine dragging a solid object and a fishing net through water. The net is going to require more muscle."

So what accessories can truck owners add to help aerodynamics?

Tonneau covers for the bed help smooth air flow over the truck, and Bloch said soft covers are more beneficial than hard covers because they form to how the air wants to flow.

Running boards can also help air flow smoothly down the truck's sides.

"Round, tube-style running boards can provide a minor improvement to the truck's drag coefficient," said Bloch. "Fully integrated, flush-mount running boards are even better."

Ford to Shutter Assembly, Engine Plant Production in Australia by End of 2016

Ford will close its Australian car and engine plants in 2016 after almost 90 years of manufacturing there.

Approximately 1,200 jobs in Ford's Broadmeadows assembly and Geelong engine plants will be lost when manufacturing at those sites ceases in 2016, Ford Australia CEO Bob Graziano said.

Both plants are in the state of Victoria.

Ford will continue to import vehicles in the Australian market through more than 200 dealers.

Ford announced the plan May 23, noting that the move will produce a more efficient and profitable business structure and adding that the decision on local manufacturing was driven by increasingly challenging market conditions, including market fragmentation and the high cost of manufacturing.

Ford losses in Australia in the last five years have totaled approximately \$600 million (AUD).

"All of us at Ford remain committed to our long history of serving Australian customers with the very best vehicles that deliver cutting-edge technology at an affordable cost," said Graziano.

"Unfortunately, due to challenging market conditions, we are unable to do that longer-term while continuing to manufacture locally."

All manufacturing employees' benefits will be provided in line with current agreements. During

the next three years, Ford will work with affected employees and their representatives on support arrangements and provide clarity about the closure process.

"We know this announcement is very difficult, especially for our employees," said Graziano. "Providing support to those in our team whose roles will be affected is a key priority for us during this three-year transition period."

While the way Ford is structured is changing, Ford says its commitment to Australia remains strong.

"Ford will remain a significant employer in Australia, with more than 1,500 team members, as will our network of more than 200 dealers around the country," said Graziano. "The Australian team's role as a global center of excellence for vehicle development also will continue to be an important focus for us."

Australia is currently one of four product development hubs for Ford globally. Recently, the Australian team has been responsible for designing, engineering and testing global vehicles, including the Ford Ranger and Ford Figo, and will continue this task.

Currently, Ford has more than 1,000 team members in product development in Australia, giving the company more designers and engineers than any other auto company in Australia.

"Our customers will buy and

service Ford vehicles through the same great dealers we have throughout the country today, and we will continue to support the communities in which we operate," said Graziano.

Given the changing dynamics of the auto industry, a number of business scenarios were reviewed during the past year to determine next steps for Ford's Australian business.

Ford officials say all viable alternatives were evaluated as part of the process, including manufacturing various types and combinations of vehicles for local sale as well as the viability of a significant export program. The scenarios investigated, said Ford, also included varying levels of government support, manufacturing cost reductions and productivity improvements.

Australia has annual sales of approximately 1.1 million new vehicles, and customers have access to more than 65 brands and 365 models available for sale. This makes Australia one of the most competitive and crowded automotive markets in the world.

"Given the fragmented marketplace and the low model volumes that result, we decided that manufacturing locally is no longer viable," said Graziano.

As part of the transformation, Ford has plans to introduce even more new products – including a 30 per cent increase in the number of new vehicles offered to Australian customers by 2016.

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