

Initially meant to be just a vehicle refresh, the 2013 Ram 1500 program ended up being a major re-engineering project.



Re-engineered Ram

Thermal management—along with other significant changes—improves Ram 1500 fuel economy and earns EPA off-cycle credits.

by Paul Weissler

Thermal management isn't a new frontier for improved fuel economy, but automakers are finding that seemingly small changes add up and that system integration provides opportunities to do more with less.

The 2013 Ram 1500 pickup HFE (high fuel efficiency) uses a host of effective ways to get class-leading truck fuel economy, and the U.S. EPA window sticker numbers are impressive: 18 mpg city, 25 mpg highway for the 3.6-L V6 with idle-stop and eight-speed automatic—a 20% improvement over the previous model. The standard V6/eight-speed model (without idle-stop) is close: 17 mpg city/25 mpg highway.

The eight-speed automatic accounts for six of the 20 percentage points, and although the 3.6-L V6 and low-rolling-resistance tires also contribute, thermal management plays an important part, too. The previous generation had a 3.7-L V6 with only the six-speed automatic and EPA numbers of 14 mpg city/20 mpg highway.

At the front are computer-controlled “active” grille shutters, a considerable advance from their historical origin: a manual “winterfront,” primarily on trucks and buses, to restrict grille airflow to raise coolant temperatures for cabin heating. Next we began to see computer-controlled shutters on premium European cars as a way (with a road speed input) to improve vehicle aerodynamics. The Ram 1500 pickup is a step ahead.



automotive
ENGINEERING
international

Mike Cairns

Head of Ram Truck Engineering

Mike Cairns discusses weight reduction and other changes to the 2013 model, including an air suspension system adapted from the Jeep Grand Cherokee, in this AEI-captured video viewable on the SAE site at <http://video.sae.org/11615>, or at <http://www.youtube.com/watch?v=xb1Wie5KpY4>. (Ryan Gehm)

If forward motion (“ram”) airflow is more than sufficient for the front-end cooling module (condenser, radiator, and transmission oil cooler), the shutters close to the extent possible and excess airflow runs over and around the front end. The Ram’s coefficient of drag is 0.360 in the HFE vs. 0.376 for the standard model and 0.386 for the 2012 edition. A truck bed tonneau cover also is used on the HFE, and it’s a measurable contributor to the HFE aero, too.

Most road-speed-triggered active shutters close for improved aero at 35-40 mph (56-64 km/h) if coolant temperatures are in an acceptable range. The Ram’s more comprehensive strategy, however, uses a test-proven map that is based on coolant,