Elliptical Acoustic Mirror Makes for Quieter SUV

by Irena Granaas
Special Writer

Depending on how well designed a new vehicle is, road noise can be extremely distracting or fade gently into the background.

Optimizing control of exterior noise, vibration and harshness ensures a more pleasant and relaxing commute for the vehicle's occupants.

Recognizing the value of a quiet interior, Ford Motor Co. employed a high-tech device called an elliptical acoustic mirror to design the quietest possible interior for the all-new Ford Escape.

This mirror, which resembles a satellite dish with a microphone, pinpoints "hot spots" where exterior noise penetrates the interior of the vehicle. It's a cutting-edge solution which up to now has mostly been used in Europe to design luxury automobiles.

Road noise versus a quiet ride probably isn't the first thing consumers look for when they go to a dealership to weigh their next vehicle purchase, acknowledges Ford spokesman Aaron Miller.

But once they're considering a specific vehicle and take that car for a test drive, the exterior noise and vibration quieting capability of its interior declares itself, you might say, "Loud and clear."

"It definitely contributes to customer satisfaction," Miller said.

"If you just think about it, in your daily commute, all the exterior noise going on, if you're either trying to have a conversation on the phone, trying to listen to the radio or just want a place to escape in the inside of the car, you want the interior to be quiet, because all of the distractions from the outside could disturb your driving or whatever you're trying to do.

"When people are taking that car for a test drive, they definitely can notice if there's a lot of noise coming from the outside, whether it's from going over a pothole or if it's busy traffic, so it's definitely a contributing factor.

"I'm not going to say it's a leading factor in purchase consideration, but it definitely helps to the overall customer experience and customer satisfaction."

Creation of the new, quieter Escape was done at the Ford Aeroacoustic Wind Tunnel in Germany.

Using data from the acoustic mirror, engineers were able to make strategic changes to the shape of the Escape, particularly to the A-pillar and exterior mirrors, while development was still in the early clay model stage.

Engineers were able to test noise-cutting theories and validate their effectiveness in an efficient, cost-effective manner.

The Ford team fine-tuned the vehicle's final shape and acoustic qualities with more than 160 hours of engineering. Using the Wind Tunnel with acoustic mirror, engineers could test more than 20 configurations per eight-hour day, including adjustments to the glass, door sealing, and mirror sealing.

"Using the elliptical acoustic mirror helped the team pinpoint the source of the noise," Bill Gulker, NVH (noise, vibration and harshness) supervisor, stated in a news release.

"Previous technologies required more of a trial-and-error approach to finding the issue."

With the acoustic mirror enabling the Ford team to optimize the vehicle's shape in an early stage of its development, the new Escape is measurably quieter than the outgoing model. In fact, early data indicates this vehicle will be among industry leaders in interior quietness, thanks in large part to tuning work on its A-pillar, which gives the Escape better noise performance when a cross-wind situation occurs.

Ford's elliptical mirror helped make the all-new Ford Escape the quietest Escape ever.

"We benchmarked (in interior quietness) against the Volkswagen Tiguan and an Infinity," Miller said.

Further good news for Ford is that vehicle design teams will have access to closely related technology for state-side vehicle manufacturing.

Miller said Ford is using a similar tool that evolved from the acoustic mirror at one of its U.S. plants.

Company sources note the technology behind the acoustic mirror dates back nearly 100 years. A precursor to radar, it was used by Great Britain to detect enemy aircraft along its coast during World War I.

Trenton Engine Produces One-Millionth Pentastar

AUBURN HILLS – Chrysler's powertrain team is on something of a roll these days.

That's because just 18 months following the start of production as the standard engine for the 2010 Jeep Grand Cherokee, the one millionth Pentastar V-6 engine was assembled recently at the Chrysler Group's Trenton (Mich.) Engine Assembly Plant.

"The Pentastar engine is a cornerstone of Chrysler Group's effort to reinvent its business model with world class quality products. This award-winning engine is proof that the Company is transforming it products to meet the needs of our customers," said Brian Harlow, Vice President, Head of Powertrain Manufacturing, Chrysler Group LLC.

"To build one million of anything, and in an impressively short amount of time, is a significant achievement. But to do it with such a high degree of quality is a testament to our skilled and dedicated workforce at both Trenton South and Saltillo engine plants."

The 60-degree, V-6 engine, the most advanced six-cylinder ever produced by Chrysler, is now available in 11 vehicles across the Chrysler, Dodge and Jeep lineup and available in front-, rear-, and all-wheel-drive configurations.

Depending on the vehicle, engines are tuned for specific applications with horsepower ranging from 283 on front-wheel-drive models and up to 305 horsepower on the sporty Dodge Challenger. The all-aluminum engine is standard or available on the Chrysler, 200, 300 and Town and Country; Dodge Avenger, Challenger, Charger, Durango, Journey and Caravan.

For 2012, the 3.6-liter engine also is standard with Jeep® Wrangler and provides 285 horsepower – an increase of 40 percent over last year's model. Torque is up 10 percent to 260 lb. ft. and highway fuel efficiency is improved to 21 miles per gallon on the 2012 model.

Engineered to meet a variety of requirements, the Pentastar V-6 engine also is the exclusive engine used with the new eight-speed automatic transmission on the Dodge Charger and Chrysler 300 models. The new engine and transmission combination deliver 31 mpg on the highway.

Just recently, the Pentastar V-6 repeated as one of the "10 Best Engines" following evaluation and testing by editors of Ward's Automotive magazine.

Despite the impressive gains in power, the engine is designed to run on regular 87 octane gasoline. It also is capable of running on alternate fuels including E85.

Since its introduction, the new engine has replaced six legacy V-6 engines ranging from 2.7-liter up to 4.0-liters in the Chrysler Group LLC product portfolio. Overall, the new Pentastar has enabled Chrysler's Powertrain organization to reduce major engine components from 189 parts to just 32, greatly simplifying the build process and improving quality.

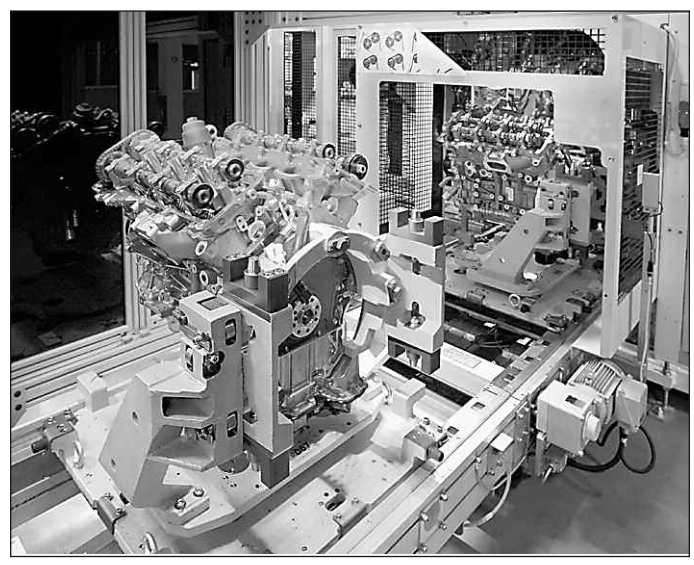
Some parts, including exhaust manifolds, have completely disappeared by virtue of being cast directly into the cylinder head. Previously, 32 different exhaust manifolds were used on a variety of V-6 engines. Upper- and lower- intake assemblies, which accounted for 21 and 11 different part numbers (respectively), have been reduced to two upper and two lower assemblies.

Camshaft variations have dropped from 14 to four and just two fuel -rail assemblies are now required rather than the previous 14.

Weight reductions are equally impressive. Fully dressed, the new Pentastar V-6 is 94 pounds lighter than the 3.7-liter engine it replaced on the Jeep Grand Cherokee. Similarly, while larger in displacement, the Pentastar is 42 pounds lighter than the 3.5-liter it replaced in the Chrysler 300.

The engine also is extremely efficient with advanced emission technology.

The V-6 requires no Exhaust Gas Recirculation (EGR) which helps reduce the mass and complexity of the engine. The engine meets Federal Tier 2 BIN 5 emission requirements and Ultra-low Emissions Vehicle II (ULEV II) standards, and was designed to meet all known future worldwide standards including LEV III and PZEV Californian standards. For export, the engine is capable of meeting Euro6 emission standards.



Chryslers new Pentastar V-6 engine goes through the rocker arm location verification station at the Trenton Engine plant. The Trenton plant recently assembled its 1 millionth Pentastar engine since production began 18 months ago.

In addition to Trenton South, the Pentastar V-6 also is produced in Saltillo, Mexico.

More than 1,300 workers are employed at the two engine assembly plants with two shifts at each location. The Trenton Engine Plant, one of Chrysler group's most modern plants, was the first engine manufacturing facility to receive the U.S. Green Building Council LEED Gold Certificate for environmental excellence in building design.

The Cadillac Ciel concept car at the Chicago Auto Show. Pronounced "C-L," the French word for sky, the Ciel is a four-seat convertible that opens a new chapter in Cadillac's long design history.

Chicago Show: A Different Influence

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Cadillac was there with all models including the blacked-out 2012 CTS-V Sport Coupe with 556 H.P. and the Ciel convertible concept car which harked onlookers back to the '50s.

Of particular interest to Illinois is the all-new Dodge Dart, which will be produced at the Belvidere auto plant (formerly home to Neon and others).

The new Dart is wider and longer with a very affordable base price of a little over $15,000. In addition, Ford's new Police Interceptor will be manufactured in the heart of Chicago on Torrance Avenue.

One couldn't help but notice that attention to detail has risen to new levels. U.S. car manufacturers now rival their European counterparts in the fit-and-finish department, sporting well-appointed interiors and breathtaking paint jobs.

Meanwhile, the green concept was everywhere and no more apparent than on the Chevy Volt and Ford Fusion. Visitors to the auto show during press week could make arrangements to take the Volt for a test drive through the streets of Chicago.

Charging stations for the new electric cars are popping up everywhere, both in the city as well as at stores in the suburbs. Chicago-based Walgreens plans 800 charging stations nationwide by the end of this year, by the way.

Also, generally speaking, small cars were abundant, prominently featuring Fiat 500 and Chevy's Z-Spec Hatch 2 Concept car.

Both Jeep and Ram Truck had test tracks set up for thrill-seeking visitors to ride up a 45-degree incline.

The Chicago show follows Detroit, Washington and Philadelphia on the national auto trade show circuit. The convertible version of the revised Shelby GT500 made its world debut as well.

The public days in Chicago are Feb. 10-19.