

How Ford Builds Ultra-Durable V8 Engines for Mustang



Published on August 2, 2026

Document Date: Sun, Aug 02 2026 06:31:35 pm

Category: ,English,Qatar - ,Snippets

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Doha-Qatar, August 2, 2026: Ford 5.0-liter V8-based race engines were pushed to extremes no streetcar would ever see, revealing opportunities to strengthen components like the camshaft drive to better perform under high-stress conditions.

Engineers refined the design on the track and carried those improvements back into the production 5.0-liter Coyote V8 engine.

This is just one example of how Ford is bringing learnings from race testing to vehicles used for trailer towing, grocery store runs, and oceanside road trips.

The goal: to break the powertrains, the essential system of engine and transmission that generates and delivers power to the wheels and then make them better before the customers buy them.

“This requires us to look at failure differently. We now celebrate internal test failures,” said Charles Poon, Ford vice president of Vehicle Hardware and Software Engineering, and the Powertrain Engineering team.

Engines pushed to their absolute limits on the track and in the lab are sent back to facilities like the Essex Engine Plant, where dedicated mechanics tear them down daily to hunt for weaknesses.

Those weaknesses get turned into opportunities for product improvements, not just fixes—like the camshaft drive upgrade.

Without racing, Ford may not have developed this feature for retail customers as quickly. Now, customers who cruise the highway in a Mustang GT® coupe, or chase lap times in a Mustang Dark Horse® sports car experience the benefits of that race-tested durability.

“Ultimately, testing is not simply about ‘finding new defects’ — it is about validating our engineering,” Poon said.

“When a failure does occur, our goal is to predict exactly what will fail and when. That level of predictability is how we prove our engineering models truly align with real-world conditions.”

For Ford powertrains, that work never stops. Each test, teardown, and improvement helps engineers build engines and transmissions designed to deliver confidence, durability, and performance for customers on the road and on the track.