

2000 SVT Mustang Cobra R Exterior/Interior

2000 SVT Mustang Cobra R: A Performance Flagship from Concept to Customer

Development

When the Ford Special Vehicle Team first proposed a Cobra R in 1992, the concept was to provide a competitive package that would help put more Mustangs on race tracks - and in more winner's circles. While the original 1993 Cobra R had limited success (mostly on shorter, tighter race tracks), the second generation produced in 1995 was very successful, primarily due to increased power (300 bhp from its 5.8-liter OHV V8) and extra fuel capacity that provided extended range for long races. According to John Coletti, Ford Special Vehicle Engineering manager, the continuing success of the 1995 Cobra R made a new model unnecessary, until now. "This is the kind of car you *want* to do, when it's time," says Coletti. "We have a simple rule of thumb for when it's time to develop a new Cobra R: first, when there's a need, and second, when the new one will be able to far outshine the old one." With the introduction of Cobra's independent rear suspension, and with the availability of the 4-valve DOHC 5.4-liter modular V8 engine, significant elements came together that allowed the SVE team to produce a Cobra R with the kind of elevated performance Coletti wanted. To successfully produce an SVT Mustang Cobra R powered by a DOHC 5.4-liter V8 engine, the first and most fundamental issue was fitting the engine into the Mustang's engine bay. "This was uncharted territory," says Tom Bochenek, Cobra R project manager at Special Vehicle Engineering. "Some said it couldn't be done. So first we had to prove it was possible." There were two parts to the engine-fit issue: physically placing the large 5.4-liter DOHC V8 without major body and chassis alterations or displacement of parts surrounding it; and engineering the process so installation could be done on the Dearborn Assembly Plant's line. On both counts, the SVE team proved that the 5.4-liter engine was feasible. They redesigned the engine mounts to lower the engine 6mm, and also lowered the number-two crossmember 6mm, which resulted in a powertrain 12mm lower in the car's body. In addition, they specified stiffer rubber in the engine mounts to reduce movement. The fit also involved re-routing several water hoses, moving the accumulator and brake fluid sensor to a new location, and removing the bleeder valves from the brake master cylinder assembly. Now the 2000 Cobra R had an estimated 385 bhp and 385 lb.-ft. of torque on tap. The SVE team's next challenge was to properly harness all that power. They proceeded to specify, engineer and fit all the components necessary to put the power to the road reliably, and to provide the best possible handling and braking. It involved a component-by-component evaluation. The team changed everything that was required to achieve the car's performance purpose and to provide the essential reliability and durability. "When working on low-volume niche products like this, the whole idea is to use as many carryover components as possible," says Bochenek. "That helps reduce costs and timing for tooling." For example, when it came to mounting the six-speed transmission, they were able to use the '98 Cobra's number-three crossmember, along with reinforcement brackets that provided extra support. During the Cobra R development, the SVE team came to a conclusion that significantly changed the final outcome. "We started out with the simple notion that this car had to be better than the previous Cobra R and keep us competitive on the race tracks," Coletti says. "But as the car's potential started to become apparent, we saw the opportunity to take the car to a much higher performance level and produce the ultimate Mustang Cobra. "We had the solid support of our management," he points out, "so we were able to go beyond the original concept and push the envelope in several different areas." One of those areas was aerodynamics, and what has evolved is a car that is very stable at its top speed of more than 170 mph. "With this car's power, it was capable of a top speed around 175 mph with the stock bodywork," Coletti says. "At those extreme speeds the stock Mustang body shape generates lift, both front and rear, so the handling became kind of a white-knuckle affair." Comprehensive wind tunnel testing drove the design of the rear wing and front splitter. Those

pieces, in combination with the lowered ride height, create some high-speed downforce which in turn induces drag. The net result is a top-speed reduction of about five mph, but also greatly improved high-speed stability. Coletti also points to the front brake ducts as an addition that notches up the car's capabilities. "We run a severe set of brake tests, which involve stopping the car from 60 mph 10 times in rapid succession. To pass, the car's stopping distance on the 10th stop must be 110 percent or less of the first stop's distance. With the ducts, it passed that test; without them it didn't. That's a functional enhancement that elevates this car to a much higher level." In comparison tests, the 2000 Cobra R demonstrated its increased braking power over the 1995 Cobra R. From 60 mph, the '95 car stopped in 143 feet, while the 2000 car took just 127 feet. In this test, the 1999 Cobra showed its great braking capability with a 130-foot stop. It was the 100-to-0 test that really showed the higher level of the 2000 Cobra R's system. From 100 mph, the 1995 Cobra R took 371 feet to stop, and the '99 Cobra did it in 362 feet. The 2000 Cobra R chopped almost 50 feet off of the '99 car's distance, stopping in 315 feet. The Recaro seats were included because the team believed a car with the 2000 Cobra R's capabilities for generating high g-forces demanded a seat with the kind of support a driver really needs for racing. Touches like the instrument cluster with its 180 mph speedometer and Cobra R badge are features that complete the car's image. The 2000 Cobra R's testing and prove-out process includes two durability tests in the form of simulated 24-hour races. The first was run April 8 and 9 at Firebird International Raceway in Chandler, Ariz., and the second was December 7 - 9 at Texas Motorsport Ranch in Cresson, Texas. "We're subjecting this car to more development abuse than any previous Cobra R," Coletti asserts. "This car is going to set a new standard for power, handling, braking, and it will be an absolutely bullet-proof product. "Our development goal is to break everything that's going to break, then do the engineering necessary to fix those issues before the car ever gets into customers' hands," Coletti adds, "so they get the thoroughly engineered product they expect, and can race with complete confidence."

Production

Like the two previous generations of Cobra R, the 300-unit production run of the 2000 model is being integrated into the regular Mustang assembly process at the Dearborn Assembly Plant. And more of the 2000 Cobra R is being built at the Dearborn plant than ever before. "We gave the Dearborn Plant first right of refusal for everything on this car," Bochenek says. "Let's face it, a 300-unit niche build in a plant that produces 150,000 units per year could be seen as a major inconvenience. However, the people at the plant are so excited about the car that they've really worked hard to figure out how to build as much of it as possible. There's genuine excitement and pride of ownership there about this car. They're building the flagship of the Mustang line and they're really enthusiastic about it." Cobra Rs leave the Dearborn Assembly Plant complete except for the rear wing, hood, front splitter, oil cooler, brake ducts and Borla side exhaust pipes. They are transported to MSX International in Detroit, the company that manufactures the hood, splitter and rear wing. Here the remaining parts, except for the front splitter, are installed. To avoid possible damage to the splitter during transport (because of the car's lowered ride height), this part rides in the car's rear seat area during the trip from MSX to its designated dealership. It is then left to the dealer, or the customer if he or she chooses, to complete this final installation. The splitter is attached with Dzus fasteners, allowing easy installation or removal.

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