

Mazda MASTERY

By Joe Sage



It's been two years since we met the all-new-for-2012 Mazda3 SKYACTIV, which we drove through the mountains beyond the Hollywood Hills, in Southern California. Flash forward, and we're doing something quite similar, but in the mountains beyond the San Diego foothills, and in a Mazda3 that has advanced more than those two years might normally suggest.

Flash back a month or two, and you'll start to see why. Our San Diego launch drive of the all-new Mazda3 comes right on the heels of our weeklong Arizona drive of the all-new Mazda6. That in turn had come on the heels of our week with the Mazda CX-5, which had been all new the prior year, but for this year received a significant

boost in power—which, in fact, was exactly the only thing it needed. "Nailed it," our headline said. They then nailed it with the new Mazda6. They are the first to confirm that the pressure was on, when creating a new Mazda3.

Mazda's KODO "Soul of Motion" design language had already made it to the CX-5 and Mazda6. As we noted with the Mazda6, they have taken the essence of that theme from original auto show concept cars and delivered "an extremely high percentage of what you saw then, and in short order." We had called the actual production grille on the new Mazda6 "one of the best-proportioned in the current lineup."

If anything, the Mazda3 implementation is even moreso—and a huge improvement over the smiley face it replaces. This was a great place for the redesign to start, putting the car's style right up front, along with its high-class, smaller-size value.

The Mazda3's C-segment is the largest in the world and is now the second-largest in the US. It is only expected to get larger, with 25 percent growth forecast over the balance of this decade. Mazda has sold some 3.5 million copies of the Mazda3 in 120 countries—and won many awards—since its 2003 introduction. It's almost hard to now recall that in 2003, the segment was dominated by largely unlovable econoboxes. With both style and performance, the then-new Mazda3

drew attention immediately. With multilink rear suspension, 4-wheel disc brakes, nav, leather, xenon headlamps, rain-sensing wipers and other such traditionally high-end and high-dollar features making it into a high-fuel-efficiency mid-\$20s sedan and hatch, the Mazda3 forced everyone else to up their game.

Thus the pressure for the new Mazda3. The team's mantra was that they "must get it right." We'll jump ahead a little, right here, to let you know that, yes, they nailed it on the Mazda3, too. They have upped their own game.

At the core of Mazda's current product lineup are the dual goals of delivering a fun and performance-oriented driving experience, along with frugal fuel economy. Tackling these two attributes simultaneously is not unique to Mazda, but they do have their own comprehensive approach to it: SKYACTIV. This suite of technologies comprises the development of everything in unison—engines, transmissions, chassis and suspension, body, interior materials, you name it. All is interrelated, all is examined and some things are unexpected. For example, higher compression ratios (13:1) demand new air conditioning systems. A new transmission requires a different design for the trunk. Ultimately, anything that can be tweaked to weigh less while performing better and/or looking classier has been addressed.

Two SKYACTIV engines are available in the Mazda3: a 2.0-liter four-cylinder achieving up to 41 MPG and a 2.5-liter achieving up to 39 MPG. (Both those numbers are for the Mazda3 four-door; the five-door test cars we drove in California—specs at right—are rated a little lower.) The smaller engine has an improved low-end and midrange torque curve, while the larger one has available i-ELOOP regenerative engine braking. Your decision will fall mostly to the balance between price and horsepower. (The 2.5L has about 18 percent more power and 23 percent more torque, for just 14 percent more cost, so if you have three grand, the choice is probably pretty clear—but if not, you won't be disappointed.)

The success of Mazda's new engine comes from their approach to computer engineering, in which they have wiped classic concepts of economy of scale out of the formula. They are able to scale individual parts for maximum performance and efficiency, both, rather than adapt larger and smaller engines parts, each to the other, and rather than spend the sums traditionally needed to optimize both. Older Mazda MZR engines shared blocks among 2.0- and 2.3-liter engines, and shared crankshafts between 1.8- and 2.0-liters. Four iterations from 1.8 to 2.5 liters all were essentially the same size and weight. This



OUR 2014 MAZDA3 TEST CARS

MAZDA3 I 5-DOOR GRAND TOURING	
ENGINE	SKYACTIV 2.0L four-cylinder
TRANSMISSION	6-speed manual
HORSEPOWER/TORQUE	155 hp / 150 lb-ft
MPG (EST)	29/40 city/hwy - 33 combined
BASE	\$23,245
DELIVERY	\$795
TOTAL	\$24,335

MAZDA3 S 5-DOOR GRAND TOURING	
ENGINE	SKYACTIV 2.5L four-cylinder
TRANSMISSION	6-speed auto w sport mode
HORSEPOWER/TORQUE	184 hp / 185 lb-ft
MPG (EST)	27/37 city/hwy - 31 combined
BASE	\$26,495
CARGO MAT	\$70
REAR BUMPER GUARD	\$100
SCUFF PLATES / DOOR SILL TRIM PLATES	\$125
DELIVERY	\$795
AS OUTFITTED	\$27,290

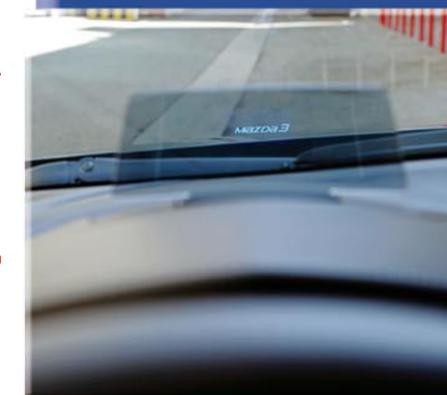
was no way to optimize fuel economy, much less performance. Bore, stroke, size and weight are all pro-rata on the SKYACTIV-G series (the two discussed here, plus a 1.5-liter). Lightweight performance, achieved.

And here's one more way all this effort ends up not only in your garage, but in your wallet: this approach to engineering reduced 45 assembly processes down to just four. The engine assembly rooms are so efficient and so spotlessly clean, you might think you are in a hospital or a climate-controlled computer clean room. The general look and feel of the finished drivetrain is surprising to most who see it—exquisite as a Swiss watch, while powerful enough to rip up the roads with pleasure.



One look at the Mazda3's cockpit shows style, features, sport and comfort you would expect to see at a much higher price point. All the vitals are designed to work with the driver's center line. The display screen is separated, so its functions remain distinct.

Mazda's ADD is a new take on heads-up displays. The familiar approach projects key readouts on the windshield glass. This could limit the slope of the windshield, and therefore the car's aerodynamics, plus it could be exposed to more glare. Mazda's solution (below): a separate transparent screen, which pops up where it's needed.



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The Mazda3's frame is heavily reworked, with more high-strength steel and alloys, resulting in a 30 percent increase in torsional rigidity. The benefits of this are many, but they include the car's best-ever steering response. Number one, the steering communicates—this is not one of the disconnected electric units we've seen in a few vehicles over the past couple of years. It steers as well as a Miata and feels even better. Steering effort is carefully calibrated for the right amount of effort at varying speeds and throughout a turn. As with all things SKYACTIV, there is more to this than just the steering mechanism. For example, a new high caster angle in the front suspension self-centers to create the neutral basis for a solid feel. The system is a fully mechanical build, with power added only for fine-tuning the driver's effort—not for the steering itself, as in full electric systems. It feels great.

Mazda claims the best fuel-economy-to-power ratios in this class—"right down to the base models." Speaking of classes and base models, Mazda points out that their overall goal is to provide "class-above" content and technology. This already includes—carried over from the previous model—such things as keyless entry and start, dual-zone climate, Bose 9-speaker audio, auto-leveling bi-xenon headlamps, heated front seats with leather trim and 6-way power driver's seat, auto headlights, rain-sensing wipers, adaptive front lighting, blind spot monitor, rear cross traffic alert and more.

Added for 2014 are LED daytime running lights, 18-inch alloy wheels, rear camera, paddle shift, a heads-up Active Driving Display (ADD: see side photo and notes on previous page), the CONNECT™ infotainment system, and more safety (or near-autonomous) electronics, such as lane departure warning, high beam control, forward obstruction warning, radar cruise control and smart city braking. Look at those prices again. A couple of years ago, you were talking Mercedes-Benz E-Class and well above, to get all that.

Much of the Mazda3's tour de technology falls under the i-ACTIVSENSE umbrella—a suite of radar-, laser- and camera-based features. Radar (76 Ghz in front, 24 in rear) provides adaptive cruise control, forward obstruction warning, smart brake support and rear blind-spot vehicle monitoring. Near-infrared laser data also contributes to smart brake support, and cameras set the stage for lane departure warnings and high-beam controls.

That's a lot of technology for a driver-oriented car, but it doesn't get in the way of your driving. Overall, these features contribute fairly passively

to your driving enjoyment. Adaptive front lighting reacts to your speed and direction plus actual perceived road conditions, to point your headlights more toward where you're going. You will be aware of blind spot warnings, and if you need them you will be glad they are there. Lane departure features vary, but the Mazda3 has the best ratio of usefulness to intrusiveness: it gives you visual and audible signals if you deviate (approximating the effect of crossing Bott's dots on lane markings). Smart braking features are of the warning and brake-force-preset variety, letting you know an obstruction is imminent, then reducing your speed to where damage should be greatly reduced, or—better still—you command a full stop more easily than you would without the assist. Its laser input claims faster responses than others who use radar. When asked whether all these features were aimed toward a future with autonomous cars—something that at the moment seems semi-inevitable in some form, industrywide—Mazda tells us that their brand is "all about the driver and the driving" and that these features are "just helping out... so far."

There are a lot of ways to choose your Mazda3, starting with seven trim levels. Five of those are with the 2.0L engine and two with the 2.5L. Trims available with a manual transmission (any of the 2.0L models) are priced \$1050 lower than their automatic counterpart. (We consider the manual, at a savings, to be a win-win, but the actual take rate on the manual is just 10-15 percent. They do say a manual is in the works for the 2.5-liter, though, and they expect a higher take rate with that.) The automatic, however (officially known as SKYACTIV-Drive), is not your uncle's automatic. This unit is engineered to work and feel like a dual-clutch manual, though below 5 mph, it operates like a conventional automatic. The result is impressive. On challenging roads in the mountains of Southern California, we found both transmissions strong, smooth and enjoyable.

The whole lineup starts with a 2.0L SV with manual, at \$16,945 base. This carries forward 16-inch steel wheels, AC, 4-speaker AM-FM audio and tilt-telescope wheel—things that do sound like the base model—but for 2014 adds that 2-liter SKYACTIV engine with 41 MPG highway rating, a 6-speed SKYACTIV transmission, stylish DRLs, USB audio input, keyless entry and push-button start, and power doors, windows and mirrors. All that for under \$17,000, and the values build from there. At the top of the chain is a 2.5-liter GT, which has everything five prior levels of 2-liters have added, plus everything an S Touring 2.5L has—including Sport mode on its 6-speed



SKYACTIV automatic, LED/DRL combos and 18-inch alloys—then adds moonroof, leather trimmed seats, adaptive front lighting, auto dimming mirror, auto headlights and rain sensing wipers. This chart-topping hit has a price of just \$25,995. On most models, that moonroof is a standalone option, a rare opportunity to choose without compromise, which may be welcome with some Arizonans, who don't always want a moonroof at all, given the intense sun beating down for a few summer months.

Mazda has been selling about 70 percent four-doors and 30 percent five-doors in the Mazda3 segment. Note that they call this a five-door, not a hatchback. Intensely popular in most of the world, hatches have traditionally received a cooler reception in the US. Calling them something else may be helping, but most likely the overall trend toward shopping smaller has awakened a few more people's senses to the wonders of this format. Mazda expects the five-door percentage to rise. Note that we grabbed five-doors for both halves of our launch drive.

Mazda is a much smaller outfit than the Japanese big three, and they have mastered their processes at this scale. Small size and focus are big pluses for the development of the SKYACTIV program and its drivetrains. And the company's efforts have not gone unnoticed in the marketplace. Sales have been strong, with the month before our launch drive having been the company's best in ten already impressive years. The newest models—the new CX-5 and the new Mazda6—are leading the pack. Supplies are tight, with turnarounds (days on the lot) in the 40s for the CX-5 and 20s for the Mazda6. If you like what you see in the new Mazda3, you might want to get your name in. ■

Drive time in the Mazda3 included some of the best roads we've driven, in the mountains east of San Diego. Through steep climbs and slaloms at speed, this car handled like a champ, all the while aiming for 40 MPG. There's a lot to love in the Mazda3.

Part of our drive route was very close to the Mexico-US border—so close, in fact, you could pretty well kick a football over the fence. That dark line three-quarters of the way up the hill is the border, and Mexico sits at the top of the hill. Mazda is building a new assembly and engine plant in Mexico, but the Mazda3 is built in Japan.

