

## A beautifully refined hot rod from Bavaria



# BMW 325e

by Jim Hall

Undoubtedly one of the better ideas to come from the Bayerische Motoren Werke in the last few years was the installation of a lightweight version of BMW's inline six in the firm's smallest sedans, the 3-series. Ever since it was introduced in Europe, over six years ago, the 323i has been one of BMW's most popular models. And even though BMW of North America never chose to import the 6-cylinder 3-series in the past, quite a few 323s managed to find their way into the U.S. through the gray market. Now, one year after the introduction of the second-generation 3-series BMW, the 318i, the American market is getting its own 6-cylinder baby Bimmer.

Called the 325e, the latest BMW is essentially a 318i with the 101-hp 1.8-liter L-4 replaced by a mildly reworked version of BMW's 2.7-liter eta concept L-6 powerplant. The 164-cu-in. short-stroke engine makes 121 hp at 4250 rpm, or to put it another way, 29 hp less than the Euro spec 323i motor. As in the 528e the 325's eta motor is a low-revving engine with crankshaft speeds kept as low as possible (5000 rpm) through a computer-controlled fuel cut-off. This redline is up slightly from the 5-series sedan that is fitted with the 2.7-liter L-6. Horsepower and torque outputs are the same as the 528e, although the oxygen sensor has been relocated farther down the exhaust manifold, and the engine control module has been specifically re-engineered for the 325e.



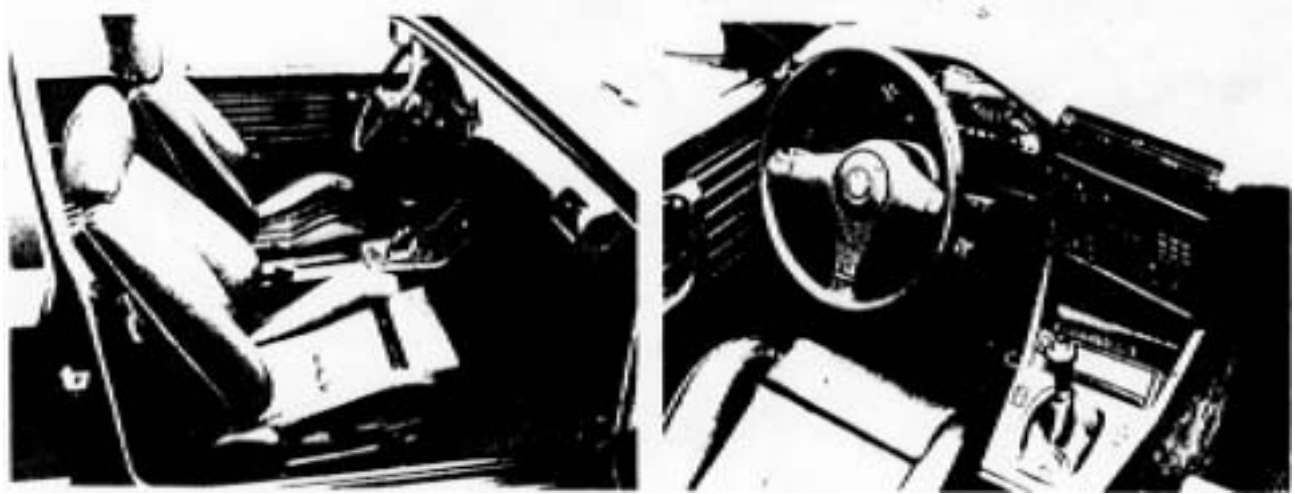
Part of the eta concept is the integration of both electronic fuel injection and electronic ignition systems. The 325 uses Bosch's Motronic ECM for all engine management functions.

Like all of BMW's 6-cylinder engines, the 325's eta motor is as smooth as a turbine. The short-stroke (81.0 mm) powerplant pulls willingly with no hesitation all the way up to the 5000-rpm fuel shutoff. With maximum power coming up just 750 rpm short of redline, and the willingness of the engine to rev, it's annoyingly easy to get into the rev limiter at first. But not as easy as in the 528e, with its fuel cut-out set to trigger at 4750



rpm.

The 325e is offered with a standard 5-speed manual gearbox, with automatic an extra cost option. The 325 we tested was equipped with the overdrive 5-speed with a 0.81:1 top gear mated to a 3.45:1 axle ratio. That works out to a 2.79:1 final drive ratio, identical to the Euro 323i. Unfortunately, the 323's optional close-ratio 5-speed with a direct top gear isn't available in the sixes destined for the U.S. Still, the 5-speed that is offered stacks up as one of the best we've driven--once it's properly warmed up. The shifter is light and precise in the gate, never balking when engaging a forward gear. The warmup period required to produce all this harmony was usually brief here in California, but we can imagine it being a problem in the cold-weather locales. When it's cold, the transmission resists engagement in first, second, and reverse. We noticed this on the 528e that BMW gave us before the 325 arrived, apparently to condition us to the joys of eta motoring.



Gear spacing is quite good, with the ratios well selected for the high-torque low-revving eta powerplant. For those fond of clutchless motoring the 325 can be had with a 4-speed overdrive automatic transmission (model No. 4 HP 22) from ZF. As automatics go, the 325e is pretty good, with decent performance after some initial bogging off the line. But even with the automatic 325 turning in a respectable 22 mpg in the EPA city cycle, 35 for the highway, the lockup self-shifting transmission isn't as satisfying to drive as the 5-speed.



Economical operation, of course, is why we're getting the 325e instead of the peppier 323i. So how economical was it? Pretty good. Our 5-speed averaged 25.7 mpg during the course of our testing, which included plenty of non-economical driving. The automatic scored 23.9.

At the 318i introduction last year, BMW announced it wouldn't be replacing the 320i S with a 318 S edition. The S was actually a package option that included firmer suspension, a large front air dam, leather-rimmed sports steering wheel, BBS-style alloy wheels, and Recaro seats. With the S accounting for a good portion of the old 320i sales, BMW wasn't going to walk away from the serious end of the sports sedan market. And the 325e marks BMW's reentry into that segment. Suspension has been beefed up on the 325 compared to the 318. To some degree the uprated springs and shocks are to compensate for the 297-lb increase in curb weight (2687 lb compared to 2390 for the 318). But the stiffer underpinning and rear anti-roll bar (absent from the 318) help sharpen the 325e's subjective feel. The retuned 4-wheel independent suspension copes pretty well with the car's 54/46% weight distribution, but with the higher avoirdupois and increased engine output, the 195/60HR14 tires (Pirelli P6s on both of the cars we drove, exactly the same as the 318i) are now perhaps the weakest link in the chassis componentry. The 318i we tested in this year's Import Car of the Year competition, shod with a set of shaved NCTs, was able to generate 0.85 g on the pad compared to a maximum later acceleration figure of 0.79 g for the 325. As for the actual road manners of the 325, our Pirelli-shod test sample showed light-to-moderate oversteer in steady-state conditions with more than a tad of trailing-throttle understeer. The tail can also be brought out with application of the loud pedal in all but the fastest corners. When flying through your favorite twisties, the 325 can be hustled along at a respectable clip, but at nine-tenths of its limit the car starts to get twitchy, making the driver think one of the ends is on the verge of washing out. Overall, the 6-cylinder 3-series handling is best described as competent but not confident.

Along with the suspension upgrade, the 325e has had an improved set of brakes slipped underneath. The solid discs of the 318 have been replaced by a pair of 10.2-in. internally-ventilated rotors up front. Discs of the same diameter replace the drums used on the rear of the 318. Brake performance is improved with 136 ft. required to bring the 325 to a halt from 60 mph, compared to a 166-ft figure for the last 318i we tested. Subjective feel is much better than the drum-braked 4-cylinder car, with rear-wheel lockup makings its appearance only after the brakes have been well heated.

Visual differentiation between the 325e and the 318i requires a very sharp eye, with nothing but the alpha-numeric badge on the right side of the decklid to identify the 6-cylinder model. Although the European 323 is built with a small flexible rubber tail spoiler and dual-outlet exhaust, neither of these items has found its way to the 325e.

The sportier character of the 325 is more obvious in the interior than on the outside. The basic instrument panel is almost the same as the 318, but the 4-cylinder's 7000-rpm tachometer has been replaced by one that peaks out at the eta engine's 5000-rpm fuel cut-off point. The tach is flanked by a 140-rpm speedometer, as well as fuel and water temperature gauges. No other instruments are fitted, a surprising omission for a car with strong sporting credentials. Oil pressure and temperature instruments, at a minimum would be welcome. To the right of the main gauge cluster and above the ventilation controls is the 325's onboard computer (standard equipment). The 13-button keypad can be used to call up the time or date, average speed, fuel consumption, outside air temperature, or distance-until-empty on the remaining fuel. The unit is also fitted with a programmable speed-limit warning chime, a stopwatch, and an anti-theft device that will interrupt the starter. The computer, a revised version of the unit first installed in BMW's 745i turbo flagship sedan, can provide information in U.S., Imperial, or metric measures. In addition to pressing one of the keypad buttons to change the LCD readout, the computer display can be cycled by pushing the end of the turn-indicator stalk. The onboard computer is only one of several features that is standard on the 325e. Some of the others: a power sunroof, central locking, electric window lifts, opening rear-quarter windows, and top notch AM/FM/cassette stereo player.

Two features of the old 320i S are also included in the base 325e: a 3-spoke leather wrapped steering wheel and multi-adjustable sports seats. The steering wheel is one of the best installed in a current production car, with a substantial but not too thick rim. The diameter and spoke placement allow an unimpeded view of the main instrument cluster, and the wheel has the right look for the car. The sports seats are as close to Recaros as any manufacturer has come and are absolutely first-rate. The bottom bolster is fitted with generous side bolster to hold you in place during those giddy moments of maximum lateral g. The reclining backrest is similarly bolstered again adding to the seat's retentive qualities. Like the 318's seats, the sports seats in the 325 are mounted on tracks that allow the entire seat to be raised or lowered by pushing the backrest reclining lever downward. A second lever enables the seats to rock rearward, raising the front of the seat bolster at the same time. An improvement over the S package Recaro seats is the method of adjusting the thigh-support pad built into the bottom bolster. Where Recaros are fitted with a metal bar that must be pulled up and forward, the BMW sport seats are fitted with a convenient roller wheel that moves the thigh pad. We have only two complaints. The backrest recliner is a ratchet mechanism, and some drivers need a position between the detents; we'd prefer an infinitely adjustable roll wheel. The other problem won't concern everybody, but if you are too short for your weight, according to those charts printed on cereal boxes, or can be considered (unkindly) "broad in the beam," the same heavy-duty bolsters that hold thin occupants snugly in place will make heavier drivers feel like the Blob.



Although a patterned velour cloth-trim is standard on the 325e, neither of the cars we drove was so equipped, both were upholstered in leather. The hide seat coverings are offered in black, parchment, or red for an additional \$790. Rear seat accommodation is just like that of the 318, which is to say adequate for two adults, rated on the great scale of 2 + 2 coupes. Access to the rear seats is about what you'd expect for a 2-door of these dimensions--tough. BMW will offer easier rear-seat accessibility when it puts the 4-door 318 and 325 models on sale later this year. The price of this additional entry will be higher. (What else?)

On paper the 325e looks like BMW has built a better 3-series using componentry from other offerings, which is essentially what the engineers have done. The philosophy is not new to the Bayerische Motoren Werke. Back in 1968

the firm did essentially the same thing by putting the 2.0-liter L-4 from its 2000 4-door sedan in the lighter 1600 body to create the celebrated 2002, the car that really put BMW on the map in this country. Now, 16 years later, the installation of one of BMW's L-6s in a smaller car has brought a sophistication and refinement to the little Bimmer that is quite remarkable. Even if the new powerplant didn't make the 325e any faster than its 4-cylinder brother, it would be worth the additional cost from the standpoint of smoothness alone. But the 325e *is* noticeably quicker than the 318i. Subsequently, the premium of \$1890 when adjusted for the 325's more extensive list of standard equipment seems more than justified. We're not saying this is a perfect car, though it's close in many ways. While we found it much easier to adjust to the eta engine as fitted to the 325 compared to the 528, we'd still prefer a proper high-revving BMW six. And visually we could also do with some larger wheels and tires in the wheelarches. But as it stands, the 325e is an absolutely first-rate sport sedan, one that rewards its driver on winding back roads and positively shines on the interstate.

BMW has done well here. The 325e rates with us as one of the very few contemporary cars where the whole is much greater than the sum of the parts.

# BMW 325e

## ▣ SPECIFICATIONS

### GENERAL

Vehicle mfr.	Bayrische Motoren Werke AG, Munich, Federal Republic of West Germany
Body type	5-pass, 2-door sedan
Drive system	Front engine, rear drive
Base price	\$20,970
Major option on test car	Leather interior, limited slip differential, cruise control
Price as tested	\$22,370

### ENGINE

Type	L-6, liquid cooled, cast iron block, aluminum head
Displacement	2693 cc (164.0 cu in.)
Bore & stroke	84.0 x 81.0 mm (3.31 x 3.19 in.)
Compression ratio	9.0:1
Induction system	Bosch Motronic port fuel injection
Valvetrain	OHC
Crankshaft	Forged, 7 main bearings
Max. engine speed	5000 rpm
Max. power (SAE net)	121 hp @ 4250 rpm
Max. torque (SAE net)	170 lb-ft @ 3250 rpm
Emission control	3-way catalyst, oxygen sensor
Recommended fuel	87 octane unleaded

### DRIVETRAIN

Transmission	5-sp. man.
Transmission ratios (1st)	3.83:1
(2nd)	2.20:1
(3rd)	1.40:1
(4th)	1.00:1
(5th)	0.87:1
Axle ratio	2.79:1
Final drive ratio	2.26:1

### CAPACITIES

Crankcase	4.3 L (4.5 qt)
Cooling system	12 L (12.7 qt)
Fuel tank	54.9 L (14.5 gal)
Luggage	424.8 L (15.0 cu ft)

### SUSPENSION

Front	Independent, MacPherson struts, coil springs, anti-roll bar
Rear	Independent, semi-trailing arms, coil springs, hydraulic shocks, anti-roll bar

### STEERING

Type	Rack and pinion, power assist
Ratio	21.4:1
Turns, lock to lock	3.9
Turning circle, curb to curb	32.2 ft

### BRAKES

Front	10.2-in. internally ventilated discs, power assist
Rear	10.2-in. discs
Swept area	301.6 sq in.

### WHEELS AND TIRES

Wheel size	14 x 6.0 in.
Wheel type	Cast aluminum
Tire size	195/60HR14
Tire mfr. & model	Pirelli P6
Tire construction	Steel-belted radial

### DIMENSIONS

Curb weight	1204.0 kg (2654 lb)
Weight distribution(%), f/r	54/46
Wheelbase	2570 mm (101.2 in.)
Overall length	4490 mm (176.8 in.)
Overall width	1646 mm (64.8 in.)
Overall height	1379 mm (54.3 in.)
Track, f/r	1407/1414 mm (55.4/55.7 in.)
Min. ground clearance	134 mm (5.3 in.)

### CALCULATED DATA

Power to weight ratio	21.9 lb/hp
Brake swept area to weight ratio	22.3 sq in./ton
Speed per 1000 rpm in top gear	30.9 mph
Top speed	116 mph
Drag coefficient	0.41

### SKIDPAD

Lateral acceleration	0.79 g
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### FUEL ECONOMY (mpg)

EPA rating, city/hwy.	22/36
Test average	25.7

## ▣ TEST RESULTS

