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ROAD & TRACK

SEPTEMBER 1973 UK 25p SWEDEN KR. 6.25 INKL. MOMS SEVENTY-FIVE CENTS

Gasoline Shortage—Are Diesel Cars the Answer?

MUSTANG II—
FORD'S NEW SPORTY CAR

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ROAD & TRACK R&T ROAD TEST

PEUGEOT 504 DIESEL

Safe hedge against the fuel shortage

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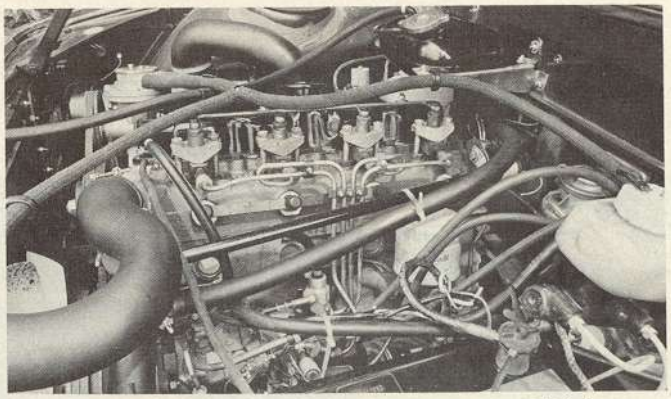


Fuel-injection system and auxiliary vacuum pump are visible here.

OVER THE YEARS the staff has driven various diesel cars, but in general we haven't taken them very seriously. After all, fuel was plentiful and cheap, and every diesel car we drove was low on performance and high on noise in order to get its extra fuel economy. But things have changed and are still changing. Now the diesel car rates a fresh look as a transportation device that at once saves precious fuel and promises cleaner air. "Promises" is a word we use cautiously, because there are several unanswered questions about the diesel's exhaust—which is clean by the standards governments currently set for automotive emissions but not always so clean to the eye or the nose.

Peugeot has been in the business of making and selling diesel cars longer than any other company—even Daimler-Benz—and currently manufactures more diesel passenger cars than any other maker. There are three diesel Peugeot models, each with its own engine: the small 204, the in-between 404 and the large 504. For now Peugeot intends to sell only the 504 Diesel in the U.S. although the 204 might appear here later; deliveries should start at the beginning of 1974. For this test we borrowed a 504 Diesel originally built for Germany, so the test car didn't have all the features required by U.S. safety standards, such as impact bumpers, seatbelt buzzers, side clearance lights and other terribly important items. But mechanically it was the car we'll be getting here, so the performance data we obtained applies to the car you'll be able to buy.

Peugeot hasn't set the U.S. price of the car yet, but we should be able to project it with reasonable accuracy. The 504 gasoline sedan currently sells for $4230 in the U.S. In France the 504 Diesel sells for about $750 more than the gasoline version, but here the price of the latter is raised by the modifications and equipment required to conform the gasoline engine to our emission regulations so we expect a smaller price differential here. Given this and a casual quote by someone at Peugeot that "our diesel will cost $2000 less than the nearest competitor (the Mercedes 220D)," we come to our estimate of $4750 for the U.S. diesel version. There's also a station wagon available; that would sell for about $5200 and it's the only diesel wagon U.S. customers will be able to buy, at least for the next year or so.

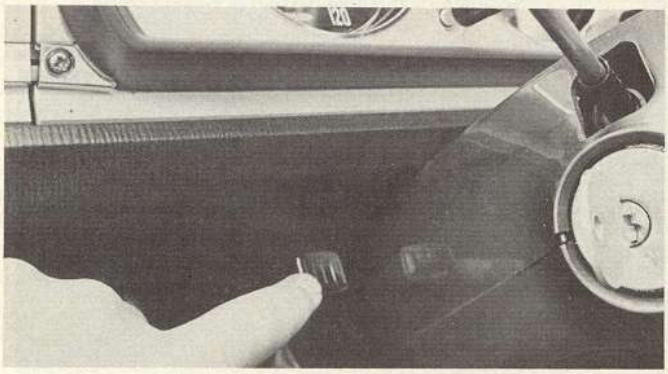
There's essentially no difference except the engine and some compensating sound insulation, so the 504 Diesel is the same roomy, comfortable, soft-riding and good-handling—if somewhat rattly—car as the three earlier 504s we've tested. From our experience with other diesels we could have predicted its behavior and performance pretty well. When it's idling there's quite a clatter to be heard from the outside, but this is fairly well subdued inside and becomes less noticeable as engine speed increases until, from about 2500 rpm upward, there's little to choose between the gasoline and diesel 504s for noise. A diesel sounds like a diesel and nothing else, though, and one thing the observant driver will notice is that the engine sound changes very little from acceleration to cruising to deceleration; this is probably due to the absence of a throttle butterfly in the intake. At no speed and under no condition does the engine sound overworked, and highway cruising at or near the car's maximum speed would be perfectly pleasant except that the gearshift lever begins "buzzing" badly at anything over 65 mph. This is too bad, because it spoils an otherwise good rating for the 504 Diesel as a good long-distance car.

We thought this car was peppier than the Mercedes 220D, and it should have been since its engine develops slightly more power and the Peugeot is 300 lb lighter. The Peugeot is slower getting "off the line," takes slightly longer to get from rest to 60 mph and covers the standing ¼-mile in almost exactly the same time. Our performance figures didn't match what Peugeot claims for the car—they say 0–60 in 23.6 sec, 84-mph maximum speed—but the test car had only about 5000 miles under its tires and this may not be sufficient break-in for the diesel engine to develop its maximum performance and economy.

Driving a diesel is always slightly different from operating a conventional car. For the first start of the day one has to turn on the glowplugs for a few seconds; on the Peugeot this is done by pushing the left side of a double switch until a pilot light comes on to indicate sufficient heating for a start. Then a push on the other side of the same switch puts the big starter (about twice the size of that on the spark engine, and there's a battery to match) into action. There are no tricks to it after this—just screw on the fuel enrichment control a bit for the warmup period. When the main switch is turned on a lever beside the steering column pops out, and to shut off the engine the driver must push this back in; it's the fuel cutoff control for the injection pump. Peugeot intends to automate all this for the U.S. version so that starting and stopping the diesel will be just like starting and stopping the gasoline engine; we've never seen this done before and think most customers will appreciate it if it works well.

The engine clatters madly for the first minute or so, the result of late, random combustion when everything's not up to temperature and a perfectly normal diesel phenomenon.

Above, dual switch for glowplugs and starter facilitates morning starts; below, fuel shutoff lever must be pushed in to stop engine.



There are a couple of other unique characteristics. When the driver accelerates toward a certain speed, as the engine reaches its stable speed it seems to pull back abruptly. We understand that this is due to the extremely high compression ratio of the diesel; as it reaches cruising condition it's also approaching the deceleration condition, which with a diesel generates much more engine braking than we're accustomed to. And when the engine reaches its peak speed—4500 rpm—it won't go any faster unless the car drags it along, because the fuel delivery is strictly governed to prevent its overspeeding. In the acceleration tests we shifted just a split-second before the injection pump would have told the engine to quit climbing. By the way, the 504 Diesel would chirp its rear tires a little in our pop-the-clutch starts for the acceleration runs.

Ah, but now for the punch line. When we tested the gasoline 504 in 1971, our standard fuel-economy test gave 19.4 mpg; in our comparison test of the 504 with three other sedans in late 1972 a route biased toward freeway driving returned 20.0 mpg, indicating that everyday economy for the spark 504 is now probably below 19 mpg. But we put the 504 Diesel through the regular economy test, which includes city, suburban and freeway distance in proportions typical of all-around American driving patterns, and it returned a sensational 29.5 mpg. That, friends, is economy—and in a sedan big enough to haul around a large family and its luggage, in good style if not so rapidly. Be reminded too that pure city driving won't lower this figure as much with a diesel as it does with a gasoline engine; the 504 should do well over 25 mpg even in stop-and-go traffic and travel 350 miles between fillups.

For topping up the Peugeot we did, as expected, have to hunt a bit for stations with diesel fuel. Not every neighborhood establishment has it; generally the ones with diesel fuel are to be found along major arteries. We found the price of a gallon of diesel fuel no. 2, normal for automotive diesels, to be 36.9¢ in our area, almost exactly the same as the price of regular gasoline. The cost savings, therefore, come from the engine's economy of fuel, not a low price per gallon. There are also the well-known maintenance advantages (no carburetor, no sparkplugs, no points) and a strong possibility of a longer service life for the engine.

Whether or not you need the diesel's advantages and can live with its disadvantages, we leave to you. But of this we are sure: the Peugeot 504 Diesel is a good diesel car, rich in transportation value and economy of operation. If you're an environmentalist at heart, you might even find it exciting.

PRICE

List price, all POE ..... est $4750

ENGINE & DRIVE TRAIN

Type ..... ohv inline 4, diesel
Bore x stroke, mm ..... 90.0 x 83.0
Displacement, cc/cu in....2112/129
Compression ratio 22.2:1
Bhp @ rpm, SAE net..62 @ 4500
Torque @ rpm, lb-ft....88 @ 2000
Fuel requirement.....diesel no. 2
Transmission ..... 4-sp manual
Gear ratios: 4th (1.00) 3.89:1
3rd (1.41) 5.48:1
2nd (2.17)..... 8.44:1
1st (3.66) 14.25:1
Final drive ratio..... 3.89:1

CHASSIS & BODY

Body/frame ..... unit steel
Brake system.....10.8-in. disc front & rear, vacuum assisted
Wheels ..... steel disc, 14 x 5
Tires..... Uniroyal Rallye 180, 175SR-14
Steering type..... rack & pinion
Turns, lock-to-lock..... 4.5
Suspension, front/rear: MacPherson struts, lower A-arms, coil springs, anti-roll bar/semi-trailing arms, coil springs, anti-roll bar

GENERAL

Curb weight..... 2790
Weight distribution (with driver), front/rear, %..... 55/45
Wheelbase, in..... 108.0
Track, front/rear 56.5/53.5
Length 177.0
Width 66.5
Height 57.5
Fuel capacity, U.S. gal..... 14.8

CALCULATED DATA

Lb/bhp (test weight) 49.9
Mph/1000 rpm (4th gear) 18.9
Engine revs/mi (60 mph)..... 3170
R&T steering index 1.61
Brake swept area, sq in./ton..2830

ROAD TEST RESULTS

ACCELERATION

Time to distance, sec:
0-100 ft 4.7
0-500 ft 12.5
0-1320 ft (¼ mi)..... 23.8
Speed at end of ¼-mi, mph..... 56
Time to speed, sec:
0-30 mph 7.6
0-40 mph 11.7
0-50 mph 18.6
0-60 mph 28.1
0-70 mph 42.0

SPEEDS IN GEARS

4th gear (4500 rpm) 83
3rd (4500)..... 58
2nd (4500) 37
1st (4500)..... 22

FUEL ECONOMY

Normal driving, mpg..... 29.5

BRAKES

Minimum stopping distances, ft:
From 60 mph 165
From 80 mph ..... na
Control in panic stop .....good
Pedal effort for 0.5g stop, lb 35
Fade: percent increase in pedal effort to maintain 0.5g deceleration in 6 stops from 60 mph..... nil
Overall brake rating ..... very good

INTERIOR NOISE

All noise readings in dBA:
Idle in neutral..... 55
Constant 30 mph 66
50 mph 73
70 mph 76

SPEEDOMETER ERROR

30 mph indicated is actually .. 28.0
60 mph 58.0
70 mph 68.5