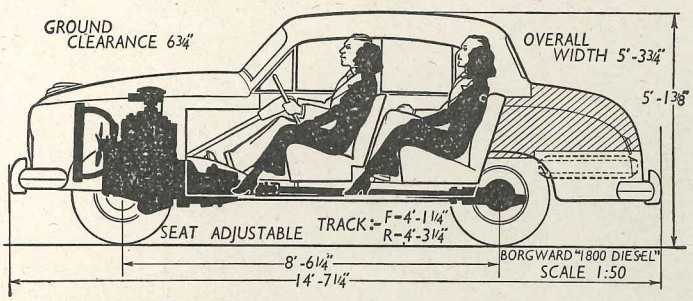
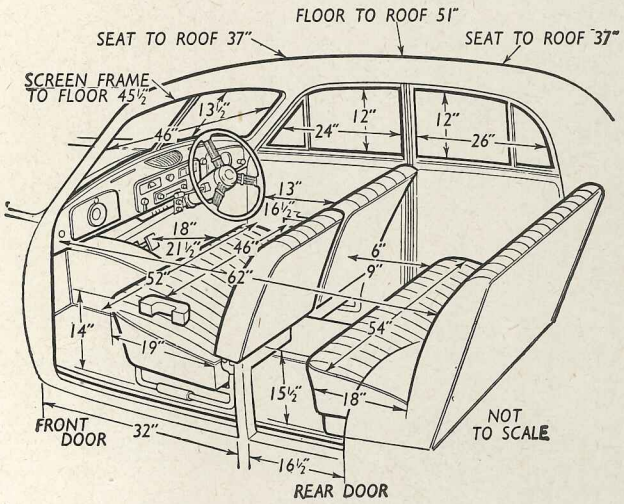
The Motor Road Test No. 8/54

Make: Borgward **Type:** Hansa 1800D. 4-door Saloon

Makers: Carl F. W. Borgward G.m.b.H., Bremen, Germany

(British Concessionaires: Metcalfe & Mundy, Ltd., 280 Old Brompton Road, London, S.W.5.)





Test Data

CONDITIONS. *Cool, dry weather with light breeze. Damp tarmac surface. Pump Diesel oil fuel.*

INSTRUMENTS

Speedometer at 30 m.p.h.	4% fast
Speedometer at 60 m.p.h.	2% fast
Distance recorder	2% fast

MAXIMUM SPEEDS

Flying Quarter Mile

Mean of six opposite runs	68.0 m.p.h.
Best time equals	70.3 m.p.h.

Speed in gears (governed maxima)

Max. speed in 3rd gear	47 m.p.h.
Max. speed in 2nd gear	28 m.p.h.
Max. speed in 1st gear	15 m.p.h.

FUEL CONSUMPTION

60.0 m.p.g. at constant 20 m.p.h.
56.0 m.p.g at constant 30 m.p.h.
45.0 m.p.g. at constant 40 m.p.h.
38.0 m.p.g. at constant 50 m.p.h.
30.5 m.p.g. at constant 60 m.p.h.
Overall consumption for 490 miles, 10¾ gallons, =45.6 m.p.g.
Fuel tank capacity, 8¾ gallons.

ACCELERATION TIMES Through Gears

0-30 m.p.h.	11.1 sec.
0-40 m.p.h.	17.6 sec.
0-50 m.p.h.	27.9 sec.
0-60 m.p.h.	42.1 sec.
Standing Quarter Mile	26.9 sec.

ACCELERATION TIMES on Two Upper Ratios.

	Top	3rd
10-30 m.p.h.	19.5 sec.	10.8 sec.
20-40 m.p.h.	17.7 sec.	11.3 sec.
30-50 m.p.h.	19.7 sec.	—
40-60 m.p.h.	27.8 sec.	—

WEIGHT

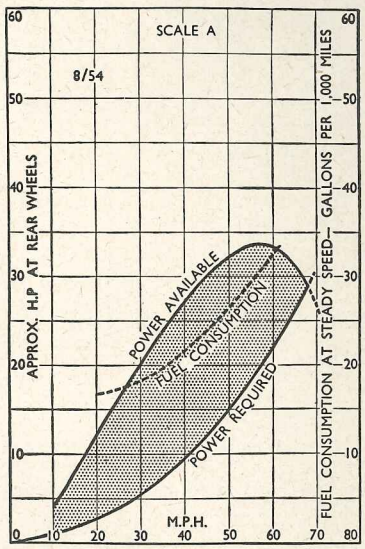
Unladen kerb weight	24½ cwt.
Front/rear weight distribution	51/49
Weight laden as tested	28 cwt.

HILL CLIMBING (At steady speeds)

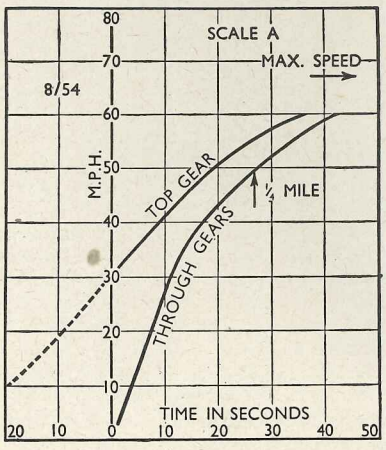
Max. top gear speed on 1 in 20	51 m.p.h.
Max. top gear speed on 1 in 15	33 m.p.h.
Max. gradient on top gear	1 in 13.9 (Tapley 160 lb./ton)
Max. gradient on 3rd gear	1 in 9.1 (Tapley 245 lb./ton)
Max. gradient on 2nd gear	1 in 6 (Tapley 370 lb./ton)

BRAKES at 30 m.p.h.

0.79 g retardation (= 38 ft. stopping distance) with 100 lb. pedal pressure.
0.75 g retardation (= 40 ft. stopping distance) with 75 lb. pedal pressure.
0.39 g retardation (= 77 ft. stopping distance) with 50 lb. pedal pressure.
0.12 g retardation (= 250 ft. stopping distance) with 25 lb. pedal pressure.



Drag at 10 m.p.h. .. .. .. 37 lb.
Drag at 60 m.p.h. .. .. .. 137 lb.
Specific fuel consumption when cruising at 80% of maximum speed (i.e., 54.4 m.p.h.) on level road, based on power delivered to rear wheels .. .. 0.70 pints/b.h.p./hr.



Maintenance

Sump: 10½ pints, S.A.E. 20 HD oil. **Gearbox:** 1¼ pints. **Rear Axle:** 3½ pints. **Steering gear:** gear oil. **Radiator:** 13 pints (2 drain taps). **Chassis lubrication:** By grease gun every 950 miles. **Injection:** 20° b.t.d.c. **Injection pressure:** 105 atmospheres. **Valve timing:** I.O., 10° b.t.d.c.; I.C., 56° a.b.d.c.; E.O., 52° b.b.d.c.; E.C., 14° a.t.d.c. (set timing with 0.012 in. tappet clearance). **Tappet clearances:** (Hot); Inlet and Exhaust 0.008 in. **Front wheel toe-in:** (at hub level) ⅛ in. **Camber angle:** 2°. **Castor angle:** 4½°. **King pin inclination:** 4°. **Tyre Pressures:** Front 20 lb., Rear 25 lb. **Battery:** 12 volt, 75 amp. hr.

The BORGWARD "1800 Diesel" 4-door Saloon

An Economical Oil-engined 5-seater with some Sporting Characteristics

In Brief

Price (leatherette upholstery):—
£1053 8s. 8d., plus purchase tax £440 1s. 1d., equals £1,493 9s. 9d.
Capacity ... ... 1,758 c.c.
Unladen kerb weight ... 24½ cwt.
Fuel consumption... ... 45.6 m.p.g.
Maximum speed ... ... 68.0 m.p.h.
Maximum speed on 1 in 20 gradient... ... ... 51 m.p.h.
Maximum top gear gradient 1 in 13.9
Acceleration:
10-30 m.p.h. in top ... 19.5 sec.
0-50 m.p.h. through gears 27.9 sec.
Gearing: 18.1 m.p.h. in top at 1,000 r.p.m.; 75 m.p.h. at 2,500 ft. per min. piston speed.

ONE characteristic alone accounts for the steadily growing popularity of cars with compression-ignition power units: the fact that they burn surprisingly small quantities of a low-cost fuel. Recently submitted for test by the British importers, the Borgward "Hansa 1800 Diesel" has been advertised as the fastest oil-engined car in production, and certainly its character departs quite considerably from the "sensible but dull" nature which tends to be expected of this kind of economy vehicle.

Like other oil-engined production cars of Italian and German manufacture which we have been invited to test, the Borgward has a four-cylinder engine of rather less than 2-litres swept volume, a compression ratio of around 20/1, and direct injection of fuel oil into pre-combustion chambers in the cylinder heads. Like its direct competitors, it is a 5-seater saloon of modern appearance weighing somewhat more than 1 ton unladen.

In most of its measured performance figures, the Borgward does not differ by any huge margin from its contemporaries. In the impression which it makes on a driver, however, the Borgward is entirely distinctive. The slogging power at low engine r.p.m. usually attributed to "Diesel" cars is not especially marked, the best engine torque being developed around 35-40 m.p.h. in top gear: equally, although the engine is controlled by the usual pneumatic governor, power output at reasonably high engine r.p.m. is not in this instance curtailed with that abruptness which is apt to be irritating to drivers accustomed to petrol engines.

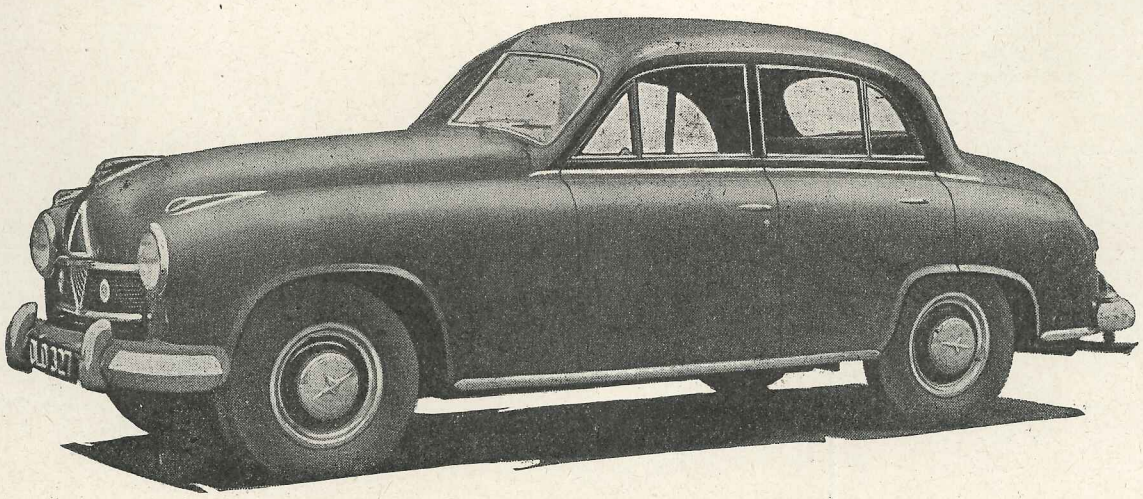
Traffic Economy

Among the measured performance figures recorded on the opposite page, a timed speed of 68 m.p.h. will be noted, this being well above the speed to which a majority of oil-engined cars are limited. In this instance, as in others, the real advantage of the compression-ignition engine is its fuel economy at low speeds and under light load: many motorists, however, place a high value upon a useful reserve of performance, even if fuel economy depends on the exercise of some restraint in normal driving. The sort of figure which really distinguishes the oil-engine from the petrol engine is our measured 56 m.p.g. fuel economy at a 30 m.p.h. cruising speed, a figure which is backed up by almost negligible rates of fuel consumption whilst the engine idles in traffic hold-ups: even the 60 m.p.h. cruising pace which is available when required gives a 30½ m.p.g. fuel consumption which very, very few petrol-engined cars match.

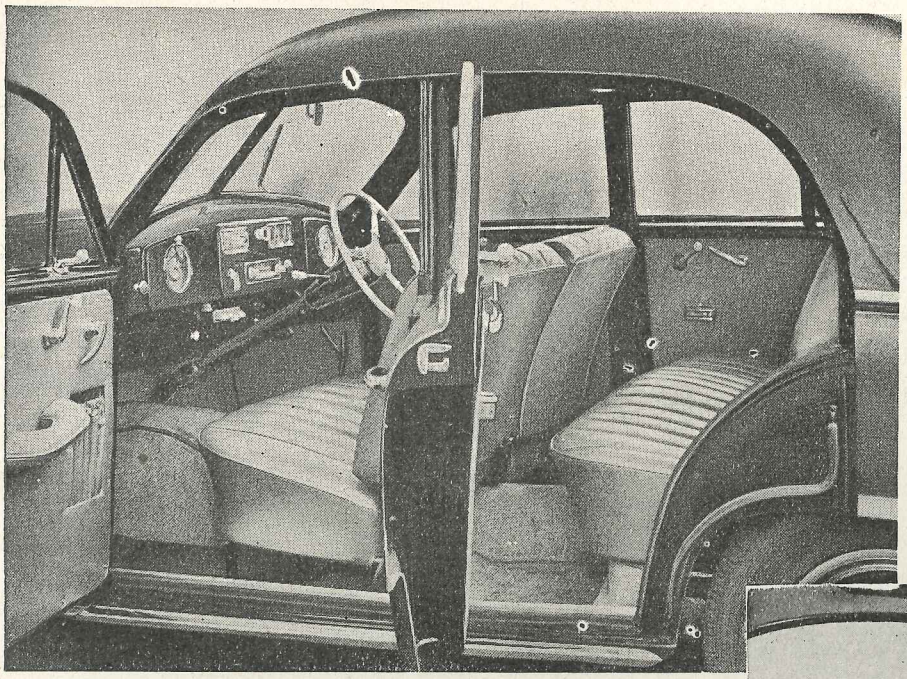
In a manner which is not easy to define, this Borgward gives the impression of being a man's car. Businesslike interior furnishing and equipment, steering which is firm and quick but not always light, and a gearbox which is meant to be used, are features which certainly contribute to this impression.

A bench-type driving seat is fitted, even although a large hump over the gearbox precludes three-abreast seating in front, but the backrest is divided and each half is separately adjustable for rake: thus, the driver can sit bolt upright while the passenger beside him enjoys a more reclining backrest angle. Backbone chassis construction has allowed a very low floor and quite low door sills to be combined with the conventional rear-wheel drive, and although the seats are quite high above the floor, headroom inside the body is good. Despite the imposing dimensions of the bonnet, driving vision forwards is quite good, and the mirror gives an excellent view to the rear.

Sensibly and quite pleasingly finished in



LOW DRAG obtained by smooth body lines secures good fuel economy at cruising speeds up to 60 m.p.h., the low-speed efficiency of the compression-ignition engine providing even more remarkable mileage per gallon at low speeds.



black paintwork, red imitation leather, and grey carpeting, the interior of the car submitted for test was agreeable to all but the most extreme modernists. The facia panel might offend some "stylists" by its combination of straight lines and circles, but it sets a clear and reasonably accurate speedometer directly in front of the driver, and has such vital items as the lighting and engine starting controls shaped and positioned so that they are easily found at night. One glove locker is provided, with an illuminated (but manually-wound) clock on its lid.

Entry to the four-door body (there is the option of two-door coachwork at a lower price) is, in practice, slightly less easy than the width of the doors and their low sills might suggest, the front and rear doors being set rather far back in relation to the seats, so that toe-room between the seats and the door pillars is less than might be desired Once entered, the car is an adequately spacious five-seater, the hump formed by the transmission and chassis backbone being of not unreasonable bulk in the rear compartment.

Willing Cornering

Independent suspension is provided for all four wheels, in accordance with normal German practice, but no attempt has been made to secure great softness of riding. Transverse leaf springs are used at both front and rear, subsidiary coil rear springs coming into operation when a full load is carried, and telescopic dampers are used at both front and rear. Riding qualities with the car fully laden are quite good, but the car shows a much quicker response to bumps when run one- or two-up. The low unsprung weight associated with independent wheel suspension minimizes minor shocks encountered on good road surfaces, even though the riding is not altogether flat. Really bad surfaces, however, call for quite an appreciable reduction of speed.

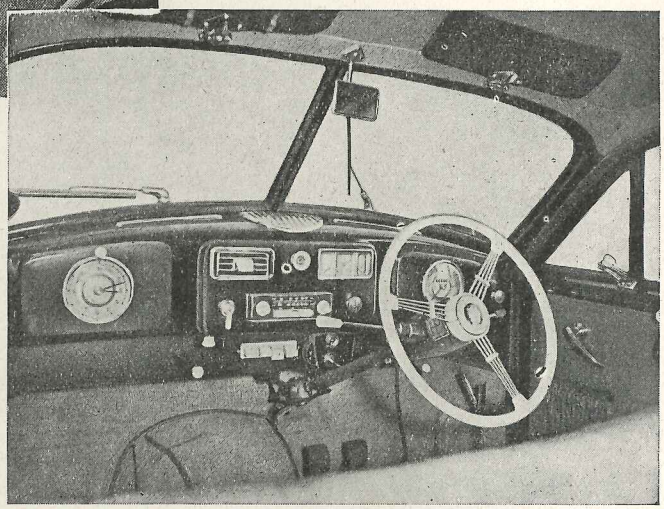
The reward for accepting firm suspension is fast cornering with much less body roll or tyre squeal than is common with modern saloon cars. In the past, independent rear wheel springing systems of the divided-axle type have sometimes been associated with very marked over-steer characteristics during cornering, but no such exaggerated behaviour was encountered with the Borgward. The most that can be said is that the car takes fast corners in a more willing style than its rather heavy low-speed steering might lead an unfamiliar driver to expect, and that when the car is pushed to the limit it is the rear wheels which break away in a normally controllable slide.

Considerable self-centring action plus a certain amount of friction combine to make the steering rather heavy at low speeds, but with the steering geared at 2½ turns from lock to lock (and the turning circle is usefully compact), above-average effort is balanced by below-average amounts of steering movement. Mechanically, the steering on the test car (which had covered only a modest mileage) was positive yet almost free from shock.

At the low speeds which show an oil engine's fuel economy to best advantage, and even more at traffic stops, the compression-ignition engine is frankly noisy—this is especially so during the warming-up period after a start from cold, when the engine knocks quite heavily. When the car is running on the open road, however, the engine smooths out, and sound-insulating material at the scuttle keeps the interior of the car quite normally quiet. Flexible mounting eliminates engine vibration very successfully, the trace which can be felt through the spring-spoke steering wheel being less than with some four-cylinder petrol engines.

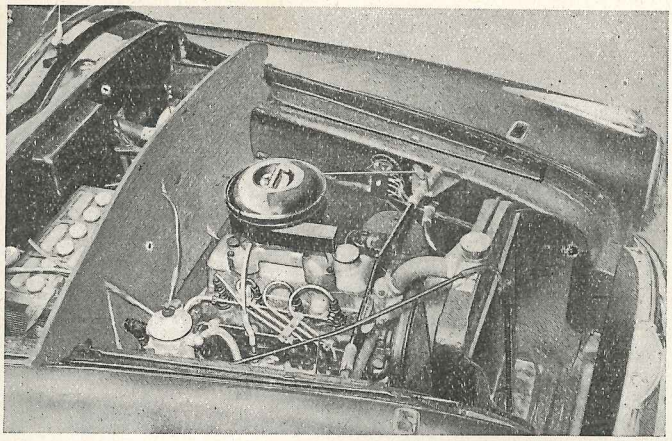
Top-gear flexibility is adequately good, 12 m.p.h. in top gear being reasonably usable, although the car runs a little jerkily below about 16 m.p.h. in its highest gear. Acceleration from low speeds in top gear is by no means rapid, however, the engine feeling at its best from 30 m.p.h. upwards, when it is exceptionally responsive to small movements of the accelerator pedal. An especially pleasing feature of this model is that, whilst it is quickest to start in first gear, it is, in fact, quite easy to s art in the second ratio of the four-speed gearbox and accelerate up to very nearly 30 m.p.h. before needing to change gear. In third gear a useful 45 m.p.h. is available without fuss, and it is only beyond 55 m.p.h. that top-gear acceleration diminishes seriously.

All the indirect gears are commendably quiet, and all have synchromesh to facilitate their engagement, but the synchro-



FOUR DOORS hinged at their forward edges give access to a 5-seater saloon body in which there are very comfortable legroom and headroom. Not differing appreciably from the form used with a petrol engine, the facia layout has its controls arranged where they are accessible without risk of confusion after dark.

REARWARD VISION through a large curved-glass window is good, and the luggage locker is capacious although less easy to load than is usual.



INSULATION by an extra panel of fibre minimizes the transmission of noise from a four-cylinder oil engine to the interior of the car. The bonnet top may be opened from either side, or removed completely.

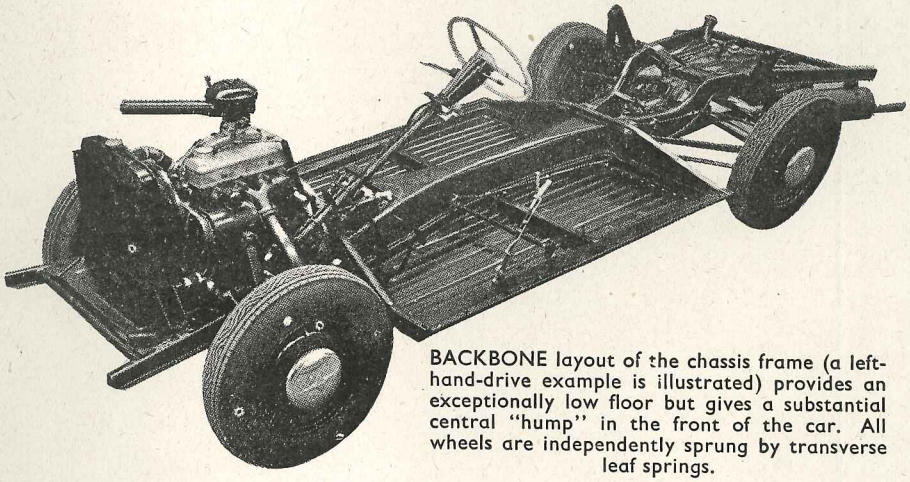
mesh mechanism can easily be overridden and the neat-looking steering-column gear control also does not feel worthy of the car. Very positive and free from slip, the clutch normally took up the drive in acceptably smooth fashion, although if hurried starts were attempted the combination of a heavy flywheel and firm clutch could jerk the transmission quite viciously.

Our test period included nights of open-air parking during which temperatures fell well below freezing, but engine starting presented no difficulties. The starter control required turning to a halfway position for about one minute to energize electrical heater plugs in the cylinder heads, after which period the engine usually responded instantly to the further control movement which brought the actual starter motor quietly into operation. With a warm engine, first-touch response to the starter was invariably experienced. A radiator blind was provided on the test car, but a thermostat in the water system was itself well able to get the engine up to the temperature of 80 degrees C., at which it ran most smoothly, without aid from the manually controlled blind.

Fresh-air heating is provided for the car interior, by ducts passing along each side of the engine in which are two water-heated radiators, one water tap and two air shutters being controlled from inside the car. Despite the absence of any fan, quite useful heating and de-misting is provided even at moderate road speeds, especially if the four hinged ventilator panels on the doors are opened to produce a slight suction effect inside the car. In really cold weather, however, we found that as the two heater elements had "series" water flow through them, most of the available heat was concentrated on the right-hand side of the car, while the left-hand duct fed almost cold air to the front-seat passenger. One inherent snag with a floor which forms the lowest part of a car is that, desirable as low floors are from most points of view, they do become rather cold in severe winter weather.

Arranged to open from either side or to lift off completely, the Borgward bonnet top was rather heavy, but its combined lock and hinge arrangements appeared better engineered than have been some other rather similar layouts. Power unit accessibility seemed, in the main, to be commendably good. At the rear of the car, the luggage locker also has a rather heavy lid, and the self-locking struts do not allow this to be lifted far enough to make the loading or unloading of baggage very easy: a separate lower shelf is provided for the spare wheel and for an excellent tool kit.

Imported cars pay heavy rates of import duty and purchase tax in Britain at the present time, and the oil-engined car does not save as much on running costs in Britain as it does in countries which tax fuel oil less heavily than petrol. Nevertheless, the oil-engined car with its remarkably good mileages per gallon of fuel is earning a significant place on the British market. With the ability to put up quite high average speeds when need arises, in addition to the more obvious ability to give upwards of 40 m.p.g. fuel economy at moderate driving speeds, the Borgward Diesel evidently has especial attractions of its own for some large-mileage motorists.



BACKBONE layout of the chassis frame (a left-hand-drive example is illustrated) provides an exceptionally low floor but gives a substantial central "hump" in the front of the car. All wheels are independently sprung by transverse leaf springs.

Mechanical Specification

Engine

Cylinders	4
Bore	78 mm.
Stroke	92 mm.
Cubic capacity	1,758 c.c.
Piston area	29.6 sq. in.
Valves	Pushrod o.h.v.
Compression ratio	19.8/1
Max power	42 b.h.p.
at	3,400 r.p.m.
Piston speed at max. b.h.p.	2,050 ft. per min.
Fuel injection pump	Bosch, PES 4A 50B 410RS 80/7
Ignition	Nil
Injection nozzles	Bosch DN 4 SDV 3774/1
Oil filter	Multi-disc type

Transmission

Clutch	Single dry plate
Top gear (s/m)	4.28
3rd gear (s/m)	6.47
2nd gear (s/m)	9.86
1st gear (s/m)	15.7
Rev.	18.5
Propeller shaft	Enclosed in chassis backbone
Final drive	7/30 spiral bevel gearing
Top gear speed at 1,000 r.p.m.	18.1 m.p.h.
Top gear speed at 1,000 ft./min. piston speed	30 m.p.h.

Chassis

Brakes	Borgward-Teves hydraulic
Friction lining area	129 sq. in.
Suspension:	
Front	I.F.S. by transverse leaf spring and wishbones
Rear	I.R.S. by swinging half axles transverse leaf spring, and auxiliary coil springs.
Shock absorbers	Telescopic
Tyres	6.40—15

Steering

Steering gear	ZF—Ross
Turning circle: Left	35 feet
Right	33 feet
Turns of steering wheel, lock to lock	2½

Performance factors (at laden weight as tested):

Piston area, sq. in. per ton	21.2
Brake lining area, sq. in. per ton	92
Specific displacement, litres per ton mile	2,080

Coachwork and Equipment

Bumper height with car unladen:
Front (max.) 16 in., (min.) 13 in.
Rear (max.) 22 in., (min.) 13 in.

Starting handle	No
Battery mounting	On scuttle
Jack	Bevel-type
Jacking points	4 on sides of body

Standard tool kit: Grease gun, tyre pressure gauge, wheel nut spanner, injection nozzle tools, tappet spanner 6 open-ended spanners, 1 adjustable spanner, 1 screwdriver, 1 pair pliers: tin of touching-up paint supplied with each car.

Exterior lights: Two headlamps with pilot bulbs, two stop/tail lamps, number plate lamp.

Direction indicators	Flashing type, self cancelling
Windscreen wipers	Two-bladed electrical, self-parking
Sun visors	2

Instruments: Speedometer (without decimals or trip), fuel contents gauge, oil pressure gauge, coolant thermometer, clock.

Warning lights: Dynamo charge, starting glow plugs, headlamp main beam, direction indicators.

Locks:
With ignition key: "Ignition" (accessories, starter, etc.)
With other keys: Left-hand door, luggage locker

Glove lockers	One on facia panel, with lid
Map pockets	Two on front doors
Parcel shelves	One behind rear seat squab
Ashtrays	Three (1 on facia, 2 on rear doors)
Cigar lighters	One on facia

Interior lights: One (with courtesy switches) on centre door pillar; also inspection lamp to plug into cigar lighter socket.

Interior heater	Fresh-air type with de-misters (no fan)
Car radio	Optional extra (Radiomobile, etc.)
Extras available:	Radio; cloth upholstery at approx. £13 lower basic price
Upholstery material	Leatherette
Floor covering	Cloth carpets
Exterior colours standardized	11 options (6 interior colours)

Alternative body styles: 2-door saloon, £45 lower basic price. Station wagon, £32 lower basic price.