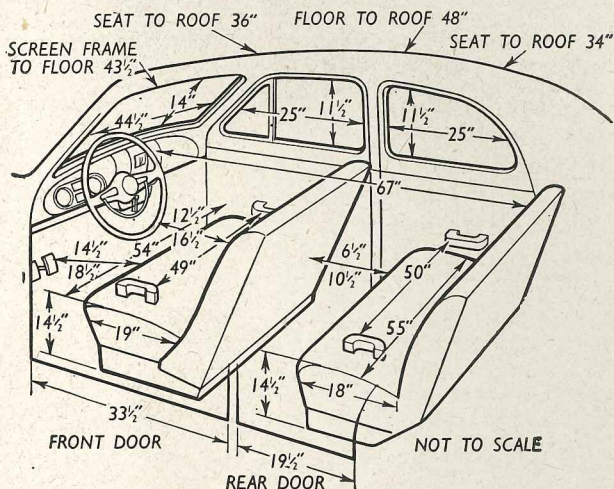
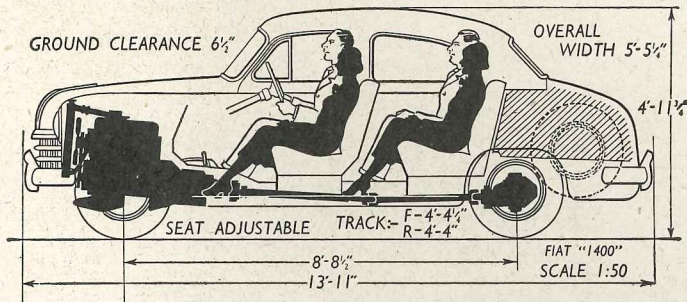


# The Motor Road Test No. 2/54 (Continental)

**Make:** Fiat  
**Makers:** Fiat, Turin, Italy

(British concessionaires, Fiat (England) Ltd., Water Road, Wembley, Middlesex.)

**Type:** 1400 Diesel



## Test Data

**CONDITIONS:** Mild, damp weather with no wind. Tarred road surface. Diesel-oil fuel.

### INSTRUMENTS

Speedometer at 30 m.p.h. .. .. 7% fast  
 Speedometer at 60 m.p.h. .. .. 7% fast  
 Distance recorder .. .. 4% fast

### MAXIMUM SPEEDS

**Flying Quarter Mile**  
 Mean of four opposite runs .. .. 63.8 m.p.h.  
 Best time equals .. .. 65.0 m.p.h.

### Speed in Gears

Max. speed in 3rd gear .. .. 41 m.p.h.  
 Max. speed in 2nd gear .. .. 27 m.p.h.

### FUEL CONSUMPTION

55.0 m.p.g. at constant 30 m.p.h.  
 47.5 m.p.g. at constant 40 m.p.h.  
 39.5 m.p.g. at constant 50 m.p.h.  
 31.5 m.p.g. at constant 60 m.p.h.  
 Overall consumption for 88 miles, driving fast  
 2.6 gallons, = 33.9 m.p.g.

### ACCELERATION TIMES Through Gears

0-30 m.p.h. .. .. 10.2 sec.  
 0-40 m.p.h. .. .. 16.0 sec.  
 0-50 m.p.h. .. .. 27.4 sec.  
 0-60 m.p.h. .. .. 45.2 sec.  
 Standing Quarter Mile .. .. 27.2 sec.

### ACCELERATION TIMES on Two Upper Ratios

Speed Range	Top	3rd
10-30 m.p.h.	18.8 sec.	10.3 sec.
20-40 m.p.h.	16.9 sec.	10.7 sec.
30-50 m.p.h.	18.4 sec.	—
40-60 m.p.h.	27.5 sec.	—

### WEIGHT

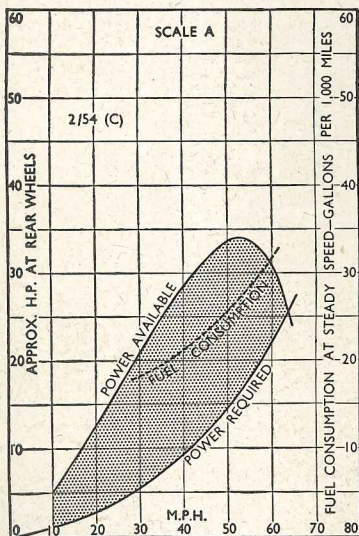
Unladen kerb weight .. .. 25 cwt.  
 Front/rear weight distribution .. .. 55/45  
 Weight laden as tested .. .. 29 cwt.

### HILL CLIMBING (At steady speeds)

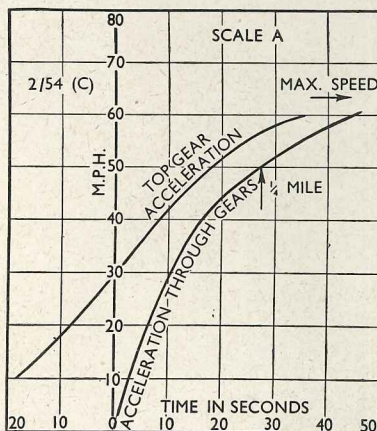
Max. top gear speed on 1 in 20 .. .. 44 m.p.h.  
 Max. gradient on top gear .. .. 1 in 16.0 (Tapley 140 lb./ton)  
 Max. gradient on 3rd gear .. .. 1 in 8.9 (Tapley 250 lb./ton)  
 Max. gradient on 2nd gear .. .. 1 in 6.2 (Tapley 350 lb./ton)

### BRAKES at 30 m.p.h. (wet road)

0.70 g retardation (= 43 ft. stopping distance) with 75 lb. pedal pressure  
 0.52 g retardation (= 58 ft. stopping distance) with 50 lb. pedal pressure  
 0.19 g retardation (= 158 ft. stopping distance) with 25 lb. pedal pressure



Drag at 10 m.p.h. .. .. 39 lb.  
 Drag at 60 m.p.h. .. .. 137 lb.  
 Specific Fuel Consumption when cruising at 80% of maximum speed (51 m.p.h.) on level road, based on power delivered to rear wheels .. .. 0.70 pints/b.h.p./hr.



## Maintenance

**Fuel tank:** 10½ gallons. **Sump:** 11 pints, S.A.E. 30 H.D. (S.A.E. 50 H.D. above 95° F., S.A.E. 20 H.D. below 14° F.) **Gearbox:** 1.6 pints S.A.E. 90. **Rear axle:** 2 pints, S.A.E. 90 E.P. gear oil. **Steering gear:** S.A.E. 90 gear oil. **Radiator:** 17½ pints (2 drain taps). **Chassis lubrication:** By grease gun every 950 miles to 14 points. **Firing order:** 1-3-4-2. **Injection timing:** 27° B.T.D.C. **Valve timing:** Inlet opens 5° B.T.D.C., closes 40° A.B.D.C.; Exhaust opens 53° B.B.D.C., closes 5° A.T.D.C. **Tappet clearances:** (Cold) Inlet and exhaust 0.008 in. **Front wheel toe-in:** (measured on rims, car fully laden) 0.08 to 0.16 in. **Camber:** (measured on rims with car loaded) 2 to 6 mm., 0.08 to 0.24 in. **Castor angle:** ½°. **Tyre pressures:** Front 24 lb., rear 25 lb. **Brake fluid:** Lockheed No. 5 (Yellow label). **Battery:** 24 volt, 46 amp. hr. **Lamp bulbs:** 24 volt. **Headlamps:** 50/45 watts. **Side and tail lamps:** 5/25 watts.

# The FIAT 1400 Diesel

A Full Road Test Report on a New Italian 4-6-Seater Car, which Cruises at 60 m.p.h. or can Give Over 50 m.p.g. Economy on an Inexpensive Fuel

## In Brief

Price in Italy: 1,545,000 lire (plus purchase tax 3%) equivalent to £909.	
Capacity ... ..	1,901 c.c.
Unladen kerb weight ...	25 cwt.
Fuel consumption... ..	33.9 m.p.g.
Maximum speed ... ..	63.8 m.p.h.
Maximum speed on 1 in 20 gradient ... ..	44 m.p.h.
Maximum top gear gradient... ..	1 in 16.0
Acceleration	
10-30 m.p.h. in top ...	18.8 sec.
0-50 m.p.h. through gears	27.4 sec.
Gearing: 18.1 m.p.h. in top at 1,000 r.p.m.; 76.5 m.p.h. at 2,500 ft. per min. piston speed.	

**E**CONOMY of running cost is the prime objective of the Fiat 1400 Diesel. The extent to which it achieves this objective may best be appreciated by a tabular comparison of the results obtained in our recent test of this model with those recorded on the conventional Fiat 1400 in our test report No. 16/50.

At	"1400" steady (petrol)	"1400" Diesel"	Saving
30 m.p.h.	33.0 m.p.g.	55.0 m.p.g.	40%
40 m.p.h.	32.0 m.p.g.	47.5 m.p.g.	32½%
50 m.p.h.	29.0 m.p.g.	39.5 m.p.g.	26½%
60 m.p.h.	25.5 m.p.g.	31.5 m.p.g.	19%
70 m.p.h.	24.0 m.p.g.	—	—
Overall figure	24.2 m.p.g.	33.9 m.p.g.	28½%

In comparing these figures, it should be observed that whereas the overall figure is inevitably influenced by random variations in road and traffic conditions,



PERFORMANCE on hills in top gear is improved when a 1.9-litre compression-ignition engine is installed in the Fiat 1400, here seen cornering fast on a road through the Alpine foothills.

the steady-speed mileages per gallon are strictly comparative. It must also be observed that Diesel fuel oil costs less than does petrol, the difference being rather small in Britain where both fuels carry an equally heavy tax, but representing a further saving of fully 30% in Italy and many other countries. Apart altogether from the lower price per gallon of the fuel used, however, anyone who covers large mileages at fast main-road cruising speeds will buy about 25% less fuel for this oil-engined car than would be needed for its petrol-engined counterpart, whilst a purchaser whose driving is mainly on slow roads or in city traffic can reasonably look for a 40% drop in fuel consumption.

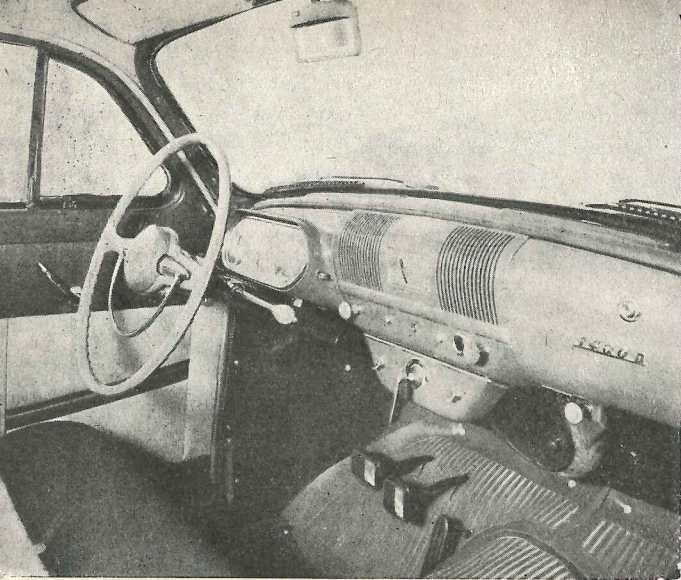
It has long been realized that the compression-ignition engine could offer large savings in private car running costs. The simple thermodynamic approximation known as the "air standard cycle" suggested that an increase in compression ratio from 6.7/1 to 20/1 should cut fuel consumption by approximately 24%, and whilst extra friction might prevent this saving being fully achieved under all conditions, the fact that the direct-injection oil engine

ran on very weak mixtures during light-load operation means that under many road conditions savings of far more than 24% could be expected.

Exploitation of the potential advantages of the compression-ignition engine in the private car field has been delayed hitherto by the need for a great deal of development work. Now, after coming into almost universal use upon heavy lorries and motor coaches, the oil engine has been developed in small enough and sufficiently fast-running forms to make it reasonably competitive with petrol engines in respect of power-to-weight ratio, smoothness of running and cost of manufacture. Two leading German car factories and the largest Italian car factory are already building substantial numbers of oil-engined cars, and one of the "big six" British motor factories has announced its intention of doing likewise, so that the oil engine for cars must now be regarded as a very serious commercial proposition.

The Italian car which forms the subject of this Road Test Report evidently results from some very clear thinking by the Fiat company, of Turin. For some years past,





ONE CHANGE is made in the facia layout when an oil engine is fitted to the Fiat 1400, the addition of a central lever which is turned clockwise to start the engine or anticlockwise to stop it.

this company has been building a four/six-seater saloon of modern chassis and body design, the majority of examples incorporating 1.4-litre four-cylinder engines developing 44 b.h.p. at 4,400 r.p.m., and a smaller number of "de luxe" cars having long-stroke power units of 1.9-litre size developing 60 b.h.p. at 3,700 r.p.m.: the new compression-ignition oil engine, which has been built to the same overall dimensions as these two alternative petrol engines, has the same bore and stroke as the larger of the two, but with an output of 40 b.h.p. at only 3,200 r.p.m. compares closely in performance with the 1.4-litre petrol engine. In effect, the oil engine develops 10% less power at peak r.p.m., but has much more torque at low speeds.

#### Moderate First Cost

Externally, the petrol- and oil-engined models are indistinguishable from each other, the only recognition feature being a different starter control which may be observed on the facia panel of the Diesel model. Mechanically, one significant alteration is replacement of the petrol car's 4.44/1 rear axle gears by others giving a ratio of 4.10/1, this reducing engine r.p.m. at any road speed by 7½%. The retail price of this Fiat 1400 Diesel in Italy is 1,545,000 lire (equivalent to £909), this price being only 14½% greater than the price of 1,350,000 lire (equivalent to £795) charged for the petrol-engined Fiat 1400.

For the two members of the editorial staff of *The Motor* who were recently invited to test the Fiat 1400 Diesel in Italy, the greatest interest inevitably lay in

market provided that it is acceptable in other respects. So far as general behaviour is concerned, the comparison between the petrol-engined Fiat 1400 and the Fiat 1400 Diesel may be summarized by saying that with the oil-burning engine the top gear acceleration and hill climbing qualities of the car are actually improved but that the figures for acceleration through the gears deteriorate; the maximum speed is reduced by 10 m.p.h. from approximately 74 m.p.h. to 64 m.p.h., both models being equally willing to maintain maximum speed indefinitely when required; there is very appreciably more noise but no serious vibration when the oil-fuel engine is idling with the car at rest; with the car in motion, there is virtually nothing to indicate to a passenger which type of engine is fitted to a particular car.

True cold starting trials were not made during this particular test, but it was evident that a good deal of thought had been given to ensuring that starting was always simple. At the centre of the facia, below the "ignition" key which was turned on to bring the instruments, etc., into operation, the 1400 Diesel has a convenient twist-action control which is spring-loaded into its central position. Turning the lever a short distance to the right energizes electrically heated glow-plugs inside the cylinders, use of these for up to one minute being advised before starting in conditions of extreme cold: the remainder of the lever movement to the right operates the electric starter and at the same time increases the delivery of fuel to a "starting" or "fast idling" rate. In our

comparisons between this model and petrol-engined cars. What we wanted to know was whether the oil-engined car was as pleasant as are those with petrol engines, and how large a saving in fuel costs it could offer.

The vital question of savings in fuel cost has been dealt with in the table at the commencement of this test report, and these savings are very evidently large enough to assure the oil-engined car of a big

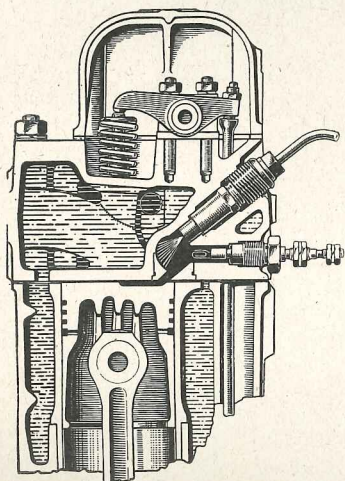
use of the car, engine starting was always instantaneous without it being necessary to pause with the control in the half-way position. With the control released, the engine idled normally, whilst a twist to the left would cut off the fuel and so stop the engine when required.

Idling, on the factory-maintained car which we tested, was very smooth indeed, thanks to the flexible mounting of the complete power unit. Under these conditions, the engine of the test car was much quieter than are many other compression-ignition units, but certainly not silent, especially to observers outside the vehicle. No engineers seem able to obtain consistent freedom from knock when an oil engine is idling, and in the interests of quietness in town streets it seems that more attention should be paid to silencing European oil-engined cars by the technique (widely used on petrol-engined cars in America) of shutting in behind thick insulating material such engine noise as it is too difficult or costly to eliminate at source.

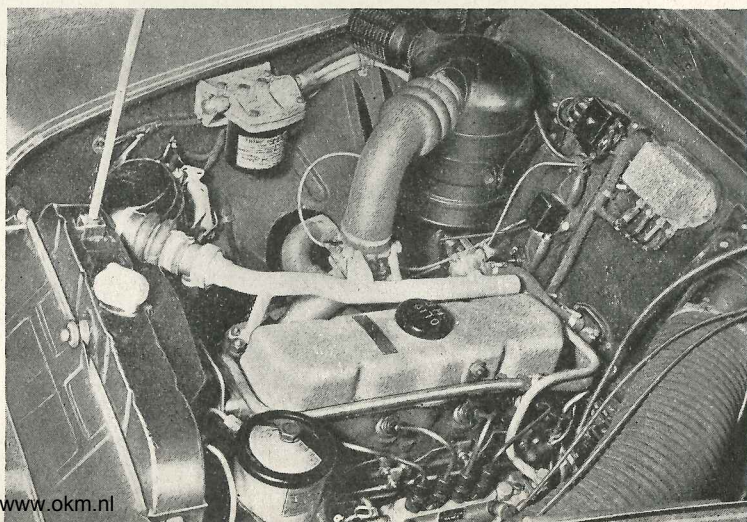
#### Governed Cruising Speed

Once this model is in motion, it is fully as quiet and as smooth to ride in or to drive as are other cars of four-cylinder type. Perhaps the most useful cruising speed is 55 m.p.h., the acceleration falling away very sharply between this speed and the governed maximum of 63-64 m.p.h., but the car is very free from wind or mechanical noise at any pace in its top gear range; for example, in the course of our trials a 20-mile length of motor road was happily covered at full speed throughout. The operation of a pneumatic all-speed governor gives rather different response to the throttle from that experienced on a petrol-engined car, some initial lost motion being especially evident when the car is running fast, but this difference in "feel" of the accelerator pedal is not in any way disconcerting.

On steep hills, this engine will pull really hard in top gear down to below 20 m.p.h. before roughness begins to suggest the desirability of a downward gear-change. There is little need or possibility for using high r.p.m. in the indirect gears, although when necessary just over 40 m.p.h. can be held in third and rather more than 25 m.p.h. in second ratio without any fuss. At no time during the accelera-

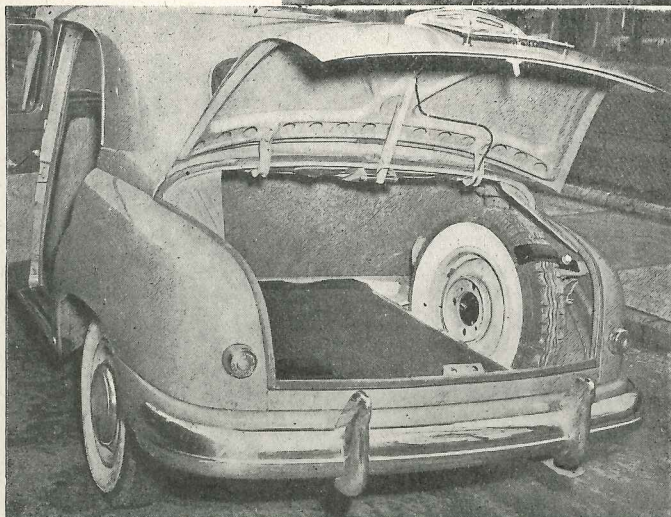


FUEL INJECTION takes place in a pre-combustion chamber of this engine, an electrically heated glow-plug being provided in each cylinder to facilitate starting from cold. Prominent in the under-bonnet view on the right are the fuel injection pump, separate fuel and lubricant filters, oil-bath air filter, and an air intake duct for the car interior heater.



Contd.

ENCLOSED in the smooth tail of the low-drag Fiat body is a luggage locker of considerable size. The spare wheel is mounted in a well to one side of the flat rubber-covered floor, and the fuel filler (with overflow pipe) is under the lid on the opposite side.



high, for passengers in either the front or the rear seats. This flexible suspension naturally allows the car to roll appreciably on corners, but although the amount of roll is greater than British motorists expect of a Continental-built car, it is in fact kept within very reasonable bounds. If the rubber buffers setting a limit to spring travel ever came into action, they did so in a progressive manner which was not perceptible to passengers.

tion or hill-climbing tests were any signs of exhaust smoke evident.

Damp roads prevented this car recording good results in our usual braking tests from 30 m.p.h., but did not prevent us working the brakes very hard on mountain descents. Using top gear only, and accelerating a fully laden car between each of the corners, drops of several thousand feet were tackled quickly without the brake pedal pressure needed to check the car for each hairpin corner increasing to any appreciable extent. The handbrake acts on the transmission, and so is quite separate from the main braking system.

### Positive Stability

Installation of a compression-ignition engine adds somewhat to the front-axle weight of the Fiat 1400, which in petrol-engined form has such components as the cylinder head cast in aluminium alloy; naturally, 2½ cwt. of extra weight and the fitting of larger-section tyres has some small effect upon handling qualities. Both the self-centring action of the steering and the understeering characteristic of the chassis are quite marked, so that fast cornering involves quite vigorous use of the wheel: the car seemed to hold on to wet and very slippery Italian road surfaces in a very commendable fashion, was stable on the straight, and at normal cornering speeds was quite light to steer.

In its riding qualities, this model showed the modern softness such as is especially favoured on the American continent. The standard of riding comfort provided is very

Fiat 1400 is closely comparable with a great many other modern cars of around 1½-2½ litres size, its proportions being such that four people are very much at ease in it whilst six people can be carried in reasonable comfort when need arises. Headroom dimensions, however, are not such as to suggest that the wearing of hats by full-sized men is envisaged, and a chassis cross-member below the front seat slightly limits toe-room for the rear passengers. Standardized equipment includes armrests on the four doors, hinged ventilation panels on the front windows, and an interior heater of the fresh-air pattern which is reasonably effective provided that the engine is working hard enough to keep it supplied with hot water. A glove locker is provided on the fascia panel, and the luggage locker provides a usefully large flat-floored compartment at one side of which the spare wheel is clamped.

### Adequate Performance

In sum, we found the Fiat 1400 Diesel an extremely commendable model which will have a strong appeal for those who cover large annual mileages. We were especially impressed by the good sense of designing and developing a compression-ignition engine closely equivalent in bulk and power output to an existing modern petrol engine, so that the vehicle into which this engine is fitted, although extremely economical to run, is not significantly lower in performance than its petrol-burning counterpart.

## Mechanical Specification

### Engine

Cylinders	...	...	...	4
Bore	...	...	...	82 mm.
Stroke	...	...	...	90 mm.
Cubic capacity	...	...	...	1,901 c.c.
Piston area	...	...	...	32.8 sq. in.
Valves	...	...	...	push-rod o.h.v.
Compression ratio	...	...	...	20/1
Max. power	...	...	...	40 b.h.p.
at	...	...	...	3,200 r.p.m.
Piston speed at max.	b.h.p.	1,890 ft. per min.		
Injection pump	...	...	...	Fiat (Bosch licence)
Ignition	...	...	...	nil
Sparking plugs	...	...	...	nil
Fuel filter	...	...	...	Fram
Oil filter	...	...	...	Fram
Electrical system	...	...	...	24 volt

### Transmission

Clutch	...	...	...	s.d.p.
Top gear (s/m)	...	...	...	4.10
3rd gear (s/m)	...	...	...	6.44
2nd gear (s/m)	...	...	...	9.77
1st gear	...	...	...	15.8
Propeller shaft	...	...	...	divided open
Final drive	...	...	...	10/41 hypoid bevel

### Chassis

Brakes	...	...	...	Hydraulic
Brake drum diameter	...	...	...	9.85 ins.
Friction lining area	...	...	...	161 sq. in.
Suspension:				
Front	...	Coil and wishbone I.F.S., with anti-roll torsion bar		
Rear	...	Coil springs and rigid axle, with laminated torque arms and transverse stabilising rod		
Shock absorbers	...	...	...	Telescopic
Tyres	...	...	...	6.40-14

### Steering

Steering gear	...	...	...	Worm and roller
Turning circle	...	...	...	35 feet
Turns of steering wheel, lock to lock	...	...	...	3½

### Performance factors (at laden weight as tested):

Piston area, sq. in. per ton	...	...	...	22.6
Brake lining area, sq. in. per ton	...	...	...	111
Specific displacement, litres per ton mile	...	...	...	2,175

## Coachwork and Equipment

Bumper height with car unladen (including over-riders):—

Front (max.) 23 in., (min.) 13 in.

Rear (max.) 25 in., (min.) 15 in.

Starting handle ... nil

Battery mounting ... Under front seat (24-volt battery)

Jack ... Bevel gear type

Jacking points 2 sockets on each side of car

Standard tool kit ... 4 double-ended spanners, 1 box spanner, 1 pair pliers,

1 screwdriver, 1 key for injection pump,

1 wheelbrace, 1 wheel chock. (Also spare fuses, injector nozzle, and heater plug.)

Exterior lights ... Two head, two sidelamps/winkers, two stop/tail lamps, one number plate lamp.

Direction indicators ... Flashing type (self-cancelling switch)

Windscreen wipers ... Two-blade self-parking electric

Sun vizors ... Two, universally pivoted

Instruments ... Speedometer (with trip reading 1/10ths km.), fuel contents gauge,

oil pressure gauge, coolant thermometer, ammeter.

Warning lights ... Three, for direction indicators, parking lamps, and starting glow plugs.

Locks: "With ignition" key: Instruments and auxiliaries. With other keys... Two separate keys for one front door and for luggage locker

Glove lockers One on fascia panel, with lid

Map pockets ... Two, on front doors

Parcel shelves ... One, behind rear seat

Ashtrays ... Two (one front, one rear)

Cigar lighters ... nil

Interior lights ... Two (one in roof, one over mirror)

Interior heater Fresh-air type, with de-misters, fitted as standard

Car radio ... Optional extra

Extras available ...

Upholstery material ... Cloth and plastic

Floor covering ... Rubber

Exterior colours standardised ... Seven colours available

Alternative body styles ... nil