

# AUTO TEST

## Volvo 145E Estate Car

### MORE POWER AND LUXURY FOR VOLVO ESTATE

#### AT-A-GLANCE:

Low-compression version of petrol-injection engine gives useful gains in performance but worse economy. Luxuriously appointed and tremendously spacious. Comfortable ride and good, but not sporty handling. Heavy clutch and temperature-conscious brakes. Much improved gear-change

**O**f necessity, estate cars require a greater degree of design compromise than do their saloon or van counterparts. Passenger accommodation, load-carrying capacity, ride, handling — these are some of the factors which spell conflicting interests in terms of design requirements. All too often, this is reflected in the character and behaviour of the finished product. Not so with Volvo; the 145-series estate cars are exceedingly well-planned vehicles, offering a high level of passenger comfort allied to first-class load-carrying capabilities.

A newcomer to the range for 1972, the 145E is powered by a low-compression (8.7:1) version of the petrol-injection engine employed in the 144 Grand Luxe and 1800 ES models. Designated B20F, the new unit develops 115 bhp (DIN) at 6,000 rpm — a 15 per cent improvement on the twin-carburettor B20B unit used in the 145S. Moreover, the injection engine is content with a diet of 94-octane (3-star rating) fuel, whereas 100-octane (5-star) is recommended for the B20B.

Even in "basic" form, the 145E is very well equipped. Included in the standard specification are a laminated windscreen, automatic seat belts, cloth upholstery, cut-pile carpets, front-seat headrests, reclining backrests, metallic paint finish, mud flaps, heated rear window, rear wiper and washer, plus a host of other details not found on lesser vehicles. Price, including purchase tax, is £2,146.87.

In addition, our test model was equipped with a pair of Marchal Senior Starlux foglamps (£24 fitted), a Volvo AM/FM radio installation (£68 fitted), and an additional, rear-facing seat (£45 fitted). These raise the total to £2,283.87.

Among other extras listed are a roof rack (£17.50 fitted), a dog guard (£9 fitted) and a specially tailored petrol can (£4).

For 1972, Volvo have abandoned their lengthy and somewhat old-fashioned gear-change lever in favour of a remote-control design. This has enabled a supplementary panel to take the place of the former snap-on fuse cover. On it are mounted a clock and illuminated push-button switches for hazard warning, rear-window heating and the rear wiper-washer system. Hinging it downwards (a matter of releasing two turn-lock fasteners) reveals nine fuses and the indicator flasher unit. Four spare fuses are provided in recesses on the inside of the panel.

Also new is a restyled steering wheel with "spectacle" horn ring. Quarter-vent catches have been simplified and outside door handles are of the flush "letter-box" pattern.

#### Performance

Starting is always a first-turn affair, but there is a tendency for the engine to stall after a few moments' running on frosty mornings. Restarting is equally prompt, the unit then settling down to a smooth and dead-reliable idle. Drive-away flexibility is impressive, yet there is no sign of over-richness.

Bearing in mind the severity of Scandinavian winters, warm-up is disappointingly slow. It takes a mile or more before the heater makes its presence felt. While this may well be peculiar to the test car, it does prompt us to question the wisdom of using a viscous coupling for the large six-bladed fan. Would not an electro-magnetic clutch be better?

Even when warm, the engine is somewhat noisier than average. Most of this is valve-gear clatter and, as such, is unlikely to worry or offend the majority of owners. It is something one quickly learns to ignore.

Despite its considerable size and robust build, the 145E tips the scales at 25.2cwt. — just 1.6cwt. more than the equivalent saloon (144 Grand Luxe). Saloon gearing is employed (4.1-to-1 final drive), whereas the less powerful variants are lower geared (4.3-to-1 in manual form). Surprisingly, it out-performs the Grand Luxe tested earlier in the year (*Autocar*, 26 August 1971) on almost every score, in spite of having a nominally less powerful engine. This apparent anomaly suggests that the Grand Luxe concerned was somewhat substandard, a theory borne out by references to surging and plug-melting contained in the text of our report.

To allay any doubts concerning the 145E's B20F unit, the model was driven almost brutally hard for lengthy periods. We are pleased to report that it revelled in such treatment. In fact, its performance and feel improved with every mile. Incidentally, MIRA testing was undertaken with only 1,600 miles on the clock, much too little for optimum results.

With nearly 53 per cent of its kerb weight over the rear wheels, the Volvo is blessed with excellent traction. Unfortunately clutch fade prevent full use being made of this during standing-start acceleration checks. Even so, 60 mph is reached in 11.5 sec. and the quarter-mile post in 18.1 sec. Even by sporting saloon-car standards, these are very creditable times.

Top speed averaged 102 mph, equivalent to 5,700 rpm. Best one-way figure was 104 mph, with the optimistic speedometer indicating 111 mph. Even at these speeds, there are no signs of stress.

Contrary to what the figures suggest, the 145E does not *feel* particularly lively. This, at least in part, is due to the abnormally heavy throttle mechanism. Around 20lb effort is required at mid-travel, increasing to 30lb at full bore.

It is impossible to be dogmatic concerning cruising speeds. Without doubt, 90 mph (97



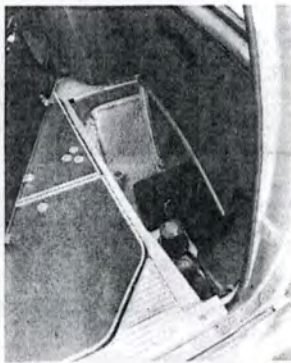
Below: Although rear passengers sit well within the wheelbase, there is ample leg-room. Note attractive fabric trim



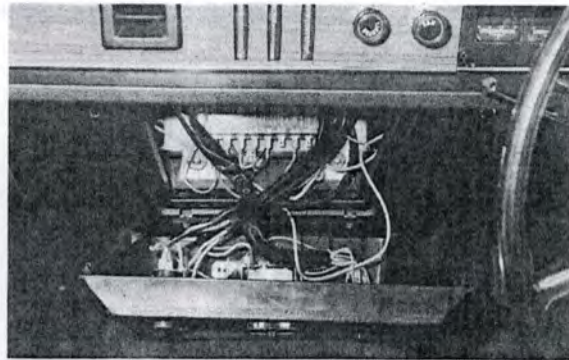


Top left: Heated rear window has its own wiper and washer. Note mud-flaps and rubber-faced bumper. Left: Large tailgate gives completely uninterrupted access to cargo space. Minor irritation is needed to use both hands when closing (one to release left-hand prop)

Above: One-piece rear quarter windows enhance the Volvo's clean lines. Note extractor vent at extreme rear. Excellent Marchal foglamps are an extra

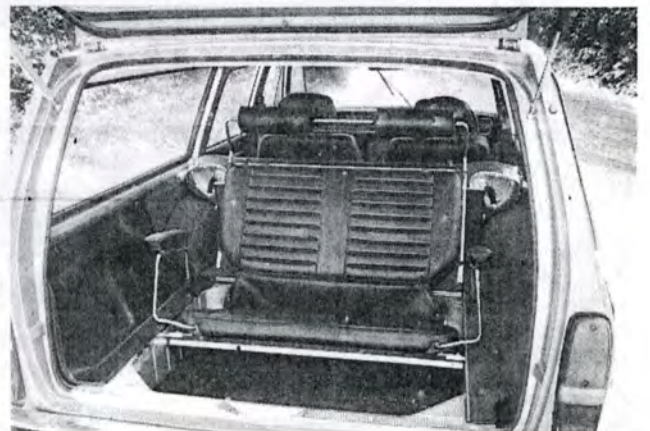
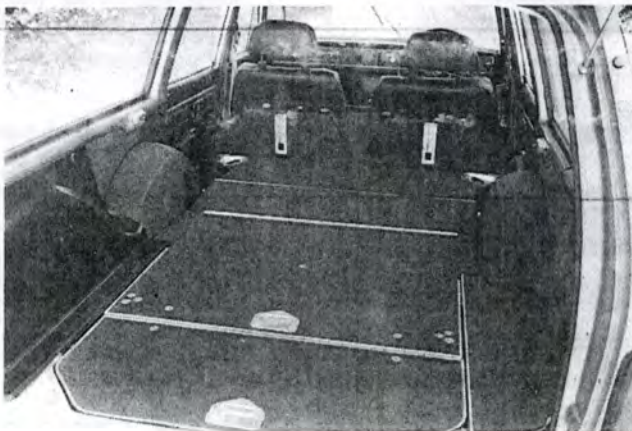


Far left: Spare wheel lives in rear quarter, behind easily removed cover. Note high standard of trim. Left: Jack, tools and rear window washer live beneath snap-on cover on right of load platform



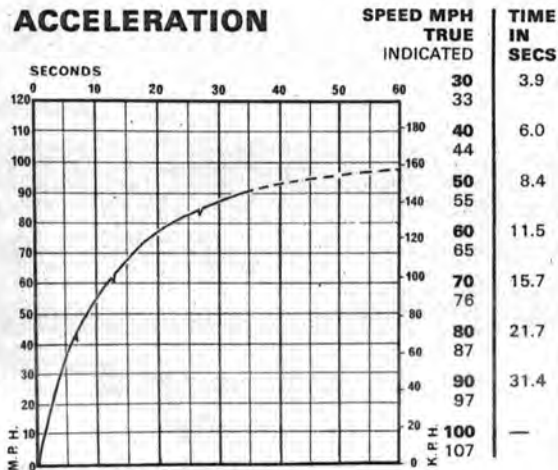
Right: Auxiliary panel swings down to reveal nine fuses and indicator flasher unit

Below, left: With rear seat folded, there is an enormous amount of cargo space. Below: The rearward-facing auxiliary seat is big enough for two adults



# VOLVO 145E ESTATE CAR (1,986 c.c.)

## ACCELERATION



## GEAR RATIOS IN TIME IN SEC

mph	Top	3rd	2nd	
10-30	—	8.3	4.8	Standing 1/4-mile 18.1 sec 74 mph
20-40	11.5	7.1	4.2	Standing Kilometre 33.6 sec 92 mph
30-50	10.2	6.4	4.3	Test distance 1,100 miles
40-60	10.4	6.7	5.3	Mileage recorder
50-70	11.6	7.7	—	1.1 per cent over-reading
60-80	14.1	9.7	—	
70-90	19.6	—	—	

## PERFORMANCE

MAXIMUM SPEEDS			
Gear	mph	kph	rpm
Top (mean)	102	164	5,700
(best)	104	167	5,800
3rd	88	142	6,660
2nd	60	97	6,660
1st	38	61	6,660

## BRAKES

**FADE**  
(from 70 mph in neutral)

Pedal load for 0.5g stops in lb

1	40	6	40-30-40
2	40	7	40-35
3	40-20-30	8	40-35-40
4	40-20	9	40-35-45
5	40-30-50	10	40-35

## RESPONSE

(from 30 mph in neutral)

Load	g	Distance
20lb	0.17	177 ft
40lb	0.46	65 ft
60lb	0.64	47 ft
80lb	0.70	43 ft
180lb	0.88	34 ft
*110lb	0.92	33 ft
Handbrake	0.35	86 ft

Max. Gradient 1 in 3.  
\* Preceded by interval of 2 min. instead of 3 min.

## CLUTCH

Pedal 47 lb and 6.2 in.

## COMPARISONS

MAXIMUM SPEED MPH	
Triumph 2.5 PI Mk.II Estate (£2,085)	106
Vauxhall Victor 3300SL Est. (£1,464)	106
Citroen Safari 21 (£2,067)	106
<b>Volvo 145 E (£2,147)</b>	<b>102</b>
Volkswagen 411 LE Variant (£1,580)	96

## 0-60 MPH, SEC

<b>Volvo 145E</b>	<b>11.5</b>
Triumph 2.5 PI Mk.II Estate	11.5
Vauxhall Victor 3300SL Estate	12.1
Citroen Safari 21	13.9
Volkswagen 411LE Variant	15.9

## STANDING 1/4-MILE, SEC.

<b>Volvo 145E</b>	<b>18.1</b>
Triumph 2.5 PI Mk.II Estate	18.1
Vauxhall Victor 3300SL Estate	18.7
Citroen Safari 21	19.5
Volkswagen 411LE Variant	19.7

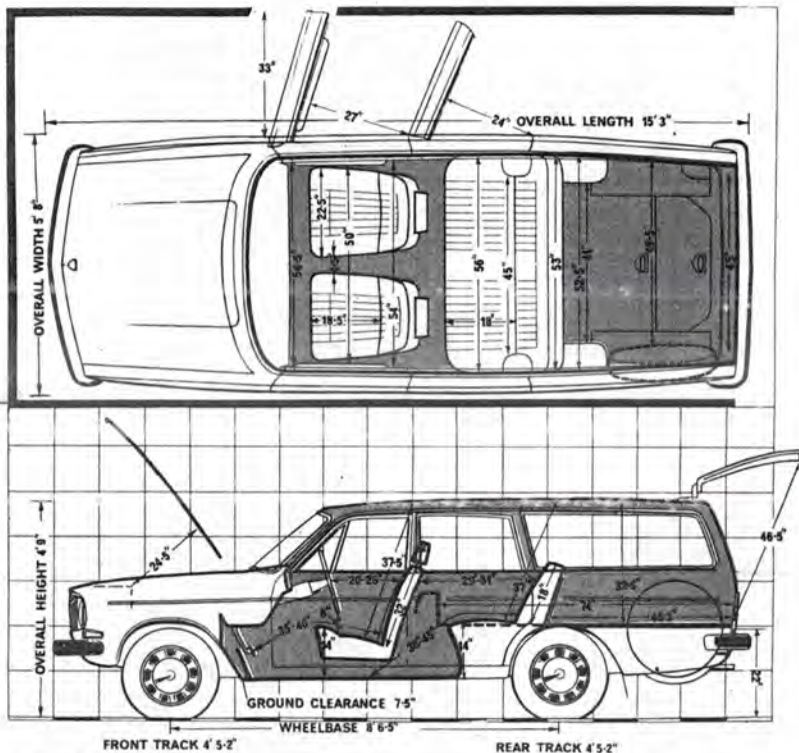
## OVERALL MPG

Citroen Safari 21	23.1
Volkswagen 411LE Variant	22.5
Triumph 2.5 PI Mk.II Estate	21.8
Vauxhall Victor 3300SL Estate	20.6
<b>Volvo 145E</b>	<b>18.9</b>

## GEARING

(with 165-15in. tyres)

Top	17.9 mph per 1,000 rpm
3rd	13.0 mph per 1,000 rpm
2nd	9.0 mph per 1,000 rpm
1st	5.7 mph per 1,000 rpm



STANDARD GARAGE 16ft x 8ft 6in.

## CONSUMPTION

### FUEL

Steady speed fuel consumption figures are not quoted, as our test equipment is not suitable for use with the car's Bosch electronic injection system.

Typical mpg	21 (13.5 litres/100km)
Overall mpg	18.9 (15.0 litres/100km)
Grade of fuel	Mixture, 3-star (min. 94 RM)

### OIL

Consumption (SAE 20W/50) 700 miles/pint

### TEST CONDITIONS

Weather: Bright and clear. Wind: 10-25 mph  
Temperature: 3 deg. C. (37 deg. F).  
Barometer: 30.55 in. hg. Humidity: 60 percent  
Surfaces: Dry concrete and asphalt.

### WEIGHT:

Kerb Weight 25.2 cwt (2,822lb-1,281kg)  
(with oil, water and half full fuel tank).  
Distribution, per cent F, 47.1; R, 52.9  
Laden as tested: 28.8cwt(3,225lb-1,464kg).

### TURNING CIRCLES:

Between kerbs L. 30ft 8in.; R. 31ft 7in.  
Between walls L. 33ft 0in.; R. 33ft 1 1/2in.  
Steering wheel turns, lock to lock 4.2.  
Figures taken at 1,600 miles by our own staff at the Motor Industry Research Association proving ground at Nuneaton and on the Continent.

## SPECIFICATION FRONT ENGINE, REAR WHEEL DRIVE

<b>ENGINE</b>	
Cylinders	4, in line
Main bearings	5
Cooling system	Water: pump, fan (with viscous coupling) and thermostat
Bore	88.9mm (3.50in.)
Stroke	80mm (3.15in.)
Displacement	1,986 c.c. (121cu.in.)
Valve gear	Overhead, pushrods and rockers
Compression ratio	8.7-to-1 Min. octane rating: 94
Carburation	Bosch electronic petrol injection
Fuel pump	Bosch high-pressure electric
Oil filter	Full-flow, throw-away canister
Max. power	115 bhp (DIN) at 6,000 rpm
Max. torque	116 lb. ft. (DIN) at 3,500 rpm

<b>TRANSMISSION</b>	
Clutch	Borg and Beck, diaphragm-spring, 8.5 in. dia.
Gearbox	Four-speed, all-synchromesh, remote control.
Gear ratios	Top 1.0 Third 1.36 Second 1.99 First 3.13 Reverse 3.25
Final drive	Hypoid bevel, 4.1-to-1

<b>CHASSIS and BODY</b>	
Construction	Integral, with steel body

<b>SUSPENSION</b>	
Front	Independent; double wishbones, coil springs, telescopic dampers, anti-roll bar
Rear	Live axle; trailing arms, radius rods, Panhard rod, coil springs, telescopic dampers

<b>STEERING</b>	
Type	ZF-Gemmer, hourglass worm and roller
Wheel dia.	16.7in.

<b>BRAKES</b>	
Make and type	Girling all-disc system
Servo	Vacuum, direct-acting
Dimensions	F 11.6in. dia. R 11.6in. dia.
Swept area	F 212 sq. in., R 198 sq. in. Total 410 sq. in. (285 sq. in./ton laden)

<b>WHEELS</b>	
Type	Pressed-steel disc, 5-stud fixing 5in. wide rim
Tyres—make	Pirelli
—type	Cinturato radial ply tubed
—size	165-15in.

<b>EQUIPMENT</b>	
Battery	12 Volt 60 Ah.
Alternator	35 amp
Headlamps	Robo 100/90 watt (total)
Reversing lamp	Standard
Electric fuses	12
Screen wipers	Two-speed, self-parking at front; single-speed, self-parking at rear
Screen washer	Standard, electric, front and rear
Interior heater	Standard, thermostatic water valve
Heated backlight	Standard
Safety belts	Standard, inertia reel
Interior trim	Cloth seats, pvc headlining
Floor covering	Cut-pile carpet
Jack	Geared screw-pillar
Jacking points	2 each side under sills
Windscreens	Laminated
Underbody protection	Underbody rails galvanized before painting, sealing compound elsewhere

<b>MAINTENANCE</b>	
Fuel tank	12.8 Imp. gallons (no reserve) (58 litres)
Cooling system	17.6 pints (including expansion tank and heater)
Engine sump	6.6 pints (3.75 litres) SAE 20W/50. Change oil every 6,000 miles. Change filter element every 6,000 miles
Gearbox	1.3 pints SAE 80. Change oil every 25,000 miles.
Final drive	2.3 pints SAE 80 EP. Change oil only at first 1,500 miles
Grease	No points
Tyre pressures	F 26; R 28 psi (normal driving) F 31; R 45 psi (fast driving with full load) F 27; R 41 psi (full load)
Max. payload	1,193lb. (542kg)

<b>PERFORMANCE DATA</b>	
Top gear mph per 1,000 rpm	17.9
Mean piston speed at max. power	2,860 ft/min.
Bhp per ton laden	80

on the clock) is entirely feasible. Naturally, there is appreciable engine noise, but it is patently obvious that the unit is still well within its limits. In fact, full-throttle was held for appreciable periods (more than 10min at a time) without the slightest ill effects.

At the opposite end of the scale, the situation is rather less rosy. Below 1,700 rpm in all gears, there is a most objectionable body boom. Fortunately, it is no hardship to avoid making the engine pull at such low revs.

Over the whole of the test period, petrol consumption averaged 18.9 mpg. On a cost-per-mile basis, this is equivalent to around 20 mpg on five-star fuel, a not unreasonable figure for a vehicle of this size and performance. Surprisingly, mode of driving had relatively little effect. A visit to MIRA for the hectic business of performance testing gave an overall figure of 18.0 mpg. In contrast, a spell of M4 commuting returned 19.1 mpg, the best achieved on this particular vehicle. Although many owners will improve on this, they are unlikely to achieve much over 20 mpg.

Oil was consumed at the rate of a pint per 700 miles. The engine remained spotlessly clean, as did the garage floor.

### Gearbox and clutch

We like the new remote-change mechanism. The sturdy lever is nicely placed and has well-defined and reasonably short movements. It is lightly spring-loaded towards third and top, and follows the same change-pattern as its predecessor (reverse spring-guarded beyond first). Although stiff and notchy to begin with, it proved quite pleasant when bedded in. Our only criticism concerns the reverse guard, whose action is a trifle too bulky. On the credit side, there is not a trace of lever rattle.

Cable actuation is employed for the 8.5in. diaphragm-spring clutch. Pedal effort, at 47lb, is high by current standards — a feature aggravated by the somewhat lengthy travel (6.2in.). In spite of this, the unit has a marked tendency to fade when subjected to abnormal stress. Such behaviour was experienced during the standing-start acceleration runs and when checking gradeability on the 1-in-3 test hill.

Even so, a restart on the latter proved just possible. Fade recovery is rapid and complete. Another good point is the unit's smooth take-up; not once did we experience any sign of judder.

### Ride and handling

According to Volvo figures, the 145E can cope with a total payload (including driver and passengers) of more than 10cwt. Looked at another way, a payload of 5cwt. may be carried in addition to four average-sized people.

An ability to cope with such heavy loads often goes hand-in-hand with a harsh ride and mediocre handling. This certainly doesn't apply here; we would rate the Volvo's ride as better than that afforded by most saloons of comparable size and price.

A glance at the illustrations will show that there is considerable rear overhang. As a consequence, attitude changes appreciably with changes in "platform" load. Accessible thumb-screws make for easy headlamp realignment on a long-term basis, but there is no provision for pre-set lowering.

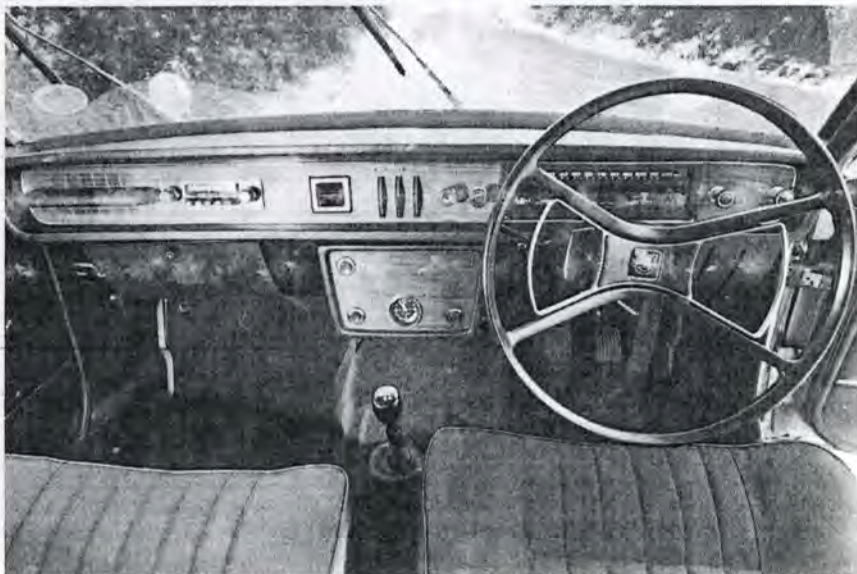
There is virtual freedom from high-pitched road noise of the type generated by tyre treads and coarse-textured surfaces. Large bumps and potholes are also dealt with effectively. Sadly the same cannot be said of nobbly going, which tends to set up an unpleasant rumble at low and medium speeds (up to 50 mph, or thereabouts).

Although the steering wheel has been restyled, its size and position remain unchanged. Most of our test staff thought it too large and too close to the driver's chest, but these are things most owners will grow to accept.

Mean turning-circle diameter is a fraction over 31ft—an excellent figure for a car of this size. Gearing, at 4.2 turns lock-to-lock, is lowish but not unduly so. Steering loads, we are pleased to note, are by no means excessive. A fair amount of effort is called for when the car is stationary, but this rapidly diminishes once under way.

The Volvo is not a car which inspires immediate confidence, yet it handles surprisingly well. Response is a mite sluggish, but the driver soon learns to compensate for this. There is some initial understeer, but

Remote gear-change lever makes room for auxiliary panel on which are mounted a clock and three push-button switches. Steering wheel has been re-styled but remains same diameter



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ultimate behaviour is almost neutral. It rolls quite a lot, but never catches out the driver by sudden changes of attitude or balance. An enterprising driver who knows his Volvo can achieve deceptively fast cross-country averages, even when the going is slippery.

## Brakes

Apart from poor response when first applied from cold, the brakes behaved quite satisfactorily during 1,000 miles of varied road use. At MIRA, however, their performance left much to be desired. As the results of the 30 mph response checks show, a deceleration of 0.5g (sufficient for all normal needs) necessitated a pedal effort of just over 40lb, an entirely acceptable figure. Raising the effort to 60lb gave the expected, pro-rata improvement in deceleration. Beyond this, however, their behaviour rapidly deteriorated. Sticking to the stipulated 3min interval between each stop, 0.88g at 160lb was the best achieved — this with the right-hand front wheel locked. Reducing the interval to 2min gave a best of 0.92g at 110lb with both fronts locked. This behaviour suggests that the pad material is abnormally temperature-conscious.

Looked at in terms of initial and final pedal efforts, the results of the fade test are good. However, the fluctuation in effort which occurred during many of the stops is further evidence of instability. The results show an initial build-up of efficiency, followed by a tendency to fade. On the credit side, complete recovery was achieved between each stop.

The nave of the rear discs form small-diameter drums which house the shoe-type parking brakes. These are extremely effective, easily holding the car on the 1-in-3 test hill. In an emergency, they can muster

0.35g from 30 mph.

Such an emergency is unlikely to occur in a Volvo. There are two entirely separate hydraulic circuits, each serving one rear brake and both the fronts. It is claimed that 80 per cent of the car's braking potential can be realized in the event of a failure in either system.

## Comfort and convenience

Volvo seats are among the best around. The basic hardware is made by Pullman Flexalators Ltd, a British firm. They are upholstered and trimmed in Sweden, cloth being used for all wearing surfaces on the 145E. This is woven from coarser-than-usual fibre; the result is good to look at and eminently practical.

Front seats have a generous fore-and-aft adjustment range. Friction-clutch mechanisms are used for the back-rests, which just fail to lower level with the rear seat cushion (with the robust headrests removed). There is pre-set adjustment for the rake of the seat as a whole, together with adjustable lumbar support (another Pullman Flexalators feature).

Unlike many estate cars, rear passengers are well catered for. The backrest is tall and comfortably raked, while leg-room is particularly generous. Because of the necessity to fold the seat, no centre armrest is provided. However, all four doors have comfortably-placed armrest-cum-pulls. There is also a roof grab-handle above each rear door.

We have already indicated that the test car was equipped with the optional, rear-facing seat. Quite well upholstered and trimmed in pvc, it is provided with folding arm- and head-rests. It is surprisingly comfortable and big enough for two adults. Access is via the tailgate — an arrangement which calls for a certain amount of agility. The tailgate has an internal release handle, which can be rendered inoperative for safety reasons. Surprisingly, no such provision is made for the rear doors. When not in use, the seat does not in any way impair the vehicle's load-carrying capabilities.

The Volvo's relatively tall build makes for easy entry and exit. Door closure is absolutely first-class. In contrast, all four window regulators have an abnormally stiff action.

Mention has already been made of the 145E's ability to cope with heavy loads. It is also blessed with a great deal of cargo space. The tailgate arrangement (its top edge is level with the roof) makes for easy loading of bulky items. Even so, the external hinges are particularly neat.

Folding the rear seat is a quick and easy operation. First, the cushion is swung forward and up through 90deg. Next, the backrest is released by grasping either of the inter-connected handles (one each side) and lowered to rest on substantially made stops. A hinged flap automatically covers the resulting gap, giving a large uninterrupted load platform.

The spare wheel is stowed vertically in the left-hand quarter, to the rear of the wheel housing. There is an unobtrusively shaped cover, retained by two large thumb-screws. A similar well is provided on the opposite side, with a flat snap-on cover. In this live the jack, tools and rear washer unit. Volvo also list a petrol can which fits into the remaining space. The whole layout is an excellent example of integrated design, on which it would be very difficult to improve.

For the past year or so, 145-series estate cars have featured a neat air-extractor vent on the right-hand rear flank. This has eliminated the need for hinged vents, enabling one-piece rear quarter windows to be employed. This results in a much neater appearance.

Heater output is controlled by a thermostatic water valve. The unit is slow to warm up and sluggish to respond to changes of setting. A considerable amount of heat is ultimately available, but not as much as expected. Experience of other Volvos suggests that something (possibly the cooling system thermostat) was amiss on this particular example.

There is little ram-flow effect at low speeds, necessitating use of the blower for much of the time. This was quite unobtrusive on its higher setting, but suffered from an annoying squeak at the lower speed. This, we feel sure, is a fault peculiar to the test car.

There are no face-level cold air vents, but there are two scuttle-mounted ones. Past experience has shown that these are useful in hot weather, but are of no value in combating drowsiness in winter.

Space considerations preclude full coverage of the 145E's lavish equipment. In any event, most of the remaining details follow 144 Grand Luxe practice. Once again, we are most impressed with Volvo quality and finish. Few would claim the 145E to be an exciting vehicle, but it has few rivals on the score of practicability. Added to this, it is very comfortable, goes well and handles adequately. Even more important, there is every indication that it will prove reliable and long-lasting. □

## MANUFACTURER:

AB Volvo, 405 08 Goteborg, Sweden

## UK CONCESSIONAIRES:

Volvo Concessionaires Ltd, Raeburn Road, Ipswich, Suffolk

## PRICES

Basic		£1,716
Purchase Tax		£430.87
Seat belts (approx.)	Fitted as standard	
Total (in G.B.)		£2,146.87
<b>EXTRAS (inc. P.T.)</b>		
* Marchal foglamps	(fitted)	£24.00
* Extra seat	( .. )	£45.00
* Volvo AM/FM radio	( .. )	£68.00
Roof rack	( .. )	£17.50
Dog-guard	( .. )	£9.00
Petrol reserve can		£4.00

\* Fitted to test car

## PRICE AS TESTED

£2,283.87

Despite somewhat cluttered appearance, underbonnet accessibility presents no problems. Note cross-over mechanism between brake pedal and direct-acting servo. Same high standard of finish is evident here as elsewhere

