



Volvo V70 Bi-fuel



What's different?

850 became S70/V70 a year ago, with mainly cosmetic tweaks. Bi-fuel offers a natural gas alternative to petrol at no extra cost.

LIKE MADAM BUTTERFLY WAITING for Pinkerton, the environmentalists and motor industry alike have been hankering for too long for the wonder battery that can deliver a truly practical electric car. Perhaps it would be better for them to cut their losses and settle for the chap around the corner! That's what the proponents of CNG (natural gas) would have us do – it's here, it's clean and it's cheap.

Volvo has been converting its trucks and buses for some time, but now it's added an already-converted car to its range. For the time being, it charges no extra for the second fuel system that's added to its 2.5 10-valve S (saloon) or V (estate car).

We took a V70 Automatic because we had already got the weight of an ordinary (petrol-only) version of the 850 before (see R9402). Talking of weight, the gas conversion adds around 160kg to the car's kerb weight, so it comes as no surprise to discover that this Bi-fuel's performance and petrol consumption are

both compromised compared with the ordinary version; 30–70mph takes 1 $\frac{1}{4}$ sec longer and it loses 1 $\frac{1}{2}$ –2mpg. Apart from that, it behaves impeccably, although our car did display a peculiar warble from its exhaust at around 1500rpm.

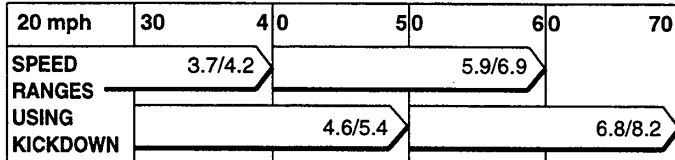
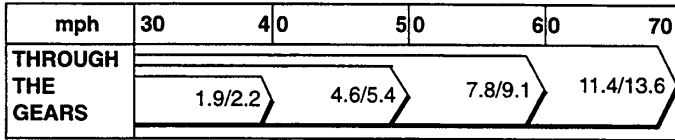
But what happens when you switch to gas? The first problem is finding a filling station – they're few and far between at present. CNG is sold by weight instead of volume, and our car took enough to cover only a third of the distance that could be comfortably managed on petrol between forecourt stops. Theoretically you can rent (at £60 a month) or buy (£3000) your own home dispenser and top up from the domestic gas supply. The real future lies in greater acceptance, resulting in the proliferation of gas stations, of course. It's also worth remembering that a fleet of tankers wouldn't be required to meet town demand, if there's a gas supply on hand, in the infrastructure.

OK, so we've filled the tank and we flick the fascia switch – a warning lamp winks a few times, then stays on (too inconspicuously) to tell us we're now running on gas – otherwise, we would never know! In urgent overtaking, you can subjectively detect a certain loss of urge (30–70mph acceleration, flat out, grows by a further 2sec), but other than some tinkling sounds

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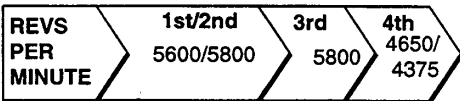
PERFORMANCE

Acceleration time in seconds – on Petrol/Gas (using accelerator kickdown)

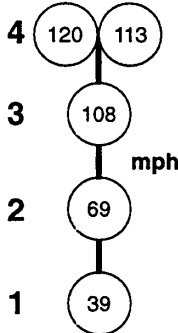


Maximum speeds

using accelerator kickdown (in E or S mode)



(Only fourth gear different using gas)



SAFETY AND SECURITY FEATURES

Assessed on their effectiveness and convenience (the more black blobs the better)

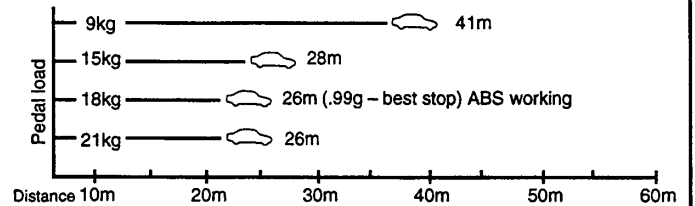
Seatbelts	front ●●●●○ rear ●●●●○	Door locking	●●●●○
		central locking?	<input checked="" type="checkbox"/>
Head restraints	front ●●●●○ rear ●●●●○	remote control?	<input checked="" type="checkbox"/>
		auto window closure?	<input checked="" type="checkbox"/>
Interior		deadlocks?	<input checked="" type="checkbox"/>
safety padding	●●●●○	Luggage	
driver's airbag?	<input checked="" type="checkbox"/>	secure from interior/hidden	●○○○○
other airbags? (side type)	<input checked="" type="checkbox"/>	from view (not estate)	●○○○○
side impact protection	●●●●●	Alarm	●●●●○
Fuel anti-spillage	●●●●○	engine immobilised?	<input checked="" type="checkbox"/>

standard on test car factory fitted option not available

BRAKES

Pedal feel ●●●●○ Behaviour in an emergency ●●●●○ Handbrake ●●●○○

Dry road stopping distance from 50mph (with standard ABS)
(A good-to-average best stop is about 28m at 20-30kg pedal load)



Fade test: pedal load required for a moderate (34m/.75g) stop:
11kg at start of test, 13kg at end of test. (Ideal brakes show no change)

FUEL CONSUMPTION

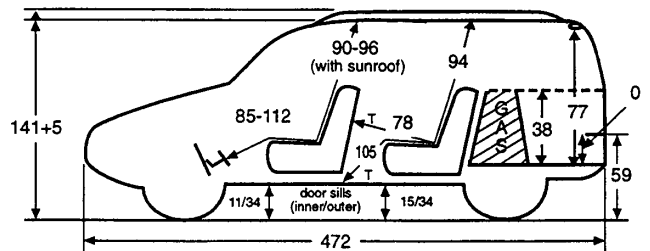
Fuel grade: Bi-fuel; unleaded petrol or natural gas (CNG)

Type of use – with air conditioning off*	petrol/mpg
In the city – heavy traffic	18
In the country – quiet driving	30
Typical mpg overall – petrol	26
Realistic tank range (not nominal tank capacity)	65 litres/370 miles
Typical gas consumption	9.4 miles per kg/29¹/₂mpg
(1kg equivalent to 1.452 litres) – see text	
Gas tank range to empty	13.45kg/125 miles

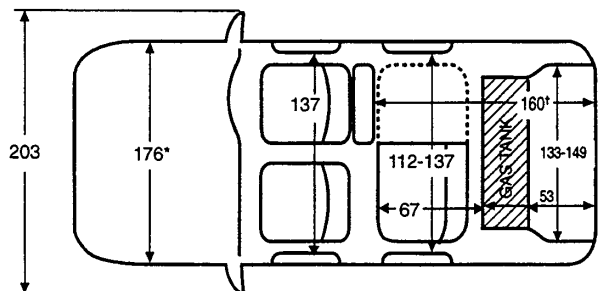
*with air conditioning switched on, consumption will increase by 2–4% in winter and 4–8% in summer

MEASUREMENTS

Centimetres Estate car



T: typical back seat space behind medium-sized front occupants



*with mirrors folded above gas tank

from the tank, mounted amidships, it's impossible to detect any other differences – unless you get out and smell the exhaust.

It's this exhaust emission that's one of the two big reasons for running on gas – it's much cleaner and more environmentally friendly. All the nasties, such as carbon monoxide, nitrous oxide and hydrocarbons are significantly reduced, and there's no benzene or sulphur to worry about, either. In fact, natural gas is mostly methane, and although greenhouse gas is still present in the exhaust, there's less of it.

The other big advantage of CNG is that it's cheap and plentiful. Its price is, of course, ruled by politics, but there seems to be a clear commitment to give it taxation preference against fossil fuels into the foreseeable future, because of its environmental advantages.

At present pump prices, our car would have needed a 41mpg overall result on petrol to ensure the same cost-per-mile on the two fuels – as things stand, we paid 60 per cent more on petrol to cover the same distance.

It's all the more frustrating then that we used up our gas so soon, despite the intrusive, bulky tank that seriously compromised our estate car's load-carrying potential. This is a significant disadvantage and it won't get any better in a smaller car, either. Worries about safety seem to be unfounded, however – the tank is built to withstand most assaults that would spill petrol everywhere and the pressurised system prevents vapour leaks even when refuelling. If you run out of gas, the car simply reverts to petrol by itself, with only the flashing warning lamp to confirm the fact; you certainly don't detect anything from underbonnet.

Another look at the V70

The change of model designation, with subtle styling revisions but no radical changes, has done nothing to dampen our enthusiasm and respect for Volvo's best model. Indeed, our 1994 test car's weighty accelerator, manually adjusted driver's door mirror and key-only door opening have all been upgraded. The remote-control locking isn't used if you're leaving the dog in the car, however – using the driver's door key locks the car without the alarm, but having no keyhole on the other side is a nuisance at times.

The V70 still rides firmly, though not too harshly, but it steers and handles with real poise. We like the

auto 'box, too – its shift sensitivity is set just right in the two normal (S and E) modes provided, except that first gear seemed more willing to engage in E than in S – peculiar.

The optional climate control is dreadfully expensive, but works splendidly, with separate temperature variation from side to side, as well as upstairs and down.

Volvo's commitment to safety is unquestionable, but there's a touch of the nanny-state about its clicking and flashing seatbelt reminder and its headlamps-on-all-the-time. Incidentally, we find headlamp signalling impractical with this regime – you can't flash them when they're already on!

Despite that gas tank, seating remains uncompromised and very comfortable, with two separate load compartments available when the back seat is folded away.

VERDICT

Full marks to Volvo for leading the way – the first bi-fuel car in its normal line-up, not a rehashed retrofit. The benefits of this are noticeably better fuel economy, even before costs are taken into account, no major performance penalties and excellent driveability, free of tantrums.

The intrusive tank is a serious snag, but on the other hand, its limited range is less of a problem if you view this dual-fuel car as an alternative to the hybrid that some manufacturers seem to be backing at present. Hybrids need two power units – with bulky batteries – which makes this Volvo's two fuel tanks seem straightforward, by comparison.

The hybrid concept envisages a diesel engine to propel the car and recharge the batteries out on the open road, with a switch to battery/electric propulsion (with zero emissions) in town use. This bi-fuel concept seriously challenges this approach with a technology that's available now. The car could be designed to start up from cold on gas and automatically switch between fuels once the catalyser starts working 100 per cent.

Gas in the city, petrol (or diesel) in the country – it begins to make a lot of sense, but it needs a lot of converts to get the show on the road and iron out the snags in the pipeline.

Bi-fuel likes . . . and gripes

Relatively "clean" exhaust, especially from cold starts . . .	Gas tell-tale should be adjacent to gauge
Cleaner burning with extended oil and filter change intervals . . .	Gauge reading unreliable and erratic
Favourable taxation prospects . . .	Tank intrudes on luggage space
Fewer tanker deliveries . . .	Lack of filling points for most potential users (unless you're lucky)
Less complicated than a hybrid . . .	Extra weight blunts performance
Plentiful North Sea resource, domestically piped	