



# VW 3-cylinder diesels

Featuring Polo 1.4 TDi and Lupo 3L



**T**HIS ISN'T THE FIRST THREE-CYLINDER diesel in modern times – Daihatsu had one under the bonnet of the Charade in the early eighties. However, this state-of-the-art VW diesel has come to fruition as part of a project to demonstrate how frugal and environmentally considerate future motoring can be.

In 1.2 litre/61bhp guise, installed in a special version of the Lupo (not yet on sale here in the UK), VW claims that its fuel consumption will average 3 litres per 100km (i.e. 94½ mpg) in the official tests – hence the title Lupo 3L(itre).

To achieve such frugality, VW has virtually reconstructed the model, so that although it looks similar to any other Lupo, in fact it bristles with ingenious (and expensive) solutions to reduce weight and ensure ultimate mechanical efficiency. The use of aluminium, plastics, even magnesium in the body and chassis has produced a formidable weight saving, compared with an equivalent, regular-series Lupo 1.7SDi, and its aerodynamic efficiency has improved from a Cd value of .32 to .29.

However, it's the under-bonnet wizardry that plays a major role. As well as the direct-injection three-pot

turbo-diesel, the “conventional” five-speed synchromesh gearbox is also electronically controlled, it uses hydraulics to do the shifting, so it finishes up behaving like an automatic, with an additional “Tiptronic” manual shift facility when required.

Even the automatic shift sequence has dual modes – for ultimate fuel economy, an Eco button on the fascia is depressed, which results in very early upshifts (1800rpm on half-throttle compared with 2800rpm in non-Eco mode), plus two other features. These are a freewheel on the overrun (like being in neutral) and the engine switching off a few seconds after coming to a traffic halt – if the footbrake stays depressed. The traffic-lights turn green, you release the brake and the engine starts again, with gentle “creep” (just like a conventional automatic) in gear.

We found the early upshifts embarrassing at times (when it changed from first to second half way across the traffic, emerging from a junction, for instance) and the shift quality can be rather ponderous, especially when taking off from rest.

In non-Eco automatic guise, these “special effects” don't occur and if you prefer a clutchless manual car,

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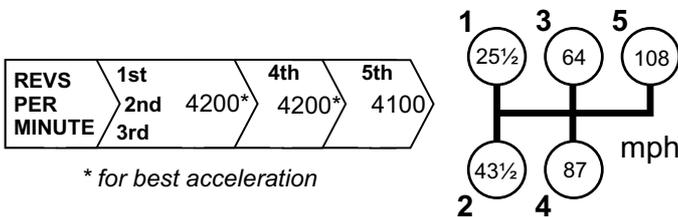
### PERFORMANCE - 1.4 TDi

#### Acceleration time in seconds

mph	30	40	50	60	70
<b>THROUGH THE GEARS</b>		2.0	4.9	8.4	13.3
<b>IN 5TH GEAR</b>		7.8	13.3	17.8	22.8
<b>IN 4TH GEAR</b>		4.0	7.2	10.8	15.4

20 mph	30	40	50	60	70
<b>5TH/4TH SPEED RANGES</b>		17.6/10.2		10.0/6.8	
			13.3/7.2		9.5/8.2

#### Maximum speeds using accelerator kickdown



### FUEL CONSUMPTION - 1.4TDi

Type of use - with air conditioning off*	mpg
Urban (17mph average/heavy traffic)	39½
Suburban (27mph average/6.4 miles from cold start)	55
Motorway (70mph cruising)	55½
Cross-country (brisk driving/20 miles from cold start)	64½
Rural (gentle driving/20 miles from cold start)	76
<b>Typical mpg overall</b>	<b>62</b>
Realistic tank range (not nominal tank capacity)	37 litres/500 miles

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

### FOR THE TECHNICAL - Polo 1.4TDi

#### ENGINE

**Type** transverse three cylinder with all-alloy block and head. Four main bearings and counter-balance shaft

**Size** 79.5 x 95.5mm = 1422cc

**Power** 75bhp at 4000rpm

**Torque** 144 lb ft at 2200rpm

**Valves** belt-driven single overhead camshaft actuating two valves per cylinder

**Fuel/ignition** direct injection diesel with electronically controlled high pressure unit injection for each cylinder; turbocharger and intercooler with unregulated catalyser. 45-litre tank, with low-level warning lamp

#### TRANSMISSION

**Type** five-speed manual, front-wheel drive

**Mph per 1000rpm** 26.4 in 5th; 20.7 in 4th

#### CHASSIS

**Suspension** front: independent damper/struts with integral coil springs and lower wishbones. Rear: torsion beam (dead) axle with trailing arms and coil springs; telescopic dampers. (Modified front wishbone and wider track in latest Polos)

**Steering** rack and pinion with hydraulic power assistance; 2.9 turns between full locks. Turning circle diameter averages 10.1m between kerbs, with 14.6m circle for one turn of the wheel

**Wheels** 6J alloy with 185/55R14H tyres (Michelin Energy on test car)

**Brakes** ventilated discs front, drums rear with servo-assistance and standard anti-lock control (ABS)

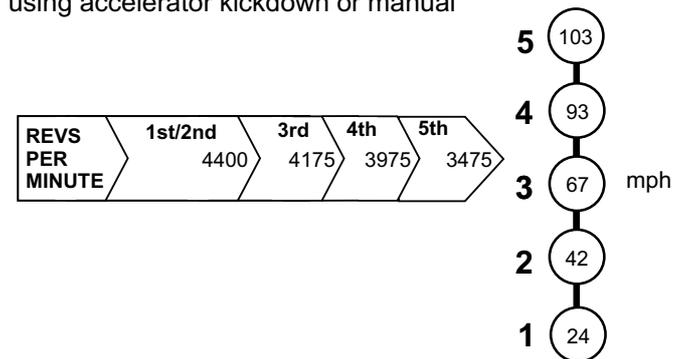
### PERFORMANCE - 3L

#### Acceleration time in seconds - using kick-down or manual

mph	30	40	50	60	70
<b>THROUGH THE GEARS</b>		2.0	6.0	9.6	15.8

20 mph	30	40	50	60	70
<b>SPEED RANGES USING KICKDOWN</b>		4.0		7.6	
			4.0		9.8

#### Maximum speeds using accelerator kickdown or manual

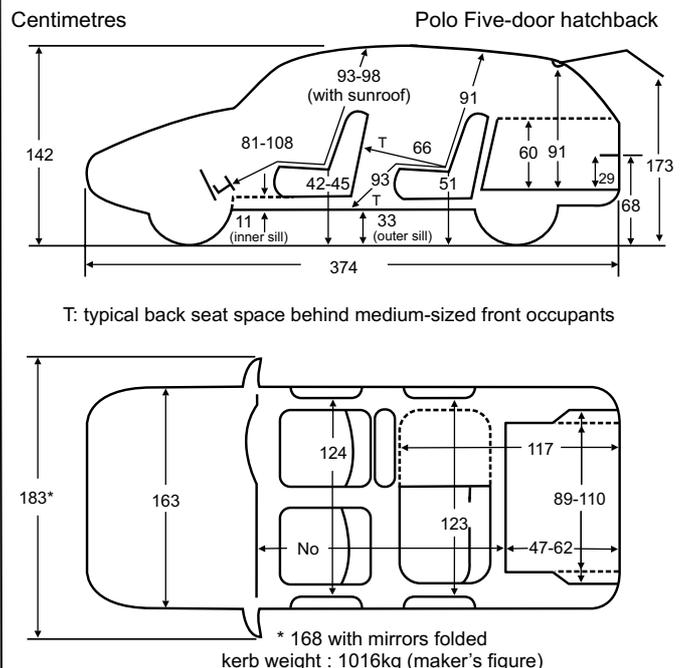


### FUEL CONSUMPTION - 3L

Type of use - Eco mode switched on/switched off	mpg
Urban (17mph average/heavy traffic)	49 / 48
Suburban (27mph average/6.4 miles from cold start)	60 / 59
Motorway (70mph cruising)	66 / 66
Cross-country (brisk driving/20 miles from cold start)	72 / 73
Rural (gentle driving/20 miles from cold start)	90 / 86
<b>Typical mpg overall</b>	<b>71½</b>
Realistic tank range (not nominal tank capacity)	28 litres/440 miles

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

### MEASUREMENTS



moving the selector across the gate produces sequential shifts, up and down, as the stick is nudged fore and aft. That's unless your selection is unreasonable, in which case you'll be ignored, or it will make its own choice (e.g. selecting first as you pull up, even if you didn't remember to). You sometimes finish up wondering which gear you're in.

The electric power steering (another fuel-saving measure) can weight-up in brisker cornering, when pronounced roll and lack of tyre grip also begin to show; this Lupo really doesn't like being pressed, though the ride is reasonable.

### The Polo alternative

As we write, VW has still to decide whether this Lupo will be converted to right hand-drive and brought to UK showrooms. In any event, it's hardly likely to make a profit – it really is costly to build and is a bit of a flag-waving exercise even back home, with politics involved.

However, the latest revised Polo has recently been augmented by a 1.4/75bhp version of this special engine, but without the drastic weight-saving measures or the transmission complexities. The result is a still-expensive (but larger, five-door) proposition that weighs 186kg more, has an extra 14bhp, but has an mpg Combined Official test result that's 33 per cent worse than the Lupo 3L – or that's how it seems.

### 100mpg - Fact or Fiction?

The AA has always made a point of conducting its own real-life mpg tests, using special test routes and metering equipment. This results in accuracy and repeatability to within 1mpg – vital when comparing the counter-claims of rivals. In this instance, of course, they're from the same manufacturer, but VW was as keen as we were to see our results. For the test, we borrowed a left-hand drive Lupo 3L specially brought-in from Germany.

Our tables speak for themselves. The trouble is that the actual 10mpg gain we recorded in overall terms in the Lupo's favour may seem a let-down, compared with the publicity hype. Yet in engineering development terms (where gains are always more modest than in the sales department), any fully equipped four-seater hatchback that can accelerate this respectably and still attain over 70mpg in typical use, has to be something of a *tour de force*. Remember, this Lupo comes equipped

with all the safety equipment and low pollution measures demanded nowadays; car makers have been struggling in recent years to maintain diesel economy in the face of latest legislation.

In fact, the Lupo can attain as much as 90mpg away from traffic. However, you must be prepared to bridle yourself to under 2000rpm, no more than 45mph and be happy to live with the Lupo's Eco mode switched on.

### Testers' choice

For ourselves, we would settle for the Polo; it really is an endearing performer. Forget the economy aspect for a minute and you're left with a sweet power unit that combines vibration-free response with eager pull-away from lower revs than you would think sensible. The contra-rotating balancer shaft effectively quells most of those nasty vibes that afflict so many diesels around 1500rpm – including VW's four-cylinder derv-burner.

This brings us back to the problems of how and when to change gear. The Lupo's auto-solution doesn't work too well, and we suspect that, left to their own devices, most Polo TDi drivers will spend too much time in the lower ratios.

We found it paid off to operate between 1200 and 1800rpm when accelerating normally. VW should install a change-up advisory light (like that used on the Formel E models in the early eighties) to encourage drivers to do the right thing.

Our track testing confirmed that revving this only-too-willing engine is largely pointless – it goes almost as well in fourth when overtaking!

This reinforces the fact that, unlike many small diesels, this Polo gives you the choice of remarkable mpg or eager acceleration – but you can't enjoy both at the same time, of course.

### VERDICT

**The Lupo 3L is a valiant enterprise and the car isn't without appeal to environmentalists or those who are simply worried by escalating fuel costs. However, the Polo 1.4TDi, compromise though it may be, looks the better proposition, even though its asking price is too high.**

**Of course, it's the engine rather than the host car that's the main attraction – married to the Fabia, it would look irresistible.**



## REVISED POLO FOR 2000

While the next all-new Polo is having its audition (at lower ticket prices) as the Skoda Fabia, both the Polo and Seat Ibiza have been freshened up in appearance and equipment in an attempt to remain competitive for the next couple of years.

The Polo in this latest guise is a shade longer outside, though not to the enhancement of interior space, which is restricted in the rear; only headroom shows any improvement. The Lupo-style facia isn't without its irritations (poor ventilator direction control, hard-to-see minor controls and dials), but both interior finish and safety equipment are impressive, with standard ABS and dual airbags on even the cheapest version.

Apart from this 1.4TDi, engines aren't particularly refined – we found the racey GTi's acceptably raucous, the all-alloy 1.4 16v's unacceptably gruff at times, with a surprisingly ruffled ride, as well.



HOW THE POLO 1.4TDi COMPARES	Engine cyl/cap/power (no/cc/bhp)	Revs at 70mph (rpm)	30-70mph through gears (sec)	30-70mph in 5th/4th gears (sec)	Fuel economy (mpg)	Brakes best stop (m/kg)	Maximum legroom - front (cm)	Typical leg/ kneeroom - rear (cm)	Steering turns/ circle	Overall length (cm)
VW POLO 1.4 TDi	3/1422/75	2650	13.3	22.8/15.4	62	26/26†	108	93/66	2.9/10.1	374
Fiat Punto 1.9 JTD	4/1910/80	2330	14.2	25.4/17.1	51½	27/12	108	96/67	2.8/10.9	384
Peugeot 206 Dturbo	4/1997/90	2600	11.4	19.8/14.4	52½	26½/8	108	94/66	3.3/10.1	384
Seat Ibiza 1.9 TDi*	4/1896/90	2400	11.3	21.7/15.1	57	28/32	109	97/72	3.1/10.1	385
Vauxhall Astra 1.7 DTi	4/1686/75	2675	14.0	32.3/20.5	56½	26/21	108	99/75	3.1/10.4	411
VW Lupo 1.7SDi	4/1760/60	2700	18.3	36.5/26.0	62	26½/18	104	92/65	2.9/9.9	353
* 1998 model						† with ABS				

