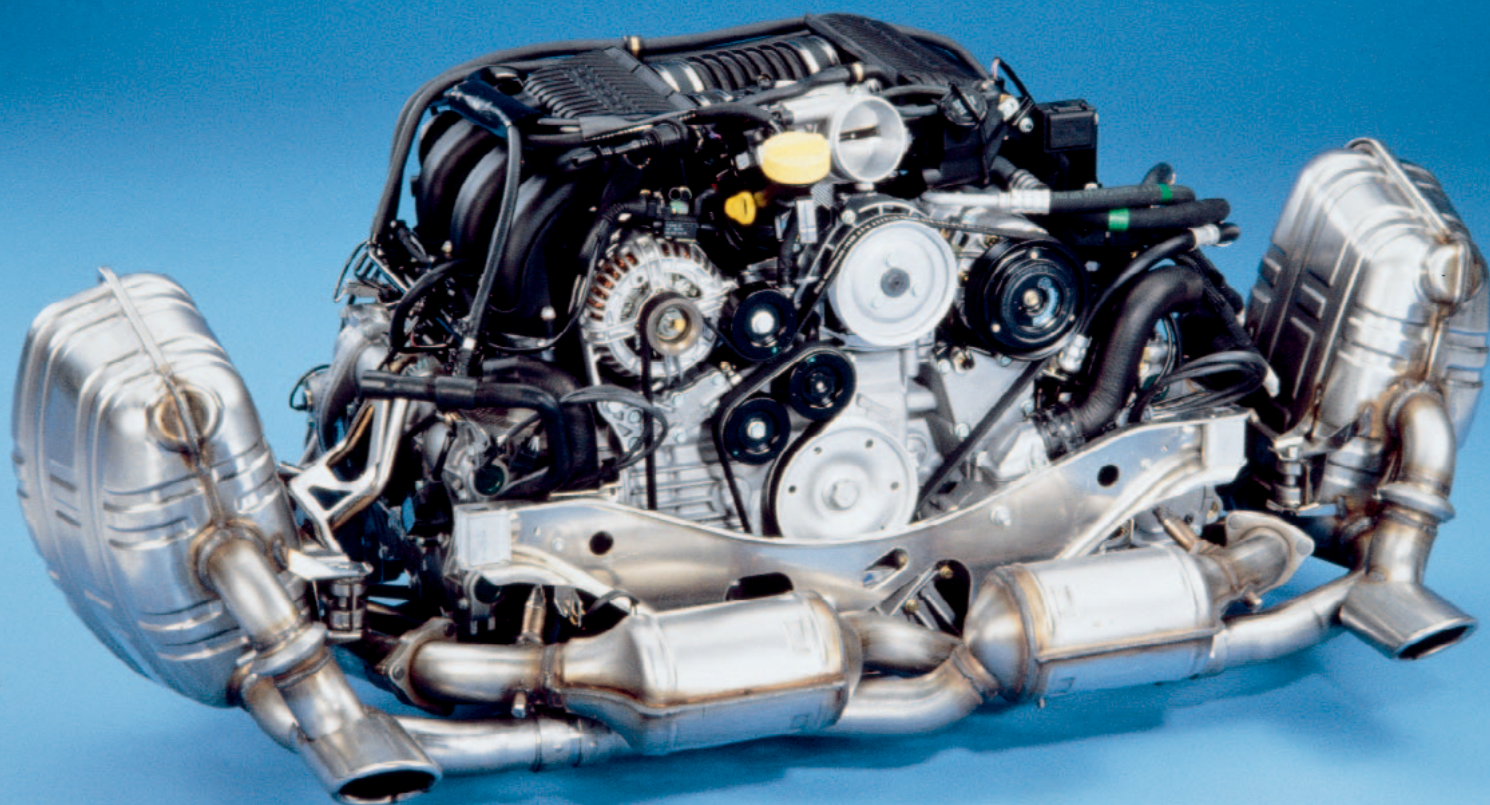


# Exploding myths

The early 3.4-litre 996 engine has developed a reputation for being unreliable. We explain the potential issues and assess the risks

Written by Philip Raby





**W**e're going to lay our cards on the table right from the start with this article. At *Total 911* we are not in the business of scaremongering. Read some magazines and Internet forums and you'll be frightened off buying an early 996 because you're led to believe that the engines will fail on you. In reality, though, there are tens of thousands of the cars out there that are running beautifully, and it's only a minority that have major problems.

That said, if your engine does fail, the chances are that you'll be faced with a very large bill because, in many cases, the only practical solution is a new engine.

So what can go wrong? To find out, we spoke to two of the UK's best-known Porsche specialists: Autofarm in Oxfordshire and JZ Machtech in Hertfordshire; both companies get a lot of 996s through their doors. Autofarm's engine builder is Nick Fulljames, while the man in the know at JZ is Steve McHale.

First, it's important to point out that it is the early 3.4-litre engines, made from 1998 to 2000, that are most susceptible to major failure. The later 3.6-litre engine is pretty much problem-free. Also, Porsche made many changes to the 3.4-litre unit over its production life, so the last of these smaller-capacity engines – made in 2001 – tend to be more reliable.

All 996 engines have an intermediate shaft that runs the length of the underside of the block and is chain-driven from the crankshaft. This, in turn, drives the twin camshafts on each bank of cylinders. At the end of this is a sprocket which turns on a bearing. The sprocket is retained by a small stud that can break, causing the bearing to fail. At first, this manifests itself as a noisy rattle, which turns into a death rattle as the cam chains come off, leading to further internal damage.

Porsche changed the design of this shaft no less than four times during the life of the 996; partly to solve the bearing failure issue, and partly to reduce an annoying rattle on start-up. Later types, therefore, have a larger bearing and a different sprocket designed to mate with a special toothed chain, whereas the earlier ones drove a conventional double chain. Because of this, it is not possible to fit the later type intermediate shaft to an early engine without also using a later-type crankshaft, which will work with the toothed drive but is an expensive

**"If your engine does fail, you'll be faced with a large bill"**

solution. So you have to fit another early-type shaft which may, of course fail again. However, Autofarm can modify a 997 intermediate shaft with an original-type sprocket to get around the problem.

Incidentally, failure of the intermediate shaft bearing can also lead to an oil leak from the front end of the engine, because of an accompanying failure of the oil seal. What's more, the flanged end of the shaft is secured to the end of the engine with three bolts, the holes for which project right through the end of the engine and so oil can seep through these, too, if the threads aren't sealed with locking compound.

Nick maintains that what are often mistaken for RMS leaks (see panel) are, in fact, oil leaks from the intermediate shaft seal.

"The next things to be concerned about are cracked cylinder heads", says Steve. "The mounting point for the hydraulic tappets is a weak point," he explains. "The head can crack from the bolted face across to a core plug. This leads to oil forcing its way into the water jacket." So look out for tell-tale signs of contamination in the coolant. Steve says that they have crack-testing equipment and examine every head they take off, as a matter of course. Interestingly, he says that they only ever find cracks on left-hand heads, even though the castings are identical. This could well be down to the way the coolant circulates around the engine.

Cylinder liners can also crack, and this is something that Autofarm has investigated in detail. The 996 engine is quite different to those in earlier 911s, in that the cylinder liners are cast into the two halves of the engine block. They are made of a very hard, carbon-heavy material called Lokasil, and are positioned in the cast and then surrounded by molten aluminium. When the casting cools, the liners become an integral part of the block.

Unfortunately, cracks can appear in the lining and its surrounding aluminium. "It appears to be an issue with the block's torsional rigidity," claims Nick. "All engines twist to some extent," he explains. "And the harder you work them, the more they tend to distort. It's like the wing of an aeroplane – it visibly moves up and down as the aircraft passes through turbulence, but if it didn't flex it would simply snap."

Nine times out of ten, it's one of the centre cylinders



This shows a classic cylinder bore failure. Note the two parallel cracks running down the bore. In time, these can join and a 'D' shaped chunk of liner may break away





– two or five – and it's always the lower edge that fails; two parallel cracks appear about 30mm across. In the worst scenario, a 'D' shaped chunk of liner breaks off between these cracks.

You may not notice a cracked liner at first, although it can lead to a tiny amount of coolant loss. As the crack gets worse, though, it will reach a stage where the engine won't start or, if it does, it will 'hydraulic' and coolant will be forced out of the header tank and exhaust pipe.

Unlike air-cooled 911 engines, which had individual cylinders, you can't replace a cylinder in a 996 engine, so that half of the crankcase is ruined. In other words, the engine is essentially irreparable. However, Autofarm has developed a solution (see following page). On the last 3.4-litre and the 3.6-litre engines, by the way, the crankcase castings were modified to solve this problem.

Another weak point which Porsche modified several times is the oil breather system. If this fails internally, it can draw oil into the inlet system. At best, you'll get a smoky exhaust; at worst the engine will simply refuse to turn over because one or more cylinders are filled with oil. The solution is to fit a modified breather and then let the oil drain out before starting the car again.

If your early 996 has a lumpy idle, it's possible that the VarioCam hydraulic mechanism isn't operating correctly. "This is usually because moisture has leaked into the controlling solenoid and caused corrosion," explains Steve. Again, Porsche modified the solenoid on later cars to prevent this from happening.

Finally, what about bottom-end failure, when the crankshaft bearings break up? Both Steve and Nick agree that this is not at all common with 996 engines and, whenever they've come across it, it's been caused by oil starvation due to lack of maintenance.

If an engine suffers from a cracked liner, cracked head or failed intermediate shaft bearing, most specialists will advise that you fit a new unit. And, until recently, that often made financial sense because Porsche was selling them in the UK at the obviously subsidised price of £6400 (plus VAT). However, that price has now risen to over £10,000 and, on top of that, you have to factor in fitting and any other remedial work that may be required. You could easily spend £12,000, which could be half the value of the car! The good news, though, is that the new engine will have all the latest modifications and so should be reliable and, besides, it will come with a full Porsche warranty.

Another option is to obtain a second-hand engine from a breaker. Typically, this would cost around £3500 plus VAT (again, you'll need to add fitting and other costs) so it's an attractive option for those on a tight budget. However, there's no guarantee that the replacement engine won't itself cause trouble in the future. Also, used 3.4-litre engines are hard to get hold of – breakers sell them very quickly.

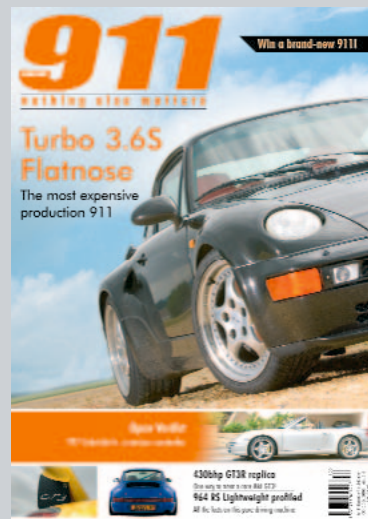
So, should early 996s be avoided? Nick and Steve each admit that they wouldn't themselves buy one, but are keen to point out that the problems they've discussed probably affect five to ten percent of early 996 engines. In other words, there are plenty out there that are running fine. Of course, though, no one knows what will happen in the future.

And if you already own an early 996, what can you

## RMS leaks

Mention 996 engines, and most Porsche enthusiasts will think of RMS (rear main seal) oil leaks. However, when you see what else can go wrong, an oil leak suddenly seems no big deal.

We covered the RMS issue – which is not as widespread as some people would have you believe – in some detail in our October 2005 issue (picture below; go to [www.total911.com](http://www.total911.com) or call 0845 450 6464 to order a copy).



## Silsleeve

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## The Autofarm solution

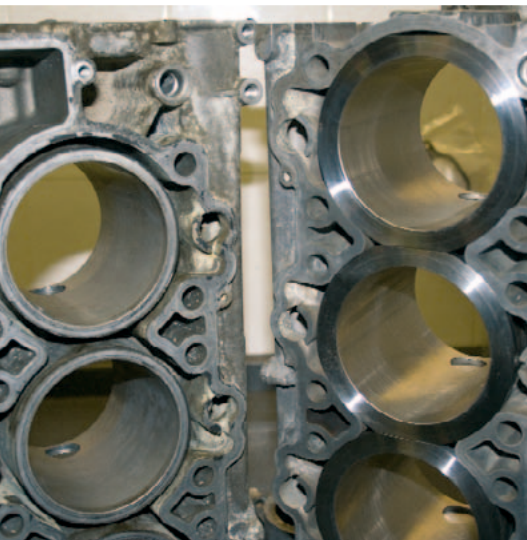
Not happy with the idea of throwing away good engines because of cracked bores, Autofarm boss, Josh Sadler, and engine man, Nick Fulljames, put their heads together to find an alternative.

The result is what Autofarm calls Silsleeve. Damaged blocks are shipped to a company called Perfect Bore in Hampshire, UK, where the old liners are machined out and replaced with thicker steel ones which are Nikasil-lined (a hard, low friction material which was used successfully on earlier 911 engines).

When the modified engine is subsequently rebuilt, Autofarm incorporates its own intermediate shaft and other Porsche modifications, including later-type chain tensioners and VarioCam solenoids.

An added advantage of the Silsleeve process is that you can choose, if you wish, to upgrade your engine to 3.7 or even 4.0-litres to give increased power. The latter is said to produce in the region of 400bhp.

An Autofarm Silsleeve engine costs from £5650 plus VAT, so offers a considerable saving over a new engine from Porsche..



On the left of the photograph (left) is an original Porsche block; on the right one with steel Silsleeve cylinder liners. Note that they are substantially thicker



The right-hand intermediate shaft is a late-type with the large toothed sprocket. The other is Autofarm's own design which combines the later bearing with a sprocket that is compatible with the earlier twin-chain drive

do to ensure you sleep sounded at night? Unfortunately, not very much other than to keep an eye on your coolant and oil levels and stop the car as soon as you see anything amiss. "People tend to forget about the 996's oil-level," says Nick, "because you have to fiddle around with a digital display whereas, on the old 911s, the oil-level gauge was always visible."

That said, he and Steve say that, if your engine's going to fail, there's not much you can do to prevent it. Although Nick has his own pet theory: "Jonathan Palmer Motorsport has several 3.4-litre cars which are driven hard on the track every day," he says. "These engines are running fine, whereas maybe those that have been driven more sedately seem to suffer problems!"

Also, if you're looking at buying an early 996, check the service record and engine number carefully – it's possible that it's already received a new engine, perhaps under warranty. If it has, then that will give you peace of mind.

However, the key thing for us is the five to ten percent figure. That means that around 90 to 95 percent of early 996s out there are likely to be free of major trouble. And that, we reckon, is a gamble worth taking. **911**

**"90 to 95 percent of early 996s are likely to be free of trouble"**

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