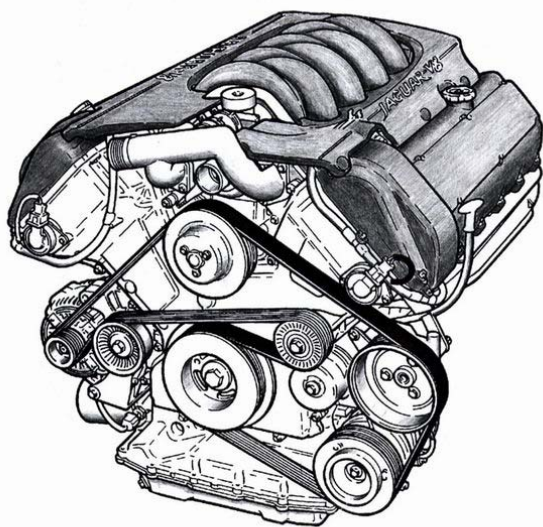


Though it may not be well known among even Jaguar aficionados, certain Jaguar engines have had some serious problems over the years. And surprisingly, the most significant problems may well be in the most recent engines! I refer specifically to the early V-8 engines used in the XJ 8 sedans from early 1998 and the XK 8 sports cars starting in 1997 up until the 2000 model year.

In putting together this article, I'm indebted to the web site jag-lovers.org for their reprint of a Jaguar World article, which can be found at [www.jag-lovers.org/cjw/nikasil.jpg](http://www.jag-lovers.org/cjw/nikasil.jpg). Also to the wonderful reference book: *Jaguar, The Classic Marque* by Steve Kennedy. This article is by no means exhaustive, nor the result of extensive scientific research. But based on conversations with people and sources whose opinions I respect, it hopefully represents a reasonably accurate assessment of Jaguar engines which might be owned or considered for purchase by club members.

### Jaguar V-8s



Jaguar 4 litre V8

**What is the major problem?** Nikasil is a special coating which was applied to cylinders in the aluminum engine blocks fitted to the earlier cars equipped with these engines. Under ideal circumstances, this coating prevents wear and allows making engines which do not require steel cylinder liners. The problem arises when the sulfur in the fuel starts reacting chemically with the Nikasil and destroys the coating, leading to a catastrophic loss of compression. Ultimately, this

prevents the engine from building up enough compression to even start. Once this happens, the entire engine block is history. A temporary fix can sometimes be accomplished by pouring a small amount of oil into each spark plug hole, but it's only a temporary fix good for a few months at best. Engine replacement is the ultimate and only long term solution.

Interestingly, the early BMW V-8s from the mid to late 1990s had similar problems. I'm told that almost all had to be replaced under warranty. And just so no one feels I'm picking on Jaguar, Mercedes Benz has been bedeviled by electrical system and other problems since the late 1990s. (It seems that the early Lucas electrical systems are no longer the only targets of derision by frustrated owners.)

**What has Jaguar done about it?** Jaguar has replaced many of the engines under warranty within the service schedule, sometimes even before the owner was aware of the problem. There are reports of out-of-warranty replacements by the factory up to 100,000 miles, though I'm unsure of the current position of the factory for continuing replacements for cars which are now presumably all beyond the warranty time period. The factory continues to offer rebuilt engines over the parts counter, though they're hardly inexpensive. Replacement with a later engine out of a wrecked car is another alternative.

**How do I tell if a car still has a Nikasil engine problem?** Engines which have been replaced should have paperwork evidencing the change in engine serial number. Replacement engines will have a green label affixed to the block behind the right cylinder head which is visible from above. If in

doubt, try a leak down test in which the air is injected into each spark plug hole to assess the condition of the cylinders. I'm also told that the original engines had black painted crankcases, while the replacements were silver colored when viewed from below. However, I'm not sure whether this can be relied upon as a definite information on possible engine replacement.

The Nikasil engines were never fitted to the 4.0 liter S-Types, so if you're the owner of one of those cars, you have no reason to worry about your vehicle. For the other cars, the VIN number holds the key to identifying which engine was originally fitted. If it's a Nikasil liner engine, the last 6 digits of the VIN are all numbers. If it's a later steel liner engine, the first of the last 6 positions will be a letter, with F or G used for the XJ sedans and A for XK models. The change was made early in the 2000 model year, though I've been unable to ascertain the exact date when the change took place.

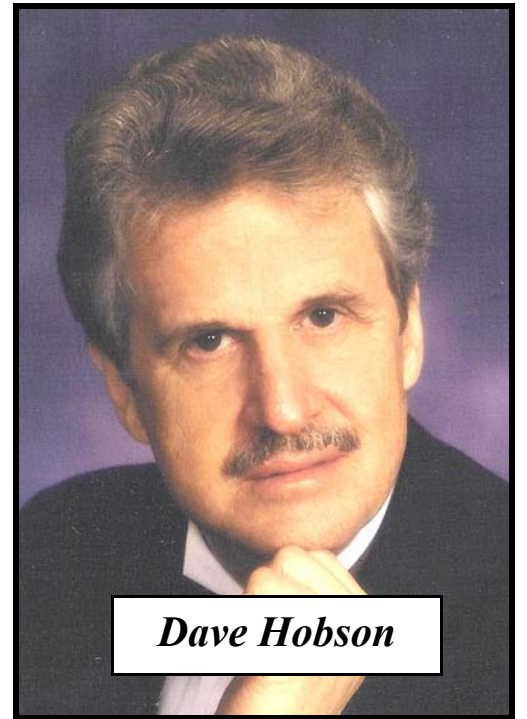
**What can be done to help preserve the engine?** The first and most obvious solution is to use a good quality fuel, and to have the car serviced regularly. The second is somewhat less obvious. Short trips which fail to fully warm up an engine are hard on any car. But on these engines, restarting a partially warm engine leads to over-fueling by the injection system, which causes rapid damage to the cylinders. If you need to get out to close your door or return to the house to pick up something you forgot, and you live in a reasonably safe neighborhood, it's best to just leave the car running. Fully warming up the engine can take up to 15 minutes in winter, but it's reportedly good and inexpensive insurance.

Sadly, these are not the only problems with the earlier Jaguar V-8s. These engines also had a tendency to overheat. But unlike the earlier 6 cylinder engines from 1948 through the 1960s - which would often run hot while sitting in traffic on a hot day - overheating these engines can cause immediate warpage which can destroy the engine. If one of these engines starts to overheat, the wisest (and by far cheapest) solution is to shut it down immediately!

The earlier engines also had problems with the timing chain guides or "slippers." Updating the chain guides and tensioners is relatively inexpensive, and there is reportedly adequate warning via noise in the chain area before everything lets go. But allowing the chains to get to the point of breakage causes irreversible damage as the pistons and valves try to share the same space.

**Water pumps** and the associated seals have also been a continuing problem on all the V-8s. The first generation pumps were notoriously short lived, and the second generation was reportedly worse. The third generation has given much better service, and the upcoming fourth generation pumps which eliminate the plastic impellers will hopefully solve the problems once and for all! One downside for at least some of the pumps is that instead of gradually failing by starting with minor seepage, they sometimes let go completely with no warning, causing very rapid loss of coolant. (See the earlier admonition about shutting things down immediately to prevent very expensive damage.)

Apparently, by the time they got to the 4.2 liter V-8 engines in 2002, most issues had been successfully dealt with.



Dave Hobson

**AJ 6 & AJ 16 Six Cylinder Engines**

The first AJ 6 engines, introduced for the new XJ40 sedans for the 1988 model year, had some minor problems with things like minor cylinder head leakage. The 1988 & 1989 cars also had other problems with the electronic dash gauges and self-leveling suspension systems, to the extent that the factory brought out a retro-fit kit which simply eliminated the leveling function. But overall, the engines were a winner from the beginning. The 4.0 liter engine was introduced in 1990, and quickly gained a reputation for outstanding longevity. I'm told by people familiar with the engines that 150,000 miles and up is the norm for the cylinder heads, with 300,000 miles not at all unusual for the bottom ends. The further improved AJ16 introduced in 1995 in the XJ sedan and XJS continued the tradition up through the end of its life in 1997. Both power and fuel economy when compared with the previous engines in the Series III XJs were markedly improved.

**Jaguar V-12**

Despite an initial degree of trepidation over the unnecessary complexity of a V-12, these engines have acquitted themselves admirably. The early examples were notoriously thirsty for fuel, but with the introduction of the Mays high compression cylinder heads in 1981, both performance and fuel economy improved dramatically. These engines were originally introduced in the Series III E Type, but also found their way into the XJ 12 sedans in 1974 and XJS models from their introduction 1975.

With the move from 5.3 to 6.0 liters in mid-1993, the performance of these engines was transformed. While the non-emission controlled engines in the earlier European models were somewhat quicker, a 0-60 time of 10 seconds was quite typical in the US market cars equipped with a 5.3 liter engine and the standard GM Turbo-hydramatic transmission. With the introduction of the longer stroke 6.0 liter coupled with an electronically controlled transmission, 0 – 60 acceleration times dropped to around 7 seconds with the transmission in sport mode. The original XJ40 sedan hadn't been designed with enough room in the engine bay for a V-12. When the modified frame was introduced in February, 1993 as a 1994 model, all the V-12s fitted were the new 6.0 specification. For XJS buyers, the best way to tell which engine is fitted in 1993 cars is to verify it via the VIN number. (The information is available in publications available to the motor trade.)

With good care, 150,000 miles or more can be expected routinely with these engines. However, the engines are extremely expensive to rebuild, with the older cars often not worth the cost involved in a complete overhaul. In order to preserve the engines, there are two things which must be avoided at all costs.

Once a V-12 is overheated, resolution of the damage is nearly impossible without a complete overhaul. There are 2 coolant thermostats, one on each side of the engine. And there are a seemingly endless number of cool-

ant hoses, all of which need to be maintained and replaced before they reach the point of rupturing. A little time and money spent in keeping the cooling system in shape is an excellent investment

There are also lots of fuel hoses. In prowling salvage pools, I'd guess that about a third of the XJS models being written off as totals by insurance companies are a result of a relatively minor engine fire. A burst fuel hose spurting gasoline on a hot engine and exhaust system are a sure recipe for disaster in very short order. Maintaining the fuel and coolant hoses is a must on these engines.

**Early 3.8 and 4.2 Six Cylinder Engines**

One of the all-time great engines in the automotive world is the twin overhead cam 6 cylinder engine introduced by Jaguar in 1948. It powered all the early Jaguar XK sports cars, and the sedans starting with the Mark VII in 1950. It won LeMans and many other important races in the early to mid-1950s, and continued in production up through the last of the Series III XJ 6 models in 1987.

As previously noted, it was a very forgiving engine in many respects. I can still remember several episodes of sitting in my XK140 roadster in stop and go traffic on a hot southern California day. The temperature gauge would be solidly beyond the 100 degree C boiling point, with lots of interesting smells and gurgles coming from the engine compartment. But there was never any long-term damage. Even in hard or competition use, it was rare to see a connecting rod through the side of the block. The engines were durable enough to also power such things as fire apparatus, armored cars (the British Fox) and Daimler limousines.

Although my old XK140 required a rebuild and an additional valve job during the 100,000 miles I used it as a daily driver, the later versions proved to be more long lived. In talking with mechanics and the staff at Jaguar Heaven, the consensus is that the Series III engine are typically good for about 150,000 miles before needing attention, with the cylinder head gasket typically the first item to finally give way to age and miles.

Compared to a contemporary engine, the old sixes don't deliver the power or fuel economy we've now come to expect. But an engine which enjoyed a production life of almost 40 years with only minor changes and can still attract admiring comments from onlookers at a car show has to be admired and remembered fondly.

**Publisher's Note**

*Personally in my Jags I have four of the engines reported in Dave Hobson's interesting and informative article. Red Betsy the 1966 3.8S has 123,350 miles on her. My 1970 S1 XJ6 4.2 engine has 198,156 miles on it, 1976 XJ12IL has clocked 146,665 miles and the 1990 XJ6 (AJ40) model now has 86,377 miles under its tires. The only engine which has badly misbehaved was the 1990 XJ6 which blew a head gasket at 23,000 miles that Jaguar repaired under warranty. Since then nothing major has happened, but the electric failures continue on all of them from time to time.*

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