

## When is buying a used Porsche Boxster, Cayman, or 911 is right for you?

Written by Charles Navarro, President & Founder of LN Engineering

We field many phone calls on a daily basis about first time Porsche buyers considering purchasing a vehicle with an M96 engine. Against popular belief, this includes all Boxster, Cayman, and 911 models from model year 1997 through 2008, excluding Turbo, GT2, and GT3 models. There are many concerns from intermix to rear main seals and now even intermediate shaft failures. A well-informed consumer willing to take a few extra steps and perform a more than thorough pre-purchase inspection can potentially reduce their chances of having a failure.

Statistically, most Porsche owners will have excellent ownership experiences and will end up owning more than one without incident, but for the unlucky few who do have problems, this knowledge is of little consolation. Although the venerable aircooled Porsche ending with the 993 are considered bulletproof, pretty much every series of 911 had one issue or another, all of which are conquerable. The only question is how much is it going to cost to fix and the fact that Porsche owners over the decades have learned that it is very easy to spend as much money on preventative maintenance and repairs as one can spend on the car itself. Remember, even though prices on Porsches have gone down making them very enticing for first buyers, they are still Porsches and maintenance can easily surpass purchase price or vehicle value. But remember, this doesn't diminish the enjoyment or satisfaction you have from driving a Porsche.

Extended warranties are always an option, but many are questionable or even if you do get one that will pay out for repairs, warranty companies won't always pay to have the repairs done right. Sometimes a complete engine may cost more than what a policy will pay out, as many limit costs to the replacement value of the vehicle. A certified pre-owned Porsche is one excellent way to ensure the car has been thoroughly checked and backed with a limited warranty from Porsche. If you service your car with an independent shop or plan to do so, make sure that they accept any policy that you are planning on purchasing, as many shops either don't accept aftermarket warranties or only accept select ones. They may have recommendation as far as which companies to look into. Regardless, any vehicle you are looking to purchase should be subject to an exhaustive PPI, certified vehicles included.

There are several sure fire ways to limit your probability of buying a car with an impending failure. **YOU MUST GET A PPI TO PROTECT YOUR ASSETS.**

Alternatively, there are also steps that can be taken to self-insure against these types of failures. It is best to plan so that when the unexpected occurs, you're ready for it. This can be everything from doing preventative maintenance or setting money aside for a rainy day.

One thing to consider is purchasing a vehicle that is slightly cheaper than what you can afford to spend. Plan on setting aside the difference in price for planned preventative maintenance, or if you can, to set aside what it might cost for a new engine. From the high volume of calls we get from individuals who purchased a used car but now cannot afford to fix it, this something to consider when buying. Remember, the car might be affordable, but the repairs can be costly if you jump into a purchase without doing your homework!

For starters, to properly rebuild an engine if you do have a failure, figure usually about 60 hours plus parts. A quality rebuild, addressing all the areas that need upgrading, along with upgrades will start at about \$15,000 and can easily exceed \$20,000. This is pretty much standard with all flat-6 Porsche engines, aircooled or watercooled. A factory crate engine from Porsche is similarly priced. If you see

an engine priced significantly less, remember, you get what you pay for (or don't pay for).

We're not going to discuss what to check for other than what directly could lead to expensive engine repairs. A shop that has done pre-purchase inspections previously will know what to look for. Prior to purchasing a used car, there are ways to check the health of its engine. First off, pay for an oil change to be performed. Ask to be there when they remove the filter and drain the oil. Check for any debris whatsoever in the filter as well as for any sign of intermix, which makes the engine oil look like a milkshake. Although not something typically done, pulling the sump plate also can expose many ills, from signs of lack of proper maintenance or even foreign object debris in the oil pickup. If there is any sign of any debris or contamination, walk away. You can also have a sample of oil collected and tested for irregular wear content and even contaminants like coolant. All you are out is the cost of the PPI and an oil change at this point.

You also should ask about having a compression and leakdown test done. Technicians with a trained eye can also evaluate the spark plugs and identify conditions where one or more cylinders may have a problem, when they remove the spark plugs to perform the aforementioned compression and leakdown tests. Considering the high incidence of cylinder and cylinder head cracking, checking for intermix, oil in the water or vice versa, is also a must, throughout the engine. One method to check for intermix is to pressurize each combustion chamber (when the spark plug is out) while placing a rubber glove on the coolant fill to see if it fills up. The integrity of the cooling system itself can also be checked by pressurizing the system and checking to see if it holds the pressure without any loss. If an engine has been fitted with a new water pump, it may have suffered a water pump failure previously, which can lead to cracked cylinder heads later on down the road. Also, if the engine was overheated, it's possible the cylinders and pistons also were affected, which would be reflected in lower compression in some or all cylinders. All these steps might seem overkill, but remember, spending a few hundred dollars now in advance can provide peace of mind that the engine is in good condition.

To verify that the engine is original to the car, cross-reference the engine number with the VIN of the vehicle and see if the engine is original to the car. A dealership can assist with this. If it's a factory replacement engine, some rebuilt engines from Porsche will have an X in the engine number identifying this.

With this in mind, do not pay a premium for low mileage cars or cars with blown engines. That's the first thing to not do. These cars were meant to be driven and not to be treated as coffee tables. Low mileage cars cost more and typically have more problems. Pull a Carfax report and find where the vehicle was serviced and get copies of the service history. This is invaluable. This will also tell you if the car spent its early years sitting and only recently started being driven heavily. For example, you could have two cars that have similar mileage and be ten years old and have 50k miles— the first driven 5,000 miles yearly through its life and maintained regularly, where the other might have never been driven and then had 15k yearly miles put on it in the last three years, meaning it sat the first 7 years. Considering the high cost of replacement engines or engine rebuilds, you cannot buy a car with a blown engine cheap enough to make it cost effective to then purchase an engine for the car. By that same token, don't expect to get top dollar for your car if you have an engine failure and then decide not to fix it.

If you still choose to purchase a low mileage car, plan on immediately performing an IMS Retrofit and new water pump replacement immediately, to prevent two of the most common problems of IMS bearing failures and cracked heads. Once this is done, a low mileage car should provide a long life of satisfactory service if regular preventative maintenance is performed.

Although a bit more time consuming, using a Durametric, PIWIS, or PST2, you can have the camshaft timing verified to check for deviation and fluctuation during operation. Also a must is to have the DME read out to see how many overrevs it has. If there are excessive overrevs, the engine has been abused and you shouldn't purchase the car. Anything over a range 1 (say range 2 or higher) means that the engine was mechanically over-revved, which can lead to catastrophic rod and main bearing failures later, among other things.

A trained ear with an engine stethoscope can listen to the IMS bearing – when it's going bad, it sounds just like a bad water pump or idler bearing, which most mechanics should know how to listen for, but the safest method for checking the IMS bearing is the removal of the oil filter and sump pan to inspect for debris also the best way to check for the early signs of an IMS bearing failure, if the car isn't already fitted with an LN Engineering IMS Retrofit or IMS Guardian. In my opinion, if you are serious about purchasing a vehicle, part of the PPI should include replacement of the IMS bearing before you even think about driving off with the car. We get too many calls from new owners who experience this failure weeks if not days after purchasing their car.

If there is any oil at the mating area between the crankcase and transmission (from possible IMS or RMS leaks – they puddle at the same areas), you must have it checked out. Since you should have a copy of the service history, see if the engine has had multiple rear main seal replacements. This is a sign that there is something wrong with the engine, not just the rear main seal, and again, is a signal that maybe this isn't the right car for you.

At this point, if you find major leaks, I wouldn't pay to have this done – that's the seller's job or they have to discount the car accordingly. I'd find another car or have the seller have this addressed. If there is a leak and the seller is willing to fix it prior to your purchase of the vehicle, then I would think it's worth proceeding. If the transmission has to come out for an RMS seal and even more so if the IMS flange is leaking (only once everything else above has been completed to your satisfaction), then I would commit and while the transmission is already out, have an IMS retrofit kit installed and evaluate for a new clutch disc and dual mass flywheel if needed.

Another consideration on what vehicle model year to purchase is whether or not you get an engine with Variocam F1 or Variocam/Variocam Plus – this boils down to non-vane cell (5-chain) or vane cell (3-chain) engines. On the earlier non-vane cell engines, you have Variocam actuators with wear pads. This design is similar to the 968, and on those engines, it's a well documented fact that the wear pads are good for 60-80k miles, and then they need replacing. (Boxsters to 2002 and 911s to 2001 are 5-chain). Obviously driving style and maintenance history will affect this number greatly, but it's something to consider. Later vane-cell engines don't have these wear pads. The flip side of this is that the lifters in the 3-chain vane-cell engines are about six times more expensive on the Variocam Plus engines than earlier 5-chain non-vane cell Variocam F1 engines.

This brings us to the next thing to listen for – noisy chain tensioners and lifters. If at start-up, the engine is noisy but quiets up almost immediately as oil pressure builds, the tensioners need replacing and can be done externally. Once the engine is warmed up and the oil gets hot, then you can listen for bad lifters, which sometimes will have audible ticking. In some cases, an engine will sound like it has bad lifters when in fact, it has a bad cylinder with excessive wear resulting in piston slap, which should be detectable by the above compression and leakdown tests, as we would expect said cylinder to read low. By all means, do not do an engine flush. That's a guaranteed way to ensure you need new lifters and tensioners on these earlier engines and increase the likelihood of plugging a narrow oiling passage

somewhere in the engine with loosened sludge or debris. Engines with poor fuel economy can also have bad lifters or be out of time, as it's easy to find engines that are well over 11 degrees out of time (detectable using a PIWIS or PST2 tester), but won't have any symptoms other than poor fuel economy. It might be worth your while to do the wear pads and re-time the cams if you're approaching this mileage. If the lifters come out, they should be checked and any replaced if questionable, along with the lifter cradle (TSB from Porsche recommends replacing lifters and cradle as a pair). Same goes with the tensioners – if you're re-timing the cams, they come out, and it's better to replace with new ones.

Although we've focused solely on the engine, you also want to make sure that the transmission shifts smoothly and doesn't have any problems between gears, as is typical with worn synchros. A heavy clutch pedal is indicative of a worn out clutch. Also check for noisy bearings. Many of the gearboxes used a sealed ball bearing in them like the problematic IMS bearing and also cause problems with the gearboxes. A proper rebuild on a gearbox will be several thousand dollars. The Tiptronic gearboxes are relatively bulletproof and last a long time with proper maintenance.

These are all things that a typical PPI doesn't include, but you want to make sure you do this. Although doing all this may cost you up front, addressing problem areas preventively should reduce the chances of a later problem that will cost several times more to fix after the failure has occurred. The purpose of this document isn't to scare you out of buying a Porsche, to make you stop driving yours, or to suggest that you spend thousands doing repairs needlessly- the informed consumer can hopefully with enough knowledge in hand hopefully steer clear of problem vehicles so you can enjoy ownership of your new (to you) Porsche. Don't forget, drive it like you stole it!

Keep the Faith!

Charles Navarro  
Copyright LN Engineering LLC 2012

P.S. Already had a failure? Mike Focke has an article about that too!  
<https://sites.google.com/site/mikefocke2/what-can-you-do-if-your-engine-is-blown>

In the market for a used engine? This article from Flat 6 Innovations is a must read.  
<http://www.flat6innovations.com/used-engine-article>

Hartech in the UK has an excellent set of buyers guides that is much more detailed than ours that is also very informative.  
<http://www.hartech.org/buyers.html>