Hartech Porsche test day feedback

To demonstrate the performance and capability of Hartech new 996 4.1 we decided to invite few customers to sample its delights as well as some of our other cars (some equipped with our eco power technology). Here's a selection of the feedback we received from the guests who attended this event.

Hartech test cars in the order shown in the image:

Hartech's Eco power 3.7 manual 996

Hartechs 4.1 manual 996 Targa

Hartech's Eco power 3.4 tiptronic 996

Grants personal 3.9 manual 996 C4S

Baz's 4.0 9A1 Gen 2 was supposed to be included but he fell ill on that day with Covid and couldn't make it – one for the future?.

These are all copied from the Facebook Porsche engine guru's page.

Andy Healey

Long post warning😂
I was lucky enough to be invited to Hartech on Sunday 26th Feb to test drive their eco engines and capacity conversions. The day started with introductions by the team and apologise for Barry who was feeling under the weather.....get well soon Barry.

The overview of the different engines and the philosophy behind the designs was a great insight into the development, particularly with the eco engines, and set the level of anticipation for what to expect.
In order of capacity, the 3.4 eco engine was mated to a tiptronic transmission in a gen 1 996 and the results were astounding.

Out on the road a light squeeze on the throttle from 1200rpm in 2nd gear had you up to 40mph in no time and the level of acceleration was such that I though it was still in second but a glance down confirmed it had short shifted twice and was actually in 4th! The torque delivery and instant response from such low rpm is similar to that of a modern turbo diesel and the effortless progress that could be made in real world conditions was perfect. Cruising along was showing the throttle input at 3-4% which would clearly return great fuel economy but when you put your foot down the wave of torque kicked in again with a strong surge up to 5.5k rpm and the turn of speed felt quicker than a stock 3.6. Overall, the 3.4 eco and tiptronic box were a perfect match and would make an excellent daily driver. Impressive start to the day.

Next was a 3.7 version of the eco engine in another gen 1 996 but this time a manual. I thought the 3.4 was good bit this turned everything up to 11. The pull from 1200rpm in any gear was excellent but particularly strong in 4th and manually shifting gears meant that you didn't short shift like the tiptronic which tempted you to drive harder,

against the eco philosophy of course but the level of acceleration and the way the car got down the road was addictive.

As with the 3.4, the eco element was brought back into check when cruising with a similar 3-4% throttle input. I guess this engine could potentially be the more economical of the two due to the higher torque meaning lighter throttle for longer and less gear changes.
In both versions the wave of acceleration felt very strong and progressive throughout the range with no obvious flat spots suggesting the torque and hp graphs would be near perfect.

Last on the day but next in order of capacity was Grant's personal 996 C4S with a 3.6 to 3.9 conversion. The power delivery was higher up in the revs than the eco engines and while it still pulled strong from 2k rpm there was a noticeable increase in response from 3k rpm and it just kept on pulling hard to the red line. The performance was noticeably up on the stock 3.6 M96 with the additional torque providing effortless in-gear acceleration and an ability to make progress quickly without breaking a sweat. I dare say if you drove sensibly you could return better mpg than the stock engine because of the higher torque but not to the extent of the eco options.

The 3.6 to 4.1 conversion was what everyone wanted to drive and was slotted into a stunning 996 targa with red leather interior and manual gearbox. I own a 996 targa and the comparison to my stock car was night and day. The 4.1 engine was very similar to the 3.9 but again with everything dialled up and the end result was amazing. Driving the car in traffic and at normal speeds was very relaxing and with higher torque being a common factor across all of the engines the experience of light throttle and changing gears less often was no different here. The capacity increase did not affect the clutch control or make it hard work in slow traffic, it was no different to the stock set up. Getting out to more open roads showed the engines strengths. It's ability to eat up A and B roads was outstanding and as a point to point road car you couldn't ask for any more.

To sum up the cars, anything eco in engine terms for me usually means pretty mundane but the 3.4 and tiptronic were far from it and were a great combo for a daily driver but the surprise of the day was the 3.7 eco engine. I was expecting a slight improvement over stock and then a slight improvement over the 3.4 but this was on another level. That huge surge of acceleration from almost idle rpm and the improved economy make for the perfect road car for all occasions.

On any other day the 3.9 would have been my car of the day but in the presence of the 4.1 it was pipped to the post; the 4.1 just did everything that little bit better. The 3.9 is a great engine and would still be a fantastic choice if budget was an issue but the 4.1 would leave you in no doubt your car would be the best possible version of itself.

The knowledge and attention to detail of the Hartech team was great to see and anyone considering a rebuild would have confidence that their pride and joy would be well cared for by likeminded people with a passion for engineering and the brand.

Paul Donaldson

Open day at Hartech yesterday to drive a range of their engines in various 996's provided for the day. We were very lucky to drive these cars, people who own theses conversions already, especially with the capacity increase are very fortunate.

The engines make the car better than they ever were when leaving the factory. Power delivery is so much earlier on the range, strong pull from just below 3k rpm and the car just wants to go. We were shown in real time how little throttle input was being used via a wireless display carried by the person from Hartech in the car at the time. Cars are all so much more driveable, on open stretches you can enjoy more urgency and in traffic the cars are easier to drive, although England.... Speed cameras ? They need sorting out, or just come to Ireland to enjoy your cars.

Highlight for me was the workshops. Engine disassembly, inspection, machining, reassembly and testing before refitting. All carried out in various rooms with processes clearly laid out at defined. There's a very distracting Calendar in Lee Jenkins workshop but it doesn't detract from the quality of his work.

My favourite images from the day are below. A completely disassembled 3.8L 997.1 engine on two shelves (each bank, excluding pistons) ready for rebuild. A god chat about materials used by Porsche and materials used by Hartech showed why this is the place to go for your rebuild, which let's face it, will be needed at some point in your cars life.

Cheers for the day out. I need to start saving for a 4.1 😎

Tim Scott

A fabulous morning's Porsche geekery at Hartech Porsche this morning, thanks to everyone there for putting it on! I'll write up more of my thoughts at some point but what a great experience to drive some different 996s, all amazing in their own way and one of which made me swear involuntarily when I put my foot down… how's that for an advert?!

Feature taken from Tims Blog page

https://timscott.net/hart-surgery/

Hart Surgery

It's definitely a non-standard colour

The Porsche 911 has gone through several different variants, the naming of which makes little sense to anyone not immersed in such things, but each has its own technical foibles. The internet has helped to spread tales of engineering woes with each generation; none more than the 996 variant, which was produced between 1997 and 2006. It was largely greeted with disdain by Porsche purists as the new 911's engines were no longer kept cool by their signature method of air, but were water-cooled instead. Derision was also heaped on the design of the headlights as, rather than the 911's traditional oval front lights, there were integrated indicators which led to unflattering comparisons with fried eggs. Despite this frosty initial reception, the car is often credited with a major role in keeping the Porsche company alive as its introduction saw Porsche adopt more modern (i.e. cost-

effective) manufacturing processes and – shock, horror – even sharing parts with another model, the Boxster.

A quick Google will introduce you to the various problems for which the 996 has become infamous – chief amongst which are failed IMS (Intermediate Shaft) bearings and bore scoring. I'm no mechanic and there are lots of articles available which go into very deep detail about these issues: suffice to say, they are well-known problems and there are some equally well-known (if significantly bank account depleting) solutions. One of these is to take your ailing 996 to the outskirts of Bolton, where you'll find Hartech Independent Porsche Specialists, who have built up an international reputation as the "go to" people for engine rebuilding for both 996 and the subsequent 997 variants of the 911.

This 996 has had its 3.4 litre engine increased to 3.7 litres

How do I know this? I'm a former customer, having had the 3.6 litre flat six engine in my own 996 911 rebuilt by them last year when it was diagnosed with the dreaded bore scoring. The rebuilding brought my poorly 996 back to rude health. As soon as I picked it up and started the drive home, I noticed a huge difference in how the car felt: particularly the urgency with which it takes off from standstill and the

midrange acceleration that's so important when joining a motorway, for example. When asked, I always say the car has much more "eagerness" about it than before the engine had its innards thoroughly sorted out. It feels ready and willing to go at pretty much any revs in any gear – much more the sports car I expected.

When having my engine rebuilt, Hartech offered the option to increase its capacity from 3.6 to 3.9 litres. I decided against it as a) I largely drive my car like a stereotypical Grandad and b) felt I was spending enough money on it. MD Grant Pritchard explained that as they developed their reputation for rebuilding the engines, many customers disagreed with me and wanted more power from their Porsches, so they started to develop capacity increases alongside a "simple" rebuild. When they recently offered the chance for interested folk to come and have a drive of their new products, including a new 3.6 to 4.1 litre car, I had to say yes, even knowing there was a risk that I might regret my decision…

A few lucky Porsche fans and I arrived at Hartech's unit earlier than seemed decent on a Sunday morning in February, lured by the opportunity to drive some different versions of their bigger-engined 996s (and the promise of a bacon butty). As well as giving us an introduction to the main event, Grant told us that as a side project, they have been working on "Eco Power" cars, which use their mechanical wizardry (it has something to do with compression ratios and that's as much as I can tell you – due to my own ignorance, not an especially secretive NDA) to offer a claimed 20 – 25% reduction in fuel consumption.

A Boxster red interior was a bold selection from the options list.

My first drive was a black manual car that had a 3.4 litre engine increased to 3.7 litres and some of the new Eco Power additions helping to lower its running costs. Despite being an older car with almost 190,000 miles on its clock, it felt similarly eager to mine, but was even happier to pull from lower revs in a high gear – it was quite happy accelerating from 30mph to 50mph in 6th as we ascended to a viewpoint overlooking a distant Manchester city centre. I was impressed at the sheer grunt the car had to offer and it felt creamily smooth and, in some respects, easier to drive than mine as it required fewer gear changes when pootling around town. On the open road, the engine has a deeper sound than I'm used to – obviously we're not comparing exactly like for like here, but it was something I'd experience even more noticeably on my next drive, the 3.6 to 4.1 conversion.

The main event: a Targa with a 4.1 litre flat six

Jumping into the Targa car (think of it as a big sunroof) which has the 4.1 conversion in is a bit of an assault on the senses at first with its Boxster Red interior. It's certainly an acquired taste, but it did grow on me whilst driving it – although once I was out on the road, I had other things on my mind. That deeper sounding engine note was there again, reminding me of a BMW 330Ci I once owned and loved. Probably largely due to being a younger and less well-used car than my first drive of the day, everything felt a lot tighter.

There's certainly no shortage of torque in the oversized engine – it felt quite happy woofling at low revs through the town but came alive on the more open roads, almost urging you to press the loud pedal. At one point, a group of cyclists formed a slow-moving lycra-clad barrier in front of me and when the opportunity to overtake came, I gave the accelerator a good hard prod. The resulting acceleration caused me to swear involuntarily (sorry Grant) as it caught me by surprise and gave me the stereotypical push back into the seat. I've never felt my 3.6 lacked power but the difference was noticeable – not just in raw power but in the smooth and progressive delivery of it. This is no ramped up parts bin special: it feels like quality engineering the way Porsche intended it.

Rear-engined layouts never give you the best view of the oily bits

If that was the main course, for dessert I hopped into a distinctively bright green 996: very definitely not a standard manufacturer colour, even with Porsche's famed Paint to Sample programme. This one had been wrapped to give it a bit more visual impact – mission accomplished. This was an earlier 3.4 litre car whose engine was the test bed for the latest Eco Power additions. There was certainly no lack of power – it didn't have the neck snapping acceleration of the 4.1 but it still felt all 911 and a match for my 3.6, even despite the Tiptronic (Porsche for automatic) gearbox.

The opportunity to be able to drive a classic sports car, with no loss of power (quite the opposite, as far as I could feel) or sound and reduce the emissions by almost a quarter is an enticing one for enthusiasts who are contemplating an electric driving future with dismay. Paired up with another development, like Porsche's own investigation into synthetic fuels, and I wonder if we are seeing the beginnings of a fossil-fuel-free future that doesn't remove all of the excitement from driving…. We can only hope. Hartech seem to be approaching this endearingly as an engineering puzzle rather than a get-rich-quick scheme to jump on the green bandwagon, and more power (excuse the entirely intentional pun) to them for that.

The benefits of Hartech's Eco Power

So, the million (or at least several thousand) dollar question was whether I would regret not getting my own engine capacity increased. I thoroughly enjoyed my morning at Hartech, meeting the people behind the company and driving their fantastically engineered cars. It confirmed the feelings I'd developed when dealing with them as a customer that they are keen engineers first and foremost who love solving problems and who care about their products.

The Eco Power innovations are really interesting in the current context of the rush to electrification despite the lack of infrastructure. Their 3.6 to 4.1 conversion is a real "wow" car, with that extra power and torque very useable on the roads on which I drove it – I can only imagine how it would perform in the hands of someone more capable than me on a track. That said, I'm too old to change the way I drive, and I suspect it would be wasted on me (so, some might argue, is even a standard 911!). I love my reborn 996 as it is – but I also know that every time I put my foot down to overtake, there will be a little bit of me that remembers pulling out past those cyclists and the kick of the

extra torque and I will smile but I won't swear…. maybe that's the difference right there!

In case you're wondering, I have no connection to Hartech other than as a former customer and the only bribe that changed hands was that bacon butty on the day. Huge thanks to Grant, Lee, Julian, Osian and Sharon for putting on the event and indulging us in a morning of most excellent car geekery. For more info, visit https://www.hartech.org

This feedback is from the Facebook page - North West Region – Porsche Enthusiasts Club

Richard Sholl

I've just scribbled this for a 997 group so thought I'd share herewith. Bear in mind other engine shops are available.

"Ok - now excuse the 996 content, but here's a bit about Hartech Automotive and our visit to their facility on the outskirts of Bolton this morning.

There's no doubt that there's real passion at Hartech for what 'they' do. Barry 'Baz' Hart (head honcho) wasn't around today - I think he was a little under the weather, sadly. However, knowing that Baz can talk a bit, I wondered if the atmosphere might be a little dry without him but I was proven wrong: Grant, Julian, Sharon, Osh & Lee were more than happy to chat all things water cooled 911 engine and to discuss what they do and why they do it. I had no idea, for example, that some of their new cylinders are fully machined in-house from blanks, that a lot of care is taken in the preparation of new pistons from Capricorn - checking & matching weights, and that generally these days their rebuilds tend to be the full '6 cylinders' rather than 1 or 2 cylinders, or a bank of 3 just to 'get it running ok'. And yes, they still carry out machining on the waterways to increase coolant flow, swap corroded core-plugs for new and know exactly where to use a bit more sealant upon engine assembly to avoid occasional oil seepage.

Hartech had 3 cars for us to try - the black 996 was a 3.4 converted to 3.7 and using Hartech's eco-power tech. I didn't drive this 188k mile car, but sat in it with 2 other not-slender gents and a full tank of fuel I wasn't expecting much. The low-speed pull was remarkable with zero hesitation, and a surprising tug backwards into the passenger seat. Holding onto the rather clever diagnostic display tablet it was interesting to see just how little throttle Andy (invited guest like

myself) was actually using - barely brushing the accelerator pedal. My wife Diane drove this black car with Hartech's Julian with her. She's used to her own 986S and our 'shared' 997S. She felt the biggest deal to be the tractability of the 'big' engine - low-speeds in high gears (6th @ 30mph) were no issue and although you may not normally drive that way the whole power train appeared quite happy and quite able to cope: apply a bit of 'gas' and the car would happily accelerate with no complaint. Hartech report that fuel economy has proven to be improved with these eco-power engines due to the light throttle loads at 'normal' speeds.

The 996 targa (not pictured) fitted with a 4.1 conversion was another absolute stump-puller: super tractable, super-torquey and super smooth.

The green car started life as a 3.4 using a high compression ratio eco-power set-up. With a tiptronic gearbox this was the car I drove (a troublesome left leg stops me using a clutch with any skill now).

Leaving Hartech's workshop and threading through town the immediate impression was one of 'liveliness at low revs' - reaching 30mph in barely an instant on a whiff of throttle. Upon leaving our 30mph restriction I whizzed past an ordinary car in very short order and then took a slow, sharp, uphill left-hander onto Rivington's Scout Road. Purposely burying the throttle in 2nd gear lit up the near side rear tyre for several (ahem) yards and once we found some grip the great gobs of torque sent us further up the hill with aplomb…

Because I'm not a particularly handy wordsmith it's difficult to fully explain what we experienced today with these cars. If asked 'is the difference like 'night and day' I'd have to say 'no'. If asked 'can you feel a difference' I'd have to say 'yes'. I think the 'performance' deal is that you're not getting a screamer of an engine with a Hartech 'big' engine conversion, you're effectively getting a standard engine which is 'turned-up a notch' - making it an easier and more willing performer.

For general road use & finances willing, if you're needing Hartech's services for an engine rebuild I think you'd be hard pressed to find a reason not to go 'big'. And if you choose to stay stock I'm confident that work completed will be to a high and proven standard.

Thanks to Sharon and the guys at Hartech for our invite, our coffee, our bacon-sandwich, our workshop tour and of course our drives.
nb the infamous Wheeler Dealers episode was discussed… ha ha!"


MORE MPG
MORE POWER
LESS EMISSIONS
Hartech
Eco - Power
Hartech
Eco - Power
BAZ 7249
Y891 RBR


Y891 RBR
BAZ 7249


FCZ 997


Hartech
Eco - Power


NO ENTRY
N222 RKS

Notes about the technical differences we set out to achieve with our capacity conversions and ECO -POWER engines.

All Hartech current engine modifications relate to changing the basic efficiency of the engine to improve it in the ranges people drive in most often while also increasing acceleration and speed when that is wanted.

Most engines are designed to produce their best performance in the upper rev range and more open throttles and ignore resulting loss and inefficiency at low revs, power and constant speeds (which we use most often).

You may be surprised to realised that we drive around a lot using 3% to 10 % throttle and between 1000 to 2000 rpm where the torque and BHP our engines produce is roughly somewhere between 40 and 100 lbs.ft and 12 to 25 BHP. This is between 15 to 40% of the maximum torque available and 4-8% of the maximum BHP. This is achieved by the engines running at extremely low compression pressures where they are extremely fuel inefficient and burn around twice the fuel they could do if the compression pressures were higher in those lower performance ranges and contribute around twice as much to global warming as they could do with higher compression pressures.

Very small amounts of fuel can still produce high combustion pressures as long as they are compressed to high enough pressures before ignition. Most of the time we are driving our cars the compression pressures are so low it takes more fuel to obtain modest amounts of torque and power – reducing economy and increasing emissions.

Because this results in poor throttle response so we tend to drive in lower gears at low performance levels so there is reasonable throttle response when we need it – but this is proven to be very uneconomical.

Improving combustion pressures at low performance levels encourages drivers to use lower gears where they still find the throttle response they seek and which is therefore much more fuel efficient.

There are only 2 ways to increase compression pressures in the lower performance range without damaging engines (knock). (1) raise the engine breathing at lower performance levels (trap more air at small throttle openings which improves Volumetric efficiency “VE”) OR (2) Raise the basic C/R and reduce engine breathing (reduce VE) at higher performance levels where it would otherwise cause knock.

Increasing the capacity without increasing other breathing parameters achieves improved performance via improved VE at lower performance levels without losing maximum power (usually increased) and no knock issues.

Increasing the C/R with a std capacity engine also increase performance and efficiency where we drive most often and will not knock anyway at low performance levels and our patented throttle control system then prevents knock at high performance levels by reducing VE there..

So far we have examples of all 4 options – increased capacity (4.1), Two ECO-POWER cars – one std engine capacity (3.4) but increased C/R and two increased capacity (3.7) with higher C/R plus 3.6 to 3.9, 2.6 to 4.1 and the Gen 2 3.6 to 4.0.

Considerable R & D continues to perfect this major improvement in reducing carbon emissions and is funded entirely by Hartech (due to the difficulties obtaining government funding which is presently wasted on many projects that will not achieve anything like the same global benefits including in one case we know about where £1M has been approved for an engine design that the designers themselves secretly admit will never work!

Meanwhile Bolton University has a multi-million pound engine dyno facility being underused but will not allow us to benefit from using it because they claim "they do not have any students capable of benefitting from it).

But engines that produce wider torque spreads do not feel as fast as slower peaky engines that increase output as the revs rise – so to satisfy those customers who don't mind poor general performance response but want peaky engines we have joined up development with BDS to try and improve the "top end" even further (although the cars will probably be less fuel efficient, may not be any faster but may feel quicker – all this to improve customer choices).

We think we have improved what Porsche tried to achieve themselves and hope you enjoy our interpretation of the perfect Porsche engine characteristics.

Baz