



# 'JUST ADD BOOST'

**With the handling improved by the Ohlins road and track suspension, and with a Revo Alcon big-brake upgrade, Simon Harper's Golf 7.5R was now ready for even more engine power...**

WE REPORTED ON the fitment of a JB4+ tuning box from Burger Motorsport in the December 2017 issue of the magazine. Along with a Volkswagen Racingline R600 cold-air intake, Simon Harper's 7.5R made a healthy 362 PS and 453 Nm on Hi-Tech Performance's rolling-road dyno in Northampton. The next logical

step was a performance exhaust and intercooler.

Simon comments: 'I've certainly enjoyed the extra performance provided by the JB4+ tuning box and, along with the chassis and brake upgrades, it's made the car much more engaging to drive. Project 7.5R remains my daily driver so it's important

that any performance upgrades to the engine do not affect the car's day-to-day useability. The R needs to remain comfortable and easy to drive and not become a thirsty monster. I do quite a few miles so I don't want to compromise reliability either, but I did want to develop the performance a little further...'

## BCS POWERVERVE EXHAUST



THERE A LOT of choices on the performance exhaust front and quite a number of firms produce good quality exhaust upgrades to replace the standard system. I thought that if I was going to do it, then I ought to go the whole hog and fit a full turbo-back exhaust. From my research, it was clear that performance gains largely come from replacing the restrictive standard downpipe and catalytic converter. Cat-back systems might look and sound great, but they don't offer much in terms of improvements to horsepower and torque.

Most performance exhausts are based around the premise of improving flow and reducing back pressure by changing the shape and configuration of the exhaust and enlarging the diameter of the pipework to improve through-flow. Invariably, almost all systems these days are manufactured from 304-grade stainless-steel, although some expensive high-end systems use lightweight titanium.

BCS Powerverve Exhausts use the same principle but they also use turbo boost pressure to control the opening and closing

of valves in the exhaust, with the valves remaining closed at low revs to improve low-down torque and opening at higher speeds to improve flow and increase the noise level. A rubber tube running from the lower boost sensor on the engine to the rear part of the exhaust allows the exhaust

valves to be opened as the revs rise.

In fact the flow valve technology allows the exhaust gases to completely bypass the rear silencer box at higher revs, once the frequency has passed beyond the level at which low pressure bass waves are present. This means that you have the



***'You have the best of both worlds, with increased torque at low revs and more power at higher rpm thanks to the improved gas flow...'***

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I was intrigued by the technology and, having been reassured about the noise levels by Nige Leeming at Powerverve, I decided to take the plunge. One of the things that I really dislike about the R is the quad exhausts. I believe that they should be reserved for Lamborghinis and Ferraris and are way over the top for a four-cylinder

Golf. There's no real choice but to stick with four exhaust outlets, but Nige was able to supply black ceramic coated rear tips to help lose the exhaust, visually, in the piano black rear valance. I also opted for the heat-wrapped titanium downpipe to ensure that gains were maximised.

The chaps from Hi-Tech Performance, who fitted the exhaust, were clearly impressed by the Powerverve system and commented on the quality of the welding

and construction. Installation was fairly straightforward, although it involved dropping the front subframe in order to change the front downpipe. Once everything was checked, including the all-important careful alignment of the tailpipes, I took the R out for a run around the block.

If I'm honest, I was fearing the worst in terms of noise levels but I was surprised at how quiet it was at idle. As soon as I trickled out onto the road there was another surprise, though, as there was a noticeable improvement in throttle response at low revs. This was even evident at slow speeds and proof that the operation of the valves was effective.

But then, when I opened the throttle and allowed the turbo to spool up, the exhaust made a fabulous noise and sounded really sporty. I'm really pleased because there's been no loss in refinement, with no more noise inside the car at cruising speeds on the motorway.



## CONTACT

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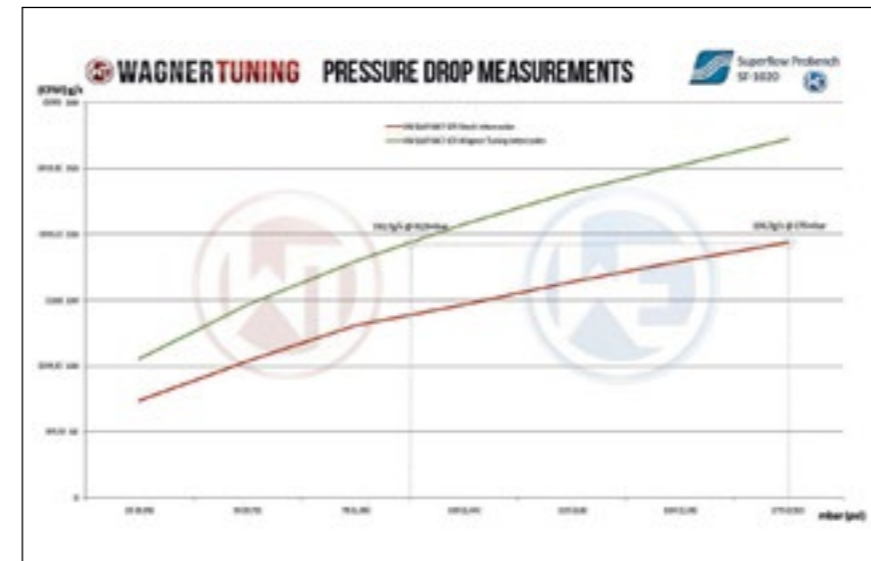
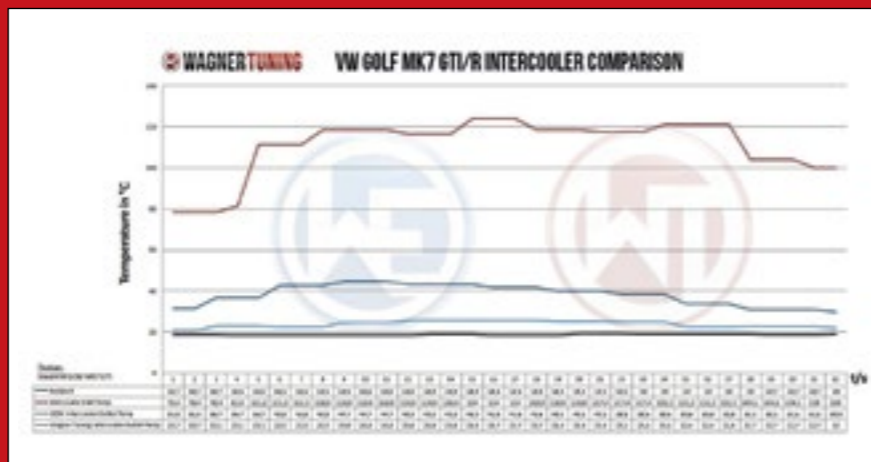
# WAGNER TUNING INTERCOOLER



*'The Wagner intercooler offers significantly improved flow characteristics...'*

Similar to performance exhausts, there are lots of choices on offer for aftermarket front-mounted intercoolers. My research on the internet led me towards Wagner Tuning who have an excellent reputation in terms of quality and performance gains.

David from JB4 Shop, who had fitted the JB4+ tuning box, had commented that the engine performance was being limited on the rolling-road dyno by the high air intake temperatures. The standard intercooler was reaching temperatures well in excess of 40°C and was struggling to recover to a sensible operating temperature of around 20°C. David felt that an uprated intercooler would offer a significant improvement in engine performance.



The standard intercooler fills unevenly and the cooling surface isn't used in an optimal way, which results in high flow rates, not enough time for effective heat exchange and a high pressure drop. Tests by Wagner on the Mk 7 GTI / R showed that flow rates at the bottom of the standard intercooler can be 120 m/s, whereas in the cooler section at the top the flow rate is only half that, at 60 m/s. This problem is not only confined to the standard intercooler and can equally be an issue with some other aftermarket intercoolers, irrespective of their size.

The Wagner intercooler core has a tube and fin construction which offers significantly improved flow characteristics over heavy bar and plate cored intercoolers. Internal air guides ensure uniform filling of the core utilising the cooling surface optimally and reducing air speed. The test undertaken by Wagner showed flow rates of between 20 m/s and 40 m/s, which means there's more time for heat exchange and a much lower pressure drop.

In terms of size, the Wagner intercooler is much larger than standard and comes complete with larger diameter silicone pipework to take full advantage of the improved flow capacity. It requires minimal alterations to the car and is installed in the OEM position, utilising the factory mounting points.

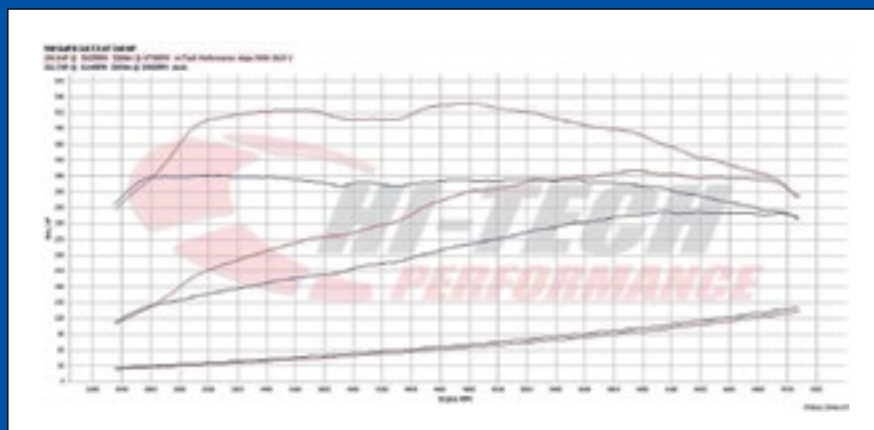
I know this all sounds very technical, but the bottom line is that a good front-mounted intercooler like the Wagner unit significantly reduces air intake temperatures and allows the engine to operate efficiently even during the heaviest use. A cooler engine also puts a lot less stress on the internal components of the engine so there are reliability gains too.

## CONTACT

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# HI-TECH PERFORMANCE CUSTOM RE-MAP



With the Powervalve exhaust and Wagner intercooler fitted it was time to see what the performance gains were on the rolling road dynamometer. After all, Hi-Tech Performance is an engine management software specialist and I was advised that I needed a custom re-map to see the true benefits of the BCS exhaust and the Wagner intercooler. John and his team at Hi-Tech spent some time optimising the timing and fuelling of the car to take advantage

of the performance benefits offered by the exhaust and intercooler. The R had previously been fitted with the Volkswagen Racingline R600 cold-air intake and turbo inlet pipe. I had also just fitted Racingline's Turbo 90 elbow so the custom re-map would provide an opportunity to maximise the gains on that front too. I left the car with the guys at Hi-Tech Performance for a week and when I returned they were really excited with

what they had achieved. They knew that it was important that the car remained easy to drive day-to-day. A 'boosty' power delivery would simply not be acceptable and I told them that if that was the case they would have to start again. True to their word, their work had resulted in a creamy smooth power delivery with a significant increase in both peak power and torque. The car now runs 400 PS (OK, so it's 399.6 PS to be exact!) at 5925 rpm and develops maximum



ABOVE: Hi-Tech's Tom, Damian and John.

torque of 528 Nm at 4776 rpm and, as you can see from the graph, both power and torque are up high over a wide range of engine speeds. And everything can be compared to the figures measured for the standard car and then the JB4+ tuning box as it's all been done on the same rolling road. I know I've said it before, but please don't believe rolling roads that show a standard R running 350 PS – it simply doesn't! The 7.5R (nominally rated at 310 PS) is usually 315-320 PS and a 7R is usually 300 PS exactly.

All credit to Hi-Tech Performance in Northampton, the R is now a fabulous drive with all the characteristics of the standard engine still intact – it just has more of everything throughout the rev range!

## CONTACT

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## FUTURE PLANS

So, with the engine sorted, along with the chassis and brakes, what do we do next? Well we're not finished with the chassis or brakes just yet. We're going to be fitting Super Pro lower control arms and a rear anti-roll bar and I'm also investigating how the rear brakes can be improved. As much as anything else they look wrong cosmetically, as they're so small in comparison with the Revo Alcon brakes on the front.

We're also going to be looking at the interior in terms of a leather re-trim and possibly even fitting a Lamborghini steering wheel. Apparently the buttons on the standard Golf wheel can be transferred over to the Lamborghini wheel, but I'll believe it when I see it! The wheels and tyres will also come under scrutiny as we look at fitting the very latest rubber from Michelin, the Pilot 4S. Watch this space...

