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FIRST WORD

Hi! I'm Emma. I've been writing about quick cars and tuner builds for years now – often right here in VWG – and this marks my first issue as the magazine's editor. I can't wait to show you what we've got in store this issue...

Let's start with the big features. There are Stage 3 Golfs, naturally, but we've got pieces on two front-drive rarities too. Plucked from opposite ends of the performance car spectrum, check out our deep dives on a straightforward, Stage 1 Up GTI and a rare yet remarkable Stage 2 Leon Cupra R 310 later in the issue. They're both unusual choices which have led to excellent results. SEAT fans will want to explore our comprehensive history of the first and second generation Leon Cupra models too, while we're looking to the future with all the latest VW electric vehicle news.

Tuners are just as vital as big manufacturers in our world and we've been speaking with some of the most exciting names in the industry. Marvel at an exclusive interview with DH Automotive about Europe's fastest RS3 saloon, before exploring our technical pieces on intercoolers and ECU software calibration. Huge thanks to the experts who lent us their time and knowledge for both pieces!

Speaking of workshop activity, I want to hear what's going on across the scene. If you've just set up in tuning, your club has an event planned or you've completed your dream project, get in touch and tell us more. Standard or Stage 3, Mk 1 Scirocco or Mk 8 Golf, our ears are open. Reach me at admin@edition-media.com and let's chat VWs!

Emma Woodcock



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INSIDE

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DIFF, COILOVERS AND BODY MODS TO
MATCH. DISCOVER NATHAN'S STUNNING
MK 5 GOLF



CARS



ORANGE IS THE NEW FAST.....016

Turn heads and snap necks with this vibrant 515bhp Mk 7 Golf R



SMALL IS POWERFUL.....026

Unit18 takes the miniature Up GTI into the big leagues



WAY BACK WHEN.....034

How the Leon Cupra came to be: our guide to the Mk 1 and Mk 2 cars



COPPER ROCKET 054
Limited edition SEAT meets British tuning know-how in this Stage 2 Cupra R



ROLLING ROAD 062
SEATCupra.net hits the dyno at Progressive Parts

REGULARS

Explore the latest in the Volkswagen Group world



FIRST WORD 003
What the editor has to say

LIFESTYLE 008
For when you're out of the car

NEWS 010
What's coming next from Volkswagen?

SUBSCRIBE 087
Sign up and save

NEXT ISSUE 094
A sneak peek at Issue 16

PARTING SHOT 098
A stunning image we just couldn't miss

TECH TALK

How it works and who can build it



SOFTWARE CALIBRATION 068
ECU modifications examined with Ecotune

WORKSHOP 076
Meet Shak Shivji at LSG Performance

PRODUCTS 078
The newest parts for the best builds

TECH GUIDE: INTERCOOLERS 088
Learn about the device that keeps your turbo cool

ECOT



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LIFESTYLE

Car culture isn't just about the automobile. This month we check out the best new cameras to snap the 2020 show season.



NIKON Z50

Mirrorless cameras are smaller and lighter than their old-school equivalents; crop sensor cameras have the same advantages over full frame devices. Now Nikon has combined the virtues of both weight-saving technologies to create the Z50, its first mirrorless DX format crop sensor camera. Just 12.7cm wide and 9.4cm high, with a weight of 446 grams, this body is perfect for low hassle show shooting. Snappers won't compromise on quality either, thanks to a 20.9 Megapixel sensor and 11 frames per second maximum shooting speed.

From nikon.co.uk

Price £849 body, £1199 with lenses

CANON EOS-1D X MARK III

Canon has just released a new, improved version of its ultimate camera, the EOS-1D. The numbers are jaw dropping, the camera boasting up to 191 autofocus points, the ability to shoot 1000 images in one continuous burst and shooting speeds of up to 20 frames per second. Add an expanded ISO range which runs from 50 to 819,200 – allowing photographers to shoot in all light conditions – and a video mode that can record in both 4K full frame and 12-bit RAW footage, and you've got one of the best devices on the market.

From canon.co.uk

Price £6499



FUJIFILM X-A5

Beginners needn't spend big to step up from a smartphone. Fujifilm sells the X-A5, a small and simple camera that focuses on ease of use. A tiltable LCD touchscreen acts as viewfinder and controls most of the settings, and there are 17 baked-in filters to get your shots ready for the 'gram. Wi-Fi and Bluetooth capability makes uploading a breeze and the camera comes with a 15-45mm F3.5-5.6 lens included.

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ID.3 PRODUCTION BEGINS



ID.3 will go on sale this year



Alternative energy is bigger news than ever before and Volkswagen is set to transform the market with its ID.3, the manufacturer's first model range to be designed solely around an electric powertrain. The pioneering hatchback needs a similarly sophisticated factory and Volkswagen has just finished the first phase of refitting its Zwickau factory for an EV future. A second sector of the plant will be converted in 2020, and the entire site will be producing electric cars soon after.

Production of the ID.3 began at the East German location in late 2019. German Chancellor Angela Merkel and most of VW's top brass attended the launch, commemorating an ongoing commitment to electrifying Zwickau which has already exceeded one billion euros. Volkswagen plans to build over 100,000 electric vehicles in Zwickau this year, rising to 330,000 in 2021 and reaching 22,000,000 EV sales in 2028.



GOODBYE ICE MOTORSPORT

Volkswagen is ending all factory motorsport commitments to the internal combustion engine. The change is effective immediately and the company no longer plans to rally the Polo GTI R5 with its own team, though private sales of the model will still go ahead. In contrast, production of the Golf GTI TCR touring car has already been concluded.

Don't panic – this isn't game over for Volkswagen Motorsport. Work on the ID.R sport prototype programme continues and the Volkswagen motorsport department also pledges to "develop new motorsport concepts for the ID. family on the basis of the Modular Electric Drive Kit." Otherwise known as MEB, that's the chassis which underpins the ID.3 and will support a range of future ID. models. Electric touring cars, electric rally cars and more could be just around the corner...



SIX FIGURE e-GOLF SALES

100,000 buyers have now purchased an e-Golf from Volkswagen. Over 30,000 of those cars were delivered during 2019 and the UK is one of Volkswagen's five largest markets for the model. First produced in 2014, the Battery Electric Vehicle uses much of the same architecture as an engine-powered Mk 7 Golf five-door hatchback. The latest variant achieves a 144 mile range in WLTP testing.

The big numbers keep coming for the marque and year-end figures show that Volkswagen has now sold over 250,000 electrified vehicles. That figure is split evenly between all-electric vehicles, including the e-Golf, and petrol-electric hybrids, such as the Passat GTE and Golf GTE. China is a major growth market for alternative energy cars and part of Volkswagen's success has come from electrified saloons only available in the Asian market.

NEW YEAR – NEW CADDY



2020 will see the introduction of a fourth generation Caddy van, 17 years after the current Typ 2K model debuted. Just weeks before the end of 2019, the first teaser sketches hit the internet and they hint at a radical redesign. There's a thinner grille and more intricate headlights up front – a strong evocation of the new Mk 8 Golf – alongside a sloping, carlike roofline.

A teaser image, showing a rear three quarter view, hints at the style of a MPV passenger car variant. There's full width glass and LED brake lights which skim round the screen's sharp edges, underlined by a crisp bumper kink that echoes the Up. The barely there suspension and arch-busting alloys are less likely to reach production but it won't take long for the aftermarket to fill that gap... Expect the final Mk 4 Caddy design to appear in the next few months, with production starting before the end of the year.



RS3 RECORD BREAKER

EXCLUSIVE – We chat with DH Automotive about Europe's fastest RS3 saloon.

You might have seen this blue RS3 saloon before. We featured the DH Automotive project car last year, profiling the 9.9 second quarter mile run it achieved at Santa Pod Raceway. That made the Audi the quickest of its breed – but other tuners soon went even faster.

Back in the workshop, Dave Henderson and his DH Automotive team immediately began work on the next step. “I wanted to push the car harder,” Dave explains, “we tuned and tuned until the engine went into self-destruct mode... We bent five conrods but that’s only because I wanted to see how far we could go.” Lessons learned, Dave rebuilt the engine to a new,

fully forged specification. The port injectors have been upgraded to 1000cc items, the in-tank fuel pump has been uprated, and even the crank, valvetrain and block are fresh. With the help of Tim Radley at Race Developments, it takes the engine to a reliable 800bhp and 723lb-ft of torque.

“You need to push the boundaries if you want to break records,” Dave continues, “we also changed to smaller brakes, getting a special kit made so we could run 15 inch wheels and specialist drag racing tyres.” The transformation is remarkable but the team has been careful not to lose the car’s dual spirit. “It’s still road legal and we drive it to every event. When we took the record, we drove it to Santa Pod, raced and drove

home. It’s a testament to how well the engine is built!”

That’s impressive but the raw shock factor is in the numbers. This car has run a 9.32 second quarter mile with a trap speed of 150mph, making it the quickest 8V RS3 saloon in Europe. “No-one else has come close! We spent a weekend testing, then came back the following week and got the pass straight out of the box: our first run was 9.46 seconds and the second hit 9.32. It’s lightning now; it’s a totally different experience at this speed.”

“The car can rest now. It’s gone as far as we can take it and we’ve got a new RS5 to play with...” We can’t wait to see what DH does next.



800bhp RS3 is still road legal





GOLF MK 8 ON SALE

Big news: the new Golf is on sale... but only in continental Europe. Early buyers get to choose between a pair of engines, one petrol and one diesel, each available with two levels of tune. The 1.5 litre TSI can be had with 128 or 148bhp, while the 2.0 litre TDI gets 113bhp or 148bhp. Every variant except the more powerful diesel comes with a standard six-speed manual, though there's a seven-speed DSG dual clutch transmission on the options list. British sales are weeks away.

The range is set to expand soon, Volkswagen increasing their commitment to electrification. Every petrol engine will be available with an optional mild hybrid system, bolstering acceleration and allowing the Golf to coast under electric power alone. A powerful GTE model will follow and is set to combine a 1.4 litre petrol engine with a substantial hybrid system to produce 241bhp. That'll do nicely!

Golf Mk 8 has hybrid power across the range



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A white Audi Sportback is parked on a paved surface next to a large, rusty metal shipping container. The scene is set at night under a dark, cloudy sky. The car is shown from the rear three-quarter view, highlighting its sleek design and multi-spoke alloy wheels. The shipping container is on the left, showing signs of wear and rust. In the background, a power line tower is visible against the dark sky.

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PHOTOGRAPHY ADE BRANNAN

COUNT TO TEN

Wound round to 515bhp, this Stage 3 Mk 7 Golf R has powered Drew Caldwell under eleven seconds in the quarter mile.

One black Charger, an orange Supra and 106 minutes of runtime. For the right generation of petrolheads, there's no more iconic combination on the silver screen: The Fast and the Furious combines Los Angeles street racing with heist movie drama to make speed irresistibly exciting. As the two machines jump the railway tracks, there's a clear message too. Ultimate victory is a ten second street car.

Drew Caldwell has been chasing that dream ever since. "That's always been what I've wanted," he laughs, "and it does boil down to those films when I was growing up!" His car history is all about performance and, for a Volkswagen fan, there's only one place that leads. After a pair of Mitsubishi Evos, three Mk 5 Golf GTis and an Audi S3, Drew arrived at the Mk 7 Golf R. "It was the obvious next step. I like Golfs but I fancied four-wheel drive for the extra speed the traction gives you over

the quarter mile."

Let's clear up any misconceptions: he's not talking about the car in these pictures. Not yet. Before Drew bought his current car, the Caldwell household turned Tornado Red with a manual-equipped R. "Back then I thought autos were for lazy boys and manuals for the real, diehard drivers," he explains. Drew certainly knew how to stir that shifter too, laying down the first official eleven second pass for any Stage 2, manual transmission Mk 7 Golf R in the UK.

Pushing 410bhp, the car's specification wasn't messing around. Revised ECU software featured, and a VWR air intake system, turbo elbow and muffler delete all took residence in the engine bay. A Milltek decat downpipe, replacement intercooler and VWR lowering springs would complete the build and help catapult the Golf over through the standing quarter in just 11.95 seconds.

Despite its shattering performance, the hatchback wasn't quite right and Drew was soon back at the Volkswagen dealership. "I had – and still have – a soft spot for Limestone Grey," he confesses, "but every car in that colour was flying out of the door when I got my first one." Now there was an approved used example on the forecourt in just that colour, aged 18 months old and wearing barely 7000 miles. He had to have it. "As a 2017 machine, it's just on the crossover to the 7.5," he says, "the interior mirror, the wiper stalks and the armrest all changed for the facelift car but they appear on mine too. They're just nice touches."

The little things matter but focus snapped back to the mechanicals when Drew fitted every modification from his previous Golf, a process which took just two weeks. One transmission tune later, the Volkswagen and its dual clutch box were ready to hit the strip. "I'm pretty

VW GOLF R VII





Looking mean
with wrap and
diffuser

fast at changing gear manually," he says, "but the DSG is obviously quicker when you're getting off the line and you do realise how much easier life is, especially when you're coming from a four paddle clutch!" There was just one problem: Drew didn't gel with the dual clutch's brutal shift style and couldn't run quicker than 11.6.

That's when he got talking with Stan Ward, owner of Glasgow experts Ecotune, and swapped to APR transmission control unit software. Compatible with various power levels, the system is tailored to the DQ250 six-speed transmission and raises torque and temperature limits to reduce electronic interference in fast driving. Building on this foundation, APR also makes manual downshifts available whenever engine revs allow, increases shift speed and customises shift points for every gear. For the ultimate getaway, there's three-stage launch control too, controlled by the throttle pedal and activating at anything up to

6000rpm. Drew is deeply impressed. "The gearshifts are quicker and they're smoother. Basically, the whole car feels a lot better." The results speak for themselves: a quarter in 11.4 and a scant 3.3 seconds to 60mph.

Even this wasn't enough for Drew's ultimate goal. It was never going to be. "My aim was still a ten second quarter mile. I'd had a Stage 3 plan in my mind from the very beginning, including a Turbo Technics turbocharger." Stuck between the V4 and V5 units, he decided to protect reliability and opt for the smaller Turbo Technics V4, a hybrid

design based around the original IS38. "It keeps power around 500bhp. Stage 3 isn't a gamble but it's not guaranteed safe either and I want to keep the car in one piece. There's a drivability consideration too; I didn't want to go too big and lose bottom end power."

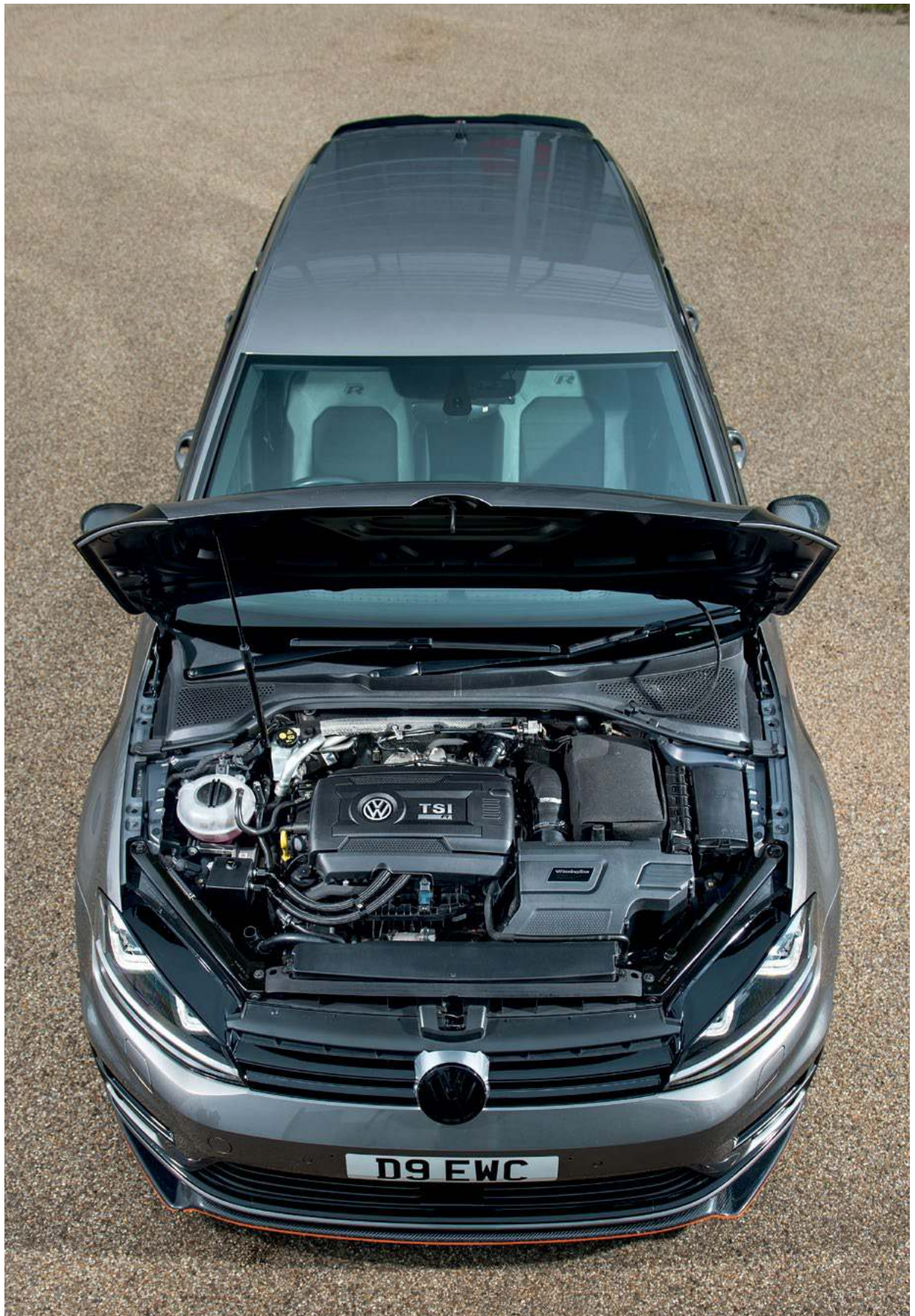
Booked into Ecotune, the car fast received both the turbo and the hardware changes it needed to run the V4 at its very best. Air intake is now handled by a full-width Racingline R600, an Autotech high pressure fuel pump keeps the petrol flowing and a Turbo Technics intake pipe smooths airflow



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Engine bay is jam packed with mods



Aston calipers are a hidden treat

into the turbo. Leading away from the engine bay, the Milltek downpipe remains but it's now joined by a valved, non-resonated exhaust system from APR that boosts both noise and power.

There's intelligent support to keep everything secure, from uprated head studs and valve springs to a hefty Wagner intercooler, and it's all tied together with customised Ecotune software. "I've got to know Stan well and see the way he works," says Drew, "and watching him write maps is just mind boggling. The guy's a wizard!" An initial result of 509bhp and 472lb-ft got the Golf flying, since uprated to 515bhp and 486lb-ft by clever computer work. "It's like going from stock to Stage 2 all in one go," Drew continues, "it's almost 100 horsepower more than before... the mid-range power is just scary!"

Detail defines this high-speed pursuit and Drew has cast his critical eye over every part that translates power into movement, starting with the suspension. The lowering springs are long gone, replaced by a SuperPro 24mm anti-roll bar to aid rear axle composure and a set of KW Variant 2 coilovers all-round. "The height and rebound are adjustable, so I've set the car up to stop it squatting. Overall feel and handling are fantastic too."

The stock alloys have also been swapped out, a set of gloss anthracite Team Dynamics Pro Race 1.2 18-inches

taking their place. Weighing in at barely nine kilos apiece, Drew chose them to drop rotational mass and further

improve his quarter-mile time. The rubber that wraps them is selected just as carefully – but it's far less aggressive than you might expect. "On road or track, it's Uniroyal Rainsport 3s for me." Designed for wet weather, the tyres won



Drew over with their soft compound and proven success on the Crail strip.

Not wanting the Golf to go the same way as Toretto's Dodge, the brakes have received a spectacular upgrade. "The changes came at the same time as the Stage 3 upgrades," Drew explains, "they're a must with the extra power and make such a difference to confidence levels when you're having fun." Ferodo DS2500 trackday pads, braided lines and MOTUL Racing brake fluid increase bite at all four corners but the best action is saved for the front: Vagbremtechnic 340mm discs, complete with 'J hooks' for increased performance, gripped by the Brembo four pot calipers from an Aston Martin DB9.

Still wearing the name of Gaydon's

"It's almost 100 horsepower more than before... the mid-range power is just scary!"

favourite supercar manufacturer, the calipers are a quiet siren call to those in know but the rest of the car looks far from subtle. All black Volkswagen roundels, genuine carbon fibre mirror caps and all-round wind deflectors take care of the smaller stuff, while Drew has hit the Maxton Design catalogue hard for bigger changes. Rear-side extensions, a three-strake diffuser and a pronounced spoiler lip all give the back more bite, sideskirts strengthen the sills and a form following carbon fibre splitter looks the business up front. They're features that have been on the car since the first days of his ownership.

"I wanted the Golf to be loud and lairy," Drew says, explaining the all-encompassing vinyl kit. Having started out with nothing more than purple pinstripes, the Golf has recently swapped to out-there orange with a matching – and massive – Ecotune

No mistaking who put the
build together!



Seats still stock,
still supportive





APR non-resonated exhaust brings the noise

sticker along each flank. A rear window decal and APR 'eyebrows' continue the colour-matched theme, while matte black kicks up the C pillars and over both sides of the bonnet. It's an ensemble that won't be ignored.

Movie star looks are one thing but the real red carpet moment is 1320 feet down the two-lane blacktop. On a searing hot day in late June, Drew ran 10.88 seconds at 128.7mph. His third run of the event, it was enough to win trophies for fastest all-wheel drive machine and fastest car under two litres. "It was my goal and I finally accomplished it," he grins. With the job done, the Golf is going – set to be replaced by a Stage 2 Audi RS3 – but Drew won't ever forget it. After all those years, he owed himself a ten second car. 🏁



VW Golf Mk 7 R

TECHNICAL HIGHLIGHTS

ENGINE

Golf R 2.0-litre EA888 TSI turbocharged inline-four with Racingline R600 air intake, Autotech high pressure fuel pump, replacement Volkswagen fuel injectors, NGK racing spark plugs, uprated head studs and valve springs, Turbo Technics V4 hybrid turbocharger and turbo intake pipe, VWR turbo muffler delete, Milltek decat downpipe, APR valved, non-resonated catback exhaust, Wagner intercooler, Forge Motorsport intercooler discharge pipe, Millers Nanodrive CFS 5W-40 NT+ engine oil, Ecotune switchable engine map capability, Ecotune Stage 3 custom ECU calibration.

POWER

515bhp and 486lb-ft, dyno tested.

TRANSMISSION

Golf R DSG DQ250 six-speed dual-clutch transmission, Haldex four-wheel drive, APR TCU software, Forge Motorsport dogbone mount insert, Dodson DSG oil.

BRAKES

Aston Martin DB9 Brembo four-pot calipers with 340mm Vagbremtechart J-hook discs front, Golf R calipers and discs rear, Ferodo DS2500 pads, braided brake lines and MOTUL Racing fluid throughout.

WHEELS & TYRES

18 inch Team Dynamics Pro Race 1.2 alloys in Gloss Anthracite with Uniroyal Rainsport 3 tyres throughout, gloss carbon fibre centre caps, Forge Motorsport 11mm front and 15mm rear wheel spacers.

SUSPENSION

KW Variant 2 height and rebound adjustable coilovers throughout with SuperPro 24mm rear anti-roll bar.

EXTERIOR

Golf R five-door bodyshell in Limestone Grey with Maxton Design carbon fibre front splitter, gloss black sideskirts, gloss black rear diffuser, gloss black rear side spats and gloss black rear spoiler extension, carbon fibre door mirror caps, gloss black Volkswagen roundels front and rear, wind deflectors, custom orange bodykit pinstriping, custom orange and black Ecotune side and rear window decals, APR orange and black 'eyebrow' decals, matte black outer bonnet stripes, matte black C pillar full height decals.

INTERIOR

Stock Golf R interior.

THANKS TO...

All the admin on the UK Mark 7 R Owners Club, Shore Wraps for the decal, Mark Ash at AwesomeGTi and the big obvious one: Stan and his team at Ecotune Scotland. They've made the experience very educational, made me appreciate what tuners actually do. And my wife Laura for putting up with my tantrums!



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PHOTOGRAPHY ADE BRANNAN

UP AND AT 'EM

150bhp, never-quit brakes and tougher suspension give this GTi oversized attitude.

Flame-spitting exhausts and Mk 7 Golfs that hit sixty in three-point-something seconds... The extreme edge of the Volkswagen tuning scene has never been faster or more accessible. Go to any show, any club meet, any specialist's workshop and you're spoilt for Stage 3 choice. The Milton Keynes workshop of Unit18 Automotive is no different. Ramps and bays drip with well-tuned customer cars, while the firm has previously built a 580bhp Audi S3 track car and a 490bhp Mk 7 Golf R Estate for its own demo fleet. This team knows how to live life fast.

That's not where their interests end, though: the team knows that small can be powerful too. Unit18 recently grabbed a Lupo GTi for a mini restoration project, bringing the 123bhp supermini back to its riotous best in weeks, and the firm founder has previously owned five standard Lupos, a GTi, a Skoda Citigo and a Fox of his own. Few firms could be a better fit for the Up GTi and, when Volkswagen finally announced production in

January 2018, the Unit18 team wasted no time in placing in an order.

Delivery took a little longer. Caught in a rush of popularity, demand for the new GTi outstripped immediate supply and would be owners around the country had to sit tight. Unit18 was no different. "We wanted the car 100% – there was never a single thought of cancelling the order." Nine months later, the Up arrived.

As soon as the team slipped behind the flat-bottomed, leather rimmed wheel, the wait was worth it. Bouncing over the local back roads and zipping round Milton Keynes' many, many roundabouts, the GTi offers a genuine hot hatch experience. "The Up is very much in the same ilk as a Lupo GTi," they explain, "it's just a more refined, newer version and we like its overall character. The Up is good fun and it's nippy – it's a decent drive!" Don't go thinking the car was destined to stay standard, though. Unit18 is a tuning company, after all...

"Don't go thinking this car was destined to stay standard"

VW UP GTi

Bilstein coilovers give
perfect poise





EA211 responds well to Stage 1 treatment



Standard Up GTi style neat and aggressive

“Unit18 has uprated the engine to amplify the GTi fireworks”

Even a quick glance confirms that this Up is sitting lower than standard, the wheelarches snug over Volkswagen's intricate Oswald 17 inch alloys. It's a change Unit18 was keen to get it place, and the team started with a set of Eibach Pro Kit springs. The GTi already sits 15mm lower than workaday Ups and the static set doubled that drop to 30mm. Problem solved!

Effective as that solution is, the company has since been offered the chance to try another option: Bilstein B14 coilovers. “We were very happy with the Eibach items but the Bilsteins make a big difference too.” Height adjustable and capable of dropping the GTi up to 50mm lower than standard, the sophisticated monotube system has also improved driving dynamics. “The Up is so much more controlled now. As standard, we



sometimes experienced the traction control taking over but the Bilsteins have mostly got rid of that. It's a far more mature car now."

That doesn't mean the Up has lost its excitable spirit, as Unit18 has uprated the engine to amplify the GTi fireworks. The company wasted no time getting started and added a Pipercross foam panel air filter, their first motor mod, just three days after the car arrived. Gigantic and promising nearly a third more airflow than the standard Volkswagen item, it had an instant effect. "The torque peak rises slightly with it fitted," Unit18 clarifies, "plus there's a bit more induction noise."

Pops, burbles and bangs are all up too, thanks to a Milltek catback exhaust. Constructed from Type 304 stainless steel and measuring two inches diameter, the resonated system adds a cultured



Unit18 proud
of its work

VW UP GTi



Volkswagen's most famous performance badge

tone to proceedings. "It does sound good, especially considering it's a three-cylinder engine. The Up is very deep now, with a little bit of overrun too." An integral carbon fibre tailpipe ensures the visual flare to match.

Change number three can't be caught with the naked eye, yet it transforms how the little Volkswagen drives. We're talking, of course, about revised engine software. Unit18 was eager to get the job done right and provided the car to Racingline headquarters for several weeks, where it was used for the development of a new OEM+ Stage 1 package. Tailor made and designed with durability in mind, the resulting file is now commercially available and pushed the Unit18 car to a proven 143bhp.

Research and development duties didn't end

there, the Up returning to Racingline for work on a high flow turbo elbow which should hit the market very soon. "It's been a long development process, complete with scanning, imaging and 3D printing," says Unit18. "The elbow has got to have the right design, the right flow and the Racingline ethos." The payoff is another seven horsepower, raising the peak figures to their current 150bhp and 188lb-ft. "It feels like the biggest single gain we've added to the car," the team continues. "As soon as it went on we could feel it: the difference in airflow is amazing!"

Even more important is how the modified miniature feels on the road – and here Unit18 has even more good news to report. "It's much, much smoother now," the team says. "The stock engine almost has a surge of boost but the modifications mean it's a very progressive drive now, which makes it easy to influence and work with the available grip." With the new power pushing under a tonne, there's speed to be had too. "The finished Up is properly quick! Thanks to its power-to-weight ratio, it's not far off a Golf R from point to point..."

Faster down the straights and quicker through the corners, the Up development car has the performance to embarrass heavyweight performance cars and it needs the braking ability to match. It's an area Unit18 has carefully considered, fitting a set of Ferodo DS2500 trackday pads on the front axle. "Here in Milton Keynes it's roundabout, roundabout, roundabout," they explain, "that's okay at stock power but at



“The finished Up is properly quick... it’s not far off a Golf R from point-to-point”



VW Oswald alloys fill the arches



150bhp makes every drive addictive

150bhp it starts to overwhelm the original pads." Replacement is a straightforward decision. "It's one of the core upgrades we suggest for any model and we always use Ferodo in the cars we build. We even use them in the racers we look after. The DS2500 is a good all-round pad too: it's got bite from cold and no fade in the Up."

Each change gives the company a better understanding of the lightweight city car and its small-scale engine, something which will soon translate to customer cars. "The Racingline guys tell us the turbo elbow should fit every 1.0 TSI application across the Volkswagen Group range and there's a big opportunity for that engine going forwards: the Up shows it can pretty much be brought up to the level of a 'budget GTI'." Other Ups are also beginning to appear in the Unit18 workshops, one customer GTI recently swapping onto more aggressive springs. More are sure to follow.

There are no parts left to fit but that doesn't mean the company and the development GTI are parting ways. "Yeah, it's not going anywhere. The Up is tauter now than it was, driver input is much more important and everything you do behind the wheel you can feel immediately. We wouldn't sell it – we love it too much!" Faster, firmer and even more fun than the Volkswagen original, the Unit18 Up is small but perfectly formed. 🐘

VW UP GTi

TECHNICAL HIGHLIGHTS

ENGINE

VW EA211 998cc turbocharged inline-three with Pipercross panel air filter, Racingline development turbo intake elbow, Milltek two inch resonated catback exhaust with carbon fibre finisher, Racingline OEM+ Stage 1 engine software.

PERFORMANCE

150bhp and 188lb-ft, dyno tested.

TRANSMISSION

Six-speed manual, XDS electronic differential.

BRAKES

VW Up GTi front discs with Ferodo DS2500 pads, stock VW Up GTI rear drums.

WHEELS AND TYRES

17x6.5 inch diamond-turned Oswald alloys with 195/40/R17 tyres all-round.

SUSPENSION

Bilstein B14 height adjustable coilovers all-round.

EXTERIOR

Standard VW Up bodyshell with GTI upgrades including front splitter, rear diffuser, honeycomb front grille, front and rear red pinstripes, GTI badging, sidestripe decal, mirror caps finished in gloss black, bumper finished in gloss black.

INTERIOR

Standard VW Up GTI interior with Jacara tartan cloth, front sports seats, leather-trimmed, flat bottom GTI steering wheel, GTI gearlever, Red 2D pixel dashboard cover.



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- ✓ Powerflex
- ✓ BC Racing
- ✓ Pipercross

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WORDS RICHARD GOODING PHOTOGRAPHY SEAT

UP FOR THE CUP

Far from the first SEATs to wear the coveted Cupra badge, the bombastically powerful first and second-generation performance Leóns shook up the hot hatch establishment

How times change. Say 'Cupra' in 2019 and, while it still refers to a sporty SEAT, it's a sporty SEAT with no 'SEAT' badge. Confused? Don't be. In 2018 the Catalanian company spun off the Cupra badge into a standalone high performance lifestyle brand but that doesn't mean it's lost its frenetic edge, even if the offshoot's first car was an excitably heightened version of the Ateca SUV. With more of the same to come, it's a very

different direction from the Cupra brand's origins.

Originally named SEAT Sport, its most notable successes belong to the Ibiza and Cordoba World Rally Cars which flamboyantly flew through stages in the mid to late-1990s. Switching to circuit racing in 2002, SEAT then built a racetrack rager with the beefed-up León Supercopa. The Cupra and Cupra R bring the same spirit to the open road.

1999-2005**'1M' MK 1 LEÓN CUPRA/CUPRA R**

Launched in 1999, the León hatchback arrived in the UK in March 2000. Born from the same gene pool as the Mk 4 Volkswagen Golf, it also shared DNA with the first Audi A3 and Skoda Octavia and was a Giorgetto Giugiaro styled five-door version of the handsome Toledo saloon. Sharing the same PQ34 platform as its cousins, the SEAT's structure was primed and ready to receive performance parts from Volkswagen Group's other hot hatches.

The first Spanish scorcher soon arrived: the 178bhp León 20VT. Powered by a 1.8 litre, 20 valve turbocharged four-pot, the £17,815 Spanish challenger would find few buyers. Price aside, that's a mystery, as its recipe was as tasty as a plate of the best tapas: smooth curvy looks; gorgeous 16-inch finned alloys; and six cogs. Its 173lb-ft of torque even gave the 20VT a 7.7-second 0-62mph time and the practical hot hatch was capable of a 147mph top



20VT was an understated street sleeper

speed.

Not to be put off, SEAT lowered the 20VT's specification for 2001, basing it on the León Sport. All cars were now badged 'Cupra', and bingo, the model found its winning formula, in part due to its great value. At just £14,995, the Cupra was a similar price to the 123bhp Volkswagen Polo GTI but offered buyers more power and more space. Priced around £4,300 cheaper than its in-house Audi S3 rival, it even shared the Ingolstadt car's dashboard. Yes, now there was no auto-dimming mirror, ESP, leather trim or rain-sensing wipers, but with a lower price than the identically engined 148bhp Golf GTI, the SEAT offered a spicier recipe. In fact the León Cupra deserves comparison with cars above the Golf: it was a cut-price Audi TT in a more sober suit.

Previewed as a concept at the 2001 Barcelona motor show and developed by SEAT Sport along



A V6 Cupra? You'd better believe it!



Cupra rear bumper has stylish clout

“The Cupra deserves comparison with cars above the Golf GTI”

HISTORY



Bigger wheels and sideskirts distinguish Cupra R

with the manufacturer's technical centre, the £16,995 Cupra R arrived in 2002 and was hailed as 'SEAT's fastest, most powerful production car. What's more, it's only the second model, after the limited-run 2000-2001 Ibiza Cupra R, to wear the now-iconic 'R' badge on its boot.

The extra-hot Ibiza may have been powered by the León Cupra's 177bhp mill, but its bigger brother boasted 207bhp from the same 1.8T lump thanks to a larger Garrett K04 turbocharger and twin intercoolers. Four-pot Brembo front brake calipers, 18-inch wheels, and SEAT's Agile Chassis Concept – a combination of revised suspension, mounts, spring and damper settings, as well as more direct steering and a traction control system – helped give the hottest León yet more dynamic muscle. Visual clout came by way of beefier bumpers and side skirts, and white dials and a steering wheel with a red 12 o'clock marker identified the Cupra R inside. The model was an immediate success but SEAT wasn't quite done yet...

In 2003 power climbed again, this time to a searing 222bhp. Essentially the same engine as the Audi S3 but with power pushed through the front wheels rather than the Ingolstadt hatch's four the 0-62 time tumbled to 6.9 seconds, the most extreme

León romping onto 150mph. The Cupra continued to be a huge success and over 45 per cent of all first-generation Leóns sold were more pulsating than pedestrian, even though a more sensible 148bhp TDI Cupra diesel slotted into the model range during 2003. A total of 4,083 Rs were sold in the UK, and it's little wonder the first hot Leóns were a hit. Much cheaper than the equivalent Golf but with stronger styling, especially in eye-popping Crono Yellow or go-faster Flash Red, there was little to dislike.

Fancy something different? Between 2000 and 2002 selected European markets got the Cupra 4, an all-wheel drive model powered by a 201bhp 2.8-litre V6. No matter the variant, the story did have to end and 1M Cupra production ceased in 2005 with the arrival of the second-generation '1P' León.

Enthusiasts keep the light burning today, standard cars increasingly recognised as future classics and modified examples showing there's endless potential in that 1.8.



Four pot Brembos worthy of Cupra R badge



Bucket seats plus thick wheel equals one driver focused interior

SEAT CUPRA



1P Cupra a subtle hot hatch choice

2006-2012

'1P' MK 2 LEÓN CUPRA/CUPRA R

The covers came off the second-generation León Cupra at the 2006 British International Motor Show. Based on the new slippery-styled León, the Cupra was claimed to appeal to 'serious enthusiasts' and was the most focused hot hatch SEAT had made. Packing a 237bhp punch, the turbocharged 2.0-litre direct injection TFSI engine was shared with the 197bhp León FR, as well as the Mk 5 Golf GTI, but the extra power allowed the Cupra to sprint to 62mph in just 6.4 seconds. It powered on to 153mph.

Aside from its predecessor's lairy yellow paint, the new León Cupra's unadorned shape was just as much a street sleeper as the first-generation machine. Its 18 inch twin-spoke alloys and enlarged black bumper sections, complete with mesh infills at the front, gave more aesthetic polish but there was very little to tell SEAT's new firecracker from its less potent sisters. An oval tail pipe and gloss

black mirror caps were the subtlest of giveaways. It was the same story in the cabin, though bucket-style sports seats, a leather-trimmed Cupra steering wheel, sports pedals and white-faced dials did give the game away.

More extrovert drivers could later choose the UK-only Cupra K1 special edition, adding more visual aggression in the form of bumpers festooned with in-ye-face air scoops, striking side skirts, a prominent rear spoiler and a centre-exit exhaust. If the K1 was still too much of a shrinking violet, the magenta Cupra Pies Descalzos customised by Colombian singer Shakira for the Pies Descalzos Foundation charity would raise eyebrows. As well as the extrovert paintwork, the interior was decorated

Pies Descalzos: a Leon fit for a pop princess



“In 2009, a new Cupra R laid speculation to rest...”



Triple air vents and front Cupra badging mark out Cupra R

with bright pink inserts!

The original hot Leóns had been a two-tiered family, so speculation was rife around the addition of a super-SEAT above the latest Cupra. In 2009, a new Cupra R laid the speculation to rest. The rip-roaring 261bhp León has almost identical power to the Mk 6 Golf and Scirocco R and matches that of the León TDI racer which competed in the World Touring Car Championship. A formidable 0-62 time of 6.2 seconds, a top whack of 155mph, and a BMW 120i M-Sport and Honda Civic Type R GT-eclipsing 258lb ft of torque ensure the Cupra R stays true to its lineage.

Employing the same TFSI four-banger as the Cupra, the Cupra R sparks high-performance fireworks thanks to a modified electronic management system, a boosted maximum turbo pressure and a revised high pressure fuel injection pump. Reworked ratios for the six-speed 'box keep the touchpaper lit and the new car has a more exhibitionist personality than its forefathers.

The Cupra R is a neat looker to match. A tell-tale smattering of 'R' badges adorn the front and back

Standard 19 inch alloys give Cupra R more bite



ends, and the 'Potenza' rims are an inch up on those of the Cupra, even though they share the same design. Ultra-low profile 235/35 rubber raises the visual stakes and new 345 x 30mm front discs peep through the twin-spoke wheels. At the rear, similarly upgraded 286 x 12mm stoppers scrub off speed, and a rear spoiler and twin central exhaust pipes denote the ultimate second-gen León. The face of the newcomer gets gloss black bumper inserts emblazoned with the 'Cupra' legend, and a trio of air vents below the SEAT badge add a touch of the Porsche 924 Turbo.

Inside, quilted leather sports seats balance the competition feel with premium brand luxury, a focus reinforced by aluminium pedals, LED instrument lighting and a leather-rimmed multifunction steering



Upgraded Cupra R engine as powerful as Scirocco R



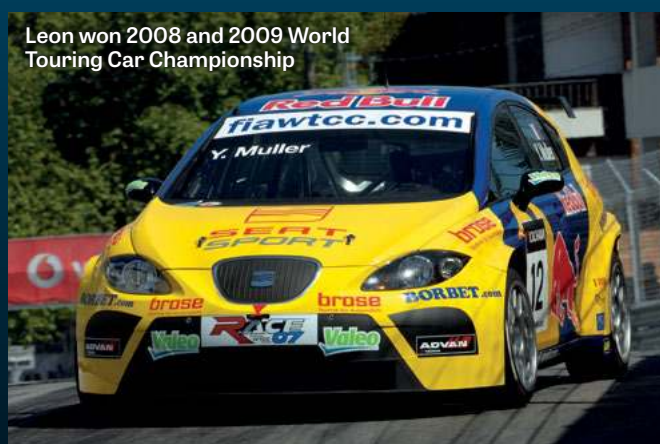
The 1P Cupra raced around the globe

RACING LINES

Motorsport plays a major role in the León's CV, with numerous wins and two manufacturer titles between 2005 and 2012 in the World Touring Car Championship. Closer to home, SEAT UK ran a pair of León Cupras in the British Touring Car Championship in 2005 and 2006. Jason Plato took second place in the drivers' championship in both seasons, while SEAT lifted the manufacturers' crown in 2006. The SEAT Cupra Championship supported the BTCC for five years from 2003-2008 too, initially with first-generation, 247bhp Cupra Rs, switching to the all-new, DSG-equipped León Supercopa racer in 2007.

The brand celebrated its successes with the introduction of limited-run special editions. German buyers were offered the 282bhp Copa Edition, limited to just 55 units and fitted with race-derived Eibach suspension, xenon headlights and white and black paintwork. A similar edition was sanctioned for Mexico, to cash in on the WTCC wins. Limited to small runs, the Swiss León Streetcopa and World Champion Editions are both in a similar vein but the most hardcore and hottest León was the Cupra 310 Limited Edition.

Only sold in the Netherlands, the 310 raised power to 310PS – that's 305bhp – and 313lb-ft of torque. The 2.0-litre engine gained an ABT Sportsline remap, and black Orion alloys, an alarm, Bluetooth and '310 Limited Edition' badges were added. A plaque on the dashboard displayed the serial number and the top speed was increased to 160.9mph. All this with a standard factory warranty, too!



Leon won 2008 and 2009 World Touring Car Championship

HISTORY



There's no missing Tribu Yellow!



wheel. Silver dash detailing and an 'R' logo on the speedo also appear, making the hot-shot SEAT something really special. If drivers really want to get noticed, Tribu Yellow or Kiwi Green paint with white alloys certainly make the neighbours' curtains twitch!

Befitting the most powerful SEAT ever, the '1P' Cupra R has everything from the safety systems cupboard thrown at it. In addition to ABS, electronic stability and brake assist programmes, traction control and SEAT's trick XDS e-differential are fitted. A full roster of front, side and curtain airbags offer protection in a crash and Isofix child seat anchoring points ensure the León's hot hatch practicality box is ticked. A high specification also includes auto lights and wipers, cornering fog lights, cruise control, dual-zone climate control, a low-pressure tyre warning system, rear parking sensors and a trip computer, in addition to an MP3-compatible, eight-speaker CD radio system. UK sales began in April 2010, the explosive León priced at £25,205. Production ceased in 2012.

Later versions may have topped 300bhp – and even an estate was thrown into the mix – but the '1M' and '1P' Leóns were the first mega-power Spanish hatches to rip up the hot hatch rulebook

with their enticing blend of tarmac-shredding power and scintillating pace, high specs and ultra-competitive prices. Offering more bang for your buck than both in-house Volkswagen Group rivals and wider, more prestigious competition, the first and second-generation Leóns were fiery Catalan gladiators in the hot hatch arena. Olé! 🍷



Hard-backed sports seats bring racing flair



261bhp and still unassuming. That's the Cupra way

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WORDS DANIEL BEVIS
PHOTOGRAPHY ADE BRANNAN

MATHEMATICAL CERTAINTY

The figures all add up with Nathan Taylor's road-and-track 537bhp Mk 5 build – but there's so much more to this than raw numbers...







REVO intake pipe gets air flowing fast

Numbers so often define project

builds. For some it's as simple as a horsepower pub boast, being able to throw out a spurious but meaty dyno number to titillate and amuse; for others it's all about chasing a particular figure for reasons of outdoing similar projects on the scene. For Nathan Taylor, however, the numbers are taking care of themselves with this staggeringly in-depth Mk 5 GTi: a huge amount of research and development has gone into his radically reworked engine, but the 537bhp headline is the result rather than any sort of target.

The point here is that this Golf has been fastidiously built to run reliable and entertaining power, all day, every day. Perhaps the most important figure here is 19... That's the number of laps of the Nordschleife he's recently competed in one hit, at maximum attack, before cruising home in comfort. These are the markers of a car that's been built properly.

"I've been into cars ever since I can remember, born and bred into it," Nathan explains. The merry dance began at the age of 16, buying a Mk 2 Polo to clean up and sell on before levelling up to a Mk 2 Golf. The hatchback led to his first dramatic road trip too: a 250-mile journey to collect a car that wasn't running right, resulting in a convoluted mish-mash of twelve hours and five recovery trucks to finally



BodyCustoms R32-style bumper and SRS-TEC spoiler add individuality

get home. Nathan's been running the numbers ever since.

A technician apprenticeship with Volkswagen encouraged Nathan to step up to a modern Fabia 1.2 but the sensible Skoda wouldn't last long. An Audi A3 TDI came next, then a Polo GTi that crept up to 234bhp. The young petrolhead had never experienced that kind of power before... and power corrupts. It wasn't long before Nathan was craving more and identified the Mk5 Golf GTi as the ideal path to high-octane success.

"I wanted an Edition 30, but at the age of 19 I knew I was dreaming," he recalls. "I did find a relatively cheap



Water-meth injection keeps engine cool



Edition 30 on eBay, but it had high miles; I went to view it and it was definitely not all it was made out to be. Back on eBay, there was one I'd been watching that was slightly out of my budget and I arranged to have a look. I immediately wanted to buy it!" What he'd found was a stock-looking Tornado Red example hiding a K04-converted BWA engine and running 362bhp and 402lb-ft. The seller was only the second owner from new and all the maths was adding up for Nathan.

"The exterior was a blank canvas, so I began making it into what I wanted," he explains. "I started with a set of Team Dynamics Pro Race 1.2 alloys.

AKS, Nortech and Peron spent weeks in here. It shows!





It then needed some coilovers, so on went those, and I also had the bumpers painted, as I think it's a much cleaner and more premium look compared to the standard black finish. I bought a rear diffuser from Russian company BodyCustoms.pro too. It's not quite an R32 bumper but it's a different approach and I've only seen a couple of others."

After these efforts, Nathan was able to enjoy both the 'show' and the 'go', although soon enough fate again intervened. In 2016, Nathan took the Golf to the Nürburgring and this immediately highlighted a number of things he wanted to change. "The car was great fun, but just didn't handle the way I wanted it to," he remembers. "I researched some common and effective handling upgrades, and bought the Powerflex anti-lift kit and bottom arm front bushes, along with an H&R 28mm front anti-roll bar. Then decided I needed a rear anti-roll bar and went for a Whiteline item. The car was now much better, far more stable and predictable,

"It took a week of development to arrive at the ideal set up"





AEM multi-function gauge tracks engine info

and a stronger all-round experience on track."

With the Golf's looks on-point and the chassis able to effectively deploy the power, it was time to enjoy the drive – and that's just what Nathan did through 2017, returning to the 'Ring twice and taking in various shows across the UK. By the winter of that year he was getting bored. He wanted more power, so the GTi was taken off the road and this is when the really seismic changes started to occur.

"I decided to do a big-turbo build," Nathan grins. "I'd gathered a few parts already, as I had some idea of what I wanted to do. I parked the car in my garage and pulled the engine, then tore it down to the block as I was planning to build it myself. With various things going on around me, I didn't really have the time or space to do an engine build over the winter, so I got in contact with Paul at AKS Tuning to discuss options. We were on the same page with what I wanted to achieve, and AKS agreed to build my engine through the winter to be ready for February 2019."

When the springtime rolled around, Nathan went to collect his freshly rejuvenated motor, along with an RPC



Bucket seats a must with over 500bhp!

Motorsport inlet manifold, a Helix 6-paddle clutch kit and more. Helpfully he lives a few minutes from Nortech Performance, which was very handy for collecting turbo parts, and James at Nortech is extremely knowledgeable when it comes to turbos and tuning. With all the bits gathered back in the garage, Nathan was able to crack on. He spent the weekend building the engine back up, fitting all the ancillaries and reinstalling it in the bay, so the motor was running by Sunday night.

"The car was driving on a base map,

so after 700 miles it was time for the fun part: tuning," Nathan continues. "I was collecting some parts from Nortech and, with Nortech and Peron being under one roof, I got talking to Mr Peron himself, Charlie Orpen. I had a workaround of their new 4WD Dynojet and that was that, the decision was made that Peron was going to tune the car. After all, the firm has one of the best tuners around, with years of experience tuning Volkswagen Group, Ford, BMW and more, as well as high-end cars like Lamborghinis and Ferraris.



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Edition 30 splitter adds aggression

So yes, I trusted Peron with my Golf."

These expert hands teased out some staggering numbers from the big-turbo motor: 537bhp and 451lb-ft, engineered for reliability rather than pub bragging. It took a solid week of development and tweaking to arrive at the ideal setup, creating a powerplant that perfectly complements a car which needs to cruise comfortably to Germany, hammer around the Green Hell, then trundle happily back home again. With the newly amped-up motor really owning the numbers, Nathan was able to take it straight from testing onto his petrolhead road trip and smash down those 19 consecutive laps with a huge grin on his face.

"I couldn't be happier with it, the car performs faultlessly," he beams. Of course, these things are never finished. People like Nathan can't sit still. The next chapter for the car will see him cracking out the tools once again, this time for a 4WD conversion with an alloy subframe and Gen-2 Haldex. And then there'll be a Plex PBC boost controller and an 8-injector setup and... well, those numbers just keep on adding up. That said, don't for a second think that the figures define this build. The Golf's purpose is clear. It's a dual-function track car and road tripper, and it fulfils both roles admirably. The numbers are merely a happy by-product. 🏁

VW Mk 5 Golf GTi

TECHNICAL HIGHLIGHTS

ENGINE

VW Mk 5 Golf GTi 2.0-litre turbocharged inline-four with REVO intake pipe with 80mm MAF housing, RPC Motorsport intake manifold, cylinder head stripped, cleaned, then milled by AKS for correct injector angle, Audi R8 valve springs with stock valves, Audi S3 CDL exhaust cam, VW Mk 5 Golf GTi Edition 30 BYD inlet cam with Audi S3 CDL fuel pump lobe, ARP cam cradle bolts, new VW cambelt kit and water pump, weighed, balanced and polished crank, ARP main stud kit, ARP head stud kit, block decked and bored to 83mm, weighed and balanced ZRP Rods, weighed and balanced Wossner forged 83mm pistons, 9.8:1 compression ratio, Audi 8V RS3 injectors with modified loom, 175-bar fuel pressure relief valve, Loba high-pressure fuel pump, Audi TT RS low-pressure fuel pump, Audi S3 200-bar fuel rail pressure sensor, Nortech Performance turbo kit, Owen Developments HTA3073 0.61AR turbo, Turbosmart Hypergate 45mm wastegate, stock N75 boost control, GFB DV+ diverter valve, Nortech decat downpipe with wastegate dump tube, BCS exhaust system, AKS Tuning balance shaft deleted oil pump, VIS Motorsport balance shaft solid gear, new chain and tensioner for oil pump, Racingline Performance oil catch can system, evaporation system delete, Vibratronics engine mounts, 300x600x76mm Toyosports intercooler, Devils Own methanol injection, S3 3-bar MAP sensor, cosmetic head gasket, tuning by Peron and Nortech.

POWER

537bhp and 451lb-ft, dyno-tested.

TRANSMISSION

02Q six-speed manual 4WD gearbox, Wavetrac LSD, steel selector forks, BAR-TEK fourth-gear support, BAR-TEK steel input shaft insert, Helix 6-paddle clutch, single-mass flywheel, Dieselseek billet short-shifter.

WHEELS & TYRES

8x18 inch ET51 OZ Racing Superleggera wheels in satin bronze, 235/40 Federal 595RSR tyres all-round.

SUSPENSION

Relentless adjustable coilovers, Superpro anti-lift kit with polybushed alloy bottom arms, Powerflex rear trailing arm bushes, Powerflex rear upper and lower control arm bushes, Powerflex rear spring mount arm bushes, all arms powder-coated in anthracite, H&R 24mm front and 26mm anti-roll bars, rear strut bar.

BRAKES

Audi 8J TT RS front calipers with 370mm discs, standard VW Golf GTi rear calipers with Audi S3 310mm vented discs, Ferodo DS2500 pads and HEL braided lines throughout.

EXTERIOR

VW Mk 5 Golf GTi bodyshell in Tornado Red, VW Mk 5 Golf GTi Edition 30 front splitter, BodyCustoms.pro rear diffuser/lower bumper, SRS-TEC boot spoiler, colour-coded sideskirts, carbon fibre mirror caps, foglight delete, Racingline Performance side stripe in satin black.

INTERIOR

Cobra Suzuka Pro front bucket seats with OMP 4-point harnesses, rear bench delete with false floor, Royal Steering Wheels alcantara wheel with red stitching and red centre stripe, AEM OBD-II multi-function gauge on steering column, boost gauge on vent, interior trims wrapped in gloss black, VW Golf GTi Edition 30 gear gaiter, carbon fibre gearknob, internal fire extinguisher, Xtrons head unit.

THANKS

"I would especially like to thank Charlie, James and Nick from Nortech and Peron for their work and support throughout the build. Customer service is second-to-none, and just an all-round great set of guys who have the same passion as us, and I would highly recommend anyone doing this type of build to consider working with them to achieve the best possible."

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FAST FASHION

Style and speed make the exclusive Leon Cupra R an impressive rarity – this Stage 2 car is faster and rarer

PHOTOGRAPHY HABIB MOHAMMED

Not every Leon gets to look quite this good. The sharp lines and deep vents of a third-generation Cupra are always compelling, looking as fresh on a brand new 300 as they remain on the original 261bhp machine, yet there's one model which goes far, far further. The 2017 Leon Cupra R. Only 799 of these limited-run Cupras have ever been built, of which a scant 24 wear a steering wheel on the right-hand side, and Aaron Paddison won't let go of his example any time soon.

Visual extras sear from all corners of the Leon R – some subtle, some eye-poppingly overt – to underline that this is no usual Cupra. Most striking is an all carbon fibre bodykit that includes a front splitter, sideskirts and a chunkier rear wing, though eager eyes will also spot widened wheelarches which integrate seamlessly into redesigned front and rear bumpers. Harsh, near vertical slashes are underlined by a mixture of gloss black and copper detailing.

The warm, burnished shade has since

become a motif of the Cupra sub-brand but this is where the look started. Front and rear badging, door mirrors and a pair of front bumper strakes all turn copper for the R and the car's model-specific 19 inch alloys continue the colour theme. They push the track 20mm wider than the standard Cupra, filling the arches and hinting hard at extra performance potential. Optional Michelin Pilot Sport Cup 2 trackday tyres confirm it.

Handling changes start with new rubber but they don't end there, thanks to revised adaptive damper calibration and new suspension uprights. That second change increases negative camber from 1.3 to a huge 2.0 degrees to amplify handling and agility, an improvement reinforced by adjustments to the steering rack. Larger brakes, complete with Brembo four-pot calipers and 370mm front discs, ensure the Cupra R stops as well as it steers.

The turbocharged inline-four gets a helping hand too, gaining ten horsepower over the Cupra 300 to

SEAT LEON CUPRA R



“Only 799 of these limited-run Cupras have ever been built”



Front discs 30mm larger than other Leon Cupras



reach 306bhp and equal the output of the Volkswagen Golf GTI Clubsport S track rat. A revised exhaust tops it off, bringing larger, circular tailpipes and extra volume to the table. Over in continental Europe, both DSG dual-clutch and six-speed manual transmissions were made available for the model but the limited run of British cars, including Aaron's example, only come with the three-pedal option.

Interior design further distinguishes the special edition from other Leons and that means there's even more copper to enjoy. The colour rims the instrument binnacle, air vents and gearlever surround, appears on the steering wheel badge and brings the cabin stitching to life, complementing extensive alcantara and evoking the more recent Leon Cupra R ST estate. The 2017 car is completed by a numbered Cupra R plaque. Aaron's example is number 609 of the 799 examples delivered.

With production so limited, there was no guarantee he'd get a delivery

slot. And at first, he didn't... "I saw the model when it was first announced," Aaron remembers, "but with SEAT building so few I thought I'd never get an R." That's when SEAT Huddersfield stepped in: Aaron's friend heard that the dealer's R 310 had suddenly and unexpectedly become available – and Aaron didn't need to be asked twice. "It's essentially identical to the 290 I had before but it immediately felt quite different too. I was full of excitement and dread when I picked it up – I could see the R turning heads as I drove down the road!"

Even amongst the 24 car British delegation, Aaron's example stands out straight from the factory. Though continental European buyers could order the R 310 Cupra with unique matte grey paint, all UK cars are finished in one of two metallic colours: Pyrenees Grey and Midnight Black. Just five British Cupra Rs wear the darker hue, making this machine the rarest of the rare.

Collector value is a compelling part of the Cupra R story but it's not the only reason to covet this fastest of Volkswagen Group front-drivers. Thanks to the EA888 engine, the IS38 turbocharger and wideranging aftermarket know-how, the Leon is every bit as tunable as a Mk 7 Golf. Aaron didn't waste a second on exploring his options, spurred on by the Stage 2 build he'd previously completed with a Leon 290.

Work on the Cupra R started under the bonnet, with the help of experienced Manchester Volkswagen group tuners Progressive Parts.

SEAT LEON CUPRA R



Rear wing is pure carbon fibre



Copper details reference Cupra name



LED lights as standard



Alcantara steering wheel for a firm grip

software calibration is, once again, the heart of the tuning bundle but this time it's coded to unleash the fury of Stage 2. A GFB DV+ diverter valve, Racingline R600 full width air intake system and Scorpion Exhausts sports cat downpipe provide airflow to match, with an Autotech HPFP on petrol pump duty. Supporting components have been swapped too. There's a Racingline intercooler and oil cooler for the extra heat, an RTS twin friction clutch for the extra torque and Racingline engine and 'dogbone' mounts to keep the driveline locked in place.

Performance has jumped dramatically, eclipsing the tuners' aims and predictions. "It's on another level," Aaron grins, "the Progressive Parts team hadn't hinted at quite how different it would be. It proves how strong and how good the Racingline parts are. There's way more torque than I expected: the Cupra comes in around 3000 revs with massive boost." Traction is no problem either, despite front-wheel drive and new set of road-oriented Goodyear SuperSport tyres. "I've launched the Cupra a few times now and it just grips – it's voodoo!"

Thanks to a club day on the Progressive Parts dyno – catch our report elsewhere in the issue – there are proven numbers to back up the

Components from specialists VAGSport transformed the inlet and exhaust system – the SEAT gained a prototype intake system up front and a resonator delete downstream – with Racingline OEM+ Stage 1 software reformatting the ECU to match. "You can hear it coming from a mile away with the resonator delete," he laughs, "and the intake system makes a huge difference. The throttle response is the main difference but you can hear the extra induction noise from outside the car too." Spark plugs from an Audi RS7 and coils from an Audi RS3 complete the Stage 1 build, two changes Aaron fitted by himself. Put it all together and you've got 365bhp and 361lb-ft.

Not every part of the Leon has been so extensively modified, the distinctive Cupra R exterior and interior styling remaining almost untouched. Only a set of wind deflectors, a custom driver's footrest with 'Racingline' branding and a Racingline engine bay dress up kit vary from factory specification. The giant Brembo discs and calipers are still in place too, and with good reason. "The Cupra 290 brakes aren't small but I've never experienced anything like these Brembos... They're immense!"

Ride and handling also define the difference between the Cupra R and less extreme Leons, as Aaron explains. "The handling is a lot lighter than my previous Cupra and you're confident

the car will respond as soon as you turn the steering wheel. I make a point of taking the backroads wherever I can... unless there are going to be potholes!" An aftermarket upper strut brace adds extra stiffness to the front, while Racingline lowering springs bring unmissable stance. "I just wanted to get the Cupra lower and the Racingline springs are suitable for what I want: the comfort hasn't really changed and the car seemed to get lower and lower as it settled over the first few weeks." There's no missing the hunkered down result.

Subtlety is absent from the engine bay too, the SEAT having recently returned to Progressive Parts for another round of upgrades. A Racingline OEM+



Bucket seats wear alcantara with copper stitching

Cupra R bodywork
tightens stylish Leon shape



“It’s on another level: the Cupra comes in with massive boost”

Each Cupra R gets
numbered plaque



driving experience. How does 392bhp and 465lb-ft strike you? The customised Racingline Stage 2 calibration can turn the head of any SEAT fan. "There was palpable shock when the my Cupra came off the rollers," says Aaron, "another 310 owner saw the results and now he's adamant he'll go Stage 2 too. Racingline has delivered. They always do – that's why they're my preferred tuner." With a Stage 3 rebuild and hybrid Racingline turbo on the way, the SEAT will soon progress to an even higher performance level.

It all adds up to make a car no VW group fan could quit and Aaron has no plans to part with his limited edition Leon. "The longer I've had it, and the more little modifications I've done myself, the more the SEAT has felt like an extension of me. The whole tuning process has built my confidence in the car and I don't intend on ever selling my Cupra R. With the stance, the copper details and the wider wheelarches, it looks like the Cupra should have done to start with!" Any Leon Cupra R 310 is catwalk ready. Add Aaron's tailor-made additions and you've got one hot to trot hatchback. 🐎

SEAT Leon Cupra R

TECHNICAL HIGHLIGHTS

ENGINE

SEAT Leon Cupra R EA888 turbocharged inline-four with Racingline R600 air intake system, Audi RS3 coilpacks, Audi RS7 spark plugs, Autotech high pressure fuel pump, GFB DV+ diverter valve, VAGSport resonator delete, Scorpion Exhausts sports cat downpipe, Racingline oil cooler and oil management system, Racingline front-mount intercooler, Racingline engine mounts, Racingline engine bay dress-up kit, Racingline OEM+ Stage 2 software calibration.

PERFORMANCE

392bhp and 465lb-ft, dyno-tested.

TRANSMISSION

SEAT Leon Cupra R six-speed manual, electronic locking differential, front-wheel drive, RTS twin friction clutch, Racingline 'dogbone' mount.

BRAKES

SEAT Leon Cupra R 370mm discs with Brembo four-pot calipers front, SEAT Leon Cupra R discs and calipers rear.

WHEELS & TYRES

19-inch SEAT Leon Cupra R copper-coloured alloys with Goodyear SuperSport tyres throughout.

SUSPENSION

SEAT Leon Cupra R suspension with Racingline lowering springs throughout, upper suspension front strut brace.

EXTERIOR

SEAT Leon Cupra R body with model-specific carbon fibre splitter, sideskirts, diffuser and spoiler, redesigned front and rear bumpers and copper detailing, aftermarket wind deflectors.

INTERIOR

SEAT Leon Cupra R interior with alcantara steering wheel rim, copper detailing, copper stitching and numbered model plaque, Ghost immobiliser.

THANKS TO...

Racingline Performance, Mark Brown and Ben Thomas at Progressive Parts and VAG Manchester, and SEATcupra.net where I get my information and whose members inspire me to do different things.

Cupra R excels on roads like these

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SEATCUPRA.NET

ROLLING ROAD SHOOTOUT

Your car feels fast on the open road but just how powerful is it really? A group of posters from the SEATCupra.net forum recently decided to find out

and booked a group day with Progressive Parts, a Manchester based tuning firm which focuses on modern Volkswagen group models and – most importantly of all – has its own dynamometer. From standard to

heavily modified, and from first generation to third, the group's Leons represent every corner of the SEAT scene. Here's how they did on the rollers... ■

Damian Hardman: SEAT Leon Cupra ST 300 Carbon Edition

One of the most desirable third generation Leons, the ST 300 has lashings of standard-fit carbon fibre to match its four-wheel drive performance. Standard power is 296bhp but Damian needed more and has gone to Stage 2. Changes include a Racingline OEM+ Stage 1 software calibration, an R600 air intake from the same firm, Audi RS3 coilpacks and RS7 sparkplugs, VAGSport additions that range from a resonator delete to a 90 degree turbo elbow and Eibach lowering springs.

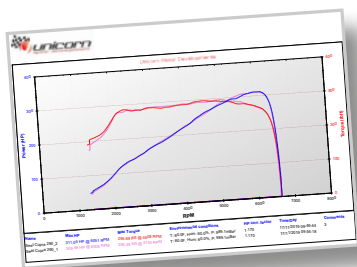
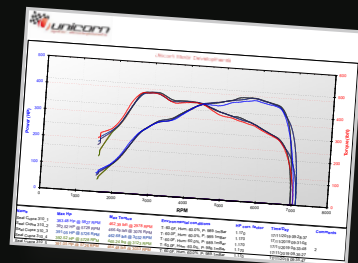
PREDICTED POWER: 350BHP
ACTUAL POWER: 340BHP



Aaron Paddison: SEAT Leon Cupra R 310

Star of a full feature elsewhere this issue, Aaron's copper-tinged Cupra R turns heads as standard and – thanks to a thorough Stage 2 build – now snaps necks too. Brand new Racingline Stage 2 software matches with an R600 air intake, intercooler, oilcooler and dogbone mount from the same firm, supported by a Scorpion sports cat downpipe and a VAGSport turbo elbow and muffler delete. Setting the rollers ablaze, the 310 outstripped expectations.

PREDICTED POWER: 380BHP
ACTUAL POWER: 394BHP



Adam Gilligan: SEAT Leon Cupra 290

Simple but effective, this Cupra focuses on breathing mods. There's a VAGSport intake hose, panel filter and turbo elbow to increase air flow into the engine, matched by a VAGSport turbo muffler delete to help gas exit quickly too. Add a resonator delete – for extra volume – and 034 Motorsport upper and lower engine mounts – for resilience – and you've got a well judged OEM+ build.

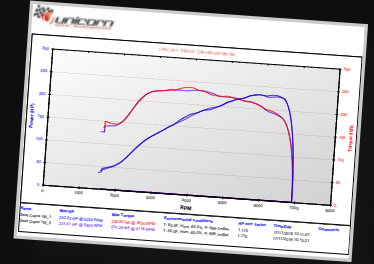
PREDICTED POWER: 300BHP
ACTUAL POWER: 311BHP





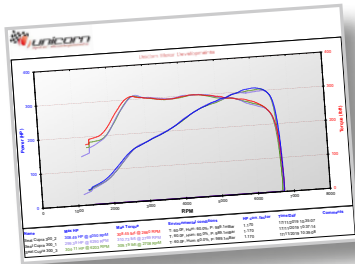
Taylor Marr: SEAT Leon Cupra

Taking it back to the old school, this first generation Cupra still knows how to move. Polybushed lower suspension arms and 20mm wheel spaces add handling and aesthetic flair, while a non-resonated, three inch Cobra exhaust creates a soundscape to match. Engine bay alterations are thorough too, utilising an FMIC, recirculation valve and boost pipes from Forge Motorsport, matched with a K&N air filter and NGK platinum iridium spark plugs.



PREDICTED POWER:
ACTUAL POWER:

240BHP
232BHP



Tony Sharp: SEAT Leon Cupra 300

Not everyone needs aftermarket improvements to enjoy their Leon – Tony's 300 is entirely stock. Keen to see what the model makes from the factory, he hit the rollers and got a pleasant surprise!

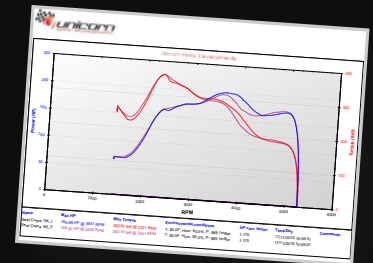
PREDICTED POWER:
ACTUAL POWER:

296BHP
308BHP



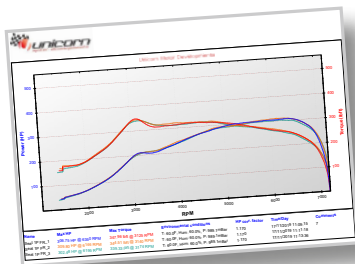
SEAT Leon FR

Proving that there's magic in modern classics, this first gen FR uses a hybrid turbocharger, full hard pipe kit and a Milltek exhaust to liberate far more power than standard. The owner enjoys both the look and the driving experience.



PREDICTED POWER:
ACTUAL POWER:

160BHP
199BHP



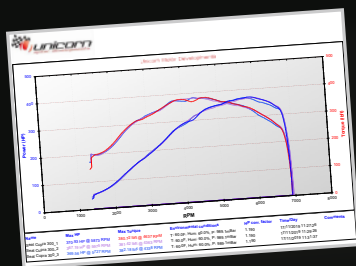
Aidan Roberts: SEAT Leon Cupra

Stage 2 in a few simple moves, this gen two Cupra loses its cats, centre resonator and back box to breathe better. Additions appear too, in the form of a RAMAIR oversize air intake and Audi R8 ignition coils. Aidan loves everything about the result!

PREDICTED POWER:
ACTUAL POWER:

315BHP
309BHP





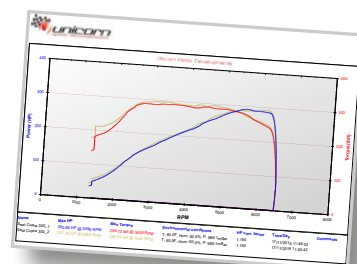
Neil Rigby: SEAT Leon Cupra 300 ST
A Stage 1 build with a mix of software and physical upgrades, this all-drive estate delights owner Neil. "I love everything about it – it's a lovely car to drive on the open road." New ECU and TCU calibrations come from APR, while the intake is a Racingline R600 item and the cat-back exhaust courtesy of Remus.

PREDICTED POWER:
ACTUAL POWER:

NONE
370BHP

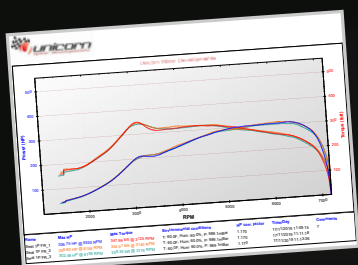


Derek 'Scotty' Dytor: SEAT Leon Cupra
Another factory standard machine, this third generation Cupra still held its own on the dyno.



PREDICTED POWER:
ACTUAL POWER:

295BHP
291BHP



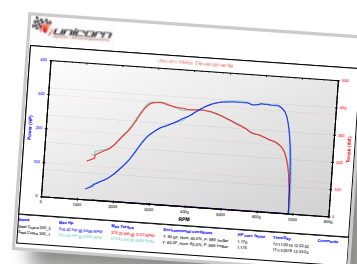
James Woolley: SEAT Leon Cupra R
Modest changes can still yield impressive gains, as James' second generation Cupra R proves. A RAMAIR intake, Audi R8 ignition coils, an exhaust centre box delete and uprated sparkplugs complete this Stage 1 transformation and he "loves everything... when it works!"

PREDICTED POWER:
ACTUAL POWER:

300BHP
306BHP



Marc McLaren: SEAT Leon Cupra 300
Behold the power of the plug-in! An exhaust resonator delete is the only physical modification to this 300, with all other power gains managed by a TDI plug in tuning box. Going Stage 1 has never been easier.



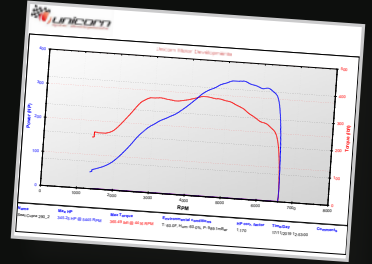
PREDICTED POWER:
ACTUAL POWER:

350BHP
320BHP



Matt Mayhill: SEAT Leon Cupra 290

One of the most recent Leons present at the dyno day, Matt's up to the minute Cupra has to contend with the newly mandated Gas Particulate Filter. The device improves emissions but it's not yet fully known what it does to power production... With a RAMAIR intake, rear exhaust box delete and JB4 tuning box, the 290 shows you can still go Stage 1 with a GPF.



PREDICTED POWER:
ACTUAL POWER:

350BHP
306BHP

Harry: SEAT Leon Cupra 280

Harry has gone big with his Cupra, rocketing to Stage 3 with a giant Turbo Technics V5 turbocharger, a Scorpion Exhausts turbo back exhaust system and a water-meth injection cooling system. There's also a Racingline R600 air intake, CTS throttle pipe and Neuspeed high-flow discharge pipe. Neuspeed RSE 102 alloys and AP Radical six-pot calipers with 390mm front and 365mm rear discs keep things turning, the DQ500 transmission has been uprated... and there's a full four-wheel drive conversion. What a weapon!

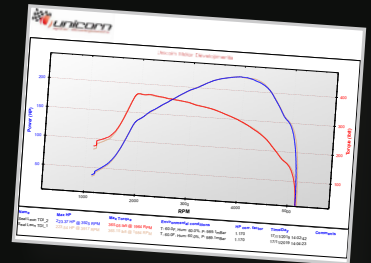
PREDICTED POWER:
ACTUAL POWER:

500BHP+
528BHP



Aqib: SEAT Leon FR

Another non-Cupra, this FR waves the flag for diesel performance with a comprehensive Stage 1 build. The DPF is gone and exhaust cut back, while Racingline springs and 034 Motorsport upper and lower mounts firms the car up. A Racingline air intake and Stage 1 software calibrations for the engine and DSG transmission round things off nicely.



PREDICTED POWER:
ACTUAL POWER:

220BHP
223BHP

Cole Smith: SEAT Leon Cupra

There's nothing missing from this Stage 3 build. A Venom 550 ceramic ball bearing turbo grabs attention, while the 980cc fuel injectors and Aquamist water-meth injection kit are equally serious changes. That's only the beginning. Intake alterations include a Racingline air intake and Turbo Technics turbo elbow, while a massive TrackSlag four inch downpipe and BaF Motorsport three inch exhaust take care of breathing out. REVO charge pipes, a Wagner intercooler and a TurboSmart DV valve also appear but this build isn't just about the engine bay: the eight-pot Audi TT-RS front brake calipers, retrimmed

PREDICTED POWER:
ACTUAL POWER: APPROX

550BHP
650BHP

alcantara steering wheel and front and rear strut braces prove Cole's car is ready for all round action.



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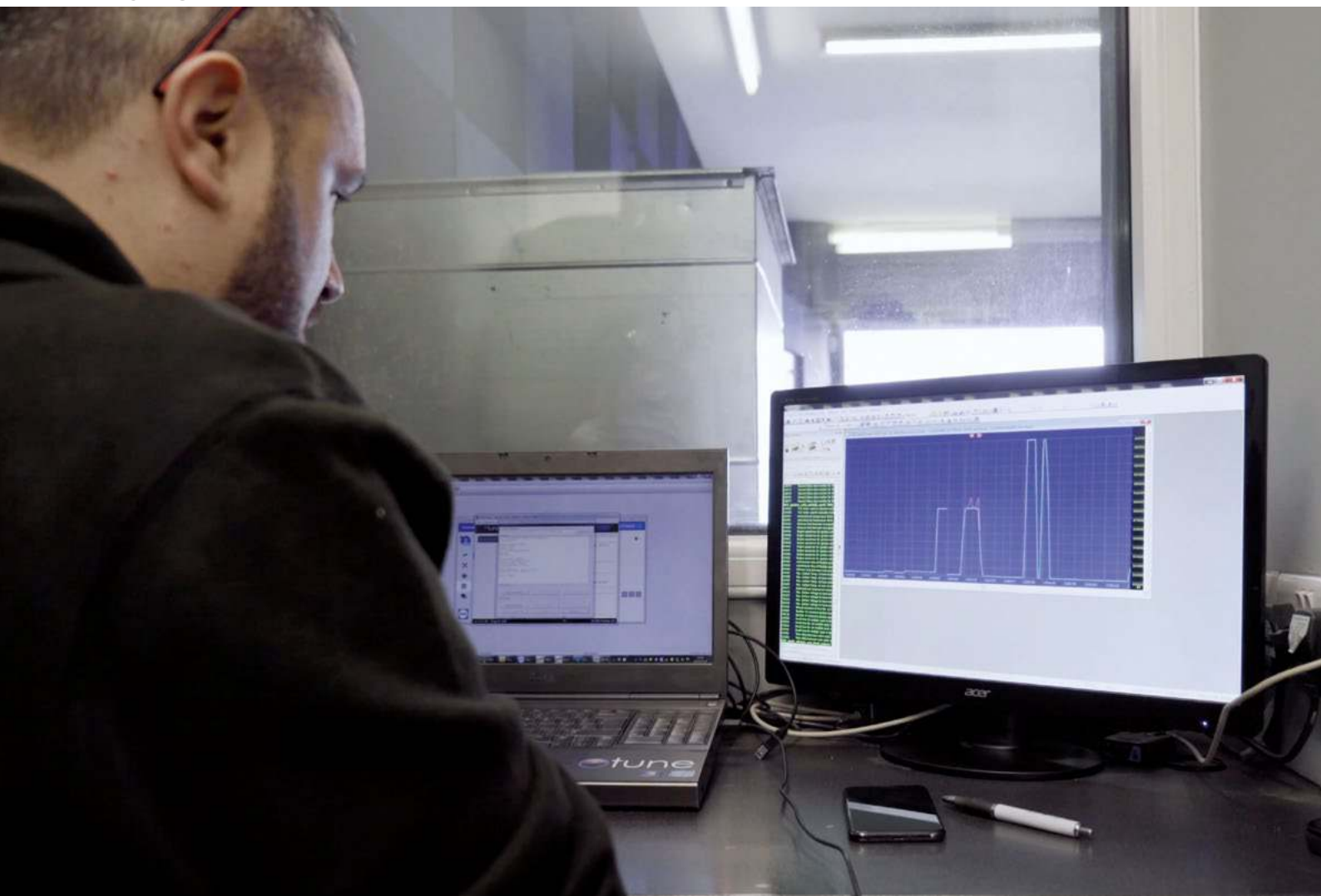
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SOFTWARE

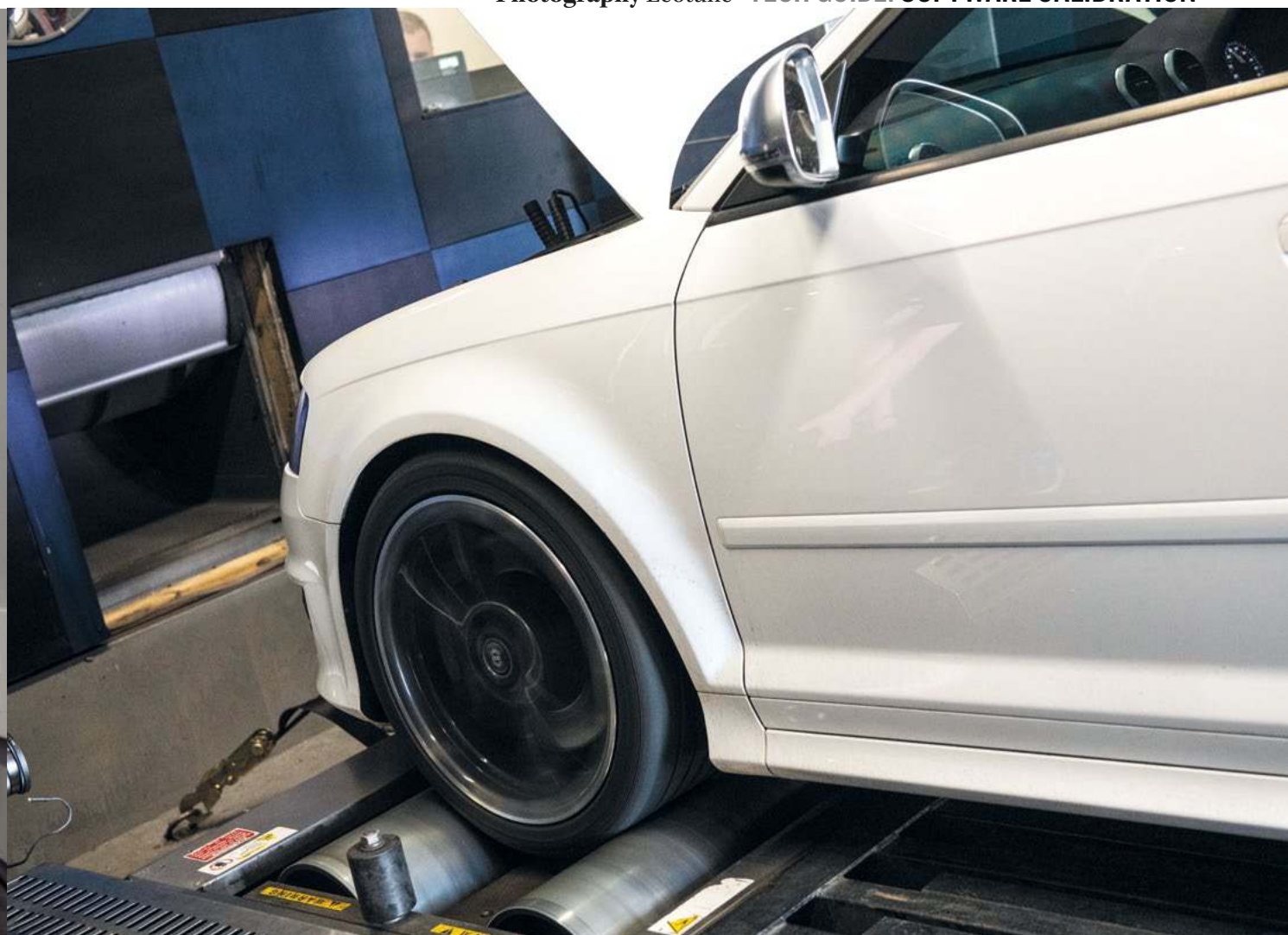
Computer software is a key part of modern performance modifying – and one that's often misunderstood. We speak with Ecotune to learn how the tuning process works.

Old school tuning is all about the physical: lower, firmer springs bring better handling; a large bore exhaust makes extra noise; larger brake discs lose more speed, more quickly. Cause and effect are visibly linked. Those metal and rubber changes are still a key part of modifying today but electronic systems can't be ignored. Software calibration is big business: it's the first modification many owners make at Stage 1 and a vital part of keeping a Stage 3 build running effectively.

Computer adjustments require skill and experience, and Stan Ward has both. Founder of Glasgow tuning firm Ecotune, he's been calibrating performance cars for



Ecotune facility includes workshop and dyno cell



CALIBRATION

14 years and creates custom ECU alterations for some of the most powerful MQB platform cars in Scotland. "We try to bring an engine to its maximum potential while retaining its reliability," he explains, "the process is about putting the sharpest focus on performance, instead of following the manufacturer approach of leaving room for poor fuel and poor servicing. Our customer base is enthusiasts who look after their cars, and that gives us room to work." Passionate about increasing consumer knowledge, he's also answered our key questions.

What should car owners know before they book an ECU calibration?

"Any engine has a lifespan: it's important that both the industry and the marketplace are aware of that. All anyone can do is maintain their car meticulously and to the best of their ability. We can make a car more fuel efficient and we can make a car produce more power

but things could go wrong. Increase the output of an air pump by 50% or so, for example, and that change will reduce the component's lifespan."

"Let's put it another way. If a car's turbocharger can move enough air to produce 270bhp and it comes out of the factory with a 210bhp calibration, we can raise peak power to 240bhp and still be within that limit but the turbocharger would be pushed harder than standard."

Walk us through the customer experience for a Stage 1 or Stage 2 calibration...

"Let's say you want Stage 1 software for your Mk 7 Golf GTI. We'd use a prebuilt APR calibration, as we do for any Stage 1 or Stage 2 car their products support, because we've got so much confidence in their work and there's no point in reinventing the wheel!"

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There's a great big screen there, so you can see the computer readouts live while your car is being tuned. Andrew – our calibration support technician – is then responsible for the car and keeping you up to date. He'll do a diagnostic run on the rollers, explain if that's highlighted any components that need fixing, then run the car again to apply the calibration. Once the APR system is in the place, the customer gets a chance to test drive before they pay."

"Coming to have your car tuned is an exciting thing and we want people to be as close to the experience as possible without being put at risk."

How does the Stage 3 process differ?

"We only create bespoke engine management calibration for situations APR don't cover and Ecotune has its own baseline Stage 3 software for a Mk 7 Golf R with a hybrid turbocharger. It's a calibration we developed over hundreds of hours of rolling road time

and it gets us 70% of the way there. You can't just flash a car and go at this level: there are lots of different hardware setups available for a Golf R and no two of them perform the same."

"The first thing with any Stage 3 car is workshop time. Our technicians all have experience building engines at this level and it's important that they give their seal of approval before a car goes onto the dyno. You're closer to the limit at Stage 3 and it's important to be responsible. We check fuel pressure, ensure the spark plugs are racing specification and pressure test the boost circuit to 35psi to detect leaks."

"We then run the car on the rollers and study what's going on, asking whether the car is flowing air well, whether it needs more boost, whether timing needs adjustment and more. Sometimes it becomes clear that we won't make the desired power without a hardware change, so we'll explain that to the customer and provide the technical data to back it up."

"In total, we spend around six dyno hours on each Stage 3 car and we tend to be quite cautious. The logs produced as we calibrate tell us when to stop. If we see an uncomfortable level of knock or fuel pressure struggling to keep up with demand, we know where the limit is and we won't be pushed."

Are there any parameters you never adjust?

"I won't ever relax knock control," says Stan. Knock is a phenomenon where, after the spark plug fires, part of the air-fuel mixture in a cylinder spontaneously ignites





and shifts the timing of the combustion process. This increases cylinder pressure and can cause serious engine damage. Knock control monitors knock levels and prevents things from getting out of hand.

And what else do you rarely change?

There's a second category Stan doesn't often adjust and it's one that might surprise you: turbocharger boost levels. "Boost is an easy way to make power but it doesn't tend to result in a fast car, especially if it's fitted with DSG. Additional boost makes a lot of heat and engine bay heat is the enemy. When it builds up, it can start slowing you down before you even reach the end of a quarter mile pass."

"An aftermarket turbocharger is usually bigger than the factory original and will flow more air than standard even when a car is still at stock boost. That creates more power immediately but we want to produce extra power while using as little boost as possible: we approach anything over 2 bar cautiously and keep data logs for anything that exceeds that. We very rarely run peak boost at the redline either. Instead, an Ecotune calibration will put full boost lower down the rev range and then tail it off as revs increase."

So which categories do you work with?

"Camshaft timing and ignition timing are where we focus. Manipulating ignition timing gives more time for fuel to burn and you can use that to go faster or to go further. It's the customer's choice!" The sophistication of modern electronics allows Stan and his team to work with other categories too. "On a Mk 7 Golf R we've got angular control over the inlet and exhaust cam and control of the exhaust cam lift from small to high lobe," he explains, "plus we can adjust the pressure for the port and cylinder fuel injectors, with angular control over when they fire. There's an awful lot more scope now than when I started!"

"Sometimes customers want calibration for a particular fuel – 110 RON race gas for example – but there has to be the understanding that using any other fuel risks serious damage to the engine. It's important that drivers listen to that advice – we even have different ignition profiles for BP Ultimate and Shell V-Power."

Does anything else need changing for safety?

"Using a Mk 7 Golf R as our example again, the ECU has a generous model for volumetric efficiency as standard. Some modified cars, however, go above that model's range and this can cause other parts of the ECU to 'lose sight' of those numbers."

"Replace the standard IS38 turbocharger with something like a Turbo Technics V5 and it will supply a lot more air than the original, so the volumetric efficiency model is no longer relevant. That's why it's important to rescale the model, to ensure the fuel maps respond appropriately. It can be unsafe if you don't move these models to suit the hardware fitted to a car, especially at Stage 3."

What other software could a car need when it gets an ECU calibration?

"I think that anyone whose car has a DSG transmission should consider a transmission control unit calibration alongside ECU work. That's because the engine control unit is constantly relaying messages to the transmission about how much power it's producing and that only works when the transmission can recognise the figures it receives."

"If the TCU can read no more than 400Nm of torque and the engine sends 500Nm, then the transmission will still behave as if it's receiving 400Nm. Sometimes that will be sufficient but other times it can lead to clutch slipping and similar. Map the gearbox to recognise and handle the extra torque instead and there's a much smaller risk of wear, especially around the clutches." 🐦

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There's so much quality in the watercooled Volkswagen world and we want to cover it all. Whether you've just restored your Mk 1 Golf GTi to better than new, you've found a way to get four-wheel drive into a Polo GTi or you've boosted your Corrado VR6 past 1000 horsepower, there could be a place for your car here. Rare and out there enthusiast choices are welcome too: tell us what you've done with your Up, your Passat or even your Caddy van.

Send us a quick specification list and a couple of photos to admin@edition-media.com with '**VWG Feature Car**' in the subject line and let's take a look. We can't wait to see what you've got!



MEET THE TUNER

*Our lowdown on life with Britain's top VW experts.
This month: Shak Shivji at LSG Performance*

A long term presence in Bolton, Lancashire, Lowndes St. Garage is somewhere any car owner can go to get the job done right. That's reason enough to use the team for running repairs or the annual MOT but fast car fans might be more interested in the company's tuning division, LSG Performance. Managed by Shak Shivji – himself the enthusiastic owner of a Stage 3 Mk 7 Golf R – the offshoot modifies customer cars and supplies parts from a range of leading aftermarket firms that includes APR, Airtec, and Racingline. Shak has worked on Volkswagen Group cars for over a decade and now he and his team dedicate much of their time to MQB models. Here's what he told us.

How did you enter the industry?

"I've had a huge passion for cars since I was a young boy and having a dad in the automotive industry has allowed me to learn about the technical side from a very young age. I studied automotive engineering at university, then got my first graduate job at Lowndes St. Garage. As I grew into the business, we started to add the performance side we've got today."

What gets you up and into the workshop?

"I look forward to new challenges and meeting the enthusiasts who come to our workshop. Their excitement is extremely contagious and I love seeing them smile when we hand back the keys! It's great to see the satisfaction owners get from our work."

Tell us about your role.

"From working with our staff to meeting our customers, I carry out the everyday tasks that make sure the workshop is running smoothly. I'm also hands on and, where I can, I spend some of my time in the workshop. As other parts of the business have developed, I now deal with suppliers and our online shop too, plus I try and keep a good presence on social media."

Where are you going next?

"We're pushing on with our performance section and that includes our webshop. Ideally, our stock and product range will expand and we'd like to move into selling software in the longer term. It does need to be the right brand, though, and one that follows our company ethos."



HOT TAKES

Favourite car?

Porsche 911 GT3: a true thoroughbred inside and out.

Petrol, diesel or electric?

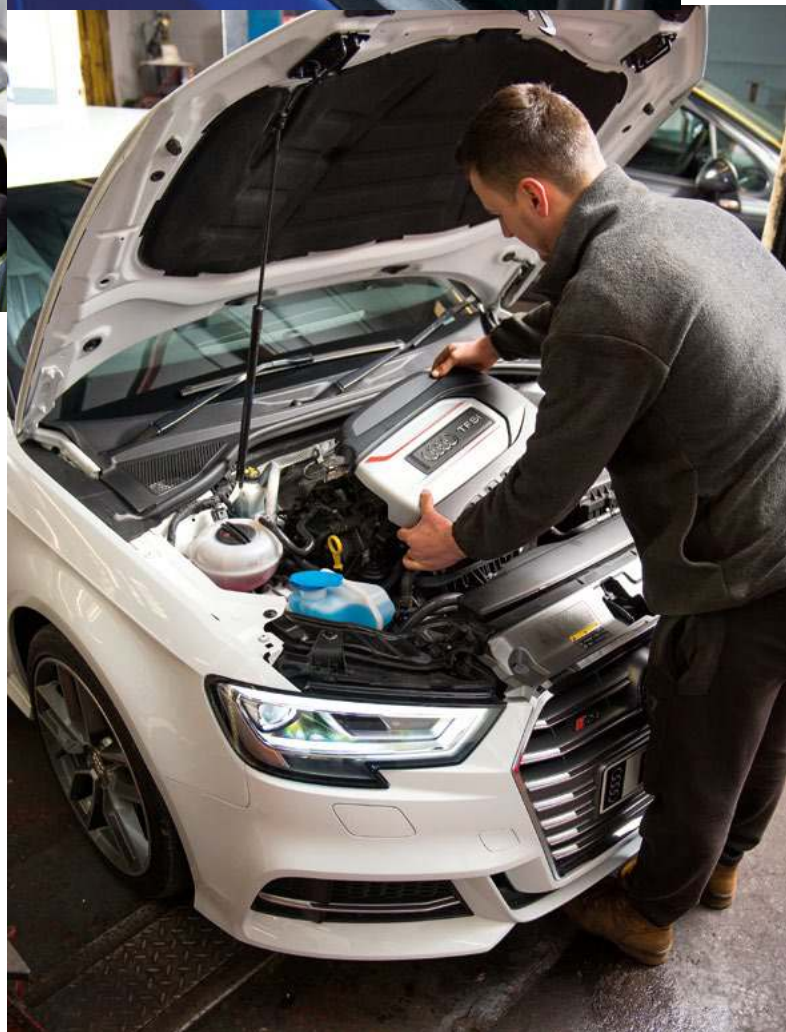
Petrol. But not for long, unfortunately...

Classic or current?

Current!

Best event?

The Racingline conference – it's great to discover the inner workings of the brand.



Gaze into your crystal ball – what do the 2020s hold?

"I have no doubt hybrid systems will be part of everyday performance cars within the next five to ten years, and that will bring some interesting tuning solutions with it. Right now, I feel we're at the pinnacle of fuel only performance: a two-litre Volkswagen engine can produce massive power with relatively few modifications. With the introduction of hybrids, performance tuning will take us to an even higher level."

How full on is full time tuning?

"My normal day involves running a busy workshop and answering a phone that doesn't stop ringing with messages from our suppliers and customers, all of whom need our attention. With current technology, you're only a click away from someone wanting to contact you too."

Any final message for our readers?

"Enjoy your car and enjoy the scene. If there's anything we at LSG Performance can do to help, don't hesitate to contact us: we'll do our best to guide you in the right direction!"

TUNING UPGRADES

HIGH ROLLER

Leighton Vans: LV-1 Alloys : Transporter

Commercial vehicles can look stylish too: Leighton Vans has been proving that with its Transporter and Caddy builds for years. Now the Rotherham firm is expanding into the world of aftermarket alloys and its first product is aimed squarely at the Volkswagen market. Called the LV-1, the 20 inch wheel boasts ten double spokes which finish in striking Y-shapes and has been designed to complement the styling of a T6 Transporter, though it looks at home on other vans and SUVs too.

The striking look is matched by a range of colours. There's gloss black, either with or without a machined face, matte grey with a machined face, and both matte and gloss bronze. Buyers can also choose to have their wheels shipped with a set of Uniroyal Rainsport 3 tyres, for the ultimate in convenience. A 5x120 PCD ensures the LV-1 bolts straight into place on a Transporter.

Two wheel widths are available – 8.5x20 and 10x20 inches – and both types are load rated to a substantial 860kg per wheel. That's more than enough for even a fully laden Transporter.

Price **Starts at £1295 per set**

Contact leightonwheels.co.uk



LOW DOWN

Eibach: Pro-Street-S Coilovers: Transporter

Can't wait to start tuning your van? Volkswagen UK has you covered. Through the Volkswagen Van Centre dealership network, the manufacturer is offering a range of customisation that stretches from uprated audio systems to internal tool racks. We're especially interested in the new coilover kit, which has been developed by leading suspension experts Eibach for the Transporter T5 and T6.

The kit includes a pair of adjustable coilovers for the front axle and a pair of adjustable springs for the rear, working together to ensure between 30mm and 60mm of lowering. Eibach has collaborated closely with Volkswagen on the project,



using access to official chassis data to design a suspension kit that's strong and durable enough for commercial vehicle use. The spring cups are made from polyamide for resilience, while the springs are formed from silicon chrome vanadium. This alloy has

a high tensile strength and resists fatigue effectively, while a standard powdercoating works to keep corrosion at bay.

Price **£1504.17 plus VAT**

Contact volkswagen-vans.co.uk or your local **VW Van Centre dealer**

TURBOZENTRUM

There's a new product bonanza at TurboZentrum UK and we've got all the details. Read on to see what the Manchester-based firm can supply for your build...



SCREEN QUEEN

TurboZentrum: FIS-Control MMI : Audi A5, Q5 and more

The central MMI screen in modern Audis shows drivers many things but it doesn't display what's going on in the engine bay. That's where the new FIS-Control MMI system comes in, plugging into a range of 2000s and 2010s Audis and relaying ECU information onto the MMI screen. Any active datafeeds can be displayed via FIS-Control in the form of three dials or a table of ten different readings.

Operated by the original MMI system buttons, the system can also be used to relay e-mail and WhatsApp notifications from an Android smartphone. The device is suitable for any Audi with MMI 3G or 3G+ and an ECU that supports UDS diagnostic protocol.

Price **£282**

Contact turbozentrum.co.uk



HIDE AND SEEK

TurboZentrum: NUKE Competition Fuel Cell Unit: Universal

NUKE has also adapted its surge tank concept to create the Competition Fuel Cell Unit, a version of the 2G Surge Tank system which can be directly integrated into a fuel cell. The tank is slightly smaller than the 2G, holding a maximum of two litres of fuel. It's attached to a 6x10 inch, 24 bolt oval panel which is designed to replace the original fuel cell lid and also features a filler cap which fits hoses up to 50mm diameter. Just like the external 2G, this system lets racers enjoy the safety advantages of a fuel cell without ever risking fuel starvation.

Price **£525.22**

Contact turbozentrum.co.uk



BACK TO THE FUTURE

TurboZentrum: CANChecked MFD28

Touchscreen: Mk 3 Golf and Mk 4 Golf

CANChecked build touchscreen control units that can interface with any car that uses CANBUS and several models which use older serial interface technology. The MFD28 2.8 inch touchscreen works with manufacturer and aftermarket ECUs alike and can display any and all information the car's computer system can provide.

Customisation is extensive too. Users can configure up to ten display pages to suit their needs, set warning screens and popups that are automatically triggered when a readout goes above or below a certain level and fit an optional shift light. Performance figures can be measured too, for drivers who need to know just how quickly their car hits 60mph. And if all that wasn't enough, there's an 8GB memory card and users can log sensor data by SD card or USB connection.

The MFD28 is attached to a cabin air vent and TurboZentrum supply different mounts for different models, ensuring the touchscreen and its black anodized aluminium surround are flush with the dashboard. Don't go thinking this is device is just for contemporary cars, either: the newest variants are designed to drop seamlessly into a Mk 3 or Mk 4 Golf.

Price **£342.01**

Contact turbozentrum.co.uk

PETROL PUMP

TurboZentrum: NUKE 2G Surge Tank: Universal

Competition drivers take note. TurboZentrum now stocks the 2G Surge Tank from Swedish motorsport expert NUKE. Designed to slot ahead of the fuel cell or tank, the three litre container serves one purpose: to keep your motor running. In hard cornering or drag strip acceleration, the forces acting on a car can cause fuel to momentarily slosh away from the pickup and – in the worst case – let the engine run dry. The 2G Surge Tank reduces that risk by providing a fuel supply that remains constant even in those circumstances.

This second generation design is crafted from CNC-milled 6063 aluminium alloy, supplied with triple 0.75 inch connectors and compatible with single, double and triple external fuel pumps.

Price **£327.89**

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PRODUCT FOCUS



FULL STOP

EBC: Floating Two Piece Brake Rotor:
Mk 7 Golf GTI, Golf R and More

EBC Brakes Racing has released a new addition to its fully-floating, two piece front brake rotor range – and it's the perfect fit for a wide range of MQB platform performance cars. Aimed at the trackday market, the 340mm discs are a bolt-on modification that can be fitted to the Volkswagen Mk 7 Golf GTI Performance Pack and Mk 7 Golf R, the 8S Audi TT and TTS, the third-generation SEAT Leon Cupra and more.

Weight savings over the factory original rotors are substantial. The EBC two piece design uses all-aluminium hubs to hit the scales at 18.9kg per pair, a 2.78kg reduction over the Volkswagen Group items. A two piece hub construction also features, shrinking unsprung rotational mass to improve handling. The discs are equally clever, using 48 directional curved vanes apiece to jettison heat and featuring a grooved disc surface to reduce the risk of cracking.

Price **Starts at £864 per pair**

Contact ebcbrakesdirect.com or your local EBC dealer



Vanes are curved to eject
hot air effectively

SD-Drive bobbins
made from stainless
steel to prevent rust

TURBOSMART

Australian forced induction specialist Turbosmart continues to update its range with modular Generation V technology. These are the latest highlights...



Turbosmart: Gen-V e-WG Electronic External Wastegate: Various Turbocharged Models

This is a big deal: the 60mm variant of Turbosmart's new electronic wastegate won a Best New Product award at SEMA – the world's largest tuning trade show – in late 2019. Those judges aren't easily impressed, so you know this device is something special...

The e-WG is operated entirely electronically, through five wires which are connected to a programmable ECU. It's a huge contrast to traditional mechanical wastegates, which use a spring-loaded actuator which vents part of the exhaust gas when pressure passes a preset limit. The advantage of e-WG, which is available in 45mm and 60mm variants, is that there is no spring and therefore no fixed pressure limit. Instead, the actuator is completely electronically adjustable and can even be controlled via laptop! Built on the existing Turbosmart Gen-V architecture, optional water cooling is also available.

Price **Coming Soon**
Contact turbosmart.com





Turbosmart : Gen-V HP External Wastegate :
Various Turbocharged Models

The Gen-V transformation continues with the updated HP High Pressure range. Popular amongst diesel tuners, the updated wastegate is shipped with a 10psi inner and 25psi outer spring. A 40psi spring is offered as an optional extra. This new development of the HP range benefits from a rotating housing, improved thermal management and better gate flow, with a water cooling option available too.

Price **Coming Soon**
Contact turbosmart.com



Turbosmart: Gen-V Internal Wastegate
Actuator: Borg Warner EFR Turbochargers

This Internal Wastegate Twin Port Actuator is another addition to the Turbosmart Gen-V range, and one that's been tailormade for use with the popular Borg Warner EFR turbocharger. Turbosmart has developed a joint and swivel system for the device that allows completely linear actuation of the wastegate flap, while the intermediate rod and valve bush have been designed to ensure an effective seal. Turbosmart ships the Internal Wastegate Actuator with three rods and three springs, the latter allowing preset pressure limits from 5psi to 26psi.

Price **Coming Soon**
Contact turbosmart.com



BRING THE NOISE

Scorpion Exhausts: Cat Back System: Up GTI

The Volkswagen Up GTI has sonic personality to spare, thanks to the combination of three cylinders, a turbocharger and VW's Soundaktor cabin synthesizer system. Now owners of the hot supermini can go one step further, thanks to Scorpion Exhausts and its new Up GTI catback exhaust system.

Boasting a two inch diameter, the package is freer flowing than the Volkswagen original and includes a resonated centre section, link pipe, connector and a single tailpipe. The finisher measures 90mm in diameter – a substantial and visible jump over standard – and can be ordered with a black ceramic or polished bare metal finish.

The entire exhaust is constructed from T304 stainless steel and weighs in at just 6.25kg, a 3.35kg reduction over the Volkswagen original. Power improves too, Scorpion claiming a 6.8 horsepower boost to 119.6bhp when fitted to a standard car. Don't forget the aural alterations either. Designed to add pops, bangs and a deep burble, the system gives the Up GTI an unmistakable voice.

Price **Starts at £486**

Contact scorpion-exhausts.com or your local Scorpion dealer



Tailpipe available with two distinctive finishes





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Our software solutions include custom calibrations for the VAG DSG gearboxes, custom ECU coding to remove fault codes due to not running the OE sensors, and removal of emission control. We can add launch control full throttle gear shift options, switchable maps, gear dependent boost maps and immobiliser removal.

Basically there is not a lot we cannot do to the software on your ECU.



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Photos: Forge Motorsport, REVO
and Wagner Tuning UK

TUNING GUIDE

ENGINE BAY RUNNING HOT?

Then it's time to consider an intercooler.

There's nothing more frustrating than a project car that can't perform. Whether you're pulling repeated dyno runs, hammering round a track or just enjoying a lengthy backroad blast, it's only natural to want any modifications to give peak performance at all times. That means managing the huge temperatures kicked out by a hard-worked engine and – in the case of any car with forced induction – an intercooler can be a key part of keeping things cool.

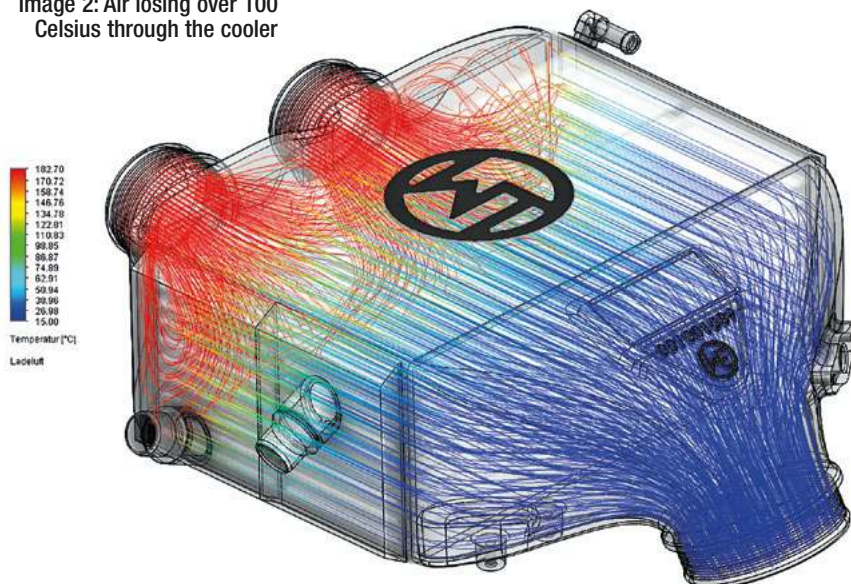
So, what is an intercooler? At its most basic, any intercooler is a radiator that removes heat from the charge air output by a turbocharger or supercharger. Thanks to intercoolers' internal design, this process can increase the density of the charge air before it enters the engine itself. Unlike the chargecooler, an increasingly common device which uses a liquid to reduce charge air heat, an intercooler utilises the ambient air

that flows through it to cool an intake charge.

Almost every forced induction car sold by any manufacturer leaves the factory with an intercooler installed but tuners should still consider switching to an uprated device. We've spoken

with three men who really understand the subject – Forge Motorsport development engineer Luke Amon, Daniel Edwards at REVO and Wagner Tuning UK head Mark Blackmore – to explore what an intercooler could really do for you.

Image 2: Air losing over 100 Celsius through the cooler



INTERCOOLERS

Why fit an aftermarket intercooler?

“Intercoolers aren’t necessarily about creating power,” Mark explains, “they’re about maintaining power.” The reasoning is simple. When you put an engine under increased stress, the heat contained in air exiting the turbocharger increases and that causes it to expand. “That’s when you need to cool the air, to increase its density and ensure that more combustible atoms are entering the engine.”

“When the amount of oxygen available in each cylinder decreases, that has an effect on your engine’s ability to produce power,” Luke agrees. “Intercoolers work to counteract that when they cool the charge air. This also ensures that the air:fuel ratio in each cylinder remains safe, which increases reliability and can increase power.”

How is an intercooler constructed?

The core of an intercooler – the long central section charge air crosses over while being cooled by ambient air – can be constructed in one of two ways. Bar and plate is the more traditional construction, and is created by layering and braising sheets of material. Wagner adopts the method for their Performance intercoolers and REVO swears by this construction. “It’s a hot topic of discussion but, per cubic millimetre of space used, bar and plate offers significantly better cooling ability than tube and fin,” says Dan. “That’s due to bar and plate having a greater

surface area to exchange heat, though it does come at the cost of weight. We feel the increase in extra power retained makes the weight addition negligible: our relentless pursuit of pound-for-pound performance makes it the easy choice.”

Wagner takes a different view. “Our Competition intercoolers use tube and fin construction,” says Mark, “which is lighter and stronger. Each fin is created through extrusion and is 0.1 to 0.2mm thick.” The weight savings are tangible but some believe that ultimate power generation can take a hit. It’s up to owners to decide which concept better suits their build.

“All cores react differently on different

engine and turbo sizes,” Luke explains. “Here at Forge, when we develop an intercooler we test different cores for every application. That can include bar and plate and tube and fin designs, variations in the fin pitch, height and shape, and changes to the density of fins within the tube. These all allow us to fine tune the amount of pressure drop an intercooler produces.” These considerations drive Forge – as well as Wagner and REVO – to create intercoolers which are tailored not just to a specific engine but also to its level of tune. Displacement, turbo size and boost pipe diameter must all be considered before creating the final product.

Boost pipes take air from turbo to intercooler



Metal end tanks stand up to heavy use



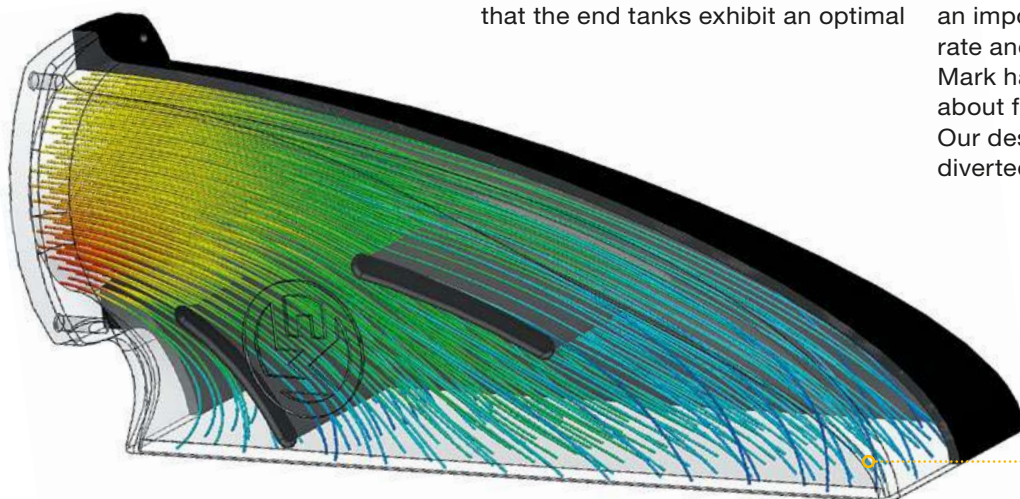
Tell me about end tanks?

Every intercooler uses a pair of end tanks: one to transfer charge air from the inlet pipe and into the intercooler; the other to carry cooled air away into the outlet pipe and towards the engine. In many standard cars,

these tanks are plastic and can fail in extreme situations. "Plastic tanks can split along their crimp, while fabricated metal tanks can fatigue around their weld," Mark says, "that's why Wagner use cast tanks." By creating their own tanks, the tuning companies can also ensure that the end tanks exhibit an optimal

airflow for their application.

"Look at our MQB platform end tanks and we've focused on giving the incoming, pressurised air space to expand and sort itself out at the bottom," says Dan, "while reducing space towards the top where the air doesn't want to go. That strikes an important balance between flow rate and internal air distribution." Mark has a similar opinion. "It's all about flow across the intercooler. Our designs ensure air is properly diverted to give an even flow."



End tanks are designed to get air into and out of a cooler smoothly

When is it difficult to fit an intercooler?

The time and disassembly required to fit an intercooler varies widely between models: some cars need only the engine undertray to be removed, though the majority will require the front bumper assembly to be unbolted from the car. "It's especially involved on something like a Mk 7 Golf," Mark adds, "the stock intercooler is sandwiched between the air conditioning and water radiators, so you have to take the entire package apart to fit our product."

Due to their tightly packed engine bays, many modern performance cars pose more significant fitment challenges than their predecessors too. Wagner resolves this problem with a range of solutions, including component relocation, 'stepped' intercoolers to skirt around other radiators and integral crossmembers. The latter simplifies fitment without compromising safety, as Mark explains. "For our Audi RS3 EVO 2 product, we literally cut the whole original member out and add a new one on the factory mounting points – that's what

gives it the right level of strength."

"Cars have become more compact," Dan from REVO adds, "so the biggest issue is finding space: we want to stuff the biggest core possible in and do it correctly. That's where our engineers get creative: they figure out how large a core can fit, then design end tanks which make the best use of the core while

still slotting into the available space."

REVO streamlines this process with CAD design and 3D printing, allowing the firm to test and refine multiple versions of an intercooler before a physical product is ever attached to a car. "We're our own worst enemy – it's the pursuit of the absolute best performance we can squeeze out of a product."



What else do I need to consider?

Luke cautions against falling for the common misconceptions that surround intercoolers. Above anything else, he highlights that increased intercooler size does not always lead to improved performance. “An intercooler that is too thick will potentially have more heat soak and a poorer recovery due to the air not being able to fully flow through the core,” he explains. “If an intercooler is too large for a small turbocharger, meanwhile, this can create lots of lag and even reduce power at different points in the rev range.”

“Turbulence and airflow are very complicated,” Dan adds, explaining the importance of correctly-scaled end tanks, “that’s because they’re all about balance. You want to give air the biggest possible open space to do what it wants – without giving it too much space to play around and slow down. Internal plates and very large volume tanks don’t really work because you end up on the wrong side of the balance: you give up too much cooling efficiency or see too much pressure drop.”

Luke also suggests that tuners need not always be afraid of pressure drop, a phenomenon where charge air loses some of its pressure while crossing the intercooler. “It’s not always a bad thing. Our testing has proven that a pressure drop stalls the pressurized air within the intercooler.” This can be a net benefit, as

it means more time is available to further chill the charge air. Too much pressure drop can be counterproductive, however. “As the intercooler reaches maximum efficiency, the turbo has to work harder to force air through the core and this can increase the temperature of air entering the cooler.”



REVO uses bar and plate build for more surface area



Give me the facts and figures

Take a glance at the graphs REVO has produced and the numbers speak for themselves. Both charts (right) compare the relative performance of REVO-mapped Stage 2 VW Golf GTI when it's fitted with a factory Golf R intercooler to the figures produced when the same car has a REVO MQB Chassis intercooler installed.

The first diagram tracks outlet temperature – the heat present in air as it exits the intercooler – over five consecutive dyno runs and demonstrates the twin advantages of a well-designed aftermarket cooler. Peak temperatures are substantially lowered by the REVO intercooler, which plots a maximum of 58 degrees Celsius against a figure of over 75 degrees for the Golf R device, and the speed with which temperature rises during each dyno run also decreases. As the gradient of the grey line shows, the Golf R intercooler's outlet temperature spikes quickly and early in each pull, while the less severe red line reflects the REVO device's ability to more consistently withstand hard use.

Wagner Tuning UK can also provide substantial evidence of their intercoolers' ability. The company, much like REVO and Forge, designs all of their products in Computer Aided Design software and use Computational Fluid Dynamics processes to predict how charge air will travel through an intercooler and how radically this will change its temperature.

In the image below, which shows a bird's eye view of a cooler, we can see how the hottest air – represented in red – is rapidly and progressively cooled – passing through orange, yellow, green and turquoise – as it crosses the intercooler. The image also shows us how ambient air which has passed through the device, visible behind the intercooler and coloured yellow, green and blue, has become warmer as it has conducted heat from the charge air. Look to the second image - on page 88 - and the scale of this process is obvious. Air enters the intercooler at almost 200 degrees but exits at little more than ambient temperature.

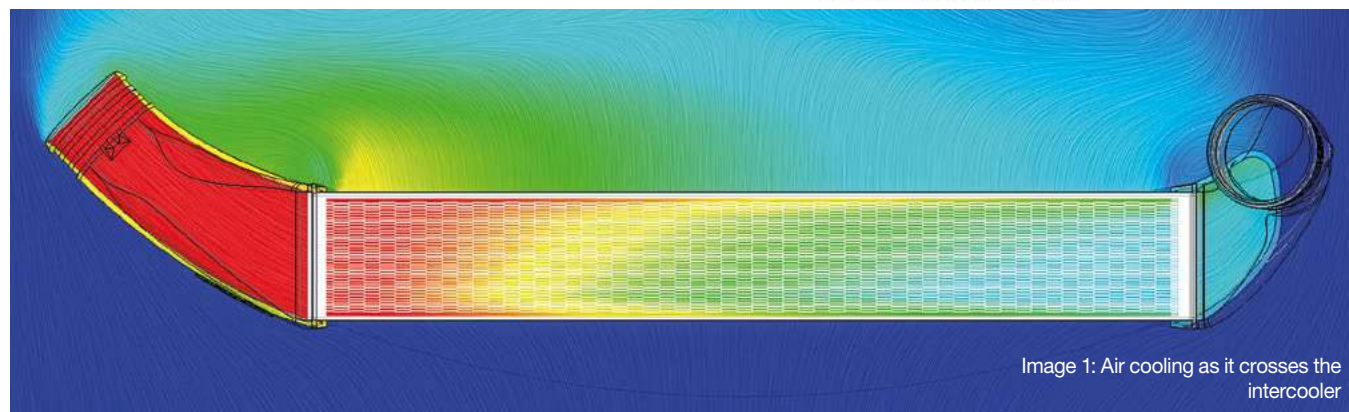
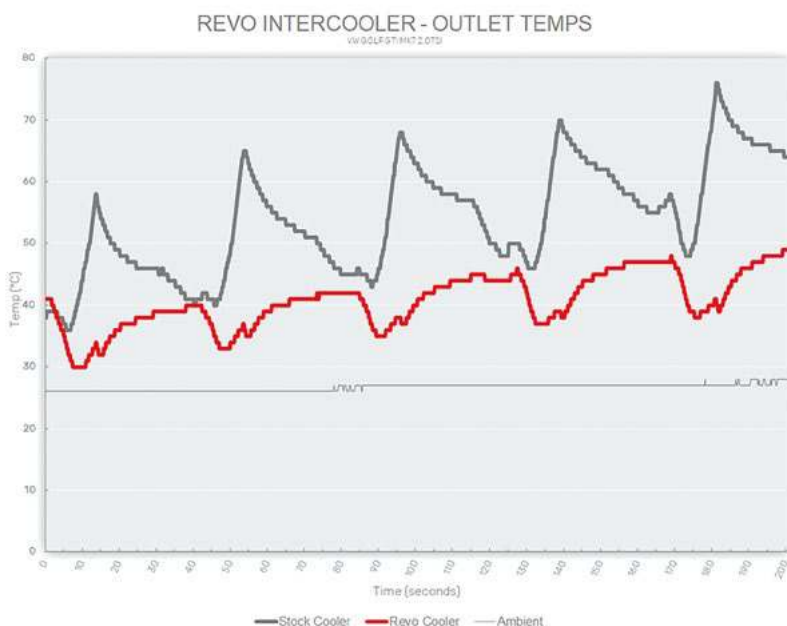
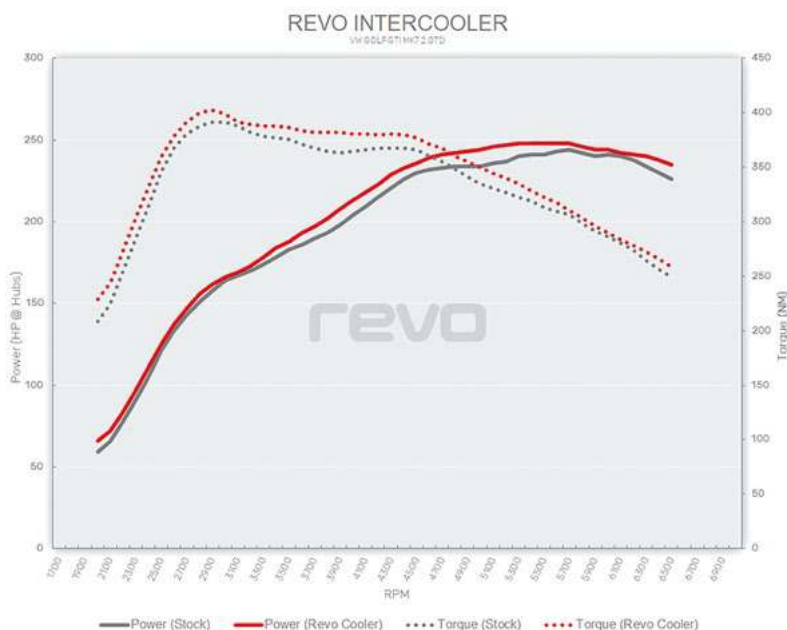


Image 1: Air cooling as it crosses the intercooler



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Volkswagen AG, Ecotune, Forge Motorsport,
REVO, Wagner Tuning UK.

PUBLISHING:
Distribution: Warners Midlands
Printed by: Warners Midlands

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PARTING SHOT

Tianmen Mountain : ID.R : September 2019

Electric power is on the way up. Literally. Volkswagen has already proven the abilities of its battery-powered ID.R sports racer on the seconds-long hillclimb at the Goodwood Festival of Speed and the longer, higher course of Colorado's Pikes Peak International Hill Climb, setting all time records at both, and now the company has turned its attention to a breathtaking road in east Asia.

Heaven's Gate mountain towers 1500 metres above sea level, dominating skyline of China's Hunan province and attracting thrillseekers from all over the world. Climbers and wingsuit wearers both flock to the rocky heights but it's the 6.8 mile, 99 turn road to the summit which seduces racers. Where better for Volkswagen to further prove the crushing capability of the ID.R?

We'll let the numbers do the talking: 680 horsepower and four-wheel drive fired the prototype over the course in seven minutes and 38 seconds, the fastest time ever recorded. That's almost three minutes faster than a previous record holder managed in a modified Ferrari 458 Italia: electric vehicles are getting faster than anything that's come before. Add Volkswagen's commitment to pushing the motorsport boundaries, we're confident tomorrow's electric GTI will be great fun too. And just look at the view.



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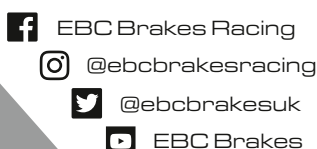
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