

# The Mighty V12 Of Aston Martin Valkyrie

With development of its new V12 progressing apace the time is right to reveal some closely guarded secrets of the Aston Martin Valkyrie's extraordinary powerplant. Developed in conjunction with longtime technical partner Cosworth, the new V12 had to satisfy a simple, yet extraordinary brief: to create the ultimate expression of the internal combustion engine.

The program called for a normally aspirated engine from the very beginning, for while turbocharging has absolutely come of age and offers significant and widespread benefits - especially in a road application - the greatest driver's car of the modern era demands an internal combustion engine that sits at the absolute pinnacle for performance, excitement and emotion. This means the uncompromising purity of natural aspiration.

The resulting engine is an absolute masterpiece. Displacing 6.5-litres the 65° V12 sets exceptional new standards for maximum rpm and specific output with a certified peak power output of 1000bhp (or 153.8 bhp-per-litre) at a mind-blowing 10,500rpm, before continuing on to a maximum rpm figure of 11,100: figures that are unprecedented for a naturally-aspirated, emissions-compliant road car application.

Peak torque is 740Nm at 7,000rpm. With these peak outputs purely delivered by the ICE (Internal Combustion Engine), Aston Martin Valkyrie's performance figures will be further boosted by a battery hybrid system, details of which will be revealed later in the development programme.

Cosworth's F1 expertise is also evidenced in the Aston Martin Valkyrie engine's weight, which also set new standards. Given the engine is a fully stressed element of the car (remove the engine and there is nothing joining the front wheels to the back!) and the level of technology in the combustion system, keeping weight down was a huge challenge.

Especially as the programme actively avoided use of extreme material alloys which are so new that material properties over time are unproven. Aside from the major castings - block, cylinder heads, sump and structural cam covers - the majority of the engine's internal components are machined from solid material.

These include Titanium con-



rods and FITM-spec pistons. Not only does this allow the use of material with ideal properties, but the ultra-fine machining process means greater consistency and components optimised for minimum mass and maximum strength.

The result is an engine that weighs just 206kg. By way of comparison, Cosworth's 3.0 litre V10 FITM engines (the last before weight limits were imposed by the FIA) weighed 97Kg. If scaled-up to 6.5 litres this pure race engine would weigh 210kg.

One of the best examples of the painstaking optimisation involved is the billet machined crankshaft.

Starting life as a solid steel bar

170mm diameter and 775mm long, it is first roughed out, then heat treated, finish machined, heat treated again, gear ground, final ground and superfinished.

Upon completion 80% of the original bar has been machined away and some six months have passed, but the end product is a crankshaft that's an astonishing 50 per cent lighter than that used in the Aston Martin One-77's V12 - itself a Cosworth-developed evolution of Aston Martin's series production V12 and, for a time, the world's most powerful naturally aspirated road car engine.

Bruce Wood, Cosworth Managing Director, said of the project: "Being asked to create a

naturally aspirated V12 engine fit for what will surely be one of the most iconic cars of all time is an immense source of pride for Cosworth.

Decades in FITMtaught us to expect a pretty demanding specification from someone with Adrian Newey's unsurpassed track record, but when we started talking about specifics of power, weight, emissions compliance and durability combined with ever harder and sometimes conflicting targets, we knew this would be a challenge like no other.

It's been a fantastic partnership between Aston Martin, Red Bull and Cosworth with each party bringing a distinct clarity of vision that has proved essential in

delivering an internal combustion engine way beyond anything previously seen in a road car application."

Dr. Andy Palmer, Aston Martin Lagonda President and Group Chief Executive Officer, said of the Aston Martin Valkyrie's V12 engine: "To anyone with a drop of petrol in their blood, a high-revving naturally aspirated V12 is the absolute pinnacle. Nothing sounds better or encapsulates the emotion and excitement of the internal combustion engine more completely.

Despite the apparently insurmountable challenges it presented, there was never any question that the Aston Martin Valkyrie would make do with anything less.

From the outset the team at Cosworth were unflinching in their commitment to achieving benchmarks which pushed the boundaries of the possible. The result is a quite extraordinary engine. One which I doubt will ever be surpassed."

Evoking the spine-tingling, ultra-high-revving FITM engines of the 1990s, but benefiting from two decades of progress in design, material and manufacturing expertise, the Aston Martin Valkyrie's 1000bhp V12 is a masterpiece, from one of the world's most illustrious engine builders: an internal combustion engine without peer for a hypercar without precedent.

## Ascent Offers Space, Comfort And Tech...



*Continued from page 8*

quite good, but is marred by the transmission! Like almost every other recent Subaru, it has a Continuously Variable Transmission (CVT), and it is awful. A CVT works best in small, light vehicles, not big, heavy off-roaders. Put your foot down, and you're presented with an unpleasant whine as it gathers speed - very annoying!

Fitting a CVT to a large vehicle is like baking the most perfect cake, and then choosing to use honey mustard as the icing and

finishing it off with pickles as the decor - it ruins all that was good!

Driving Dynamics: As just mentioned, the CVT ruins most of the driving experience, but there are some good qualities about it, too. The ride is just excellent, as it soaks up most bumps and potholes as if they aren't even there. The steering is decently communicative, and the vehicle turns in well enough, so for a big, heavy vehicle (curb weight = 2073 kg) it handles back roads better than most in its category.

The best driving experience is

on the highway, where (if you have the model fitted with the EyeSight system) you can turn on its adaptive cruise control and lane keep assist system, and it just covers the journey fairly stress free; plus on the highway, the CVT is less annoying, too.

However, perhaps the most annoying (at least, most worrying) thing about the Ascent were the brakes. I don't know if it had to do with just my tester (which had about 7000 km on the odometer) but they felt very under equipped for a vehicle of this weight. Not

only the stopping distance felt worryingly long, but the brake pedal would shudder as if it was going to fall apart at even moderate speeds. It could be, that the vehicle I was testing had recently been at Test Fest, where vehicles do get pushed quite hard, but for the brakes to feel this poor after just 7,000 km is more than just a little worrying!

Fuel Economy: During my test cycle (170 km of highway driving + 130 km of city driving), the Ascent averaged around 12.3 L/100 KM. In comparison, the Mazda

CX-9 (another seven-passenger SUV featuring all-wheel drive and a turbocharged four cylinder motor) averaged 11.6 L/100 KM. So, the Ascent is not cheap to run!

Pricing: Base price on the Ascent is \$35,995 - and goes all the way up to \$49,995.

Verdict: The 2019 Subaru Ascent offers lots of space, comfort, and tech. However, the transmission is awful, the brakes are even worse, and it looks to have been designed by someone who has no imagination. In short, personally, I'd just buy something else.