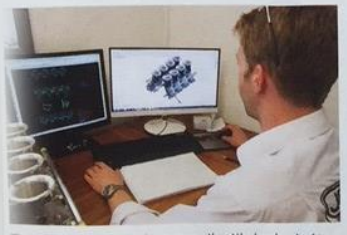
ALL UNDER ONE ROOF

Manufacturing throttle bodies since 1992, this Shropshire based business has become a specialist in the design and manufacture of throttle bodies for motorsport and niche vehicle manufacturers. CKC witnessesatypical day at Jenvey Dynamics.

Words and pictures: Ian Stent



The process of designing a new throttle body starts on the computer. Everything is designed in-house.

Wooden patterns are CNC milled using Rakutool composite modelling board.

Life on a typical day at Jenvey sees the doors open at 8am, but as a potential customer you're unlikely to find yourself walking through the front door… there's no shop here for you to browse the company's products. Unless you live locally and are popping by to collect something, almost everything is dispatched in the post.

Instead, this is a manufacturing facility first and foremost. And by that, we really mean proper manufacturing… with the exception of a few electronic components, everything is made here… from the basic raw materials. That means a large

part of the workshop is set aside for the foundry (yes, really!), where Jenvey creates the sand moulds and casts its own inlet manifolds and throttle body housings. This is old-school stuff – a furnace to melt aluminium ingots with the resulting liquid poured into the moulds by hand. Conversely, the finishing is anything but old-school, with no fewer than seven computer controlled CNC machines employed to create endless additional components and finish the cast parts. And then there's the CAD design... Jenvey has it all covered, under one roof.

The company was started by Richard Jenvey back in 1987, working from the garage at home and offering a motorsport consultancy service. His expertise was in demand as a consequence of his own race success and hands-on ability when it came to engine builds. He'd been Modsports champion in 1975, competed at Le Mans in 1979 and raced in the World Sportscar Championship in 1980. In 1992 the company began specialising in the manufacture of throttle bodies, initially outsourcing the main fabrication work before bringing it in-house with a move to the current premises in 1996.

The chances are that your first contact with Jenvey Dynamics will be via the website, no doubt followed by a call to sales manager, Nigel. He can discuss your requirements in more detail and it may be that one of the company's off-the-shelf products will be perfect, or a bespoke item can be created for your installation. Everything at Jenvey is designed in house, almost all of it via CAD. Not only does this give the company ultimate control over the design process, it also means products can be tailored for trade customers... so the throttle bodies being assembled by Oli today for dispatch out to Caterham, all have the Caterham name embossed into the casting.

In most instances relevant to us, the chances are that Jenvey will have the parts ready for immediate dispatch from the stores department, but when these run low (or one-off jobs are required) then it's a case of firing up the furnace and making some more. Here one of the company's longest serving employees, Gary, oversees the complete casting process...

Outer lift-away frame is made from MDF. This is just one half of a product.

Gary packing the patterns by hand. Sand goes hard within a matter of minutes.

This is one half of the sand mould.

Two-piece moulds 'lock' together. White spout is where molten aluminium is poured in.

This starts with selecting one of Jenvey's vast stock of patterns. Each pattern for a manifold or throttle body consists of two pieces (think of them as the top and bottom halves of the component to be created), each with a CNC machined composite modelling board inner and simple external MDF outer frame. Each 'half' is then hand-filled with a special mix of sand and hardener, being careful to avoid any voids.

When the sand goes hard (in about five minutes), the MDF frame can be lifted away and the sand mould lifted off the modelling board below. The two sand moulds are designed in such a way that they 'lock' together to create a carefully sculpted inner void into which molten aluminium can be poured.

Pouring happens twice a week at Jenvey, and this morning Gary is creating the sand moulds in readiness for firing this afternoon. That means getting the furnace up to the 800deg required, before lowering in the relevant number of large aluminium ingots stacked up nearby. Once they have melted, Gary opens the top of the furnace and lowers in a long handled ladle to then lift out the molten aluminium and carefully pour it into the sand mould via the specially made inlet tube.

Pouring happens twice a week, with between 50 and 200 items created each time.

Here you can see the furnace (red) with the rollers behind on which the moulds are moved as they are filled.

VITAL STATISTICS

Company: Jenvey Dynamics
Location: Bridgnorth, Shropshire
Number of employees: 21
Unit size: 8000sq ft
Main services: Manufacture and sale of inlet manifolds and throttle bodies

Throttle bodies as they appear out of the sand moulds.

Weights placed onto the two-piece mould stop them being pushed apart by the aluminium.

Although the aluminium sets in as little as 30 seconds, it's left to cool for as long as two hours. In this time, the sand moulds are effectively cooked by the hot aluminium inside and naturally begin to fall apart, revealing the completed component inside. Between 50 and 200 items are typically created during each firing.

Straight out of the mould, the throttle bodies and manifolds are highly accurate although, as with a fibreglass mould, where the two parts of the mould are joined there are areas where the aluminium creeps into the tiny gaps to create flash lines which must be removed. Also still attached to the component is a solid aluminium lump which is the excess aluminium that has remained in the filling tube (known as the gate). This lug is cut off before the item leaves Jenvey and, before any other process, is sent away for heat treatment to aid structural integrity and to make later machining easier.

Once back at the factory, each item passes through what's called the fettling department, where flashlines are removed and the component cleaned in the shot-blasting cabinet. Today, Mark and Dave are working on a batch of Peugeot Mi16 manifolds.

As they work through the batch, cleaned items make their way through to the machine shop where Trevor is loading them into a Dugard Eagle 850 4-axis CNC Vertical Milling Centre (VMC). Here the faces of the inlet manifold are dressed and holes drilled out for the mounting studs to pass through.

For cast throttle bodies the process is slightly different. All Jenvey throttle bodies are now powdercoated black and, before any machining, all the cleaned components once again leave the factory for coating by an outside specialist. Back at HQ, these items head for another 4-axis CNC machine where today Cliff is processing some 70mm single body turbo throttle bodies. Here the work done by the machine is more complicated, with a number of different processes, each with different tools required, with the machine rapidly switching from one to another in a fully automated

Throttle bodies and manifolds back from heat treatment. Patterns seen on the shelves behind.

Manifolds pre and post fettling, where excess material is trimmed away and the surface cleaned.

Fettling is done by hand, here with a belt sander.

Mark and Dave get products ready for the next stage.

All throttle bodies now sent away for powdercoating.

Four-axis CNC milling machine works on two manifolds at a time.

process. Even here, in amongst all this high tech machinery, there's a need for final hand finishing, with Cliff doing minor deburring and giving the components the once-over.

On another machine, Steve is overseeing the creation of the spindles which pass through each throttle body and house and control the butterfly (which is also made in house).

While every throttle body casing is made to a standard size, the inner bore must be fine tuned to match a specific engine. Larger at its outer point, it's tapered to a smaller diameter to create the venturi effect needed to accelerate the airflow into the engine. This boring is done on a CNC lathe. Work on the casing is now complete.

But there's more to a throttle body that just the case, its spindle and butterfly…

Elsewhere in the unit we return to old-school skills. At one work station, Pete is making the fuel rails, along with brackets and cable guides. Although the brackets are initially laser cut, Pete bends them to shape. He also welds together the fuel rails and other smaller components, all of which are then sent off for plating. Nearby, Charlie works in the prototyping area, where cameras aren't allowed and journalists are barred! But he also makes the tooling for the CNC machines… although the machines themselves are high-tech and do amazing things, the tooling that holds a specific component in the CNC machine has to be made by hand, and that's where Charlie's expertise comes in.

Complete throttle bodies aren't actually put together until an order is placed, because different customers may require subtly different fixings or throttle positions for their application. So from the stores are picked the necessary components to create the desired end product. Today Oli is assembling the previously mentioned Caterham throttle bodies for immanent dispatch to the factory. Finally packed and dispatched by Tracey, the process of creating a throttle body is finished. It's been fascinating to watch the process unfold, from solid ingots of aluminium and bags of sand, to a

Rear manifold's mounting face machined, front to do.

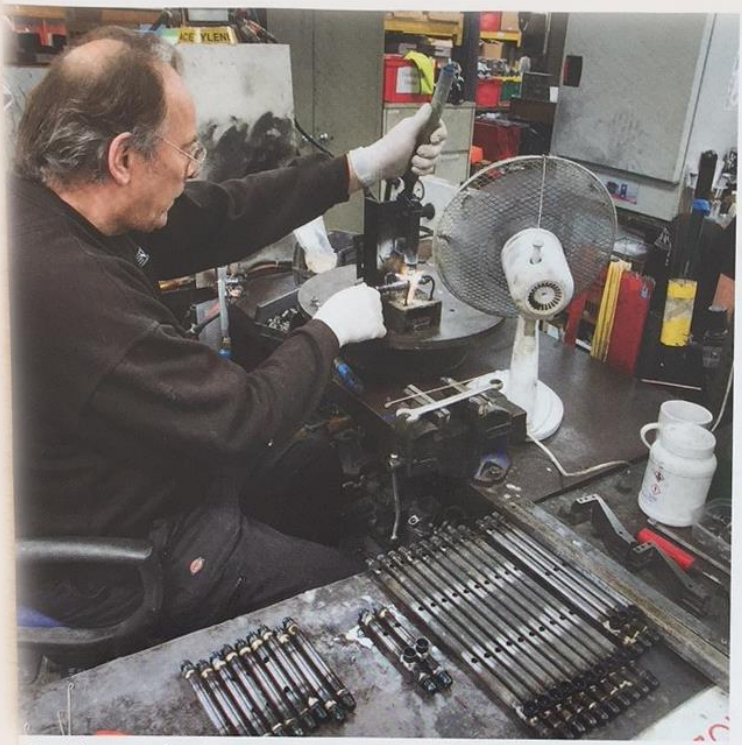
Completed manifolds ready for the stores.

Same milling machine also creates billet fuel rails.

Despite the CNC machining, components are checked by eye and minor deburring may be needed.

CNC controlled lathe used for boring throttle bodies to correct inner diameter.

Left throttle body as created. Right example now bored out to customer specification.



Pete in the process of creating steel fuel rails.

Chevrolet LS3 set-up, using individual throttle bodies.

Honda Type R set-up using bespoke manifold.

Direct-to-head throttle bodies for a Ford Sigma.

Fuel rails are sent away for plating.

Oli puts together a throttle body for a customer.

Completed Caterham throttle bodies ready for packing.

inely tuned precision component for feeding fuel nto your engine.

In terms of applications for the typical kit car ustomer, Jenvey has most options covered. With ncreasingly complicated engine management ystems on donor cars, and our own desire to tune nd tweak the performance of the engine we fit o our kit car, aftermarket throttles bodies (along with ECUs) are becoming commonplace under he bonnet of many kit cars. There's not room in his article to look at the process of choosing the ight set-up for your car, but you'll typically be onsidering one of three different set-ups – direct to ead bodies where there is no separate manifold, TB hrottle bodies are mounted to a conventional inlet manifold and look similar to a DCOE carburettor, nd finally there are individual throttle bodies for ach cylinder which, as you might expect, allow for he maximum in terms of tunability. To demonstrate the different set-ups, Jenvey has put together some complete packages which you can see in the accompanying pictures. These include single throttle bodies for a Honda Type R, direct to head units for a Ford Sigma, twin TB units for a Mazda MX-5 and an impressive Chevrolet LS3 installation (once again with individual throttle bodies). While you can order the individual components from Jenvey, the chances are you'll be looking at a complete kit, and prices start at around £750, up to over £2500 for a complex V8 application (all plus VAT).

It's been a fascinating visit, witnessing a manufacturing process (sand casting) we've never seen in action before. As far as can be practical, Jenvey keeps almost everything in-house and it means an extraordinary clash of old and new techniques from different millennia that come together to create a thoroughly modern end product.

If you are unsure which package might suit you, talk to the sales team and they'll guide you through the options. What you'll end up with is a product that has been made from scratch under one-roof by a family owned company and which can be tweaked to your own specific requirements. That sounds like just our sort of product, doesn't it? ■

Our thanks to Jenvey's production manager Tom Austin for showing us around.

USEFUL CONTACTS

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