

## CNC Heads

CNC Heads have developed an extensive range of CNC engineered gas flowed cylinder heads for European and Japanese engines. These heads are developed exclusively for circuit racing, rallying and fast road applications.

We have invested heavily in a state of the art development facility which enables us to develop the very best prototype heads and manufacture each head with 100% accuracy. Our simulation and manufacture process allows us to guarantee flow on every head we produce and give a predicted BHP. All our heads have been tested on our engine dyno facility to verify our power predictions.

The end result is a head which performs exactly as we predict. Each cylinder in the head exactly matches the others in the head. Each head we produce gives the exceptional flow we claim which is why we publish our flow figures and many other cylinder head specialists do not.

### Prototype development.

We have over 20 years of experience in developing racing cylinder heads. We use the latest Superflow flow bench and PortFlow Analyzer software to measure and analyse flow. This is supported by sophisticated software which allows us to simulate a full engine build with all the known parameters such as valve size, bore, stroke, piston speed, target max revs and many more. Simulation is a vital tool to measure changes made in the head and set a target power output for the engine. Typically a new head will take weeks of meticulous development work before it is considered ready for production.

### Replication.

Gas flowing a cylinder head used to be a very hit and miss affair. Fundamentally it is a labour intensive, highly skilled but manual process. By manual processes alone it is near impossible to produce a series of heads with identical flow characteristics. Another factor is ensuring each cylinder in the head has the same flow, ensuring a balanced engine and maximum power output. We utilise digital scanning technology to precisely measure the dimensions of the new cylinder head. These form a pattern which our CNC machines can follow to manufacture the new head.



## Ford Cosworth YBT– CNC Engineered Gas Flowed Cylinder Head.

Introducing our new gas flowed cylinder head for the Cosworth developed 2.0 litre Ford YBT engine. When we began development on this head we knew there was big potential for improvements. We wanted to produce there very highest flow possible for this engine. We quite regularly build engines for customers demanding in excess of 700BHP from these engines and we need a very special head to meet and exceed those demands.

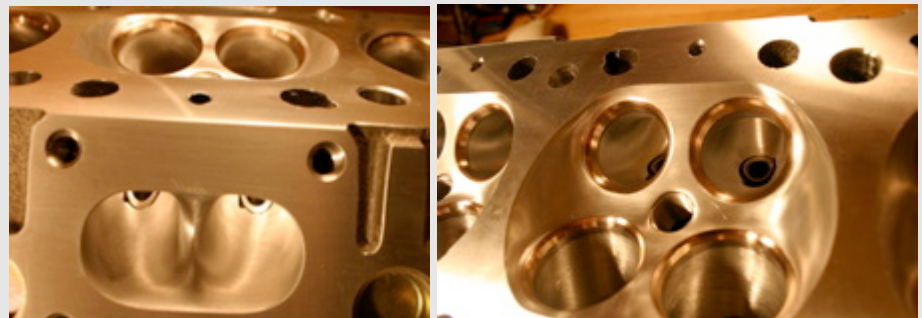
We have produced two versions. One using standard valves and a big valve version. Note: Both head versions are suitable for normally aspirated Ford YB engines. **We predict up to 331BHP for a normally aspirated YB engine with suitable modifications.**

### Standard Valve

By any measure, the improvement in flow achieved with this head is excellent. A 30% increase in inlet flow and 24.7% increase in exhaust flow. On a turbo charged engine this will enable some spectacular power gains (Over 500BHP). It will also allow less boost to be used to gain this power with much more low end torque and greatly reduced turbo lag. Any other modifications made to the engine (whether installed or planned) will also be greatly enhanced by fitting this head, realising the full potential of the modifications and the engine.

### Big Valve version

There was clearly even greater potential to be had with this head by using larger valves. We achieved a quite spectacular increase in flow. Up 57% on inlet flow and 39% on exhaust. We have built engines capable of **over 700BHP** using this head. For customers not seeking this kind of peak power they will realise huge benefits in low end torque and reduced turbo lag.



## Manufacture.

Taking a standard head as a start point, our 3 and 5 axis CNC machines begin work to machine the new head. We manufacture to very fine tolerances and a single head can take up to 16 hours to re-profile the ports. Valve seats are given special treatment on our Newen CNC valve seat cutting machine which ensures the very best valve seating possible. The end result is a head which gives 99% of the flow we achieved on the initial prototype. The final 1% is achieved with manual, hand finishing of the ports.

## Quality control.

The first heads produced are measured on the flow bench again to check flow. We also fit the head to a new engine build to check predicted power output on our in-house engine dynamometer. Often heads are developed for customer race engines. Dyno results are used to modify our simulation models. We also carry out random flow measurements on production runs as part of our quality control procedure. As a result we are able to guarantee the flow and power capabilities of our heads.

## Results.

With this process, our customers have achieved superb competition results at very reasonable cost. Using CNC production techniques has enabled a price and quality breakthrough in this area of race engine building. Considering the performance potential and quality of our heads, they represent superb value for money.

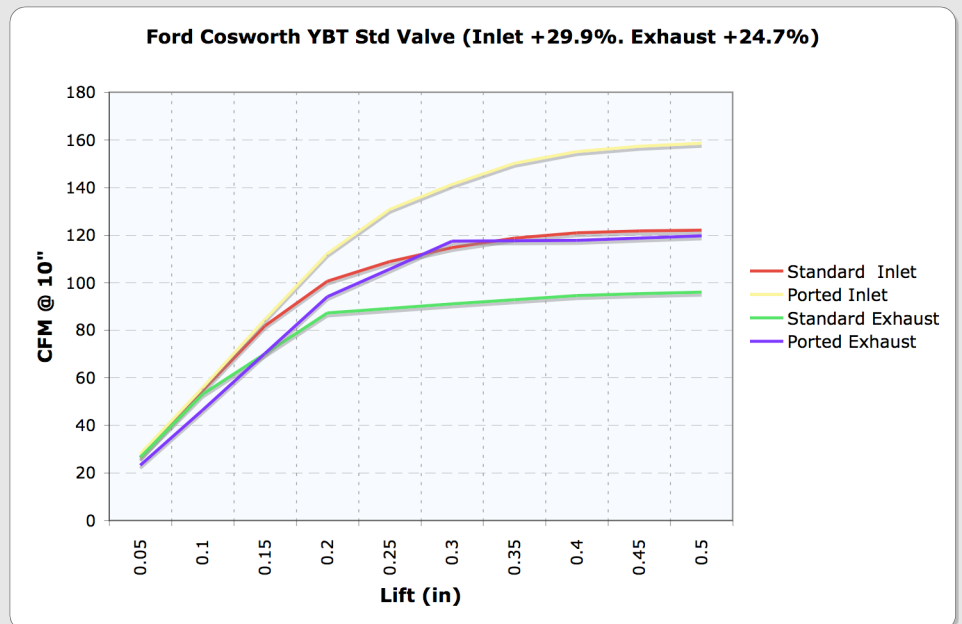
Fundamentally, what ever other modifications you make to an engine, they will always be restricted by the flow of the existing head. Customers who are ready to take the performance of their engine to the next level should seriously consider a quality gas flowed cylinder head with guaranteed flow characteristics. Not only will it improve the existing state of the engine but will also benefit further tuning if required.

A CNC Heads cylinder heads offers:

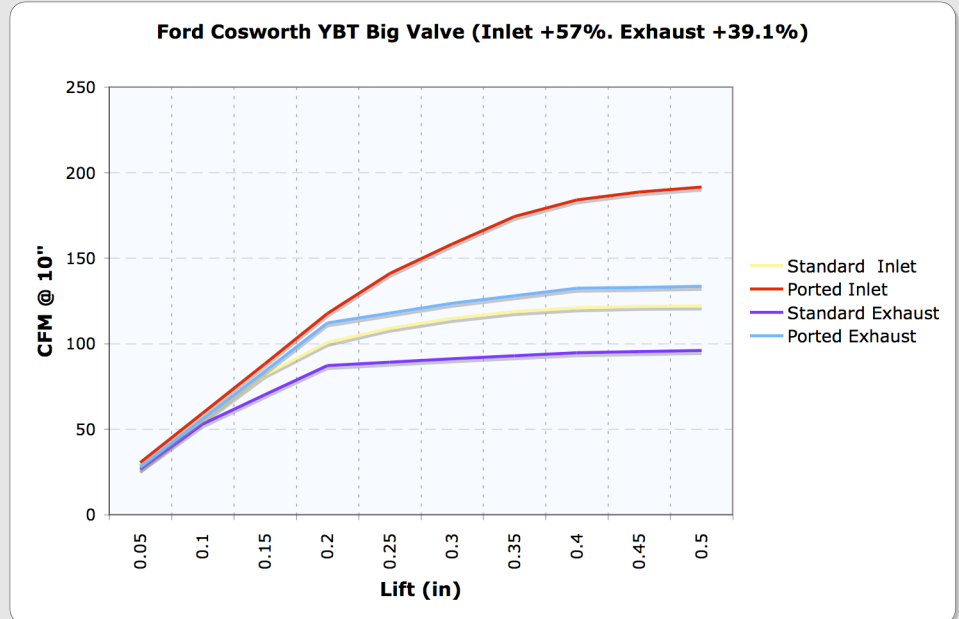
- The best flow available as a result of extensive R&D. This is the key. Our heads are fully developed racing specification, gas flowed cylinder heads.
- Developed and manufactured in the UK with full 12 month guarantee and support.
- Installation and tuning advice is available.
- Fully tested from flow bench to Engine Dyno to race track.
- Absolute accuracy guaranteeing claimed flow for each head and cylinder (giving full power balance across the head)
- A genuine price breakthrough offering custom gas flow engineering at production run prices.
- By any measure, price/performance ratio is extremely good and should appeal to racers and road enthusiasts alike.

See below for more details of our measured flow for this head. Unlike many gas flow engineering firms we publish all our flow stats. This is because we are 100% sure we can deliver this flow to the customer on every head and cylinder. We also give predicted power output based on our unique simulation to dyno testing development lifecycle.

## Standard valve flow chart



## Big Valve version



## Predicted Power

With the standard valve head we have built engines that produce over 550BHP. The Big valve version is capable of over 700BHP. These figures are largely dependant on the level of boost used and other modifications to fueling and exhaust. There are also normally aspirated applications for this engine which show equally impressive results :

### Normally aspirated Standard valve :

Vital statistics		
<b>Standard Inlet</b>	<b>Ported Inlet</b>	<b>% change</b>
122 CFM	158.5 CFM	29.92%
<b>Standard Exhaust</b>	<b>Ported Exhaust</b>	<b>% change</b>
95.9 CFM	119.6 CFM	24.71%
<b>Predicted BHP</b>	298 BHP @8300 RPM	
<b>Torque</b>	156 ft/lbs @8300 RPM	
<b>Piston Speed</b>	5313 ft/min	

### Normally aspirated Big valve :

Vital statistics		
<b>Standard Inlet</b>	<b>Ported Inlet</b>	<b>% change</b>
122 CFM	191.5 CFM	56.97%
<b>Standard Exhaust</b>	<b>Ported Exhaust</b>	<b>% change</b>
95.9 CFM	133.4 CFM	39.10%
<b>Predicted BHP</b>	331 BHP @10200 RPM	
<b>Torque</b>	170 ft/lbs @10200 RPM	
<b>Piston Speed</b>	5420 ft/min	

**CUSTOM CAMSHAFTS :** With all of our gas flowed heads we also provide a custom made camshaft service. These camshafts are designed to optimise the flow characteristics of our heads. They can also be specifically designed to deliver the power characteristics you require for your specific application. Your existing camshaft will work with our heads, however, if you want to get the most from one of these heads or you have a particular power characteristic you are looking for, we recommend that you consider our custom camshafts.

For further details on CNC Heads , our manufacture process and our extensive range of Gas Flowed Cylinder Heads, visit our website : <http://www.cncheads.co.uk>. Or you can Email us on [sales@cncheads.co.uk](mailto:sales@cncheads.co.uk)

We are happy to discuss customer requirements and give support and advice on the use of our heads. We are experienced race engine builders and can offer many more services from component sales through to full engine build.

We look forward to hearing from you..