



Trick Flow's Twisted Wedge Chamber - Material Progression - New Two-Valve Heads

Moving From Bolt-Ons To Trick Flow's Twisted Wedge Two-Valve Heads

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Horse Sense:

Since we're covering a boatload of territory with this report, some of the general "how-to" information that is associated was purposely been omitted. This was done to ensure that we'll have page space for more focus on the long-awaited heads and camshafts, as well as all of the dyno-test results (especially with the Twisted Wedge heads installed and a custom tune loaded into our test mule's PCM) from our extensive project.

There's no arguing that we're forever indebted to 5.0-powered Fox Mustangs. Ponies of 1979-to-1993 vintage are the foundations of our hobby, and to this day, they're still highly regarded as being the best Mustangs to modify. However, despite our high regard for Foxes, New Edge Mustang GTs of '99 to '04 are fast becoming the proverbial "Ponies to own," among the younger members of the 'Stang Nation.

Thanks in part to the huge success of Ford's S197 ('05-'09) platform and also the brand-new '10 Mustangs, the 4.6-liter New Edge GTs are gaining popularity nowadays because they're being sold for minimal dollars by enthusiasts who are stepping up to the newer models. Because of this new abundance of mostly virgin 'Stangs and an aftermarket that has noticed the resurgence of '99-'04s, just that quickly we're sitting on another Mustang style that may become as revered as its predecessor.

We've watched the development of and evaluated many performance products for the 4.6-liter, Two-Valve modular engines that power New Edge GTs. These pieces range from entry-level CAI systems to full-tilt power adders. Most of them have been deemed capable of helping make considerable improvement to a stock Two-Valve engine's horsepower and torque output.

In addition to testing those bolt-on upgrades, one of the projects that we've wanted to do for a long time is hop-up a New Edge 'Stang's stock Two-Valve bullet with a performance-minded "top half," consisting of improved cylinder heads, bigger camshafts, and an intake manifold. The only problem we had in doing this was the lack of non-stock pieces—mainly cylinder heads—for the 4.6 Two-Valve. While cams and even new, aluminum intake manifolds for '99-'04 GTs had come to fruition, ported versions of Ford's Performance Improved cylinder heads had been the mainstay for upgrading the top-half of a modular engine.

Not to knock ported PIs, as we have them on our own '02 GT project car (the one with the ProCharger F-1A on it) and they do the job just fine. What we wanted to see were completely new cylinder head castings for the Two-Valve mod motors, similar to high-performance heads for pushrod engines that are designed to meet almost any type of street or racing need.

Engineers at Trick Flow are serious about making big steam with small-block Ford engines (pushrod or modular), and over the years the company's Twisted Wedge cylinder-head series has become a thing of legend in the 5.0 Mustang community. Introduced in 1996, TFS's aluminum Twisted Wedge castings brought a dramatic change in the conventional design of small-block Ford cylinder heads.

These heads feature reshaped/twisted combustion chambers that allow more efficient airflow to bigger valves (which are installed at slight angles for improved clearance between the valves and pistons) and the combustion chambers. When complemented with an appropriate intake manifold/camshaft combination on otherwise stock engines, the heads proved to be serious contributors to 5.0s making bigger steam.

Today the Mustang hobby is firmly planted in the modular age now, and as mentioned earlier, with Two-Valve performance really starting to shine, Trick Flow again stepped to the front and created a new version of the Twisted Wedge cylinder head, specifically designed for 4.6- and 5.4-liter Two-Valves.

Trick Flow's all-new castings (PN TFS-51910001-CNC/38cc, TFS-51910002-CNC/44cc) are every bit as impressive as their older siblings were when they came onto the Mustang scene back in the day. The modular Twisted Wedge heads are made from T61 Aluminum, and feature increased port volume over Ford's PI castings, as well as unique 1.84-inch intake and 1.45-inch exhaust valves.

The real trick (pun intended) is in the heads' long-intake runners, which yield 185 cc in volume (despite the intake ports being the same shape and dimensions of '99-'04 OEM Two-Valve heads), and, of course the valves' placement—on 9-degree angles (intake and exhaust)—which gives air more of a straight shot to the chambers, and relocates the spark plugs for improved airflow as well.

We've followed the development of the new heads from their inception and have been anxious to install a set, to see for ourselves what the heads will do for a bone-stock 4.6-liter. Based on their design and the results of the flow tests we performed (check out our newsstand-only publication 1994-2004 Mustang Performance for the story "Twisted Edge"), it's not hard to see that Trick Flow mod-motor castings will work wonders on power-adder-enhanced Mustangs with stout motors.

Our main interest with this exercise is to see how making the modest investment in a set of Twisted Wedge heads (\$1,995.95/pair), Trick Flow's Track Max Modular Ford Performance Camshafts (PN TFS-51802001; \$449.95) and a high-flow-catted, long-tube-header exhaust system from BBK (Headers PN 1541; \$449.99 and X-shaped crossover PN 1638; \$389.99) and Pypes (PN SFM27V; \$399.95) will improve the stock, 4.6-liter bullet in Mike Glasser's '00 Mustang GT, in naturally aspirated trim.

To put this overall effort in real-talk terms, we really dig the idea of making raw-dog, pump-gas, Two-Valve horsepower without using a bottle or boost. But



before getting to the main event, we're also installing the familiar quartet of basic Two-Valve upgrade pieces from Trick Flow (CAI, throttle body, intake plenum, and underdrive pulleys), as it's simply the correct way to go about modifying a stocker for improved horsepower and torque.

As you've learned through other tests we've done with Two-Valve bolt-ons, all of the basic components can be installed at home by do-it-yourself enthusiasts. However, as you'll see in the photos that follow, swapping cylinder heads in a modular-powered Mustang definitely is a heavy-line job. It may require the talents of a technician who is trained and familiar with the procedure, and equipped with tools and a twin-post hoist, which certainly make getting the job done a lot more doable than it would be in your driveway.

Since GTR High Performance in Rancho Cucamonga, California, is the unofficial house of New Edge Ponies in the group of SoCal shops we work with (the shop performs basic and high-end mods on a huge number of '99-'04 'Stangs), once we received everything from Summit Racing Equipment (this entire, affordable setup can be ordered with a few clicks of the mouse and your credit card), we called on the talents of Ricardo Topete and Chris Balaster for this broadband installation effort, and brought in Adam Montague of Spankin' Time Motorsports, to program a custom DiabloSport tune into the GT's PCM.

On The Dyno

How does the saying go? "We love it when a plan comes together," or something along those lines? Well, it really doesn't matter what the actual phrase is—we definitely accomplished our mission to make moderate-buck, naturally aspirated big steam with a stock Two-Valve '99-'04 Mustang engine.

As per usual with bolt-on efforts like this one, we started by establishing baseline performance numbers for Mike Glasser's 2000 Mustang GT, using the Dynojet chassis dyno at GTR High Performance, and then commenced installing the Trick Flow bolt-ons that we selected for the project.

Based on dyno hits that were made after each piece was installed, the power and torque gains created by the Trick Flow parts proved to be directly on par with results we've seen from similar entry-level upgrade projects.

The answer to the burning question of how much power can/will/do the new Trick Flow 4.6/5.4-liter heads make came immediately after the first dyno pull with the top-half pieces and exhaust in place—a lot!

With Adam Montague of Spankin' Time Motorsports on hand to zero in on a DiabloSport fuel-and-timing PCM profile that made good, safe power, we saw Mike's Pony transform from baby to brutus; that makes nearly identical horsepower and torque at the rear wheels, and comes very close to giving some stock Two-Valve/power-adder applications we've seen, a pretty good challenge.

RPM	Pulleys			HCE			Difference	
	Power	Torque	Air/Fuel	Power	Torque	Air/Fuel	Power	Torque
2,500	128.63	270.24	12.51	121.34	254.92	14.32	-1.96	-4.11
3,000	156.59	274.14	12.42	152.35	266.72	13.02	5.14	9.00
3,500	197.55	296.44	12.93	198.01	297.13	13.36	13.17	19.75
4,000	231.47	303.92	12.59	246.67	323.88	13.33	30.25	39.72
4,500	254.52	297.07	12.10	282.53	329.75	13.18	44.83	52.32
5,000	265.70	279.10	12.90	321.43	337.64	13.43	77.42	81.32
5,500	262.48	250.66	13.37	331.10	316.18	13.24	95.56	91.25
6,000	n/a	n/a	n/a	334.61	292.90	13.04	n/a	n/a

RPM	Baseline			CAI			Throttle Body/Plenum			TUNE		
	Power	Torque	Air/Fuel	Power	Torque	Air/Fuel	Power	Torque	Air/Fuel	Power	Torque	Air/Fuel
2,500	123.30	259.03	12.93	124.92	262.43	12.43	124.50	261.55	12.35	126.63	266.02	13.06
3,000	147.21	257.72	12.82	150.54	263.55	12.24	150.97	264.30	12.12	154.53	270.53	12.81
3,500	184.84	277.38	12.85	189.03	283.66	12.36	190.08	285.23	12.50	194.23	291.47	13.05
4,000	216.42	284.16	12.85	221.47	290.80	12.51	223.86	293.93	12.40	226.45	297.33	12.86
4,500	237.70	277.43	12.70	244.72	285.62	12.70	248.33	289.84	12.71	249.83	291.59	12.22
5,000	244.01	256.32	13.55	250.24	262.86	13.75	254.62	267.46	13.78	258.82	271.87	13.04
5,500	235.54	224.93	13.91	241.50	230.62	14.13	245.40	234.33	14.23	254.94	243.45	13.44
6,000	219.75	192.38	0.00	172.75	252.25	12.46	0.00	0.00	0.00	240.35	210.40	13.68

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