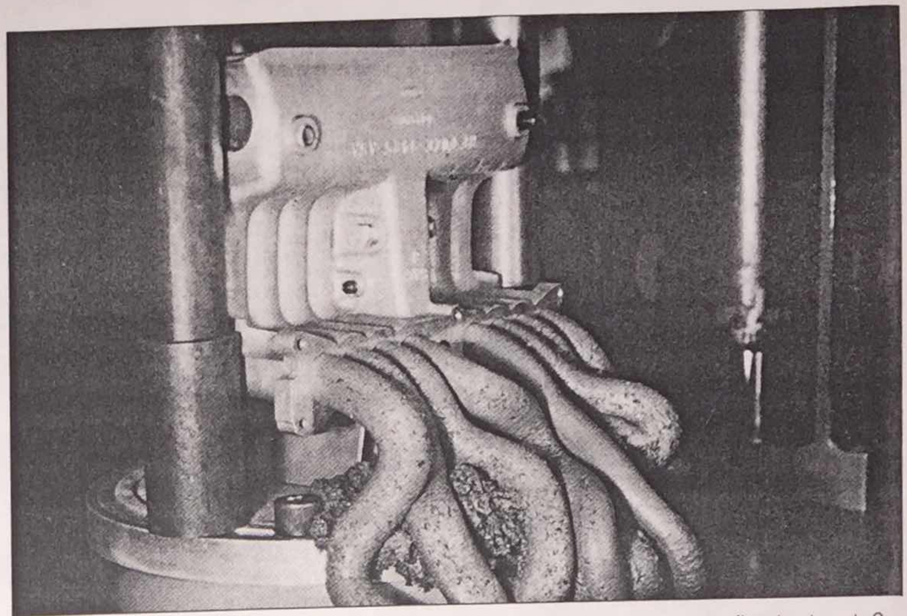
Honed to Perfection

Flow testing Extrude Honed 5.0 intakes reveals excellent gains

text and photography by Will Hodges



Looking like a bizarre sci-fi experiment, Ford's in-line oval-port receives the Powerflow treatment. Our unit saw huge increases in runner flow, balance and velocity, enabling it to beat a stock GT-40's runner performance across the board.

When making modifications to increase airflow, keep your runner diameters as small a possible. This advice is repeated by many knowledgeable cylinder head porters. But what is this about?

The key word is velocity, and the impact it has on torque and horsepower is dramatic. An engine's horsepower potential, or air-pumping capacity, is totally rpm dependent, and would increase at a linear rate, if it were not for the resistance to airflow found in the intake tract.

As detailed in two prior issues (May 1996, pg 34 and September 1996, pg 20) resistance to airflow increases at the square of the intake air charge's velocity. Example: if the resistance imposed by a hard turn, a rough surface, or restrictive runner diameter, costs 2 hp at 3000 rpm, it will, theoretically, rob four times that much power at 6000 rpm, for a total loss of 8 hp.

So, if more rpm with less resistance equals more horsepower, why not just hog the heck out of the intake runners and be done with it? At issue is the potential loss of cylinder pressure, which is the source of torque that's required for accelerating the vehicle .

A moving column of air in an intake runner has a certain inertia, or kinetic energy. When optimized, kinetic energy causes this air column to continue ramming into the cylinder after the piston has reached bottom dead center, increasing its charge density and, ultimately, its pressure.

Like airflow resistance, kinetic energy also increases (or decreases) at the square of the air charge's velocity. For a given amount of airflow, increasing a runner's cross section, without increasing its airflow, will decrease its air-charge velocity. Decrease this velocity by half, and the potential loss of kinetic energy to ram-charge the cylinder can be four times as great, with a resulting loss of torque.

Clearly, a manifold runner optimized for torque and horsepower production must possess the highest rate of velocity, and have the least possible flow resistance, for a given runner diameter. In other words, it must flow the largest amount of air through the smallest possible hole.

If cost and underhood packaging were not an issue, we could fabricate such an optimized intake system. Like many Pro Stock designs, it would have tall, cross-ram architecture, employing smooth, unobstructed, line-of-sight runners aimed directly into each cylinder head's valve pocket. The runners would have a constant shape, with no sudden transitions in size. Also, their diameters would be no larger than the engine required to achieve a given pressure drop (a measure of resistance) at the chosen peak engine rpm.

In the real world, there's a more practical way to obtain higher flow rates, with less resistance, in an existing intake manifold — and actually increase its air-charge velocities.

Enter Extrude Hone Corporation, and their patented Powerflow process. Located in Paramount, California, Extrude Hone has catered to the performance needs of the aircraft industry for the past 25 years. In the 1980s, their process was expanded to include virtually any automotive application requiring improved hydrodynamic flow characteristics and a better surface finish.

Extrude Hone's process consists of pumping a semi-solid plastic media, that's imbedded with carbide particles of varying grit and size, through part-specific tooling that directs the abrasive putty to, and through, the appropriate area of the part.

By varying pressure, viscosity and grit, the Powerflow media can selectively remove as little as 2 microns, or as much as .200 of an inch of material, in a single pass. Eventually, interior surfaces are abraded to a less resistant finish, air paths become hydraulically reshaped, and flow rates increase. Because the Powerflow process is able to achieve large flow increases with minimal runner enlargement, air-charge velocities can skyrocket.

Besides enhancing torque production, other benefits of increased air-charge velocities include: less time for the manifold surface area to transfer heat to the air charge and higher air-charge speeds past the injector nozzles, promoting greater tumble and swirl into the combustion chamber and, ultimately, greater potential for higher energy yields from a given volume of fuel and air. The bottom line is great throttle response and more overall power

Last month, we baselined the stock flow rates of eight popular 5.0 intakes, comparing runner flow rates, flow balance, and architecture. We also devised a crude cfm-per-square-inch flow calculation. Its higher number infers both reduced resistance and greater velocity and gives evidence of improved efficiency.

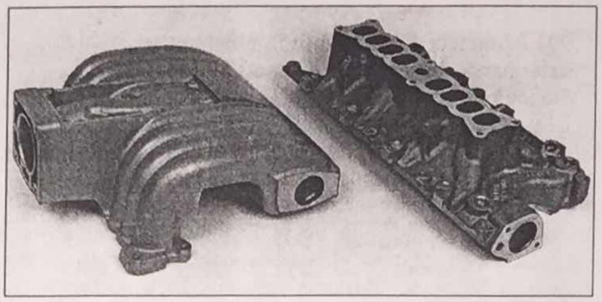
This month, having Powerflowed all eight of our intakes and retested them at Steve Bronston's B.P.E. Racing Heads in Placentia, California, we present the following flow data. Please note, all airflow numbers are stated at 25 inches of water. To convert to the ubiquitous 28-inch values, multiply by 1.06.

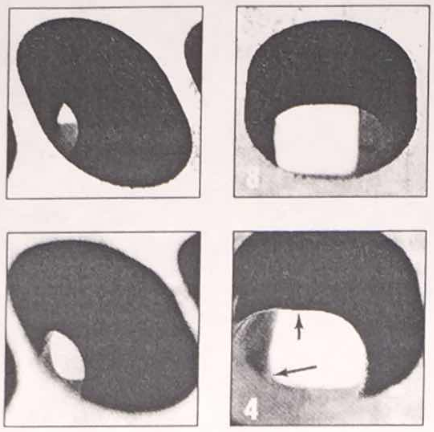
A last-minute update! Just as we were going to press, Extrude Hone indicated they were able to squeeze an additional average of 20 cfm from seven of these intakes, and an impressive 50 cfm from the Saleen/ Vortech. Until we can generate supplementary test data, consider adding these amounts to our runner flow numbers, or give Extrude Hone a call.

5.0 Liter HO

As soon as Bronston opened the air valve on his Superflow 600 flowbench, we were amazed by the transformation in the little oval-port's abilities. While flow imbalance between runners dropped from 21 percent to 8.2 percent, becoming second best in this study, average runner flow leapt from 136 to 200 cfm. This represents a whopping 47-percent increase in flow capacity, and actually betters the stock GT-40's runner flow by 3 cfm. Importantly, the Powerflow process obtains this improvement with a minimal 9-percent, or .140 of an inch, increase in runner cross section. This, when combined with 47-percent-higher runner flows, zooms comparative flow rates to 122 cfm per square inch, yielding the highest average air-charge velocities in this test. With its runner flows equal to a stock GT-40's, and air-charge velocities some 30 percent higher, the Extrude Honed in-line oval-port should be a force to be reckoned with in any street acceleration contest. What a sleeper.

Air entering the narrowed crossover tube must squeeze between two vertical through-bolt bosses, increasing resistance. Fly-cutting notches for the end bolts eliminates the restrictive bolt bosses. Also note the abrupt turn the runners make as they transition into the head.

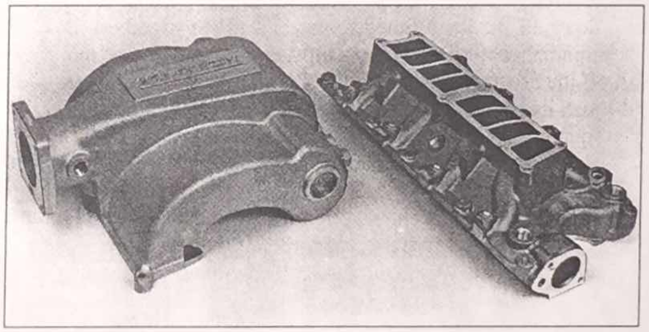




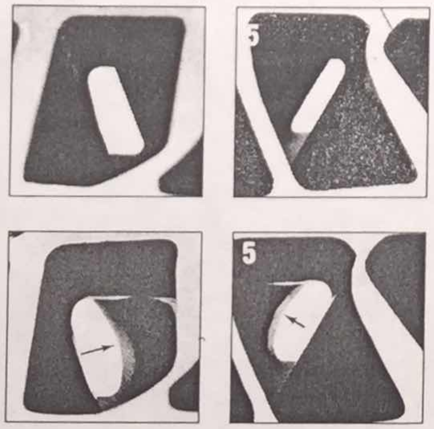
At 21 percent or 31 cfm, the stock in-line oval-port has the largest spread in runner balance of any Blue Oval 5.0 manifold. Runner 5 is 2 5/8 inches off centerline with its port exit, and at 119 cfm is visibly the most restrictive. Runner 8 offers a straight path into its port exit, and at 150 cfm flows the most air. After the Extrude Hone process (bottom photos), runner 5's flow increases a remarkable 65 percent, bringing it to within 12 cfm of the now-best-flowing runner 4 (at 208 cfm), transforming the oval-port into the second-best-balanced manifold in this test. Note runner 4's floor (LOWER ARROW) is being pulled toward its port exit centerline, and its roof (UPPER ARROW) gets a compound shape.

Saleen/Vortech

In spite of their huge 3-square-inch cross sections, the stock Saleen/Vortech's runners shrink, by half, to 1.53 square inches at their port exits, choking average runner flow to 168 cfm. Since we were told there was no gain in modifying the massive upper, only the manifold's lower was Powerflowed. With the lower's runners abraded to a larger 2 square inches at their port exits, the half-modified Saleen/Vortech's average runner flow increased by 27.4 percent, to 214 cfm. Comparative flow rates rose to 71 cfm per square inch at the upper/lower parting line, and dropped to 107 cfm per square inch at the head flange. Balance remained steady at 13.5 percent. A last minute update from Extrude Hone indicates that Powerflowing both the upper and lower together, and enlarging the lower's port exits to 2.27 square inches, yields flow numbers virtually identical to our best Cobra efforts. This makes sense, as the Extrude Honed Cobras have the same restriction, or cross-sectional dimension, at their port exits.



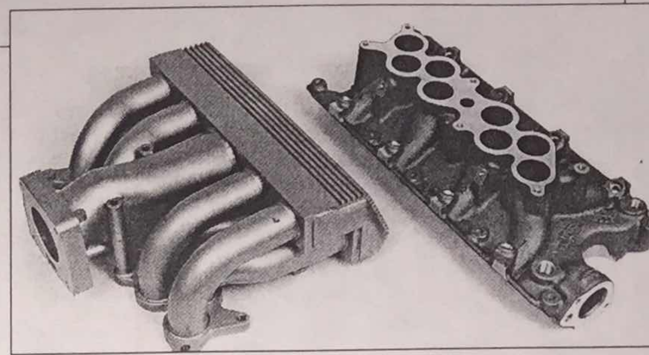
The Saleen/Vortech eliminates all through-bolt bosses with fly-cut notches for hand-bolted studs. This allows the crossover tube to splay outward over the upper, giving the air an easier turn into the runners. Ford can't do this because of assembly line considerations.



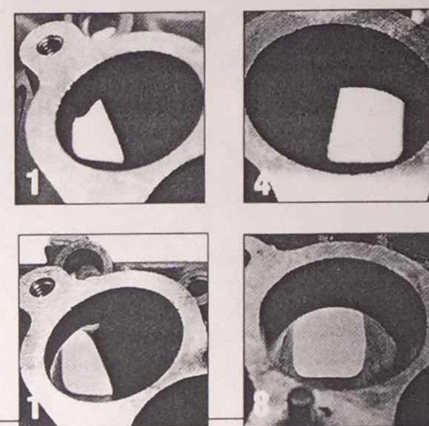
To clear the distributor housing, the lower runner architecture of all 5.0 manifolds is shoved toward the rear of the block. Being closest to the distributor, runners 1 and 5 are the most restricted by the resulting misalignment, and flow the least air. In stock form, Saleen/Vortech runners 1 and 5 flow 157 cfm and 154 cfm, respectively. Once Extrude Honed (lower photos), the airflow of each jumps to 199 cfm, an average increase of 28 percent. Like the air it tries to emulate, the abrasive media resists being turned, and strives to straighten out its flow path by taking more material from a runner turn's short side. Note how the Powerflow media has hydraulically reshaped these runners, moving their flow paths toward a better centerline relationship with a cylinder head's intake port (ARROWS), and opening up their sight windows.

GT-40

Since its 1991 introduction, the beautiful, tubular GT-40 manifold has been a performance benchmark. Out of the box, our sample achieved an average runner flow of 197 cfm, and its range of runner imbalance, at 11 percent, is among the best. Ironically, it's these same pretty tubes that limit the GT-40's ability to be modified. With an upper tube-wall thickness of .060, too thin to be Extrude Honed, and brazed welds that are even thinner, only the lower half could be safely Powerflowed. Unable to enlarge the upper beyond its natural cross section of 2.11 square inches, average runner flows topped out at a healthy 232 cfm, an increase of 17.8 percent. Runner balance improved less than 1 percent, and comparative flow rates increased 12 percent, to 104.5 cfm per square inch. While these numbers are not the highest in our test, they are more than adequate for any 302 using a stock 6250 rpm rev limiter.



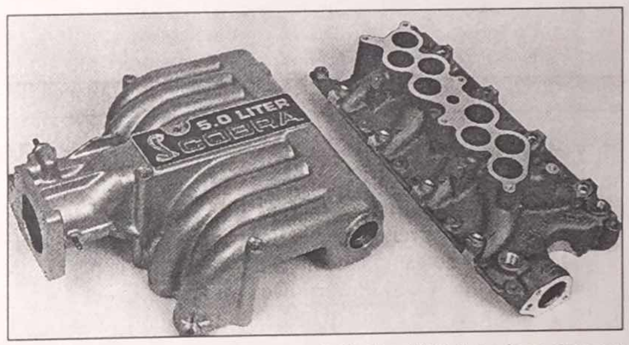
The GT-40's crossover tube retains its cross section and flow potential, as it pinches between its pair of furnace-brazed through-bolt tubes.



In the staggered-round family of manifolds, number 8 is typically the highest flowing runner, as it has the most aligned port exit. In spite of its larger sight window, number 8 becomes a trickster when used with the GT-40 upper, and flows less (at 201 cfm). The two-tiered, tubular upper has runner number 8 make its 180 degree turn (from the plenum into the head) in a 5-inch radius, whereas the Cobras provide 8 inches for the same turn. As a result, and even though runner 4 has a smaller sight window, it outflows number 8 by 3 cfm. Once Powerflowed (lower photos), the gap widens, with runner 8 stalling at 229 cfm, and number 4 hitting 247 cfm. By reducing 8's flow, the GT-40 actually beats the Cobras' runner balance by 1 percent and 2 percent. At 222 cfm, runner 1's hard turn remains too tough to cure (true of most 5.0 manifolds), and flows dead last. Note: to give our four varieties of staggered-round manifolds equal opportunity, we drilled their uppers to match a mutual runner centerline relationship with the doweled 1993 Cobra lower, then used this single lower in the Extrude Hone tests.

1993 SVT Cobra

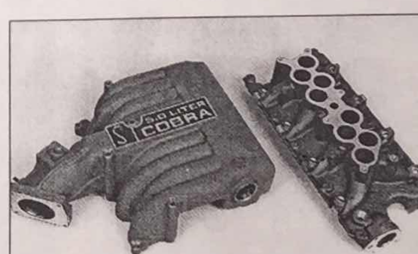
At 200 cfm, and in spite of an abnormal .090 of an inch core-shift between the upper and lower runners, this 1993 Cobra intake managed the highest average runner airflow of any stock Ford manifold in these tests. We then doweled the misaligned upper and lower together, to locate their best mutual centerline relationships, and Extrude Hone did the rest. Fresh off the Powerflow tooling, the Cobra inhaled an average of 245 cfm through its runners, and comparative flow rates jumped to 113.4 cfm per square inch, increases of 22.5 percent and 11 percent, respectively. These flow numbers are the best of all five Ford manifolds tested here, and just a tick behind our leader. Surprisingly, runner imbalance increases slightly, to 11 percent. Though not as pretty as the GT-40, the 1993 Cobra flows roughly 6 percent more air than its more cosmetic cousin, and costs about 40 percent less. Also, with .270 of an inch wall thicknesses between its runners, Extrude Hone indicates that more airflow remains. Definitely Ford's most-bang-for-the-buck 5.0 manifold.



Borrowing the GT-40's lower manifold, the 1993 Cobra's cast upper gains new runner architecture, plus two added through-bolts at runners 1 and 8.

'94-'95 SVT Cobra

The 1994-'95 manifold differs from the 1993 version in two significant areas. The crossover tube was bent 40 degrees, to fit under the swoopy new hood, and the plenum was essentially doubled in size. Otherwise, runner architectures in both models are identical (using a 302 lower), and flow figures, though perceptibly less, are effectively the same. Both before and after the Powerflow process, the SN95 Cobra's runner flows, and runner balance, were inferior to its earlier cousin's by a minor, but repeatable, 1 percent. This we attribute to the bent crossover tube. Throughout our testing, a 65mm throttle body was used to equalize the air entries on all eight of these manifolds. While swapping the 65mm throttle body for a 70mm unit would consistently increase a crossover tube's mass airflow by 30 to 50 cfm, it never added more than the same 1 percent to any manifold's individual runner airflow. The larger plenum on the '94-'95 Cobra manifold can benefit tuning for resonance on larger engines like the '95 Cobra R's 351W, but is likely wasted on the 302.



While its upper and lower runner architecture remains identical to the 1993's, the 1994-'95 Cobra gets a twice-sized plenum and a longer, twisted, crossover tube.

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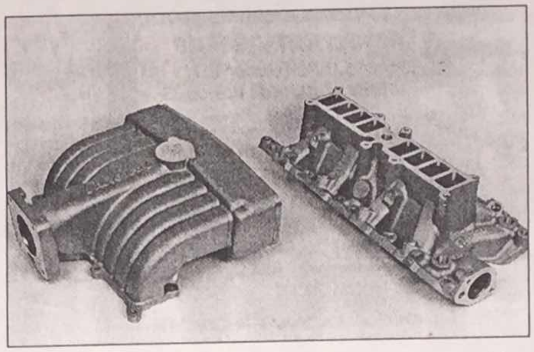
Edelbrock Performer

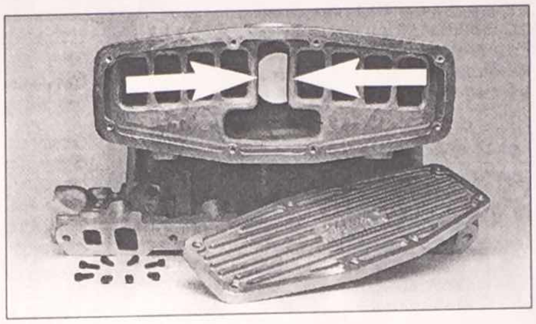
By spreading its large in-line section of rectangular runners a full 12 inches between end-most runners 1 and 8, and pulling them closer to the distributor, the Edelbrock Performer 5.0 achieves the most well-aligned runner architecture of any Ford fuel-injection manifold in current mass production. Resistance is further reduced by making its lower the tallest, by 1 inch, giving its runners larger and easier radii to turn into the head. The large plenum is fed by an inverted-T-shaped crossover tube that delivers more air to the end runners, enhancing flow distribution. Combined, these features gave the box-stock Edelbrock Performer the top flow honors in our previous flow test (September 1996), and the Powerflow process helps keep it ahead of the pack.

Its average runner flows leapt from 209 cfm to 252 cfm, a 20.5 percent increase, and range of runner imbalance went from an excellent 5.6 percent to a remarkable 4.3 percent. With a comparative flow rate of 115 cfm per square inch, the Edelbrock's air-charge velocities are just behind the leading oval-port's, but its air-pumping capacity is (at least) 26 percent greater.

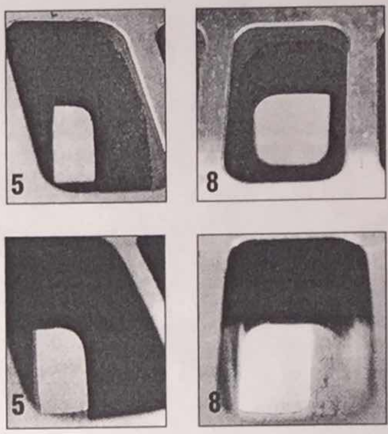
The Edelbrock is still top dog, and the unit to beat.



The 1-inch-taller Edelbrock lower provides its runners with larger, less-restrictive radii as they turn into the cylinder head. Requiring hand bolting, there are no through-bolt bosses to intrude into the airways.



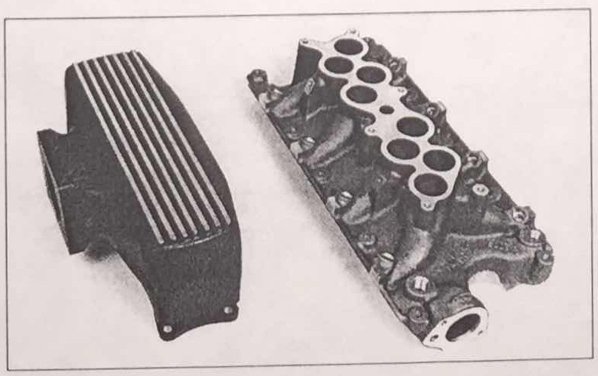
Edelbrock indicates removing any material from the bull nose around its inverted-T crossover tube (ARROWS), will damage its superior flow distribution. Also recommended: make the runners wider, not taller.



More widely spaced, and pulled closer to the distributor than any other, the stock Edelbrock has superior runner alignment, as revealed by runner 5's larger sight window (upper photo). At 203 cfm, number 5 is the Edelbrock's most restrictive runner, but not to worry. There's only a 5.6 percent spread between it and best-flowing runners 6 and 7, at 21 cfm, giving the stock Performer 5.0 unparalleled runner balance. In other 5.0 manifolds, runner 8 usually has the highest flow. With more equalized flow paths, Edelbrock's runner 8 sight window becomes proportionately smaller, flowing only 3 cfm more than 5. Once Extrude-Honed, runner 8's flow jumps 23 percent (to 254 cfm), with 5 hitting 250 cfm. Runner balance improves to 4.3 percent. Note tiny grooves the Powerflow abrasives leave in runner 8's port walls (lower photo). It is believed they improve air-stream stability.

Downs Ford

The Downs Ford design is a rounded breadbox plenum that bolts to a GT-40 lower. In fact, every manifold in this survey, excluding the scratch-built Edelbrock, uses a Ford lower half. Minus supercharging, this breadbox lacks the upper runner architecture naturally-aspirated manifolds require to effectively distribute and turn the air 90 degrees into the engine. As a result, runner flow imbalance is a wide 43 cfm, or 19 percent in stock form, and grows to a wider 57 cfm, or 21.4 percent after Extrude Honing. Stock flow capacity, at 205 cfm, increases 17.6 percent to 241 cfm, and comparative flow rates grow 14 cfm to 111 cfm per square inch. Because this plenum only adds 2 inches of runner length to the GT-40 lower's 5 inches, total runner length (including the head) is reduced to a short 12 inches (20 is typical), moving its peak ram-tuned effect to a heady 7000 rpm. Not to worry, at anything over 3 lbs of boost, a blower should compensate for any perceived deficiencies in either distribution or velocity, and the lower resistance offered by this unit's shorter runners becomes a plus for high-rpm horsepower.



Fly-cut notches for studs and a large, rounded plenum distinguish the Downs Ford breadbox design. This narrow manifold provides unsurpassed engine access.

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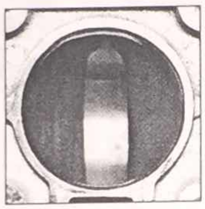
Mass Airflow

Flowing 697 cfm at 10 inches of water, the GT-40 passes more air through its crossover tube than any manifold in this study. In fact, its crossover tube flows 43 percent more air than the GT-40's runners can ingest at WOT.

Each cylinder in a four-cycle, V8 engine uses 90 degrees of crankshaft rotation (with zero overlap) during its induction cycle (2 x 360 ÷ 8 = 90 degrees). Employing a typical Ford 302 camshaft intake duration of 220 degrees, the engine (at 100 percent runner flow) can only demand 2.4 cylinders worth of airflow from the crossover tube at an one time (220 degrees ÷ 90 degrees = 2.4). Every manifold crossover tube in this group passes more air than its runners require, but how much more will vary. Those with higher flow numbers (less resistance) can offer measurable horsepower gains, but only at higher engine speeds, typically well past the rev limiter. These conditions also limit the benefits of large throttle bodies and other induction hardware. — *Will Hodges*

	Diameter of Throttle Body Opening	Area of Throttle Body Opening	Crossover Tube Cfm with 65mm TB	Crossover Tube Cfm with 70mm TB
5.0 Liter HO	**63.15mm**	**4.87 sq in**	**555**	**581**
EH 5.0 Liter HO	69.36mm	5.85 sq in	610	638
Saleen/Vortech	**70.11mm**	**5.98 sq in**	**600**	**632**
EH Saleen/Vortech	70.11mm	5.98 sq in	626	660
GT-40	**70.11mm**	**5.98 sq in**	**679**	**727**
EH GT-40	70.11mm	5.98 sq in	697	746
'93 Cobra	**70.62mm**	**6.07 sq in**	**675**	**719**
EH '93 Cobra	71.63mm	6.25 sq in	713	773
'94-'95 Cobra	**70.88mm**	**6.11 sq in**	**N/A**	**N/A**
EH '94-'95 Cobra	71.20mm	6.16 sq in	662	N/A
Edelbrock	**69.85mm**	**5.94 sq in**	**649**	**689**
EH Edelbrock	71.20mm	6.16 sq in	663	701
Downs Ford	**70.20mm**	**5.98 sq in**	**538**	**563**
EH Downs Ford	70.20mm	5.98 sq in	N/A	N/A
'96 Explorer	**69.34mm**	**5.85 sq in**	**623**	**719**



All Ford 5.0 crossover tubes are narrowed by restrictive through-bolt bosses. In spite of having what appears to be a smaller intake-air footprint, the GT-40's hot-formed crossover tube effectively wraps around these through-bolts, giving it the highest (65mm) entry-airflow in our test.

At 2.4 times 100 percent runner airflow, the Extrude-Honed in-line oval-port would require 480 cfm. Flowing 610 cfm with a 65mm throttle body, this little sight window provides a surplus in airflow of 27 percent, reducing resistance.

The Raw Numbers

With its uncompromising architecture, the stock Edelbrock Performer 5.0 dominated our flowbench test last month, and remains the leader of this test. The Powerflow process made it, and every other manifold here, a much better flowing part. With higher velocities, and runner flow increases averaging 25 percent, Extrude Hone offers performance enthusiasts the best of both worlds, more horsepower with greater torque.

	Runner CFM 1	2	3	4	5	6	7	8	Average	Flow Increases CFM	%	CFM Per Sq In
5.0 Liter HO	**123**	**140**	**142**	**145**	**119**	**139**	**133**	**150**	**136**			**90.7**
EH 5.0 Liter HO	197	202	197	208	196	191	200	207	200	64	47	122
Saleen/Vortech	**157**	**174**	**178**	**161**	**154**	**170**	**174**	**173**	**168**			**56.4**
EH Saleen/Vortech	199	214	230	208	199	218	226	218	214	46	27.4	70.6
GT-40	**186**	**202**	**202**	**204**	**182**	**197**	**198**	**201**	**197**			**93.4**
EH GT-40	222	232	242	247	226	230	229	229	232	35	17.8	104.5
'93 Cobra	**187**	**203**	**200**	**200**	**188**	**206**	**207**	**208**	**200**			**102**
EH '93 Cobra	228	247	242	247	244	245	251	256	245	45	22.5	113.4
'94-'95 Cobra	**184**	**200**	**197**	**198**	**186**	**206**	**206**	**207**	**198**			**99.5**
EH '94-'95 Cobra	224	243	239	244	243	244	247	255	242	44	22	113.1
Edelbrock	**206**	**212**	**209**	**209**	**203**	**215**	**215**	**206**	**209**			**108.2**
EH Edelbrock	245	252	254	250	250	256	256	254	252	43	20.6	115
Downs Ford	**193**	**183**	**215**	**203**	**191**	**219**	**207**	**226**	**205**			**97.2**
EH Downs Ford	233	209	266	243	225	255	238	262	241	36	17.6	111.6
'96 Explorer	**169**	**180**	**176**	**180**	**177**	**177**	**183**	**183**	**178**			**84.4**

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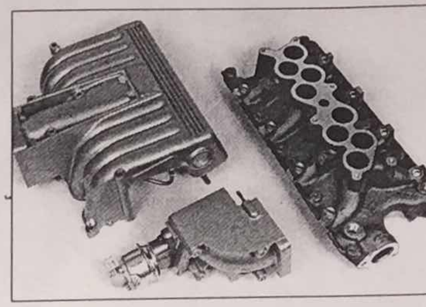
'96 Explorer



Introduced on its namesake, the '96 Explorer V8, this manifold possesses the most evolved and sophisticated staggered-round architecture to date.

The stock Explorer has the best range of runner flow imbalance, at 7.7 percent, of any Ford 5.0 intake. In spite of using larger 2.11 square-inch upper runner dimensions, the Explorer's lower manifold narrows them to 1.66 square inches at their port exits, choking stock average runner flows to 178 cfm, which reduces comparative runner flow rates (at the parting line) to 84.4 cfm per square inch. Given its utility vehicle application, this is actually a good trade, as the larger runners offer less airflow resistance for this final runner dimension, and the Explorer's steeper gearing provides more final torque at the wheels. Unfortunately, the Explorer arrived too late for us to test on our flowbench, but Extrude Hone indicates that, once Powerflowed, its runner balance remains among Ford's best, and its average runner flow falls midway between the GT-40's and the Cobras'. Note that both the stock Explorer's (lower) runner dimensions, and its resulting airflow numbers, are similar to the Saleen/Vortech's.

Honed to Perfection

Dimensions

In this chart, note the relationship a manifold's smallest cross section has on the rate, and order, of its average runner flow. Of all listed flow numbers, the cfm per square inch data can be the most useful, as higher values indicate which configurations have the least flow resistance and the highest velocities. A manifold having higher cfm-per-square-inch values, and greater runner flows, should offer the most power and torque. Also, observe the higher rates of flow in cfm per square inch at the head flange for all manifolds with a reduced cross section at that point. This is an undesirable trait, as it indicates these restrictive sections of runner are absorbing some of the air charge's kinetic energy, as well as reducing both flow and velocity throughout the runner's primary length. All such manifolds that can have their runner exits enlarged should realize an increase in total airflow and air-charge velocity.

	Port Height At Parting Line	Port Width At Parting Line	Port Area At Parting Line (sq in)	Port Area At Head	Average Runner Cfm	Resulting Cfm Per Square Inch At Parting Line	Resulting Cfm Per Square Inch At Head
5.0 Liter HO	**1.59 oval**	**1.20 oval**	**1.5**	**1.69 x .89**	**136**	**90.7**	**90.7**
EH 5.0 Liter HO	1.66 oval	1.26 oval	1.64	1.89 x 1.10	200	122	96
Saleen/Vortech	**2.33 U/1.64 L**	**1.30 U/1.29 L**	**2.98**	**1.70 x .90**	**168**	**56.4**	**110**
EH Saleen/Vortech	2.33 U/2.31 L	1.30 U/1.31 L	3.03	1.89 x 1.06	214	70.6	107
GT-40	**1.68 U/1.64 L**	**1.68 U/1.64 L**	**2.11**	**1.92 x .98**	**197**	**93.4**	**104.8**
EH GT-40	1.68 U/1.68 L	1.68 U/1.68 L	2.22	2.01 x 1.13	232	104.5	102.2
'93 Cobra	**1.58 U/1.64 L**	**1.58 U/1.64 L**	**1.96**	**1.92 x .98**	**200**	**102**	**106**
EH '93 Cobra	1.66 U/1.68 L	1.66 U/1.68 L	2.16	2.01 x 1.13	245	113.4	108
'94-'95 Cobra	**1.59 U/1.64 L**	**1.59 U/1.64 L**	**1.99**	**1.92 x .98**	**200**	**99.5**	**105.3**
EH '94-'95 Cobra	1.65 U/1.68 L	1.65 U/1.68 L	2.14	2.01 x 1.13	242	113.1	106
Edelbrock	**1.81 U/1.83 L**	**1.08 U/1.09 L**	**1.94**	**1.87 x 1.05**	**209**	**108**	**106.4**
EH Edelbrock	1.89 U/1.93 L	1.16 U/1.20 L	2.19	1.95 x 1.20	252	115	107.7
Downs Ford	**1.66 U/1.64 L**	**1.66 U/1.64 L**	**2.11**	**1.92 x .98**	**205**	**97.2**	**109**
EH Downs Ford	1.66 U/1.68 L	1.66U/1.68 L	2.16	2.01 x 1.13	241	111.6	106.2
'96 Explorer	**1.64 U/1.64 L**	**1.64 U/1.64 L**	**2.11**	**1.70 x .98**	**178**	**84.4**	**107.2**

Sources:

B.P.E. Racing Heads
702 Dunn Way
Placentia, CA 92670
(714) 572-6072

Downs Ford
360 Route 37
Toms River, NJ 08753
(908) 349-2240, ext. 58

Edelbrock
2700 California St.
Torrance, CA 90503
(310) 781-2222
http://www.edelbrock.com

Extrude Hone
8800 Somerset Blvd.
Paramount, CA 90723
(310) 531-2767

Ford Motorsport
44050 N. Groesbeck Highway
Clinton Township, MI 48036-1108
(313) 337-1356 tech line

Saleen Performance Parts
9 Whatney
Irvine, CA 92718
(714) 457-9100 tech

Vortech Engineering
5351 Bonsai Ave.
Suite 1115
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