BAUXITE BOMBER

Edelbrock builds an aluminum-head 427 for the dyno

text and photography by Issac Martin
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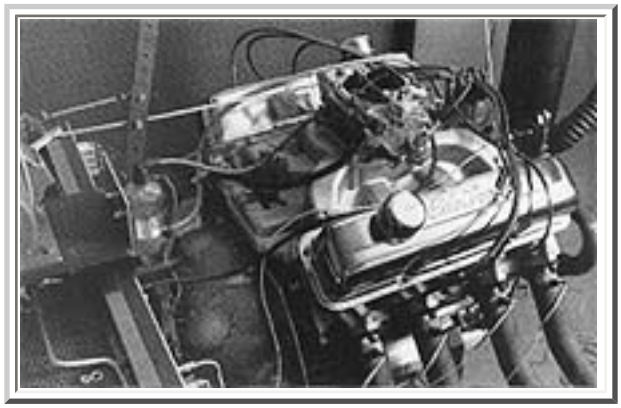


While the cylinder heads have been available for awhile, getting the entire story on Edelbrock's full set of new FE parts has been difficult; mainly because Edelbrock hasn't finalized them yet. However, we can now present this 427 engine Edelbrock built for dyno duty on their FE aluminum cylinder head program. The power numbers indicate any performance Galaxie, Fairlane or Cobra would be proud to have this engine under its hood.

Furthermore, like other Edelbrock engine combinations we've chronicled, it provides a sound recipe for building a strong, durable engine. This is a high-buck engine, but then 427's have always been considered the royalty of the FE family. For high power and high rpm, the 427 gets the nod.

While the Edelbrock dyno mule was aimed squarely at street use, it was built with a 6500 rpm upper rev limit in mind, so parts were selected for durability and not because they were Total Performance icons. Of course, we no sooner type that, than note the block is a vintage 427 side-oiler piece. It was fully machined, including alignhoning, decking and a torque platehoning of the cylinders. Final bore dimension was 4.250 inches, with a stock 3.780-inch stroke, resulting in a 429 cubic-inch displacement.

Also, in 1965 427s had a forged steel crank as original equipment, unlike the engines produced in '63-'64 and 1968, which had a high nodular cast-iron unit. The steel crank used here was deburred and Magnaflux inspected. With a clean bill of health, it was ground and polished to accommodate.010/.010-inch-undersize Clevite rod and main

bearings. Main and rod bearing clearance is .0025 of an inch. During final assembly, the ARP main cap bolts were torqued to 105 lb ft and the cross bolts to 42 lb ft.

Rather than running three-decade-old LeMans rods, a set of Ferra connecting rods were specified. These are a forged 4340 steel rod with an I-beam cross section and measure 6.488 inches center to center. Big end diameter is 2.591 inches and pin diameter is .975 of an inch. Rod side clearance is .020 of an inch. The rods come equipped with premium-quality ARP 12- point cap screws to keep the caps firmly in place. Like other FE rods, the full-floating wrist pins are retained with Spirolox.

JE Piston was the source for the custom flat-top pistons used. Interestingly, talking to JE, they carry no on-the-shelf- FE pistons, so all orders are custom made. Utilizing a silicone-enhanced, forged-aluminum alloy, the pistons were CNC-milled to run at tighter piston-to-wall clearances. They also have thicker decks, so they're ready for practically any performance demands, short of racing. Ring pack dimensions run 1/16, 1/16 and 3/16 of an inch and compression height is 1.765 inches. A neat building tip we learned was these flat-tops were ordered with two intake valve pockets cut, rather than a intake/exaust combination. That eliminates left and right pistons, and gives the builder maximum freedom for matching pistons to rod weight variations.

The induction tract starts with an Edelbrock Performer Series 750 cfm carb and Perfromer RPM FE intake. The square-bore carb had metering rods changed to match the engine's fuel calibration needs. Otherwise, the body and venturis were unmodified. The Performer RPM FE intake is one of the new variety of "large dual-plane" intakes, and thus offers a larger plenum and runners compared to the Performer 390. This extends the power range up to 6500 rpm. At the same time, the dual-plane design makes it a natural for street use. The only modifications were gasket-matched ports.

A cam pretty much determines an engine's power curve and character. Because this engine was destined to end up under the hood of a street machine, the grind was definitely street oriented. An Eagle solid-lifter cam was selected out of their cataolg . A dual-pattern cam, its duration is 242 degrees (intake) and 252 degrees (exhaust) at .050-inch tappet lift. Valve lift is .576 and .595 of an inch respectively. The intake lobe centerline is 108 degrees.

A prime reason for the latest FE interest is new parts, and a big boost came with the availability of Edelbrock's Performer RPM FE aluminum heads. Now you can build a performance FE motor without having to pick through 30-year-old castings that have been milled and ported to death.

Bare heads were chosen, so larger valves and beefief valve springs could be installed. The valve package was upped from the standard 2.09/1.66-inch pairing to a set of

Ferrea valves with 2.19/1.73-inch diameters. Dampening the valve action ia a set of dual-wound Iskenderian springs. They have a 1.530-inch outside diameter, so the spring seats need to be opened a little farther than the standard 1.45-inch-OD seats normally offered on the assembled head. Neither of these modifications present any problem, as the head is designed to accomodate these enlargments. Combustion chamber volume was 72cc, producing a healthy 11:1 compression ratio.

Another area of FE upgrading involved replacing stock rocker shafts and stands with Ford Power Parts components.The main reason is the 6500 rpm redline; it would be scary to contemplate running an engine that hard with 30-year-old shafts and stands.

FPP rocker shafts are thick-wall, chrome moly tubing. A detail improvement involves the oiling holes. Unlike stock shafts, FPP units have small reliefs cut across the holes. The purpose is to help oil spread more readily from the holes for increased shaft lubrication. Furthermore, the stock rocker shafts can break at the ends because they have no end-support stand. To greatly reduce that possibility, FPP end pedestals were added.

In between the end pedestals are FPP rocker shaft stands constructed from 7075-T6 aluminum. A slot cut in them pinches a tighter grip on the shaft as the hold-down bolt is tightened. Three versions of the FPP FE rocker system are offered, Low-, Medium- and High-Riser. The Edelbrock heads are similar to Medium-Risers, so those are the ones you need.

Once ready, the 427 was wheeled across the hall from the Edelbrock engine room to one of Edelbrock's Super Flow 901 dynos. We're showing the dyno results of two of Edelbrock's tests, one with the Edelbrock carb and a second with a Holly 850 cfm carb (PN 0-4781). Like the Edelbrock, the Holly was only jetted for optimum calibration to match the engine; it was otherwise unmodified.

Despite giving up airflow capacity, the Edelbrock carb did well. Remember, depending on what the engine is built for, the Edelbrock carb should be better suited to street use, as it should provide sharper throttle response due to a stronger vacuum signal received at the smaller venturis. Because most driving occurs at 4000 rpm or less, the Edelbrock's power numbers are easily comparable to the Holley's. Not only that, the carb makes an excellent showing at 5000-plus rpm.

Of course, the Holley delivers more power in the upper-rpm range, but that's to be expected from the larger carb. If your performance goals are defined in quarter-mile increments, with 6000 rpm shift points, then the Holly would have the edge.

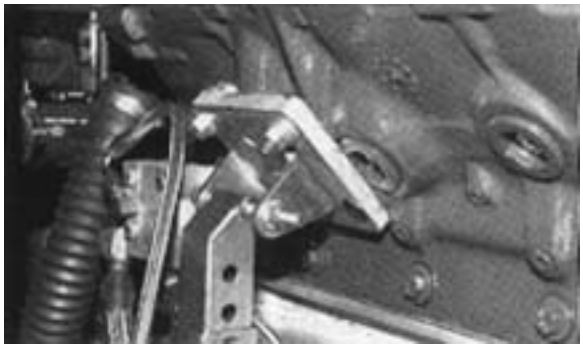
So, while Ford's current engine outlook is exclusively modular, the old iron keeps on turning. Given the interest in pre-smog street performance cars, not to mention the hot-

as-ever Cobra replica market, it seems FE performance will be with us forever.

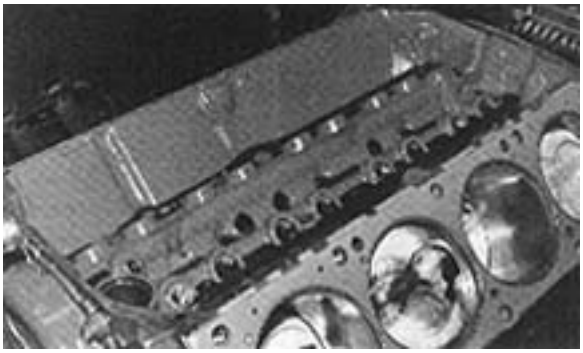
Parts List

Description	Part Number
Block	C6AE - Side-Oiler
Crankshaft	FE Forged Steel
Ford Crank Damper	D2TZ-6316-A
ARP Main Cap Bolts	155-5201
Engle Camshaft	3176
Edelbrock Performer-Link Timing Chain	7808
Edelbrock Performer Series Carb	1407
Edelbrock Performer RPM FE Intake Manifold	7105
Edelbrock Performer FE Heads	6005
ARP Head Bolts	155-3601
Ferrea Intake Valve	F2105P *
Ferrea Exhaust Valve	F2103P *
FPP Rocker Shafts	1442
FPP Rocker Shaft End Support Stands	1420
FPP Rocker Shaft stands	1424
Ford Push Rods	B8AZ-6565-C
Isky Valve Springs	8005A
JE Pistons	Custom
Ferrea Connecting Rods	R61028
AE Clevite Rod Bearings	CB756P-10
AE Clevite Main Bearings	MS863P-10
Melling Oil Pump	M57hp
Fel-Pro Head Gaskets	1020
Fel-Pro Intake Gaskets	1247
Fel-Pro R.A.C.E. Gasket Set	2720

* Valves cut to final 2.19 x 1.73-inch diameters

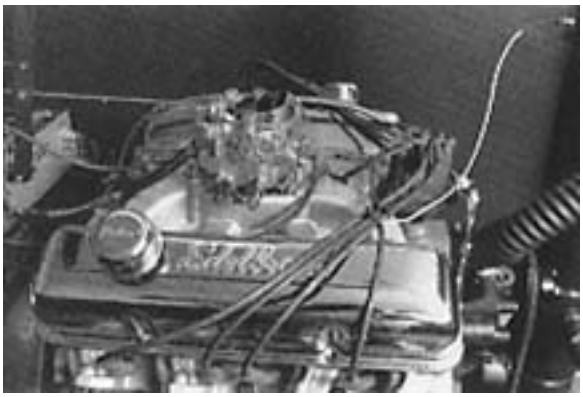


This block detail shows the bolt heads of the cross-bolted main cap fasteners. On the driver's side, right above them, are screw-in oil gallery plugs for the side oil passage. A Melling oil pump, shimmed for additional pressure, was used. Also note the screw-in core plugs that, unlike conventional press-in units, contribute to block strength.



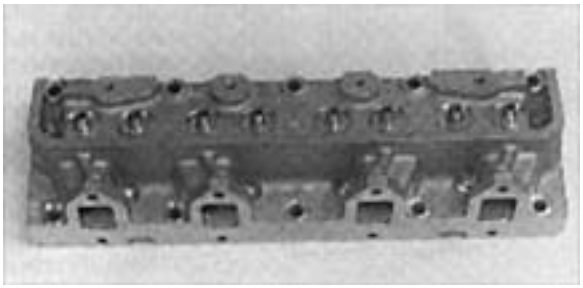
The block valley has been coated with Gyptal paint, which seals the casting surface to aid oil drain-back. JE pistons are a flat-top configuration with two intake valve reliefs and they run with .0025 of an inch piston-to-wall clearance. Deck clearance was .007 of an inch in the hole.

Ford Power Parts rocker shafts and stands were used in the stock 1.76:1 ratio. The solid lifter cam's valve lash (hot) is .018-inch intake and .020 exhaust. New, genuine Ford push rods, with oval and cup-style ends, were fitted. The Iskenderian valve springs have an installed height of 1.875 inches. ARP head bolts were used and torqued to 100 lb ft of torque.



Edelbrock's Performer Series 750 cfm carb was tested and only metering rods and jets were changed to provide optimum air/ fuel calibration for this engine. This carb has a one-piece top, which facilities easy jet changes and eliminates gaskets below the fuel line to help prevent leaks. The distributor is a stock Duraspark unit.

This version of the Performer RPM FE is cast with 72cc chambers. The larger 2.19 x 1.73-inch valves are a custom touch the average machine shop can duplicate because the castings are designed to accommodate the



increased diameters. Because the compression ratio is a healthy 11:1 squeeze, the dyno test was run using race fuel.

Edelbrock's dyno header's primary tubes were large 2.125-inch-diameter monsters; all in the name of accommodating the 6500 rpm exhaust flow. The engine was tested without mufflers. **SF**

Dyno Results: Edelbrock 750 CFM Carb				
RPM	**Torque (lb.ft.)**	**Horsepower**	**VE (percent)**	**BSFC**
3000	443	253	89	.53
3500	406	270	87	.61
4000	462	352	84	.51
4500	462	395	95	.49
5000	460	438	96	.50
5500	449	470	99	.51
6000	429	490	97	.52
6500	394	488	95	.56

Dyno Results: Holley 850 CFM Carb				
RPM	**Torque (lb.ft.)**	**Horsepower**	**VE (percent)**	**BSFC**
3000	447	255	91	.52
3500	424	283	88	.55
4000	481	367	98	.51
4500	484	415	99	.49
5000	481	458	101	.50
5500	465	487	103	.53
6000	442	505	102	.57
6500	407	504	100	.58

All dyno data was corrected to standard 29.92-inch barometric pressure and 60-degree Fahrenheit dry air. Ignition timing was 38 degrees total. Except for a .500-inch open spacer used with the Holley, the carbs were the only change between runs.