DSS’s low-cost, low-compression short-block is perfect for blowers on a budget.

By John Hunkins
PHOTOGRAPHY BY THE AUTHOR

The 5-liter DSS Bullet can be ordered in several forms: standard compression (shown) and low compression (LC). Besides piston choice, the DSS Bullet customer can now order a filled block. Crown Sportmaster forged rods, a lower main support system and a great-filled block. The DSS LC 5.0 Bullet fills the performance gap between the factory short-block and the high-dollar hardware seen on the showroom circuit. Fully-equipped, the DSS LC 5.0 is capable of handling between 500 and 600 hp and costs just $3,179 assembled—less than the cost of most factory-assembled crate engines.
and deck surfaces are all subject to an incredible pounding when cylinder pressure is elevated substantially beyond its normal level. This pressure can be the result of higher compression, nitrous oxide injection, a turbocharger, or a supercharger. It is supercharging, however, that seems to draw the most attention; we'll call it the darling of all Mustang bolt-ons.

The installation of a power adder on the S-line engine is initially followed by a big, fat smile on the mug of its owner. Sometimes, though, the smile can turn into a frown if strange noises begin emanating from under the hood. Within seconds of said noise, the twin exhaust pipes may begin to emit enough smoke and vapor to rival a space shuttle launch. Are blowers, turbo and nitrous bad things to have? Absolutely not. The problem comes as the result of our greedy human nature; if a little boost (or nitrous) feels good, then a lot will feel even better. Unfortunately, what feels great to your posterior doesn't feel so great to your engine. Oddly enough, restraint is not often a part of the average street freak's automotive repertoire. Restraint isn't a part of DS's repertoire on page 138

The basic Bullet short block includes a standard-competition TRW forged piston (left) with larger valve reliefs cut (they can take up to 2.05/1.625-inch valves). Large doses of nitrous or boost require the forged LC 5.0 piston (right, on extra $1,885). This lowers compression enough to be compatible with some of the smaller combustion chambers available on aftermarket heads, such as the Edelbrock, TFS and SVO 102 pieces. The advantage of the TRW slug is that it's strong and inexpensive and accepts a common press-fit wrist pin. DS modifies the TRW design for high-lift, large valves and low compression with its CNC machine.

Although far from ideal, the cast stock 5-litre crank is capable of some pretty remarkable things when pressed the right way. DSS thermal clips, Magneti-Marelli, shot-peens and grinds its own crankshafts in-house to 0.10 inch under. A smooth billet radius is put on each journal. This reduces the possibility of cracking by eliminating the most likely starting point for stress cracks. All all holes are chamfered, and the main journals are oil scooped for improved lubrication.
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This is part of the CNC program used to machine the LC 5.0 pistons. Rather than scrimp out expensive custom low-compression pistons from outside, DDS decided to make its own by modifying it common TRW forging. One advantage is that a standard-size plasma-machining set is used rather than the add-on metric factory stuff.

Bullit short-block consists of a stock 3-liter block, crank and rods that have been through honed, shot-peened, Magna-flowed and micromachined. Blocks are stress relieved, 0.000-inch oversize, stock equalized and align checked. Rods are forged and assembled with 5/16-inch ARP red

toires, either. The Chicago-area engine builder is known for its Pro Stock engine building and tuning. But you don't need to have a shop to build a 5.0 motor. The problem is the cost of the parts. The key to building a 5.0 motor is to keep it simple. The CNC machine is used to machine the LC 5.0 pistons. The LC 5.0 engine is a basic 5.0 motor.

Before we talk about the LC 5.0, let's go over the basic DDS Bullit. The $1,999

Here's the DDS CNC machine in action cutting out another Bullit that is a TRW blank. The CNC machine is a tool for machining the main support system and generates a precise carbon copy every time.
Notice how the nose cone of the LC 5.5 pintion is biased to the exhaust valve side. This arrangement better feeds fuel at the cutline, which means more power to the rear wheels.

Bolts: Crankshafts are ground under a 0.10 inch, milded, and polished. New TRW forged pistons are cut for oversized values and fitted with TRW plasma- moly rings, and the piston/rod/crank pieces are computer balanced.

During final assembly, the Bullet short-block is given the customer's choice of an SVG B305, E303, or S305 camshaft and timing chain sprockets. Main bearing thrust clearance, rod bearing oil clearance, rod bearing side clearance, and ring and gap are all mic'd, and new bearings and freeze plugs are installed. In its basic form, the Bullet shortblock can handle up to 500 horsepower, plenty rugged to withstand what most street cars can dish out. But what about cars over the edge? For cars with outrageous quantities of boost, lots of nitrous, or any highly stressed power adder, call continued on page 140.
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with a stickshift, DSS can endow the Bullet block with a few extra goodies. The Bullet is intended to provide the strongest package possible using the factory block, crank and rods. In this regard, it is among the best engines available and has been proven in competition time after time. DSS Bullet engines have survived entire seasons of abuse in 10-second Mustangs with alarming regularity, which is hard to ignore given its cost.

It goes without saying that the main item on the LC 5.0 menu is a custom low-compression piston, but the customer will also have his choice of an Oringed block, a lower main support system, Crosser rods and a grout-filled block. All of these items may be ordered separately or in any combination; the nice thing is that none of these options will break the bank.

Finding out just what an engine needs can be difficult, especially when funds are limited. In any case, the staff of DSS is available to help you select the proper equipment for any budget.

Pistons

Chances are, if you try to put 12 lbs. of non-interlocked boost into a motor with a 9.4 or higher compression ratio, you'll soon experience the agony of a blown gasket, or worse. Many aftermarket cylinder heads use small combustion chambers; some of them are as small as 58ccs. These combustion chambers are optimized for maximum performance in naturally aspirated engines, but when pushed into service by supercharged engines, they often lose their flow.

The trick to making a Howser live in harmony with a smaller-chamber aftermarket head is to lower the compression. This is easily achieved with DSS's low-compression piston. When specified for an additional $185 over the price of a base Bullet block, the reverse dome piston will add approximately 80% to the chamber's existing clearance volume. When compared with the pistons in the standard Bullet block (whose clearance volume is roughly comparable to the stock engine), the LC 5.0 piston lowers compression with a 64cc head from 9.26:1 to 3.63:1. This puts supercharged, turbocharged and nitrous-equipped engines in safe territory when the boost is cranked up.

The LC 5.0 piston is based on the same TRW forging that goes in the base Bullet, i.e., the base Bullet piston, the LC 5.0 piston is relieved for larger valves (up to 2.00x1.625 inches diameter) using DSS's new CNC machine. While still in the CNC machine, a depression is cut in the top of the piston (for a total negative dome volume of 13 cc's), with the reverse dome area biased toward the exhaust valve for better power.

According to DSS, the 200-overnow LC 5.0 piston is also available separately for those building their own engines.

O-Rings

For an additional $185, the Bullet customer may also opt to have his short-block O-ringed. The O-ringed block provides the ultimate in sealing head gaskets and may be used in conjunction with Fel-Pro Loc Wire gaskets (requiring grooved cylinder heads) or with a graphite gasket. DSS recommends this inexpensive procedure for all engines subjected to large doses of nitrous oxide or boost.

Under normal operation, the clamping force that seals the combustion chamber is adequate. With greater cylinder pressure, the cylinder head has a tendency to lift, allowing expanding gases to escape and inhibiting coolant into the combustion process and oil supply. Small-block Forders in particular have a nasty habit of becoming incontinent in the head gasket area, mostly because of the turbo.

The stock rods are thermal cleaned, Magnafluxed, shot-peened and then relased. The factory rod bolts are replaced with 3/16-inch ARP rod bolts, and the rods are balanced. They aren't the ultimate in performance, but the stock prepared rods have been used successfully in many 10-second cars.

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there are only four head fasteners for each cylinder. (The small-block Chevy uses five per cylinder.) One way to
improve on the existing system is to O-ring the block. This seals the combustion chamber 360° and spreads the clamping
dr partners from the four fasteners evenly around the cylinder bore.
In conjunction with the O-ring, DDS recommends the use of a cylinder head stud kit (such as ARP's 776-16 inch stud kit, part
No. 154-4061). This maximum-size, with the O-ring and prove to
called 'plated fasteners after
FILLING THE BLOCK
In a perfect world, all cars could afford SVO A4 blocks because they're cheap and plentiful. Although this may
indeed be the case for some NASCAR teams, drag racers who want the unyielding strength of Ford's best must
wait in line and then pay dearly. So what are drag racers of more modest means supposed to do?
For an extra $185, DDS will fill your Bullet block prior to birthing. This gives it additional strength in the cylinder wall area. The hollow water passages in the block are often a source of weakness worn cylinder pressure gets very high, thereby filling these passages the surrounding
areas act as if they're completely solid.
The process may sound simple, but filling a block with machinist's grit is a tricky affair that requires the kind of skill that comes only with years of experience. The cylinder head stud kit must be taken into account, as well as the fill level and water passages. Considering the difficulty, this task is best left to the professionals.
Race-only new obviously can benefit greatly from a filled block, but drivers of street cars may also benefit. Since the solid grit replaces the cooling cavities of the block, a new block may need less filling than a more block. The engine's intended use will largely determine how much a block should be filled. Since cooling capability will be affected by filling, consult DDS before ordering.

A new study system replaces the stock
main bolts with custom ARP fasteners. These two-piece studs allow for in-
dependent fasteners on both the main caps and the girdle support, thus
keeping the engine from being overheated.

Support the latte also has the effect of reducing oil runniness because it steepens the crankshaft shaft as it rotates.

COUNTERSPORTSMAN ROD
If the bottom end of the stock block is the weak link in the engine block, then the stock connecting rod is likely the weakest component in the whole assembly.
A properly pressed stock rod will make a huge difference in the amount of force an engine can handle, but everlast has its limits. Any 5-liter engine that will see more than 500 horsepower is an excellent candidate for an aftermarket rod upgrade.

Several manufacturers offer upgraded
rods for 5-liters, and generally they can be separated into two groups: press-fit and full-floating (also known as bushed). As you may know, other distinctions are made between connecting rods, but as we'll see, these are the most important for cost consideration.

The Crower Sportman rod (part No. 29213) is a $279 option on the DDS Bullet. These 4340 steel forgings offer a better construction and larger 3/8-inch red bolts, and accommodate a press-fit 912-inch Ford wrist pin.

The most obvious reason for using a press-fit pin besides street durability is cost. The Crower Sportman rod may be used with Ford replacement parts, including the modified TRW forgings used by DDS. Provided that the press-fit pin use is not expected (typically the case in a hydraulically cammed supercharged or turbocharged application), a full-floating pin will not provide any benefit.

When compared with the two other available press-fit forged 5-liter rods, the Crower also finishes favorably. Of the current offerings, the Crower is the least likely to require the use of expensive Mallory metal in the balancing process, a factor resulting from its reduced big-end weight. When the likelihood of balancing other stock crank/rod combos with Mallory metal is factored in, the use of a press-fit forged rod doesn't make economic sense, which makes the Crower a logical choice.
The Crower Sportman rod is considerably stronger than the factory rod and should be used in applications over 550 hp. The Crower piece has more meat than the stock rod and uses stronger 3/8-inch rod bolts. When compared with other press-fit forged rods, the Crower is least likely to require heavy metal to balance the crank; its large ends aren't as heavy.

Crower a logical choice for a budget 4-liter buildup. In plain English, the Crower rod can be balanced along with the low-cost TRV forging and a relatively light stock crankshaft at a minimal cost, a cost fast is included in the basic DSS bullet price.

All this is good news to DSS Bullet customers who want to upgrade their rods without going broke. Keep in mind that an upgrade to more expensive bushed rods would require more expensive pistons (which will likely feature a Chevy 357-inch pin). A high-dollar forged or billet crank can't be too far behind, and then the cost skyrocket-

**SOURCES**

Crower Cams & Equipment
3333 Main St.
Chula Vista, CA 91911
619/422-1191
Fax: 619/422-9067
forged connecting rods

DSS Competition Engines
960 Ridge
Lemont, IL 60439
708/268-1630
Bullet & LC 5.0 Bullet engines.

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**Compression Ratio**

<table>
<thead>
<tr>
<th>Chamber Size</th>
<th>LC 5.0</th>
<th>Standard Bullet</th>
<th>HC 5.0</th>
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<tr>
<td>56cc</td>
<td>10.35</td>
<td>10.33</td>
<td>12.15</td>
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<tr>
<td>58cc</td>
<td>9.82</td>
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<td>64cc</td>
<td>8.36</td>
<td>9.32</td>
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<tr>
<td>68cc</td>
<td>7.88</td>
<td>8.68</td>
<td>9.81</td>
</tr>
</tbody>
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A variety of compression ratios are available for the DSS Bullet short block. Crower are the estimated compression ratios for different combustion chamber volumes when the LC (low-compression), standard, and HC (high-compression) pistons are specified. All pistons are also available outright (call DSS for quotes). The HC piston option is new as of press time and will offer the naturally aspirated rotor excellent performance at a reasonable cost.

**Bottom Line**

So how much does one pay for an optioned LC 5.0 Bullet, and how fast does one expect to travel? That depends on which options you get. A fully decked LC 5.0 with the Billet block, LC 5.0 pistons, main support system, Crower rods and Oversized block tops out at around $3,179 (assembled), well under the cost of most crate engines. With the right blower or nitrous system (in, of course, a properly equipped car), the owner of such an engine should be a regular, trouble-free visitor to the 10-second club.

To make the most of the LC 5.0 Bullet—or any engine—a properly set-up fuel system and chassis are absolute musts. The biggest keys, however, are induction and intelligent tuning. The right set of heads, fuel, cam, intake and exhaust tuned by a knowledgeable engine builder (preferably on a dyno) will make a world of difference. In this regard, DSS can also help. Pro Stock know-how in combination with a SuperFlow flowbench and dyno effort can allow you to realize the full potential of your fuel-injected DSS Bullet—without sending you to the poorhouse. [Muscle Mustangs & Fast Fords](#)