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at a relatively slow speed. This combination will not produce the low end power that the faster turning small blower will, but will significantly outperform the small blower at high engine speeds. However, if you never drive your vehicle in the higher speed ranges, you may be giving up impressive improvements in the lower speed ranges. You may choose to do this anyway because you want the look of the larger blower and are willing to give up some bottom end performance.

To be more specific, the Pro Street/ Marine 142 makes an excellent low to midrange blower for a 350 Chevy. The 6-71 is best for mid to high rpm ranges. The 8-71 is for all-out competition style engines that will see high rpm usage. The Pro-Street 177 is a good all-around compromise that will perform well across the board, but it still won't deliver as much power as the 6-71 or 8-71 at extreme engine speeds. These recommendations are based on setting up all three blowers at a similar boost output. On the big block, Weiand offers the Pro-Street 177 for good low to midrange power, the 6-71 for strong mid to high-range power, and the 8-71 through 14-71 for large displacement, high boost/rpm engines. The Pro-Street 256 is a good all around compromise.

Again, the 6-71 through 14-71 will outperform the smaller blowers in the high rpm ranges.

Supercharger Rotors

Weiand uses two types of supercharger rotors. The smaller superchargers use new (not remanufactured) CAD/CAM designed two lobe rotors. These rotors were designed to hold their tolerances 360□ for maximum boost pressure efficiency. Two lobe rotors feature thick walls and a solid shaft, which prevent flexing at higher boost levels. The supercharger case is smaller because the two lobe rotor design takes up less area in the case. This allows for a more compact package for easier underhood installation in many applications.

Weiand's larger superchargers use three lobe helix rotors. The helix style rotor was developed by General Motors for larger GMC superchargers. They are more efficient than a two lobe rotor because they use less horsepower to supply a greater volume of cooler air charge to the cylinders. Helix rotors also resist flex under extremely high boost situations. These superchargers use larger cases, allowing for a greater volume of air displacement per rotor revolution.

There is also a version of the three lobe helix rotor used in racing called the "hihelix" rotor. This design has even more "twist" imparted into the blower rotor and does provide more power. These blowers were developed for Alcohol Dragster and Funny Car racing and are extremely expensive, making them impractical for anything but professional racing. The increase in performance

impractical for anything but professional racing. The increase in performance is not justified by the increase in cost for street applications.

Expected Performance Increases

Installing a blower is one of the easiest ways to substantially improve a vehicle's overall performance. With one of Weiand's superchargers, here are some of the improvements you can expect:

1. Improved starting. A properly set up blown engine typically will fire instantly, usually before the engine has even made one revolution. This is because the blower immediately is pushing the inlet charge right into the cylinder, rather than waiting for the engine vacuum to draw the charge into the cylinder.

2. Substantial increases in bottom-end performance. While this is true with all Weiand blowers, it is particularly attributable to the smaller ones.

3. Substantial horsepower increases. Bolting one of Weiand's Pro-Street Superchargers on an otherwise stock small block Chevy will result in an increase of approximately 100 to 120 hp. Usually with a mild blower cam and a larger carburetor you can expect a typical small block to produce anywhere from 360 to 400 streetable horsepower. The addition of a set of good heads can boost this into the 440 to 470 hp range. Torque on an engine of this type typically will be in the 400 to 440 lb.-ft. range. All of these figures are based on a blower that is producing about 6 or 7 pounds of boost. A larger blower, such as Weiand's 6-71, on a similar engine to the one described above could push the top power output well over 500 hp. NOTE: It is important to understand that for all practical purposes, an engine does not know what size supercharger is bolted to it. The amount of boost that is being produced by the blower is the critical factor. So our power output estimates above are somewhat typical of any of Weiand's blowers, with the following exceptions: At very low engine speeds, the smaller blowers will typically produce more torque than the bigger blowers. At very high engine speeds, the larger blowers will produce substantially more power than the smaller blowers.

Other Engine Modifications

One of the big advantages of a supercharger is that it can overcome many induction deficiencies in an engine, especially in the low to mid-range rpm area. Weiand Pro-Street and 6-71 superchargers can be installed on a stock engine, as long as the static compression ratio is 9:1 or less and engine speed is limited to 6,000 rpm. Most stock engines are equipped with cast pistons, cast crankshaft, two bolt main caps, and a small camshaft, requiring you to run very low boost pressure of 3 to 5 pounds maximum. Higher boost levels will cause detonation and engine failure.

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To run boost levels from 6 to 10 pounds we recommend the following:

Forged blower pistons with a static compression ratio of 7.5:1

- Steel crankshaft
- Four bolt main caps
- Steel harmonic dampener
- Stainless steel valves
- Three angle valve job
- More aggressive camshaft
- Roller rockers
- Ported and polished heads
- Steel rods with good rod bolts
- Chromoly push rods
- High output ignition
- Weiand high flow water pump (cast iron or aluminum available - see our complete water pump section for applications)
- Minimum of a 2-1/2" diameter dual exhaust with headers. Recommended primary tube diameters and collector sizes are:
- Small Blocks: 1-5/8" to 1-3/4" with 3" collectors
- Big Blocks: 1-7/8" to 2' with 3-1/2" collectors

For maximum boost and horsepower applications (12 pounds or more), we recommend the following engine specifications:

- High quality forged or billet crankshaft
- Four bolt main caps with quality bolts or studs
- Steel harmonic balancer or crank hub
- High quality steel rods (H or I beam)
- Forged blower pistons
- O-ringing the block (mandatory)
- Severe duty stainless steel valves or iconel
- Fully ported and polished heads
- Solid or roller cam designed for high boost
- Roller rockers
- Chromoly push rods
- High output ignition management system or magneto
- Blueprinted carburetors or fuel injection
- High octane race fuel (112+ rating)
- Minimum of a 3" diameter dual exhaust with free flowing street/race mufflers and large tube headers.
- Recommended primary tube diameters and collector sizes are:
- Small Blocks: 1-7/8" to 2" with 3-1/2" collectors Big Blocks: 2-1/8" to 2-1/4", with 4" collectors
- Maximum effective compression ratio on gas not to exceed 24:1

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- Maximum effective compression ratio on gas not to exceed 24:1
- It's important to realize that there are no hard and fast rules and the suggestions made here are general in nature.

Carburetion with a Blower

Choosing a carburetor is a very important step in building a blower motor. Under boost, the engine could need up to 40 to 50% more fuel and air, so it's key to pick a carburetor that is up to the task. If your carburetor can't provide enough fuel and air, you can't take full advantage of your supercharger and you won't be able to make maximum boost. In addition to providing fuel for the motor, the carburetor also is the restriction through which air must pass to get into the blower and the motor. Running too small a carburetor therefore means that you can't flow enough air to produce maximum boost. It's very simple: If a supercharger can't draw the air and fuel into it, you can't get horsepower out.

The amount your carburetor needs to flow depends on engine characteristics and on the amount of boost your blower will be making. There's a formula for determining the required carburetor cfm:

$$\text{Maximum CFM Required} = \frac{\text{Engine CID} \times \text{Maximum Engine RPM}}{356} \times \left[\frac{\text{Maximum Blower Boost}}{14.7} + 1\right]$$

If your carburetor is too lean, it will cause detonation, which can destroy your motor. How do you know if it's too lean? You'll have several obvious indications, like glowing red headers, audible "lean pop," or engine surging. Even if you don't experience these conditions, you should still read your spark plugs for proper color. You want to see a medium to dark tan color.

If you run one or more Holley carburetors, be aware that they contain power valves. Power valves provide additional fuel when there is no vacuum at the base of the carburetor. However, in a blower application, there will always be some vacuum, so the power valves will not function properly. You will need carburetors that have a "boost referenced" power valve circuit. Holley "Supercharger Carburetors" are specifically designed with this feature. In addition, they also are 100% wet-flowed, equipped, and calibrated for the special needs of a supercharged engine.

Ignition Systems with a Supercharger

Many street supercharger applications will work fine with the stock ignition system, because blown engines make so much low and mid-range power, it is not necessary to rev to high rpm's. High performance ignitions are primarily required to provide adequate spark at higher than normal rpm's. If most of your driving is going to be under 5,500 rpm, you probably won't need an

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your driving is going to be under 5,500 rpm, you probably won't need an aftermarket ignition. For optimum performance at higher engine rpm's, select an aftermarket performance ignition system. It is usually a good idea to run spark plugs that are one to two ranges colder than normal with a blower. The more boost, the colder the plug required. Colder plugs will foul easier than hotter plugs, so in this instance a "hot" ignition may be advisable.

The main thing that needs to be addressed with a blower is to make sure that detonation is controlled. A handy device to have is an ignition system with a "boost retard control," such as the Holley Ignition P/N 800-450.

With the use of this unit, you can run normal timing settings which will allow for easy starting and reasonable fuel economy under normal driving situations. However, when you step on the gas and the engine goes into boost, this timing setting may cause detonation. With the "boost retard control," the driver can dial in ignition retard with a dash-mounted knob. These devices usually operate on a "degrees of retard per pound of boost" and are typically adjustable from 1□ to 3□ of retard per pound of boost. As an example, if the unit is set to deliver 1□ per pound of boost, that means that when your blower is putting out 4 pounds of boost the distributor will be automatically be retarded by 4□. When you reach 7 pounds of boost, it will be retarded by 7□. Best results are achieved by driving the vehicle under boost and adjusting the unit until any detonation is eliminated.

NOTE: We do not recommend using these devices in marine applications. Retarding the timing under boost increases the combustion temperatures. On a street vehicle, this typically occurs for short periods of time. In marine applications the engine is usually in full boost all of the time. As a result, these prolonged high combustion temperatures can burn pistons or valves.

Most blown engines operate best on 28 to 34□ of total timing. Running more total advance will not provide any performance increase. Your distributor should have a centrifugal advance mechanism that has been set up so that the entire advance is in by 2,500 rpm. The best way to set your timing is to put a permanent mark on your harmonic damper that represents 34□ total advance. If your damper doesn't go this far, you can measure the timing marks on your damper and then, using your measuring tape, calculate where 34□ would be. 34□ is a very safe figure and should provide close to optimum performance.

After you mark off 34□, start your engine and rev it up to a speed where the entire distributor's mechanical advance will be in. This should be somewhere over 2,500 rpm. Then read the new 34□ mark like you would read TDC at idle speed. Adjust the distributor so that the new mark on the damper lines up with the "0" on your timing tab. This would provide 34□ of total timing or if

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you wanted 32□ of total timing, you could line up the mark on the damper with the 2□ ATDC mark on the timing tab instead of "0."

Supercharger Engine Camshafts

The choice of camshaft can make or break a blower motor. A legend in the industry, Lunati offers several camshafts specifically designed to work with Weland blower kits. In addition, the following are a few basic guidelines for selecting the proper cam for your motor. Obviously, the amount of boost your supercharger produces is going to be a factor in choosing a camshaft. Weland offers three different levels of superchargers, and each requires a different type of cam.

The "mildest" of Weland's blowers are the Pro-Street superchargers, which are set to produce from 5 to 7 pounds of boost. The company recommends a hydraulic cam for these applications - where the engine will not be spun past 6,500 rpm and has several grinds available. All of these cams are ground on a 112 to 114□ lobe center line, which helps maintain cylinder pressure to maximize horsepower at these lower boost levels. Keeping the cylinder pressure up also gives you excellent throttle response. The milder cams that Weland offers are great for street performance enthusiasts who want to gain about 100 to 120 streetable horsepower. The company also offers slightly "bigger" cams for the next performance level up.

For 6-71 and 8-71 blowers, Weland again recommends running a hydraulic cam, as long as you keep the boost level below 10 PSI. Weland also offers cams for these type of applications. For your higher boost levels (which includes all 10-71, 12-71, and 14-71 applications) in gasoline burning engines, the company recommends running a flat tappet or roller cam with a 110□ lobe center line. This cam design provides good overall power on pump gas and also aids in engine cooling. Plus, the 110□ center line provides even sharper throttle response and helps lower initial cylinder pressure (you won't miss the cylinder pressure with these blowers, since they make plenty of boost).

In all supercharger applications, Weland recommends running roller rockers and chromoly push rods. Table 4 displays a listing of Weland supercharger camshafts for the Chevrolet small-block (flat tappet hydraulic). For more information on Lunati's line of blower cams, consult the Lunati section of this website, or call Lunati and speak with one of their cam experts at 901-365-0950.

Conclusion Supercharging is an extremely effective way to reliably increase horsepower and torque, particularly in the low to mid rpm ranges where most street machines are operated. Unfortunately, due to the wide use of superchargers in drag racing, many people think a supercharger is an exotic

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superchargers in drag racing, many people think a supercharger is an exotic race component and is not truly suitable for the street. Now that supercharging is becoming quite common on stock factory vehicles, more people are realizing that a supercharger is a safe, practical source of performance increases. Superchargers are currently available on several Ford models, as well as Buick and Pontiac cars. These are all Roots type superchargers and operate on the same basic principle as all of Weiland's superchargers.

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