

Using high-performance (*Racing*) technology to improve engine efficiency

Instead of a standard passenger car camshaft or perhaps a truck or RV camshaft, use a muscle car camshaft. In this case, a clone of Buick's own *Stage-1* performance camshaft. That makes the engine more efficient and powerful while maintaining a smooth idle and sufficient low-speed power for duties like towing.

The camshaft controls the opening and closing of the air/fuel intake and exhaust valves. Adjusting the opening and closing times of these valves changes how the engine responds. Passenger cars normally have these valve settings engineered for a quiet and mild-mannered engine. Hot-rod engines produce much more power, but idle poorly and are hard to handle. The *Stage-1* camshaft is a little more "assertive" without compromising road manners.

An internal combustion engine must also work like an air pump: moving fresh air into the engine and expelling exhaust.

Instead of standard exhaust manifolds and original single pipe exhaust system, use exhaust headers and dual-exhaust system to reduce back-pressure on the engine.

Since less "pumping action" is required to expel the exhaust, more of the power created by the burning fuel is freed up to actually move the car.

An engine must pump in fresh air for combustion. By using an airflow-optimized aluminum intake manifold, the engine uses less power to bring in air; thus, freeing up mechanical power to propel the car. Also, the use of aluminum reduces engine weight.

Use improved design Stage-2 aluminum cylinder heads to efficiently move fresh air/fuel mixture into the combustion chamber and provide a low resistance path for the exhaust gases.

Aluminum is a better conductor of heat than iron. Therefore aluminum heads dissipate heat away from the combustion chambers more effectively. This allows for a higher compression ratio without premature detonation ("pinging".) This improves engine efficiency.

The use of aluminum also decreases the weight of the engine by about 60 lbs. (about a 10% weight reduction).

Use a higher compression ratio than commonly used on passenger cars. This requires the use of premium gasoline, but more efficiently converts the thermal energy of burning fuel into mechanical energy to move the car.

The higher compression ratio allows the use of longer connecting rods than Buick originally designed. Longer rods reduce side loading of the piston, thereby reducing piston to cylinder wall friction. That reduced friction increases efficiency and reduces wear to improve engine longevity.

