

## Ecotec Drag Racing

*Front-wheel drive drag racing reflects today's car market.*

Generating up to a remarkable 1,000 horsepower from only four cylinders, the race version Ecotec-powered Cavalier and Sunfire are some of the fastest-accelerating front-wheel drive vehicles ever built. Remarkably, many of the components used in these race engines are production based. This race effort showcases the potential of the production Ecotec to today's sport compact market.

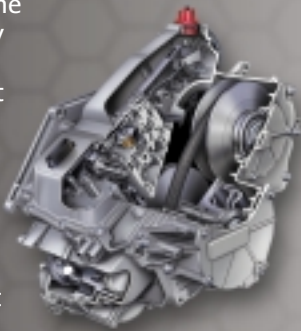


*The Ecotec drag racing engine used in sanctioned drag racing has a reduced displacement of 2.0L and a higher rpm range.*

## Continuously Variable Transmission

*VTi provides a seamless driving experience and helps improve fuel economy.*

The Saturn VUE uses the new VTi, a continuously variable transmission (CVT). It has 45 percent fewer parts than a conventional automatic transmission and helps to improve fuel efficiency by increasing the time that the engine runs at its most efficient rpm. The result is a smooth, shift-free driving sensation with no hunting for gears on hills or in traffic congestion.



*Hydra-Matic VTi has a belt and pulley system that basically eliminates separate gears.*

## Ecotec 2.2L I-4 Engine

### Specifications

|                    |  |
|--------------------|--|
| Configuration:     | 2.2L I-4   |
| Installation:      | Transverse   |
| Bore C/L Spacing   | 96 mm  |
| Displacement:      | 2,189 cc   |
| Bore x Stroke:     | 86 mm x 94.6 mm  |
| Valvetrain:        | Dual overhead camshafts,<br>4 valves per cylinder          |
| Valve Followers:   | Hydraulic roller finger followers                          |
| Compression Ratio: | 10.0:1   |
| Firing Order:      | 1-3-4-2  |
| Fuel System:       | Sequential electronic fuel injection                       |
| Main Bearing Caps: | Lower crankcase  |
| Peak Horsepower:*  | 144 hp (107 kW) @ 5600 rpm                                 |
| Peak Torque:*      | 155 lb-ft (210 Nm) @ 4000 rpm                              |
| Mass (as Shipped): | 291.5 lb (132.5 kg)  |
| Manufactured:      | Tonawanda, NY; Spring Hill, TN;<br>Kaiserslautern, Germany |

\* Horsepower and torque may vary with application.

### MATERIALS:

|                       |                                      |
|-----------------------|--------------------------------------|
| Cylinder Block:       | Aluminum                             |
| Cylinder Bore Liners: | Cast iron                            |
| Lower Crankcase:      | Aluminum                             |
| Cylinder Head:        | Aluminum                             |
| Cylinder Head Gasket: | Multi-layer steel (MLS)              |
| Crankshaft:           | Nodular iron                         |
| Camshaft:             | Nodular iron                         |
| Connecting Rods:      | Powder metal (forged steel optional) |
| Pistons:              | Aluminum, 3-mm top land              |
| Intake Manifold:      | Polymer                              |

### COMPONENT DESCRIPTIONS

|                           |                            |
|---------------------------|----------------------------|
| Oil Pump:                 | Crank driven, gerotor      |
| Engine Oil/Sump Capacity: | 5.25 qt (5 L)              |
| Accessory Drive Belt:     | 5-rib serpentine           |
| Throttle Type:            | ETC or mechanical          |
| Fuel Injectors:           | PFI, dual spray            |
| Fuel Delivery System:     | Returnless or recirculated |
| Ignition Coils:           | Coil-on-plug cassette      |
| Spark Plugs:              | Long-life, platinum-tipped |

All specifications listed are based on the latest product information available at time of publication. The right is reserved to make changes at any time without notice.



**GM Powertrain**

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# Ecotec 2.2L I-4 Engine

**Using technology from around the world to become GM Powertrain's first truly global engine**

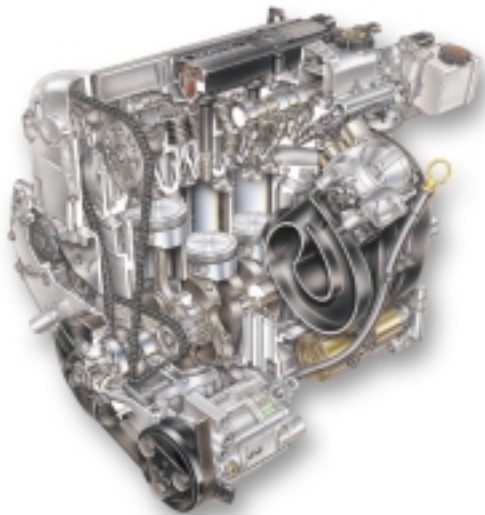


*The flexible design of the Ecotec 2.2L makes it the right choice for a variety of applications.*

## Global Perspective, Modular Design

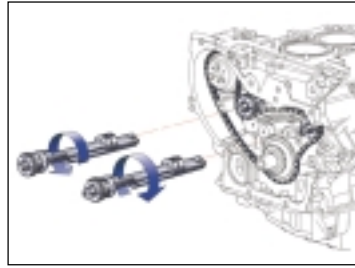
***A fuel-efficient, environmentally friendly engine in a quiet, durable package***

The lightweight-aluminum, four-valve overhead-cam Ecotec 2.2L engine features a modular design, providing flexibility for a number of future technologies, such as turbocharging, variable valve timing and direct injection-gasoline. Low maintenance is another key hallmark of this engine: oil and filter replacement is the only routine service required. One of the newest of the Ecotec 2.2L's many applications is the Chevrolet Malibu, with 144 horsepower and 155 lb-ft of torque.



*The versatile design of the Ecotec gives GM the flexibility to meet the needs of drivers around the globe, meaning the Ecotec could become one of the highest-volume engines in the world.*

### Key Features



#### **Twin Balance Shafts**

*Twin balance shafts, housed in the cylinder block, provide smooth and quiet engine operation by offsetting the vibrations inherent in an inline 4-cylinder engine.*

#### **Coil-on-Plug Ignition System**

*The coil-on-plug ignition cassette produces a strong, efficient spark and eliminates spark plug wires.*



#### **Roller Finger Followers**

*The roller finger follower, with hydraulic lash adjuster, is self-adjusting, reduces wear and improves fuel efficiency.*



#### **Tuned Intake Manifold**

*The scroll design of the intake manifold offers tuned intake passages for good power and torque in a compact design.*



### Additional Features

- Structural oil pan provides rigidity to the bottom of the engine for noise and vibration suppression
- Cast-iron cylinder liners enhance durability
- Accessories, such as the alternator and air conditioner, are directly mounted to the engine for less noise and vibration
- Long-life coolant greatly decreases frequency of coolant changes and is designed to last up to five years or 150,000 miles (whichever comes first)\*

\* Maintenance needs vary with different use and driving conditions. See Owner's Manual for more information.

### Applications



Saturn L-series



Chevrolet Malibu



Saturn ION



Chevrolet Cavalier



Saturn VUE



Pontiac Grand Am



Opel/Vauxhall Vectra



Pontiac Sunfire



Opel/Vauxhall Zafira



Opel/Vauxhall Speedster