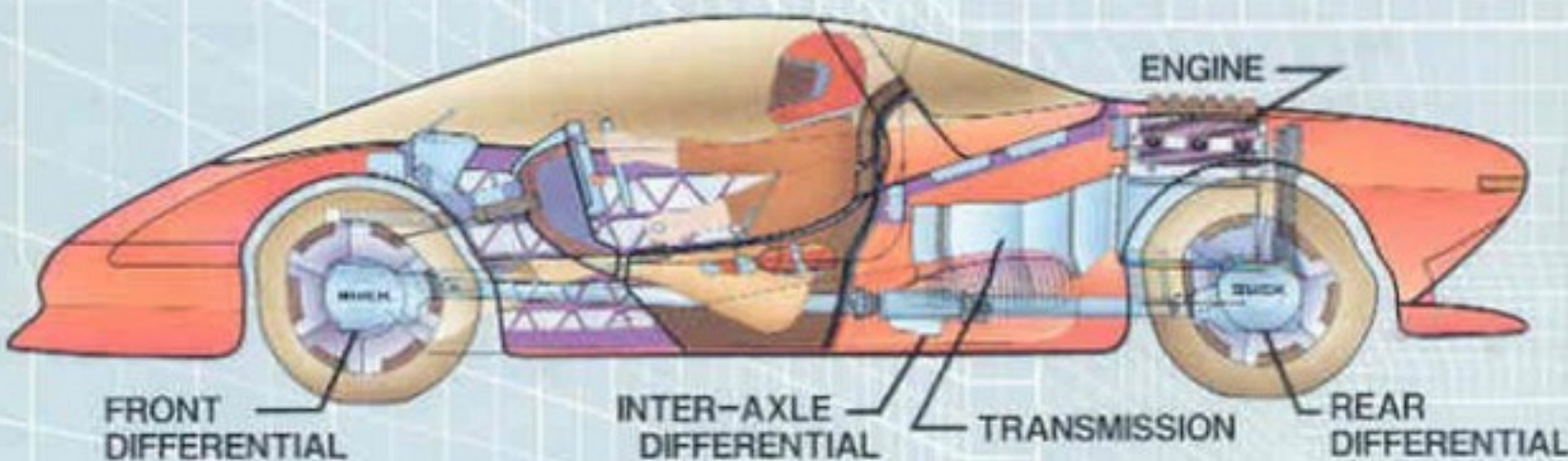


HIGH TECHNOLOGY

FROM BUICK

BUICK WILDCAT:
POWERTRAIN



BUICK WILDCAT: POWERTRAIN

Buick's one-of-a-kind Wildcat is a concept vehicle utilizing leading edge technology, and reflects Buick's commitment to being a leader in vehicle development and design. It is sleek in appearance with an emphasis on performance.

Its low aerodynamic profile has a maximum height of 43.74 inches. Specific dimensions include a 102 inch wheel base, a front and rear track of 59.53 inches, and overall width of 72.28 inches. Front overhang is 38.29 inches, and overall length is 172.75 inches.

The total weight of the Wildcat is 2910 pounds, and includes a specially designed and fabricated four-wheel-drive powertrain. Powertrain configuration is mid-engine, with the engine mounted longitudinally, facing the rear of the vehicle.

ENGINE

Power for the Wildcat is provided by a new 3.8 litre (231 cubic inch) V6 specially designed and built by Buick. With the exception of the fuel injectors, there are no production parts on the engine. The V6 has dual overhead camshafts, driven by a toothed belt/gear system, and has four valves per cylinder. The bore is 3.800 inches, and stroke is 3.400 inches. A compression ratio of 9.0 to 1 allows the engine to develop 230 Horsepower at 6000 RPM, and 245 lbs. ft. of torque at 4000 RPM. Maximum RPM is 6500.

A specially designed Buick Heavy Duty Sequential Electronic Fuel Injection system is fed by an electric fuel pump. The fuel rail delivers fuel to a tuned runner induction system, featuring a specially designed plenum. Fuel delivery is precalibrated, and based on throttle position, manifold pressure, manifold temperature, and engine RPM. Ignition is provided by a Heavy Duty Buick Computer Controlled Coil Ignition (C-3-I).

Cylinder heads are made of aluminum, and have two overhead camshafts in each. A toothed belt

which is driven by the crankshaft turns a gear located between the camshafts, and this gear drives the camshafts in a direction opposite of engine rotation. Two idler wheels keep tension on the belt at all times, one is fixed, and the other is adjustable for spring tension. The cam lobes actuate direct acting hydraulic followers which fit over the valves and valve springs.

Valves for this engine are made of stainless steel. The combustion chamber is of a pent roof design, and has a centrally located spark plug.

The block material is a chrome-moly alloyed cast iron, which is considerably stronger than the gray iron used in production engine blocks, and is more wear resistant. Special preparation to the block includes align-honing the main bearing bores to keep the center line of the bore as straight as possible, allowing tolerances between the bearings and the crankshaft to be more precise, resulting in less wear.



CHASSIS

The body of the Wildcat is fiberglass and carbon fiber reinforced vinyl-ester, and the front and rear carriers are bolted to the structure through bonded steel reinforcements.

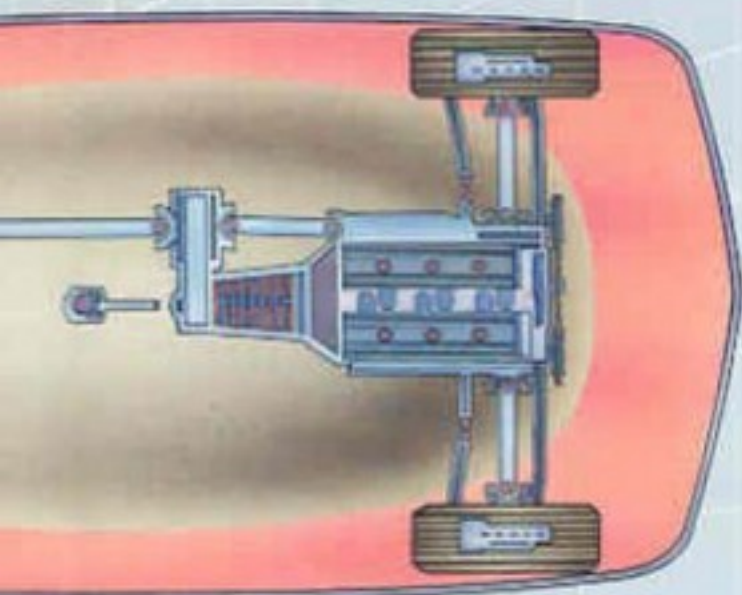
The floorpan is a laminate made of fiberglass, composite carbon fiber, and vinyl-ester resin. It is laid in successive layers, starting with a "veil" of fiberglass, followed by a layer of fiberglass material. At points where stiffness is necessary, layers of carbon fiber are added. Then another layer of fiberglass material and another "veil" of fiberglass is added, making the finished laminate 3mm thick.

At the front, a steel carrier is used to contain the front suspension, steering, master cylinder, and axle housing. The rear steel carrier contains the engine, suspension, radiators, and a specially fabricated 15 gallon fuel cell. No front to rear metal structure is utilized, the carriers are attached directly to the laminated structure.

At the front of the Wildcat, 225/50VR16 tires on 8 x 16" aluminum wheels are used, and at the rear, 225/50VR16 tires on 9 x 16" aluminum wheels. Tires with a "V" rating are necessary on a vehicle with the speed potential of the Wildcat. Tire size is maximized within body constraints for optimum performance.

Four wheel vented disc brakes are used on the Wildcat, and feature Buick's Anti-lock Brake system. The controls for the brake, as well as the accelerator and steering controls are of conventional design, even though they are custom fabricated. The air conditioning condenser is mounted at the front, and engine oil and transmission oil coolers are at the rear.

The Wildcat was designed to demonstrate the effectiveness and feasibility of implementing leading edge concepts in a performance vehicle. Its primary purpose will be to act as a tool for gathering data while under operation. The data will be evaluated, and may result in some of the Wildcat's technology being applied to production vehicles in the future.



FRONT SUSPENSION

DIFFERENTIALS

Front and rear differentials are unique and specific to the Wildcat. They feature aluminum housings, and are designed to be installed in an inverted position to fit in the allowable space. Because the differentials are inverted, the specially fabricated cases are revised internally for proper lubrication of the gears.

Specific differential cases were also necessary on the Wildcat because the differentials utilize half axle shafts, as opposed to conventional straight axles. Universal joints are used inboard to connect the differential to the half shafts, and outboard universal joints are used to connect the half shafts to the front knuckles and rear hub carriers.

The inter-axle differential features a new specific aluminum housing. It drives the front and rear propeller shafts, and allows for differences in speed between the front and rear shafts, while at the same time allowing equal propeller shaft torque. This is accomplished using an arrangement of beveled spider and side gears connected to cardan-type yokes.

The front differential has a 2.14 to 1 ratio, while that of the rear differential is 4.10 to 1. The difference in these ratios, and the difference in front to back tire sizes causes the front and rear propeller shafts to turn at different speeds.

The axle shafts on the other hand are not equal in torque. Differences in the differential ratios at the front and rear of the vehicle split the torque at 35% and 65% respectively, in order to balance the torque output to the weight distribution of the vehicle.

SUSPENSION

Suspension on the Wildcat is four wheel independent. At the front, unequal length upper and lower control arms attach to nodular iron knuckles. Coil-over-spring shock absorbers are mounted inboard and actuated by rocker type upper control arms through compression type upper ball joints.

At the rear, unequal length arms independently control cast hub carriers. Coil-over-spring shock absorbers act on the rear hub carriers.

Each coil-over-spring shock absorber unit is adjustable for spring rate, and is of the style currently in use on Gran Prix and Indianapolis racing vehicles. Shock absorbers are gas filled units provided by Delco Division of General Motors.

The front stabilizer bar has a diameter of .62 of an inch, is 21.6 inches in length, and has an effectiveness ratio of .62. The rear bar measures .64 of an inch, is 31.5 inches long, and has a .67 effectiveness ratio. Bushings made of Delrin AF offer tight control and stability. Steering is a forward mounted rack and pinion system which is power assisted.