



**HOLDEN**

**23 August 2004**

## **PRODUCT INFORMATION**

**VZ Light Commercial Vehicles**

**Ute, Crewman and One Tonner**

### **Development Cost**

\$11 million.

### **Quality Validation**

1.6 million durability and test kilometres (VZ sedans)

113,000 additional LCV test kilometres.

### **Alloytec**

A 3.6 litre, 60-degree V6, producing 175 kW of power @ 6000 rpm and 320 Nm of torque @ 2800 rpm (Ute) or @ 2400 rpm (One Tonner and Crewman) in the ECE measuring standard.

Specified in V6 Ute, Crewman and One Tonner, Alloytec provides 90 per cent of torque between an increased rev range (over 3.8 litre ECOTEC V6) of 1630 rpm to 5460 rpm.

The 3.6 litre, 175kW Alloytec V6 develops 14 per cent more peak power and five per cent more peak torque. It provides an eight per cent increase in the 90 per cent torque availability rev range.

Major features include:

- sand-cast alloy cylinder block and forged steel crankshaft;
- four valves per cylinder with roller finger followers;
- double overhead cam with advanced continuously variable cam phasing for outstanding operational flexibility;
- micro-hybrid design engine control unit with 32 bit capacity dictating every aspect of engine-management hardware operation and calculating more than 7,000 variables – compared to 1,350 on the ECOTEC – for faster and more efficient data flow;

- electronic throttle control, which precisely coordinates the driver's intentions with the actions of various control components;
- piston cooling jets and
- coil on plug ignition for maximum spark energy in the most precise timing

## **V6 Exhaust**

New V6 exhaust system for LCVs is configured differently from sedan system for packaging reasons. Features cast iron free-flow manifolds and dual close-coupled catalytic converters for emissions reduction.

## **Fuel Efficiency**

Full range testing incomplete. ADR 81/01 fuel labels will have V6 automatic Utes at 11.8 litres/100km. (Previously 11.9 litres per 100 km.) SS Ute fuel efficiency (auto models) improves from 13.9 to 13.5 litres/100km.

## **V6 Transmissions**

### **Six speed manual transmission (D173)**

Premium application six-speed manual transmission standard on Alloytec V6 Ute, Crewman and One Tonner (available from November 2004).

Six-speed ratio selection optimised by computer simulation matched to torque curves and tyre sizes. Ratio spread from first to sixth gives a more responsive first gear while allowing a sixth gear ratio of 0.75.

LCV final drive is 3:08, compared to 2.87 on sedans.

Clutch diameter increased by 14mm to 254mm. Clutch pedal engagement more progressive, complements ratios and engine torque character.

New dual mass flywheel tuned to engine characteristics reduces torque fluctuations in the transmission, lowers driveline noise and vibration levels.

An integrated concentric slave cylinder and release bearing reduce wear.

New first gear ratio and increase in clutch size allow towing of 1600 kg – 30 per cent more than naturally aspirated ECOTEC V6 models.

## **Four speed automatic transmissions (4L60 and 4L65)**

Ute (4L60), and Crewman and One Tonner (4L65) have upgraded four-speed automatic transmissions.

Features include controlling module and software that rapidly calibrates 8448 variables (13 times more than previous module). Calibration strategy differs from sedans to accommodate load carrying usage and is developed for improved shift feel and shift-to-shift variation.

Torque converter is refined to match Alloytec torque curve. A new Transmission Control Module and Engine Control Module improve launch feel at load and smoothness for more consistent shifts

## **5.7 litre Gen III V8**

Two different outputs:

Ute SS: 250 kW of power and 470 Nm of torque.

Crewman SS: 235 kW of power and 460 Nm of torque.

235 kW Gen III V8 optional on One Tonner S.

V8s have 'drive by wire' electronic throttle control and upgraded engine management systems. Throttle response is tailored to suit varied driving conditions, changed calibrations are set to a different torque map. Smoother pedal response improves driveability, launch feel, mid-range torque delivery.

## **V8 Transmissions**

Controller upgrades to the 4L60 used on SS Ute and the heavy-duty 4L65 auto used on the One Tonner and Crewman give improved shift-to-shift variation through new table calibrations timing shift events to ensure usage of available engine torque and to reduce downshift delays.

Transmission controller uses EC Cubing to control the difference between engine rpm and transmission input shaft rpm, improving transmission efficiency during low torque applications.

## **V8 Exhaust**

Two different exhaust systems for V8 Ute, Crewman and One Tonner are tailored for different body styles.

250 kW Ute SS: full twin exhaust system from manifolds through catalytic converters, intermediate and rear mufflers to the twin rear pipes.

235 kW Crewman SS (optional One Tonner S): two exhaust manifolds meet after the catalytic converters before intermediate muffler and then one pipe to the rear.

## **Cooling**

V8 and V6 cooling systems are upgraded.

V8 cooling system has revised layout and V6 system matches Alloytec. Both have 'get home' mode that allows vehicle to be driven on reduced power.

V6 One Tonner and Crewman have heavy duty 400 Watt fan, V8s have 430 Watt fan. They are respectively 120 Watts and 30 Watts more powerful than those in corresponding V6 Ute and sedans.

## **Chassis**

### **Front Suspension**

Refinements to front stabiliser bar geometry sharpen steering response, increase the range of mild understeer at low to mid lateral 'g' forces, particularly under load.

Revised geometry of pickup point on the front stabiliser bar decreases mass. Bar crank length is 40 mm shorter and a double ball joint drop link replaces previous rubber joint.

The changes improve front compliance understeer at low lateral acceleration, reduce any delay in bar's reaction to vehicle roll.

### **Rear Suspension**

Crewman now has 14 millimetre sway bar.

### **Power Steering**

New lightweight aluminium power steering pump with new hoses reduces fluid temperatures, improves quality and durability.

### **Brakes and Brake Assist**

ABS unit for Alloytec models is the latest generation Bosch ABS8. Smaller, lighter and faster than previous unit, it cycles at twice the rate and reduces stopping distance by four per cent.

LCV V6 and V8 models equipped with ABS have upgraded braking systems with a new brake booster and master cylinder.

Brake Assist senses how hard and fast a driver hits the pedal and determines whether additional braking assistance is required. A dual reaction ratio in the booster helps drivers to reach the ABS threshold. Brake Assist activates on brake pedal feel above 0.5 to 0.6 g deceleration.

### **Electronic Brake force Distribution**

Electronic Brake force Distribution (EBD) is now available on Alloytec V6 models with ABS. EBD is calibrated for use under all vehicle load conditions and provides control of rear brake pressure on all road surfaces when there is natural transference of weight from rear to front axle due to braking.

### **Crash Testing**

Extensive computer crash simulation and barrier crash tests for the VZ program took particular account of new powertrain and fuel systems.

### **VZ Headlamps**

VZ series have more compact assembly for both projector and reflector-type lamps.