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GM DIESEL ENGINES

GM's first attempt at a passenger car diesel was a dismal failure. In the late 1970s, GM designed a diesel engine based on the venerable Oldsmobile gasoline-powered 350-ci small-block. The structure couldn't take the pounding of early diesel technology. Two major limitations were the cast crankshaft (GM had dropped the Olds forging facility in 1967) and the use of only four head bolts around each cylinder, which wasn't too bad for a non-turbocharged diesel, but the lack of a turbo seriously limited power output. I'm not aware of any aftermarket support for this engine.

1982 to 2000: 6.2- and 6.5-Liter Turbo Diesel

The company's second attempt came in the early '80s with the 6.2-liter diesel engine. The 6.2-liter naturally aspirated diesel V-8 was built by GM's Detroit Diesel division and was introduced in the 1982 model year in C/K pickup trucks, as well as



Duramax engines have proven quite powerful and modifiable. Their modern injection and electronic systems make it easy for owners to add a little more fuel using an aftermarket tuner. (Photo courtesy of DHRA)

later in the infamous military Hummer H1.

In 1992, GM increased the size of the 6.2 to 6.5 liters and added a turbocharger, but the 6.2 liter was still produced until 1993. The 6.2- and 6.5-liter diesels were optional from 1982 through 2000 in the full

line of Chevrolet and GMC C/K series pickup trucks, Suburbans, full-size Blazer/Jimmy, Tahoe/Yukon, vans, and motor homes.

The 6.5 liter was used through 2000 in GM light-trucks, when it was replaced by the new Duramax line. It's interesting that the 6.5-liter turbo

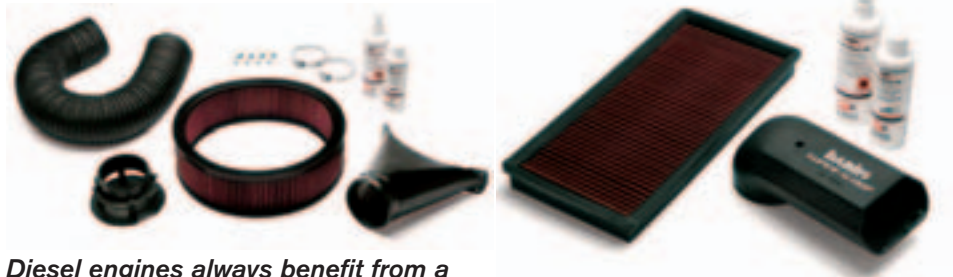


Banks offers a turbo kit for the 6.2-liter diesel. The engine powered a variety of GM pickups and trucks from 1982 to 1993 when the 6.5-liter turbo diesel variant came on line. (Photo courtesy of Gale Banks Engineering)

diesel remained in production for use in the Hummer H1 military vehicles. Because of the huge production numbers and relatively low cost, the 6.5 liter has historically been a popular power unit for custom applications, low-production models, or small-market off-road vehicles and the like.

The 6.5 liter also powered a range of light commercial trucks from 1996 until it was replaced with the new Duramax 6.6-liter in 2001. The later years of the 6.5 saw a turbocharged version available in the GMC Sierra and Chevrolet Silverado. The 1999 L65 turbo diesel produced 215 hp at 4,300 rpm and 440 ft-lbs of torque at 1,800 rpm. It used an electronically controlled high-pressure rotary injection pump with a max engine speed of 3,400 rpm. It was equipped with a catalytic converter, EGR, and PCV emission controls. You could choose between a manual 5-speed and the 4L80-E 4-speed automatic transmissions.

The primary weakness of the 6.2 and 6.5 seems to be the bottom ends. The main bearings fail and the



Diesel engines always benefit from a free-flowing intake. Banks engineered this one for the 6.2 liter. It's designed to mount on the nose in a forward facing high-pressure area to deliver a dense charge to the engine. (Photo courtesy of Gale Banks Engineering)

crankshafts go out, especially if you add a bunch of extra power. However, engine remanufacturers offer upgrades in this area that include redesigned and more robust main caps, stronger ARP fasteners, etc.

These engines use Stanadyne injection pumps, with recommended replacement at 80,000-mile intervals. The 6.2 liter used a mechanical lift pump; the 6.5 used an electromechanical one. Later-model 6.5-liter diesels have an electronic control module mated to the

Banks has an exhaust system as well as a free-flowing intake system for the 6.5 liter. Even if you aren't going to get crazy with upgrades, bolt-on parts like these give you that little extra oomph and response to make driving more fun. (Photo courtesy of Gale Banks Engineering)

side of the injection pump. The electronic control module is not reliable however the aftermarket replacement units are much better.

2001–2004: Duramax LB7

The Duramax diesel engine family comes from a joint venture between GM and Isuzu Motors, DMAX Ltd. GM's relationship with Isuzu began in 1971 and was



For the 2004 model year, the LB7 Duramax 6600 6.6L diesel V-8 was rated at 300 hp at 3,100 rpm and 520 ft-lbs of torque at 1,800 rpm. The LB7 came in 2001 to 2004 GM light heavy-duty trucks. It did not use EGR but did have catalytic converters where required. (Photo courtesy of General Motors)



This 7.8-liter inline 6-cylinder is the first diesel engine produced by the joint venture between GM and Isuzu. The 7800 was introduced in 2000 medium-duty trucks, and comes in 200-hp/520-ft-lb or 275-hp/860-ft-lb versions. (Photo courtesy of General Motors)

strengthened in 1997 when GM announced that Isuzu would develop diesel engines for GM. The Duramax Diesel family is domestically sourced, being produced in a DMAX, Ltd. facility in Moraine, Ohio.

Starting with the 2001 model year, Chevy Silverado and GMC Sierra 2500 and 3500 pickup trucks were available with an optional Duramax Diesel 6600 LB7 V-8 engine. The new V-8 featured an iron block and aluminum heads. It produced 300 hp and 520 ft-lbs of torque. The 6.6-liter engine came mated to a 5-speed automatic transmission designed specifically to handle the power and torque of the diesel engine.

The new Duramax engine came with Bosch common-rail direct-injection and four valves per cylinder. It provided Silverado/Sierra customers with best-in-class power, performance, fuel efficiency, reliability, and durability. GM also claimed best-in-class NVH characteristics, virtually eliminating

the noise, shake, and roughness often associated with diesel powerplants.

The Duramax Diesel 6600 was actually the second in a growing family of GM-branded Duramax engines. The first was the Duramax Diesel 7800 introduced in GM's 2000 medium-duty trucks.

Most of the diesel engines installed in light-duty trucks have to be restricted in terms of output because the automatic transmissions cannot handle the increased power and torque. That is not the case with the Duramax 6600, with its 5-speed Allison 1000 Series automatic transmission.

The 1000 Series is a fully automatic, electronic 5-speed with overdrive. It offers planetary helical gearing similar to that now used in Allison Transmission's popular World Transmission. It also uses a torque converter with lockup clutch and integral spring damper, and fully electronic controls.

2004–2006: Duramax LLY

The Duramax LLY overlapped production with the LB7 in 2004, as well as with the LBZ in 2006. It is important to note that all these Duramax engines are based on the same basic block and architecture, though each new model received some refinement and reinforcement. For example, the LLY shares much with the higher-output LBZ, which began to be available in late 2005 in heavy-duty Silverados and Sierras. The LLY and the LBZ both featured:

- Revised high-pressure fuel system with new injectors
- Fast-heating glow plugs
- Higher fuel pressure with new pump
- Compression ratio lowered from 17.5:1 to 16.8:1
- Cooled exhaust gas recirculation (EGR) for all applications
- New E35 engine control module