Inside The VM Motori 3.0L V6 Diesel Engine

We Get Inside The First Potential 1/2 Ton Diesel Engine

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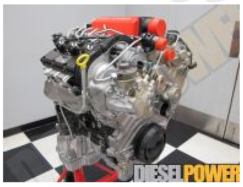
As of press time we have heard word, and seen, that there are spy photos of the 2014 Ram 1500 floating around the internet. Rumor has it that the 2014 Ram 1500 in those photos is equipped with this very VM Motori 3.0L diesel engine. Stay tuned...

> **The 630T has the potential to make more than 600 hp in race trim. —Matt Trainham, Banks Powertrain Engineer**

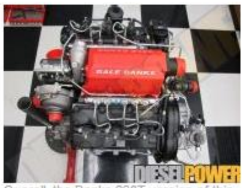
In 2013, the diesels are coming! Our industry is poised to see more diesel-powered vehicles for sale in the United States than we've had since 1985. Of the dozen new diesels we expect to be able to purchase, the one powerplant we're most excited to see is the 3.0L V-6 Jeep is going to offer in the '13 Grand Cherokee. Why are we so excited about an engine made by the 65-year-old Italian company VM Motori? Well, there are rumors this diesel may also find its way into other Chrysler products, including the Ram 1500.



That's significant because the more vehicles this engine can be adapted to, the cheaper the per-engine cost becomes. Oh, and we should mention one other thing: Fiat (Chrysler's parent company) owns a 50 percent stake in VM Motori. So Chrysler should be able to keep the costs of this high-tech engine down to a level we can all afford.

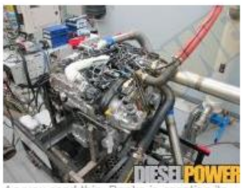
No doubt some of you are now asking, "Who owns the other 50 percent?" General Motors does. Could that mean this engine may end up in GM products like the Silverado ½-ton? We think it may. Now you see why we're so excited.

Unfortunately, no one at Chrysler or GM can talk about future products on the record. So we've never been able to see or drive a vehicle with this 3.0L V-6. That is, until we got a call from Gale Banks Engineering's Banks Powertrain division. Banks has been working directly with VM Motori to engineer its own version of the 3.0L, codenamed the Banks 630T, for use in military and other specialty-use applications. Needless to say, we grabbed our cameras and headed over to Banks' Azusa, California, facility. Check out what we saw.


Overall, the Banks 630T version of this engine is a very tightly packaged powerplant that

Inside The Banks 630T V-6 Diesel

DISPLACEMENT: 3.0L (182 ci)
CONFIGURATION: 60-degree, even-fire V-6
ENGINE WEIGHT: 498 pounds
BORE AND STROKE: 83 mm x 92 mm (3.26 in. x 3.62 in.)
COMPRESSION RATIO: 16.5:1
ENGINE BLOCK: Compacted-graphite iron (CGI) casting that weighs 159 pounds, featuring four 14mm head bolts per cylinder
BEDPLATE: A one-piece, 35-pound assembly retains the crankshaft and ties the bottom of the block together with six 12mm bolts per main bearing
CRANKSHAFT: Forged 4140 steel with 74mm (2.91 in.) main bearing journals and 67.5mm (2.66 in.) connecting rod journals, externally balanced
CYLINDER HEAD: Aluminum castings with four valves per cylinder
VALVETRAIN: Dual overhead camshafts (DOHC) with roller finger followers and hydraulic lash adjustment
VALVE SIZE: 28.5mm (1.12 in.) intake, 25.4mm (1.00 in.) exhaust
BASE POWER RATING: 221 to 268 hp at 4,000 rpm
BASE TORQUE OUTPUT: 369 to 421 lb-ft at 2,000 rpm
MAXIMUM ENGINE SPEED: 4,800 rpm
FUEL SYSTEM: Bosch common-rail injection with a CP4.2 pump and CRIN 3.4 solenoid injectors capable of running up to 29,000 psi (2,000 bar) and seven injection events
TURBOCHARGER: Electronically controlled variable geometry with water-cooled ball-bearing cartridge in high-power applications


As you read this, Banks is creating its own 268hp calibration for the 630T on an engine dy

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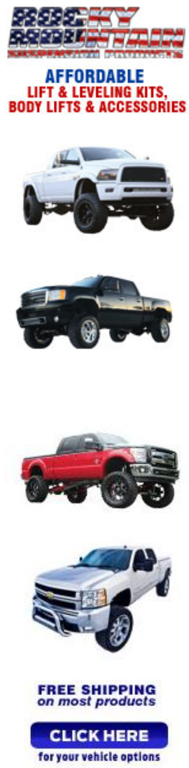

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VM Motori's 3.0L diesel is manufactured in Cento, Italy and is available in various power

The 630T's 60-degree V-6 block is made from high-strength compacted-graphite. On an engine

The block is similar in architecture to what is arguably the best part of the 6.0L Power S

When flipped over, you can see the large main-bearing webs that are cast into the reinforc

Each of the cylinders is equipped with its own oil jet to cool the bottom of the pistons.

Compared to the Cummins inline cranks you've seen, this V-6 crank is compact and lightweig

Here's the bedplate that holds the crank to the block. By making this one piece, the 3.0L

The term "windage" is used to describe the friction of an object moving through a fluid. I

The 3.0L's oil pan is a piece of cast-aluminum beauty. Using aluminum aids in cooling the

As diesel owners, we are familiar with exhaust gas temperature (EGT) that gives us a sense

These connecting rods feature Cummins-like rod caps that are so large their parting lines

To reduce mass yet retain strength, the rods feature keystone-shaped ends that connect to

The pistons are made from cast-aluminum and have large, blunt lips on the top of the bowls

The aluminum heads on this engine are unlike anything we're used to in this industry. The

The engine uses Bosch CRIN 3.4 injectors that are clamped through the valve covers using t

Banks engineer Matt Trainham told us the heads have more flow potential than the Duramax a

From this angle, you can see the siamesed exhaust ports, and the area where the injectors

Even as cast from the factory, the ports have very smooth and consistent shapes that are f

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There are four camshafts in the engine. The exhaust cams are driven off the front of the e

Plastic valve covers are used to reduce weight and provide a layer of sound insulation in

The engine's three-piece front cover is cast aluminum, and it ties the front of the oil pa

As installed on the engine, the cover acts as a mounting system for the injection pump, va

For vehicles that need vacuum to run the climate controls or brake system, the 3.0L can be

In the 240hp version, the oil cooler and oil filter element are mounted high on the driver

The 3.0L uses a Bosch common-rail injection system that is based on the twin-pumping eleme

One of the reasons Banks Powertrain chose this engine as its next platform was the fact it

On the 240hp version of this engine, Banks uses a Garrett variable-geometry turbo mounted

That turbo will send compressed intake air through an intercooler and then into this two-p

Getting an all-new engine like this to run in a standalone configuration requires a specia

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Banks & The 3.0L VM Motori V-6 engine

Since 1976 Gale Banks Engineering has been involved in building and supplying engines to the Military. During those 36 years every Gale Banks Military engine has had one dominant feature; they've all been turbocharged.

And because the Department of Defense is pushing our armed forces to use a single fuel (known as JP-8, which is very similar to diesel), Banks' current programs all revolve around diesel engines.

Banks' current military V-8 programs are based on the 6.6L Duramax long-block with with Banks external components and engine management. Higher power versions use Banks internal components as well. According to Banks, its defense customers use these engines in vehicles up to 30,000 pounds GCWR. Banks has also gotten back to its 6.2L/6.5L roots with a new power upgrade for 6.5L motivated AM General HMMWVs.

But for wheeled-vehicle applications used inrapid surgical strikes, a lightweight and high-speed diesel is required. That's where the VM Motori engine from Italy comes in to play.

The guys at VM are located in the high-performance automotive equivalent of the Silicon Valley, with Lamborghini, Ferrari, and Ducati close by. The design of its V-6 is intended for firing pressures up to 2,940-psi, and the engine freely revs to 5,000 rpm. VM Motori has a passion for its engine designs, and according to Gale Banks it was, "the excellence of this engine [which]convinced me that it would be a rugged basis for what I have in mind for these new Special Operations vehicles."

Banks went on to say, "We had first fire in our engine test cells on Friday May 4th, 2012 and my first impression was about the sound...this thing is sweet! The low-end response is excellent and it revs freely, which worries me. We've already designed a high-rpm capable aluminum intake manifold for it but, our Banks AutoMind diesel engine controller is only good to 7,800 rpm in its current form."

A Banks version of the 3.0L VM Motori V-6 engine will be also be available to the general public as well, according to Banks. "Our initial build will be 240 hp and close to 500 lb ft with an engine weight under 500 pounds," reports Banks.

When asked what other applications we might see this engine in, Banks told us, "We have a stepped power development plan in the works and racing versions will emerge as well. I can't wait to put one of these things in my '06 Jeep Wrangler!"