

2011 DURAMAX 397 HP AND 20 MPG



# DIESEL POWER

THE VOICES OF THE TURBODIESEL ENTHUSIAST



## 20,000-LB-FT BATTLE!

14 TRUCKS TOW, SLED PULL, DRAG RACE, AND DYNO

**BONUS! NHRDA  
WORLD FINALS  
TICKETS INSIDE**



**800HP TWIN-TURBO  
DURAMAX CRATE ENGINE**

**660HP '94 TO '98 DODGE BUILDUP**

**POWER STROKE ENGINE CONTROLS**

**HOW IT WORKS:**

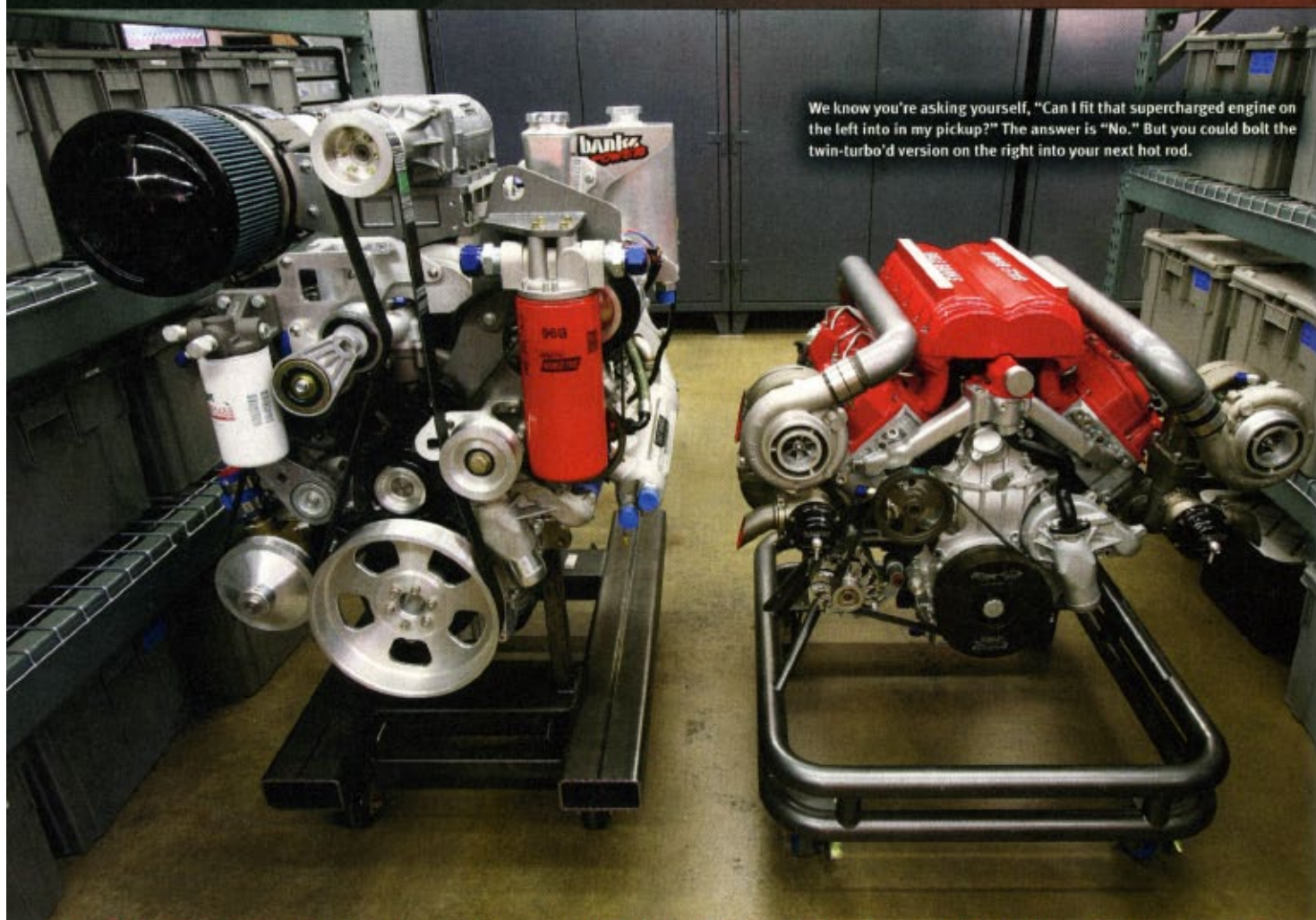
## CUMMINS INJECTION PUMPS

SEPTEMBER 2010 VOLUME 6, NO. 9 \$5.99 IN U.S. • \$6.99 IN CANADA



A SOURCE INTERLINK MEDIA PUBLICATION

[DIESELPowerMAG.COM](http://DIESELPowerMAG.COM)



# 800HP TWIN-TURBO DURAMAX CRATE ENGINE

THIS SUPERCHARGED TWIN-TURBO MARINE ENGINE  
COULD PAVE THE WAY FOR YOUR NEXT DIESEL SWAP

**D**iesel engines are at their best when the conditions they have to perform in are at their worst. They thrive on hard work, heavy loads, and continuous use—so it's no surprise that diesels are the powerplant of choice in the trucking, mining, and marine worlds.

Traditionally, diesel-powered boats (less than 50 feet in length) use engines based on over-the-road diesels that you're likely familiar with. In fact, almost all the big-name diesel engine manufacturers offer marinized versions of their popular truck engines to propel or generate electricity for boats. The one notable exception to this rule is International.

## MARINE DIESEL ENGINES

Caterpillar alone sells more than 15 different marinized diesel engines. John Deere also configures most of its farm implement engines for ocean-going use. Cummins partners with MerCruiser (on engines less than 15.0L) to offer its inline diesel engines for boats, and it seems like nearly every boat we've seen has a Cummins Onan generator.

It would be fair to say that, in most cases, a diesel engine manufacturer will prove out a new engine architecture in heavy-duty trucks first, and then once all the bugs are worked out, that engine will be upgraded to handle the rigors of marine use. Manufacturers can also use the marine industry to extend the lifespan of an engine, because after it's no longer

cost-effective to upgrade an engine to the latest on-highway emissions standards, boat builders can still install them (due to slightly less restrictive emissions laws) and get a proven diesel package.

### GALE BANKS: LAND AND SEA

Banks Power is a brand known throughout the diesel industry, but it may come as a surprise to some of you that Gale Banks has had an equally long career in the marine engine world. Granted, much of his company's boating background is with twin-turbocharged big-block race engines, but Banks' gas and diesel designs have also found their way into some very specialized engines for the Navy.

In 2002, Banks developed a 5.9L Cummins engine fitted with twin turbos, an air-to-water inter-cooler, and a compacted-graphite iron block for a SEAL Team fast-attack boat. This 700hp marine engine was built at the same time as Banks' Bonneville-record-setting Cummins-powered Dodge Dakota. The technology sharing between the land speed racing program and the marine engine



In many ways, the Duramax SuperTurbo engine is a culmination of Gale Banks' lifework. Gale Banks' (shown here standing to the right of California State Senator Bob Huff) SuperTurbo features almost all the technologies his company is known for: twin turbos, diesel, large-displacement GM V-8 architecture, sophisticated engine controls, and implementation of state-of-the-art technology.



The primary application for the Banks SuperTurbo Duramax engine is confidential, but based on the performance characteristics of the engine, it is likely to be used in a fast-attack speedboat for the U.S. Military. Other applications are sure to follow. This rigid inflatable boat (RIB), used by the Maritime Security Squadron Forward supporting Commander Task Force 158.1 in the Persian Gulf, would be the perfect home for a pair of the Banks SuperTurbo engines.



The SuperTurbo engine development actually began on the street, er, track. Banks' motorsport team has been testing the Duramax platform's durability for years using its drag racing pickup and new dragster. In fact, we wouldn't be surprised if the dragster's green 7.0L Duramax engine ended up in the Navy's next boat project.



Eaton's largest R2300 TVS supercharger is fitted to supply enough air to create 808 lb-ft at only 1,200 rpm. The supercharger compresses the intake air and sends it to a pair of BorgWarner turbos which then feed the Banks air-to-water intercooled intake manifold.

developed for the SEAL Team led to performance parts like the Banks Big Boss intake manifold for the common-rail Cummins.

#### GM POWERTRAIN, BANKS, AND BOSCH

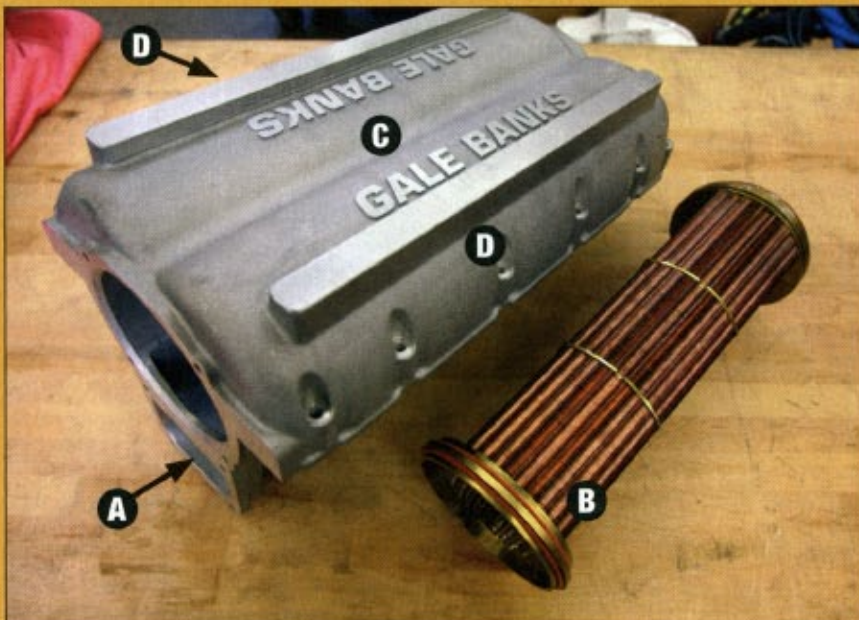
While Banks' land-based diesel accomplishments are well known to the masses, its success on the high seas did not go unnoticed by General Motors. So in 2008, when GM Powertrain was looking for a partner to marinize its light-duty diesel engine, Banks became the factory-authorized marine-engine supplier of the 6.6L Duramax.

**"We wouldn't be surprised if the dragster's green 7.0L Duramax engine ended up in the Navy's next boat project."**

# SUPERTURBO PARTS FOR YOUR PROJECT



The stock Duramax intake manifolds were designed for an engine that makes 365 hp at 3,200 rpm. Trucks have made more than 1,000 hp using them, but their design leaves much to be desired when building a diesel hot rod engine.



Banks' newest cast-aluminum Duramax intake is this air-to-water intercooled piece that was developed for marine use. The air flows in through the bottom (A) and then travels upward through an air-to-water heat exchanger (B) before hitting the roof of the intake (C) and getting directed back down toward the two cylinder heads (D).



The two-piece cast-aluminum Banks Big Boss manifolds were developed for the Sidewinder Type-R road racing truck and have also been used on the Type-D drag truck and the Top Diesel dragster. They're designed to support the airflow need for more than 1,000 hp and 5,000 rpm. Banks sells them for the '03-and-newer (LLYs, LBZs, and LMMs—but customers are rumored to have also adapted them for use on LB7 engines which use different injector lines.



The SuperTurbo engine features a very expensive cupronickel-alloy heat exchanger that will survive with salt water running through it. But if a car had ice water instead of salt water pumping through the intercooler core, the Banks intake could use a much less costly material.



This intercooled Big Boss intake would obviously require moving the turbo out of the Duramax's lifter valley—but this might be just the ticket for putting a Duramax in a vehicle without the need for a big grille opening that a conventional air-to-air intercooler requires.

Some of you are no doubt thinking, "Couldn't GM just marinize the Duramax itself?" Perhaps it could, but with more than a century of experience building automobiles, GM's business is optimized to engineer, sell, and service millions of cars and trucks each year. Banks Marine division, on the other hand, has the flexibility to tailor the Duramax engine to suit an individual boat builders' needs. And thanks to its long-term relationship with Bosch, Banks has been developing its own OttoMind version of the Bosch EDC16 ECU in order to run a common-rail diesel engine in any application it chooses.

The base 6.6L Duramax engines Banks uses for its marine program are built in the Dmax plant in Moraine, Ohio. These production-based engines

(some of the engine crates we saw actually have the engine code GBE for "Gale Banks Engineering") are sold to Banks through GM's Powertrain division. From there, the Banks Marine group takes delivery of the engines and installs marine-grade hardware to suit the application and power output (300 to 800hp versions are available) needs of the customer.

## THE SUPERTURBO ENGINE

As power junkies, we're most interested in the 800hp configuration of the Banks Duramax marine engine, known simply as the SuperTurbo. This engine is being developed for a military contractor that supplies boats to the U.S. Military.



The 800hp Banks SuperTurbo package begins life as a production engine. From there the engine is disassembled and fitted with forged connecting rods, application-specific cast pistons (to retain the oil-galley cooling), ported heads, a high-performance wet-sump oiling system, and ARP head studs and main bearing studs.

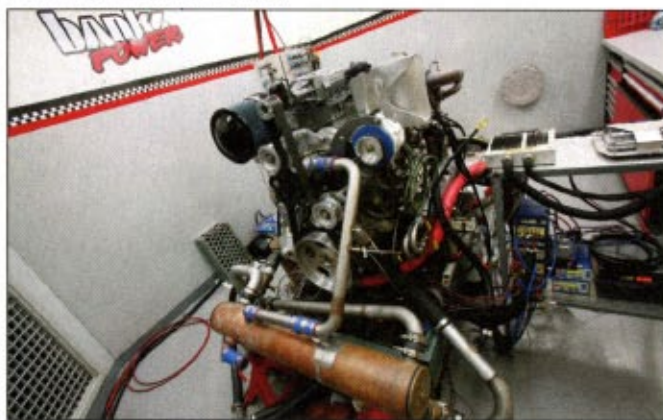
## WHAT'S A DURAMAX CRATE ENGINE GOING TO COST?



We can attest to the fact that Banks has literally dozens of Duramax engines in stock, and because everybody that works at its Azusa, California, headquarters are car guys—it was only a matter of time till they put together this hot rod crate engine concept. Banks would love to sell you one for your muscle car or race vehicle, with what New Business and Market Development Manager, John Espino, refers to as a "mission-specific build and calibration." But the costs of developing such a package are still quite high considering all of the variables. Try as we might we couldn't get Banks to commit to a firm price.



The twin turbos are fed by water-cooled exhaust manifolds that were originally intended for a 392 Hemi boat engine. The exhaust passages line up so well with the Duramax ports that they've been fitted to all the development engines. Banks is currently at work on its own marine-use manifolds, which makes it seem very likely that a street version may be in the works as well.



Testing, testing, testing. It's safe to say that Gale Banks Engineering probably spends more time testing products than any other diesel company in the aftermarket. The current SuperTurbo engine has seen more than 6,200 hours on the dyno, and Senior Program Engineer Matt Hill estimates that Banks has more than 17,000 hours of dyno time with the Duramax engine.

The SuperTurbo marine engine wasn't dreamt up overnight, rather it was born as part of a unified Duramax program. The first phase of development began when the Banks Power group started engineering Duramax performance parts for the '01 GM pickups. Phase two of its program came with the birth of Banks' Duramax motorsports effort, and the creation of the Banks Type-R Duramax road racing GMC pickup in 2005. However, since the domestic diesel market seemed much more interested in drag racing, Banks shifted its attention and built a Chevy S-10 Pro Stock pickup to put the Banks Type-R road racing engine in. After years of development and multiple 7-second passes with the S-10, the Banks team has built a 7.0L Duramax-powered rear-engine dragster. And we wouldn't be surprised if the Banks Top Diesel dragster showed up at a race with a supercharger (or two) on top of the intake! **DP**

### Source

**Banks Power**  
 (866) 602-4308 • [www.bankspower.com](http://www.bankspower.com)