6.5 NEWBIES - **START HERE**

Info: 6.5 newbies

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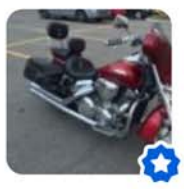

PrivatePilot
Just Horsing Around

Joined Jun 1, 2008
17,552 Posts

Discussion Starter · #1 · Sep 27, 2010 (Edited by Moderator)

Be advised, this is a VERY long post (split into two), but contains information some of the more commonly asked information that's helpful to the new (or prospective new) 6.5 owner. Reading this post (as well as the other posts marked "New Members Read This" in the 6.5 forum at the beginning of your 6.5 experience can save you a lot of hassle and money.

So you just bought a 6.5TD, or are thinking of buying one - Where to start?!

Welcome to the world of the GM 6.5 Turbo Diesel! First off, You've found the right forum - the Diesel Place 6.5 forum is one of the busiest on the 'Net, and is full of not only people like yourself (who are new to the 6.5 and wanting to learn more) but also countless other members who are extremely knowledgeable about this engine and know it like the back of their hand. Nowhere else will you find such a vast base of knowledge for free.

Setting out, here are two very important things to remember:

1/ The GM 6.5 Turbo Diesel has received a bad reputation during it's lifespan. Unfortunately much of this comes from people who simply don't treat the engine correctly and suffered the consequences. Unlike other diesel engines, the 6.5 does not tolerate abuse (or lack of maintenance) well, and frequently people who beat on them were the first to complain loudly about it when they experienced issues. The bad reputation, even though it was not really warranted, started here. The 6.5 is NOT a "Disaster" of an engine like some would have you believe...but it is important that you know it's quirks and limitations - this thread will help you with that.

2/ Diesel engines are an enigma to many mechanics, especially those not familiar with diesels in general. The 6.5 is even more of an enigma, and the plain truth is that most mechanics (even some diesel mechanics!) simply know little to nothing about it...and you MUST know this engine to understand it's intricacies and oddities. Don't fall into the trap of letting a clueless mechanic spend hundreds (or thousands) of your dollars playing the "replace this part and see what happens" game when in reality all that was necessary was a $50 part and a half hour or labor in your driveway. It pays to educate yourself about the engine, and ask for help here *before* resorting to a mechanic - the 6.5 is one of the simplest diesel engines on the roads today, and if you have basic mechanics tools and aren't afraid to get dirty, you can do most of your own maintenance and repairs easily. Knowledge is

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Last post:
PrivatePilot Sep 27, 2010

Diesel Place

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key, and you may be surprised to find more of it here then you will at your local repair facility!

Haven't bought a truck with a 6.5 in it yet? As mentioned, the 6.5 suffered a lot of abuse at the hands of less then knowledgeable owners, so it's important to make SURE you are not buying a truck that has a sick engine to begin with - always start by reading the "Purchasing a 6.5" thread located here:

FAQ: Purchasing a 6.5L Diesel - Diesel Place : Chevrolet and GMC Diesel Truck Forums

Do NOT buy a truck that fails any of the more serious/major tests in the thread above. There are plenty of 6.5 equipped trucks out there and if the engine in the one you are looking is sick, walk away and find a healthy one instead! Minor things can be fixed, but major engine issues, especially on diesel engines, can sometimes be costly to repair.

If you've already made the jump, you have some homework to do in order to make your 6.5 experience a pleasant one. With that said, let's get started!

- What's the PMD/FSD I keep reading about? What's it do, and why should I "relocate" it?

There are countless FSD related threads right here in the 6.5 forum so it's very worthwhile searching for the term "PMD" in the 6.5 forum to read up on the potential issues, even if you aren't (yet) experiencing any yourself, but here's the basics.

If you have a 6.5 with an electronic DS4 Injection pump (1994 and newer), you have a FSD. They commonly fail due to their location (and heat) resulting in stalling, hesitation, and eventual stranding.

The DS4 injection pump, like the 6.5 itself earned a much maligned reputation for being "Junk". Although in it's early years it did have some problems (which are covered under an 11 year extended warranty by GM) in many cases the Injection Pump's bad reputation came as a result of failed FSD units, not the pump itself. Unfortunately, for those who took their vehicles back to GM and found themselves out of warranty coverage, it was likely a very expensive experience.

Worse yet, many mechanics with little to no diesel (or 6.5) experience automatically fingered the entire injection pump (at a replacement cost of >$1000) when in reality the pump itself was fine, but only the (much less costly) FSD unit had failed!

The FSD (Fuel supply driver) is more commonly referred to here at the Diesel Place forum as the "PMD", or "Pump mounted driver". It's a small black box, about the size of a deck of cards mounted on the front of the injection pump. The injection pump itself is located under the intake manifold, which in turn is located under the "Turbo Power" plastic trim piece on top of the engine.

Assuming the PMD is in it's stock location it's a bit out of the way, but You CAN see the it if you look closely between the arms of the intake manifold - once you the plastic "Turbo Power" cover off (which you may want to throw away, all it does is block heat from escaping!) you will be able to see it if you look closely with a flashlight - you may see the words "Stanadyne" printed on the front of the module and there will be a single wiring harness plugged into it.

Don't be surprised to see that the previous owner has already moved the PMD - you may find it (on an extension cord) mounted on the intake manifold, or (ideally) out of the engine

compartment completely. If you see the PMD module in it's stock location but nothing appears to be plugged into it, it's been relocated already - follow the nearby cord and you should find it, if it's not already completely obvious.

The PMD module is the brain that tells the injection pump when to fire fuel into the cylinders. Without it, your truck won't run, and when it begins to fail the problems can range from hesitation, to random stalls (usually when hot), to complete no-start situations.

This module, when mounted in it's stock location, fails all too frequently. Far too many 6.5 owners have suffered the fate of a failed PMD, and if you take it to a repair facility you can end up paying $500 or more to get it fixed. It need not be that expensive, and putting a new module back in it's stock location (which is what many shops will do!) is only asking to experience the same failure again within a year or two, often less.

Why does it fail? HEAT. Although GM's plan was for the injection pump itself to act as a heat-sink (and the fuel flowing through it to cool it further) the simple reality is that it didn't work - this area was too hot and simply cooks the module, especially when you shut your engine off after driving and it gets heat soaked. Heat is a killer of the PMD!

So, if you just bought a 6.5 equipped vehicle and discover the PMD is still in it's stock location .....you really should relocate it. Look at the supporting vendors here and you will find lots of "Remote mount PMD kits" available. You will need an extension harness, a PMD cooler (ESSENTIAL!) and if you are experiencing the symptoms of a failed PMD, a new PMD itself. You can get ALL of this (Cooler, wiring, and replacement PMD) for somewhere in the $500 rane, so don't get sucked into paying $500+ at a dealer or diesel shop for a stock replacement PM alone which won't include a cooler or extension cable.

We appreciate it if you make your purchase from one of our supporting vendors, as mentioned - remember, our vendors are what keeps Diesel Place free for you and I!

Simply visit this forum (click) to find a vendor that stocks the PMD kit. It's easy!

So... Ideally, you want to get the whole PMD assembly out of the engine compartment - some kits are designed to be mounted on the intake manifold or elsewhere under the hood, and although this is *better* then the stock location, it is still not perfect - I myself had a cooler mounted on the intake manifold and it cooked after 3 years, almost stranding me in the process.

Many people mount them behind the front bumper (in one of the "nostrils), or beside the oil cooler in front of the grille itself. The module is weatherproof (as is the connector) so you can mount it almost anywhere that it will get good airflow and be protected from impact damage.

A cooler attached directly to the PMD is ESSENTIAL! The PMD itself generates a lot of heat and testing has shown that a PMD operated without a heat sink will cook itself in less then 5 minutes, so simply danging it by it's wire or zip-tying it in a good airflow area will not work. A good heat sink will take the heat generated and dissipate it to air - obviously this means the PMD and cooler need to be located in an area with adequate airflow to begin with, hence the bumper or grille locations.

When mounting the PMD to a cooler it's also essential that a good heat-transfer paste be used - this is easily available at any

computer store (and is typically included with many PMD cooler kits) - it's function is to aid the transfer of heat from the module to the cooler. Without it, heat transfer will not be ideal and you may shorten the lifespan of the PMD.

The key is that ANYWHERE else is better then the stock location. Buy the longest extension cord you can (or solder your own!) and mount it somewhere else...ANYWHERE else than the stock location. Your PMD (and wallet) will thank you, and you probably will never have to worry about PMD failure (and being stranded) ever again.

And lastly, a spare PMD in your glove box is always a wise idea for a 6.5 owner, especially if you tow or travel long distances. A $50 "used but tested good" one from eBay is a worthwhile investment as a spare - it could rescue you in a pinch!

So, the moral of the story? If you just got a new 6.5 and the PMD is in the stock location, relocate it. Most people opt to just buy a second PMD and leave the factory one in it's current location - removing it requires removal of the intake manifold and is often more hassle then it's worth, especially when all you're going to do is throw it in the garbage anyways. Yes, it's a few hundred dollars of investment, but ask yourself if being stranded in the middle of the night (or on a deserted road) plus the cost of the tow-truck is worth the savings. If your PMD is in it's stock location it WILL eventually cause you grief - head it off at the pass!

Without doubt the PMD (and it's related issues) generate the most posts in the Diesel Place 6.5 forum, so before making a new post on the subject be SURE to do a search for "PMD" and read about the issue. Of course, if you need help, make a new post - we're a friendly bunch and will be glad to help diagnose your issue.

- What's the deal with the harmonic balancer on the 6.5 - why is everybody freaking out about it?

The harmonic balancer (and sister pulley attached to it) is an essential piece of equipment on the 6.5, and it's also a part that is commonly failed (or failing) without anyone knowing about it since it often doesn't have any blatant symptoms except to the tuned ear. However, operating the engine with this essential (yet simple) piece of equipment is like playing Russian roulette with your engine - a failed harmonic balancer assembly can BREAK YOUR CRANKSHAFT!

Broken Crankshaft = Trashed Engine.

The balancer assembly takes the harmonic vibrations that the engine creates and "dampens" them. The crankshaft on the 6.5 is a known weak spot of the engine and these harmonics can (and often will) eventually cause crankshaft failure. Many scrapped 6.5's you may see in the scrapyards will have suffered crank failure due to this simple (and relatively inexpensive) part having been failed and not replaced.

The balancer itself is basically a big chunk of metal with a rubber ring in the middle. This ring should be fully intact - no cracks, no missing chunks, or no deformations. The pulley that attaches to the harmonic balancer also has a rubber ring between the inner and outer races and even more often then the balancer itself, this rubber fails - often without much indication, often just a hairline crack and some noise.

Symptoms of a failed pulley ranges from a loud clatter through the radiator (audible clearly from the front of the truck when running) to a "clunk" moments after the engine is shut off. Visibly,

you may also see a shimmy on the pulley or harmonic balancer.

If the pulley has failed, in addition to the small crack in the rubber running the entire circumference of the pulley, you will often see impact marks on the stop-pins that prevent the inner and outer rings from freewheeling if the rubber fails - in extreme cases the inner ring actually impacts the bolt heads themselves leading to further damage. Inspect carefully!

A complete circumference crack or giant missing pieces of the rubber rings on either the HB itself or the pulley is indication that it has failed and requires immediate replacement.

Both the pulley and balancer itself are easily inspected from underneath the truck - simply look at the nose of the crankshaft and carefully inspect. If you are unsure, ask someone who is familiar with the 6.5 to inspect it for you.

INSPECTION AND IMMEDIATE REPLACEMENT OF A FAILED BALANCER OR PULLEY IS ABSOLUTELY ESSENTIAL! Many people recommend not even starting your truck if you find either the HB or pulley has failed - that 5 mile trip to the auto parts store (even at low RPM) could very well be the trip that snaps your crank. Treat your harmonic balancer and pulley with the utmost respect, it's a major key to a long lived 6.5!

If you need help or guidance on inspection, simply make a post here in the Diesel Place 6.5 forum (Attach pictures if possible), or search for previous posts on the subject using the "Search" function - there are plenty of threads dedicated to the HB, as well as many vendors here on the forum that offer some intriguing replacement options such as the "Fluid Damper".

- What oil should I use? Can I use cheap 10W30 instead of expensive "Diesel" engine oil?

NO! Diesels (ALL diesels, not only the 6.5) require specially rated oils that can deal with the abuse that diesel engines dish out. Gasoline rated oils are not only of inadequate viscosity (thickness) for a diesel but also do not have the formulation to deal with the ash and other impurities (not to mention heat) that a diesel engine produces.

If you are prospectively looking at a diesel truck (6.5 or not) make SURE that the previous owner has used proper diesel oil for the entire lifespan of the engine - if he hasn't, run away - run away fast..

If you are the new owner of a 6.5 equipped truck, use diesel oil - never be tempted to buy automotive rated oils. Diesel engines that are fed a diet of gasoline rated oils typically suffer from premature wear - extreme blow-by (failing piston rings) and other issues are common. Repair is extremely expensive.

Synthetic versus Dinosaur (regular) oil is a huge topic of debate for all diesel engine owners, although all the 6.5 requires (by the letter of the manual) is a oil rated to CG-4 (or better) standards. Basically all diesel engine oils you will find for sale today meet (and typically exceed) these ratings.

Synthetic oils have benefits, but also come at a much steeper cost. You're choice - a simple Google search will turn up plenty of debate on the subject.

When changing the oil on the 6.5 don't be surprised to see that your brand new engine oil is jet-black the second you re-start your engine. This is common on most diesel engines (not only the 6.5) due to the fact that the oil cooler typically holds a lot of oil

that cannot be changed. Despite being black almost immediately the engine still benefits from the oil change, so don't feel it's in vain - change your oil regularly!

- My 6.5 is dripping oil from the oil cooler lines.

This is an extremely common 6.5 issue - the stock GM lines are junk and will leak often within a year of installation. Many aftermarket lines that are manufactured to be "direct replacements" are little better, and will leak the same as the factory lines, not to mention that they utilize the same poor connections as the stock lines. (Read on)

However, the oil cooler is essential on the 6.5 so don't be tempted to simply bypass or remove it! You'll cook your engine, eventually...no matter what any mechanic may say otherwise.

Extreme care should be taken to keep close tabs on the health of these lines - the 6.5 will continue to run even if it looses ALL of it's oil due to a blown oil cooler line, and you WILL seize your engine if this occurs. Not only are the factory lines prone to splitting (aside from their constant leaking), but they also utilize an absolutely terrible connection method to the engine itself, relying on several small clips to hold the lines into the fittings on the engine block. These tiny clips corrode as the years pass, and if/when one of them corrodes and rusts to the point where it breaks, the clip can fall out, leaving nothing holding the line into the block fitting. The rest is history when the line blows out - if you don't immediately notice it (and many don't, unfortunately) your engine will run out of oil and seize, stranding you on the side of the road.

Replacement of the factory lines is an almost essential modification for the serious 6.5 owner and there are a variety of aftermarket kits available (For about $250) which use much stronger and durable braided lines. Several of our Supporting Vendors here at dieselplace, most notably Lubrication Specialists, sells these kits directly. It will not only solve the leaky factory lines (no more mess on your driveway), but will also ensure that you don't accidentally run your engine dry (and seize it) if one of the factory lines ever blows without your knowledge.

If your factory lines seem healthy (and inspect them CAREFULLY!), at the very least most people recommend replacing the tiny clips at the fittings of the lines to the engine block. Remove the old (possibly corroded and weakened) clips and replace them with new ones. It's the absolute cheapest insurance you will ever invest in for your 6.5, short of a complete replacement of the lines with the aforementioned kit.

- I hear lots of stories of injection pump problems on the 6.5. What should I do to protect it?

The Injection Pump (IP) on the 6.5 was designed before the introduction of Ultra Low Sulphur Diesel, or ULSD. ULSD has a much lower "slipperyness" (lubricity) then the fuel that the 6.5 injection pump was designed for.

The long and the short of this is that the "dryness" of ULSD can cause premature wear (and eventual) failure of the IP at fairly significant cost. Again, the 6.5 garnered a bad reputation with many owners due to IP failures, many of which could have been avoided. Yes, as mentioned earlier, some DS4 model injection pumps did have issues that caused failure (lubricity aside) but chances are if you just bought a 6.5 equipped truck (with the DS4 electronic injection pump) the previous owner has already addressed the issue, either by replacing the pump himself, or having it replaced under warranty. Let's assume (and hope) you're

IP is still healthy - keep it that way - Buy a quality lubricity additive and use it religiously with each and every fill up.

Some people use simple 2-stroke oil, and others use brand name additives such as the genuine Stanadyne options, or other off-the-shelf additives.

What additive should you use? Some time ago there was an in-depth study done with the results posted in this thread:

Lubricity Additive Study Results - Diesel Place : Chevrolet and GMC Diesel Truck Forums

It's important to treat your IP right to ensure a long life. Maintained correctly with proper lubricity the IP on the 6.5 is typically trouble free contrary to many of the stories of dread you might have read about. Again, it's bad reputation is not really deserved but was a direct result of people unwittingly hurting the IP because of lack of understanding about the effects of the introduction of ULSD.

- What's the Lift Pump? What's it do? What happens if it quits working?

The lift pump on the 6.5 is another essential piece of equipment, but also one that presents few (or sometimes no) symptoms if failed and can lead to issues.

The lift pump is mounted to the frame rail on the driver side of the truck. It is commonly mistaken for (and looks somewhat like) a fuel filter except if you look closely you will see two wires leading to it. It's not a filter at all!

This pump draws fuel from the fuel tank and feeds the injection pump at about 7PSI.

If this pump fails, the problem is that often the truck will continue running, sometimes with no symptoms. The big issue with this is that the injection pump was not designed to "suck" fuel all the way from the fuel pump and as a result being forced to do so can result in IP problems down the road.

When symptoms do present themselves, they are typically lack of power (fuel starvation) or difficult starts (Fuel draining back to tank from IP and not being primed at key-on). Occasionally the engine will not start at all as is common with an already worn or sick injection pump which no longer has the strength to "suck" from the tank itself. Often, by the time these symptoms present themselves the damage to your IP may already have been done.

Diagnosis is fairly easy - when you turn the key on (without starting the engine) you should be able to hear the pump run for a second or three. Secondly (and more determining) by opening the water-drain tap (located on the engine near the alternator) you should be able to obtain a steady flow of fuel if opened and the ignition key cycled (You may want 2 people for this job...).

If you open this tap but do NOT get a strong flow of fuel with the key cycled to the "ON" position, you lift pump may not be functional. Although it's technically safe to drive in this condition, it's not wise....get it fixed - your IP will thank you and you will potentially save yourself the hassle and expensive of an injection pump replacement down the road.

Again, If you need help, simply make a post here in the Diesel Place 6.5 forum, or search for previous posts on the subject using the "Search" function using the term "Lift Pump" specifically in the 6.5 forum.

(Continued in response below....)

Mark - Courtice, Ontario, Canada.

SOLD: '97 C3500 Crew Cab Long Box Dually 6.5 Turbo Diesel.

Paul Rak, DJLilBASTARD, mtstewart1 and 10 others

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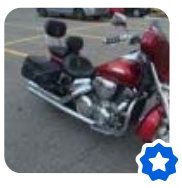

PrivatePilot

Just Horsing Around

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Discussion Starter · #2 · Sep 27, 2010 (Edited by Moderator)

The Official GM 6.5 "Newbie" FAQ
Page Two - Continued From Above

- I hear the 6.5 easily overheats (or I'm already experiencing it)...what can I do?

The 6.5 is EXTREMELY sensitive to overheating - despite GM's incredibly bad decision to put the temperature gauge "Red Line" near the end of the scale, the reality is that any excursion beyond 210 Degrees Fahrenheit is harmful to the 6.5.

Before 1997 most 6.5's were equipped with a relatively low-flow water pump and a single-thermostat setup. In 1997 and newer 6.5's the water pump was upgraded to a high-flow model and dual thermostats were added in an effort to relieve the all too common overheating issues.

No matter what, the radiator plays a critical part in cooling your 6.5. Commonly crud gets built up between the radiator and AC condenser (as well as the oil and transmission cooler) and contributes to heat build up. Cleaning the rad is important when you buy a 6.5, and if it's in poor condition internally you may need to replace it if you bought a 6.5 experiencing temperature issues.

A properly operating fan is also essential - the stock fan clutch often doesn't engage until 200-205 degrees, almost too late, but still adequate so long as you cooling system is up to the task of quickly cooling off the engine once it engages.

The cooling fan should be blatantly obvious when it engages fully - a load roar (which varies with engine RPM) will be evident. You may notice the roar first thing in the morning as well when you start your engine cold and drive away - this is normal, but it should disengage within a mile or so until it's built in thermostat calls for it to re-engage.

Under normal driving conditions with the AC off (and normal temperatures) you may never hear the fan come on, but as temperatures approach 200-205 (210 in some cases) the fan SHOULD be coming on, and you SHOULD hear it. The effect on engine temperature should be immediately evident on the gauge, and the temperature should not continue to rise..and ideally, should begin to fall rapidly.

If you have overheating issues (and anything over 210 should have you worried!) you should pay particular attention to your cooling system. If towing with your 6.5 this is all the more important.

For pre 1997 models conversion kits are available to upgrade the thermostat housing and water pump to the newer setup and is a worthy investment for anyone who works their 6.5 hard - towing, or hauling. Beyond even this, other kits are available which utilise the newer and more powerful Duramax fan assembly. Best yet, the dual thermostat housing conversion, high flow water pump conversion, and the Duramax fan conversion, so long as your rad is up to the task, will allmost assure a future with zero

temperature issues at all.

For most people it's an overkill (unless you tow heavy in a climate where it's consistently hot), but some people would rather spend the money and rest assured. Personally, although I tow a 12K fifth wheel (and have done so in many hot areas including the desert) the stock cooling system on my 1997 has proven adequate 99% of the time, so judge accordingly.

Thermostats, if replaced, should be replaced ONLY with genuine AC Delco 195 degree models. Jobber or no-name thermostats will cause you grief, TRUST US.

However, it all starts and ends with the radiator - if you are experiencing overheating issues, start there - all the upgraded water pumps, thermostats, cooling fans or whatever won't help if your radiator is clogged (internally or externally) and can't do it's job to begin with.

If you can't maintain 210F or less (even towing) your cooling system isn't working properly - inspect and repair.

If you need help, simply make a post here in the Diesel Place 6.5 forum, or search for previous posts on the subject using the "Search" function. Overheating is a common 6.5 issue and lots of previous posts on the subject exist.

- Ok, tell me more about temperatures - what are some important ones?

Commonly accepted maximum temperatures for 6.5 equipped vehicles:

- Engine coolant NEVER over 210.
- Transmission (4L80E) never over 240.
- EGT (Pyrometer) never over 1200 degrees

- What are some cheap and easy power modifications for my new 6.5?

Another common question for new 6.5 owners.

Well, first off, the 6.5 isn't a power-house. You will NEVER make the same power as your Cummins or Duramax friends, so don't get your hopes up. You can add an upgraded ECM (Engine computer) to add a few horses, but it's expensive and offers limited results, and you MUST do some of the other options below first (especially exhaust) before going this route.

However, there are a few easy modifications.

- *Exhaust*. Do it yourself 4" turbo-to-tailpipe systems can be had for about $275 and will help your 6.5 immensely. The stock system is very restrictive and really holds back the 6.5 and replacing it with a 4" system is often the most drastic change (per dollar) you can spend aside from an ECM swap. You will gain horsepower, MPG, and lower your EGT's by about 200 degrees - it will arguably be the best $275 you will EVER spend on your 6.5!

- *#9 resistor in the PMD*. Inside the plug of the PMD itself is a small resistor that calibrates the fuel flow from the factory. Typically the stock is a #4 or #5 resistor, but replacing it with a #9 resistor will add *slightly* more fuel and if driven gently can even help your fuel mileage. The value of this resistor is only read every 50 Keystarts (unless prompted to read instantly with a GM Tech-2 scanner) so the result may not be immediately evident. Don't expect drastic results, the effect is minimal at best.

- *ECM re-flash/Replacement* - The “King” of all horsepower modifications. New "power" ECM’s will be calculated with many changes (including increased fuel flow) that will add more power to your truck, but the price can be steep and your engine should be in tip-top mechanical condition before asking it to perform even harder. Unless you are towing or really NEED this extra power, ask yourself if it’s really worth it. Before adding an reflashed ECM you MUST add a new exhaust system (the stock system is too restrictive) and installation of a Pyrometer (EGT, or Exhaust Gas Temperature) gauge is also recommended to ensure you don’t hurt your engine or turbocharger...remember, 1200 degrees max - a reflashed ECM with the stock exhaust system and a marginal cooling system is just asking for problems, so do your homework first! All three of these things can easily add up to $1000 or more, so many people opt to simply go with some of the lesser expensive options above first and work upwards from there...if necessary.

Lastly, if your truck is smoking black exhaust, you’re LOOSING power..and beware, black smoke and the 6.5 is a recipe for disaster! Read more about this situation in my other FAQ HERE:

Rolling Coal & The 6.5

- What about boost levels? My truck doesn’t sound like it’s making any, or my boost gauge (if equipped) reads low.

Touching on the last paragraph above, first and foremost your 6.5 should NEVER smoke. Smoking can lead to a premature death for 6.5 engines, so despite how “cool” you may think it looks, ask yourself if it’s worth it - go back and read this post again:

Rolling Coal & The 6.5

So, how much boost should a 6.5 make? In it’s stock configuration the ECM will generally maintain a boost figure in the 7 to 10 PSI range before commanding the wastegate to open and reduce boost levels. If you have the stock (factory) air filter and intake system you may not be able to actually hear the turbocharger, but that doesn't mean it's not working - gauges will help you see exactly what your boost system is doing, so it's a great investment!

The maximum boost levels for the 6.5 should never exceed 15PSI, and adding this much boost without adding fuel serves no purpose anyways, as I will touch on in the next section.

This doesn’t seem like much, wondering why your Cummins friends are making 30 PSI yet you are only making 10 or so with your 6.5? Well again, remember - the 6.5 is not a Cummins! The 6.5 has signifigantly higher compression ratios versus many diesel engines and as such requires lower boost in order to achieve the same result. Anything more than 15PSI is only risking premature failure of your head gaskets, so don’t risk it!

- I read about a “Turbo Master”. What is it, and what does it do for the 6.5?

A “Turbo Master’ is effectively a mechanical replacement for the vacuum (and computer) operated wastegate on the turbocharger.

Typically people will install a turbomaster for two reasons:

1/ The stock vacuum pump has failed leading to non-operation of the wastegate, and as a result, the engine is puking black smoke everywhere.

2/ They (incorrectly) think that turning up the boost to 15PSI will

make more power.

#1 is a worthy reason - rather then replace the vacuum pump some people opt to simply remove it, as well as the vacuum solenoid on the turbo and simply go with a manual setup. If you build the turbomaster yourself this can offer significant financial benefit and some people may suggest it adds a bit of extra horsepower as the engine no longer has to drive the vacuum pump.

However, it's not essential - simply replacing the portion of the vacuum system that has failed (be it the pump, the vacuum solenoid, or the vacuum pot) will restore the function of the stock vacuum system as well as the protections that it offers over a mechanical system that the ECM has no ability to control.

Although some people have experienced issues with repeated failures of vacuum pumps (and as such eventually opt to go with a turbomaster), so long as you source a quality replacement (AC Delco preferred) you should experience no issues.

So, what about the "more power!" rationale?

#2 is a complete fallacy. You will gain VERY LITTLE (if any) horsepower by exceeding the boost figures that the engine requires in it's stock setup. More boost does NOT equal more power - more FUEL (which in turn will then require more boost) equals more power, but simply adding more boost without the fuel part of the equation does nothing. To the contrary, it can potentially be harmful as the engine will be forced to breathe hotter air due to increased IAT (Intake Air Temperature) numbers.

If you want more fuel you need to step in to the ECM reflash as discussed earlier in this FAQ. Only THEN should you consider adding more boost, but if you have a stock wastegate setup the reflash will automatically take care of that anyways by simply commanding the stock wastegate setup to behave differently and make more boost. No "Turbomaster" needed!

- How much can the 6.5 tow? It's a diesel so it can pull anything, right?

That's a bit of a loaded question. If you look at the "Factory" GM tow figures you may laugh your head off, or think there's a misprint. For example, my 1997 1-Ton Dually 6.5 equipped truck was rated to tow a paltry 6000 pounds.

There are people here (and especially at the RV forums) who would suggest that you never (ever!) exceed these "magical" figures, but we here at the Diesel Place look at it from a more realistic viewpoint - the 6.5 can tow a lot more then it was actually rated for. Don't be stupid and think that you're going to pull your friends 20,000# toy hauler fifth wheel, but don't be afraid by the low numbers in the manual, either - the realistic truth lies somewhere in the middle.

Done right, the 6.5 (Depending on your gear ratios and factory weight of your truck, crewcab LB versus single cab SB, etc) can tow heavy loads, but it's commonly accepted that for typical use about 13,000 LBS is the maximum, and if you tow heavy with a 6.5 GAUGES ARE ESSENTIAL! Pyrometer, engine oil temperature and transmission temperature gauges! NO EXCEPTIONS!

Unless the previous owner installed these already you'll have to do so yourself. If you're going to tow heavy with a 6.5, Budget it as part of your towing preparation.

A more free-flowing exhaust (discussed in the previous section) is

also a wise idea to help control EGT's which are commonly an issue when heavy hauling. Needless to say, your cooling system must also be in tip-top condition otherwise you WILL (!!!) overheat towing with a 6.5.

Part of the reason 6.5 equipped trucks were rated to tow relatively low weights was the fact that heavy loads can easily drive the engine into temperature ranges where it can hurt itself. GM put extremely low rated tow limits on 6.5 equipped trucks because at those figures, even with a clueless driver at the wheel, the truck will typically manage just fine, even without all the gauges mentioned here that the truck isn't equipped with from the factory.

There are people that routinely pull fifth wheels weighing in the 16,000 Pound range with 6.5 equipped trucks (Equipped with 4.11 gearing, discussed below) and some that report towing equipment trailers weighing 18,000 or more, but gauges are critical as is your driving style - don't expect to race upgrades on cruise control without paying any attention to things - you will have to work within the ability of the engine and "Take your foot out of it" if the gauges indicate you're working it too hard. Personally, I have hauled my 12,000-pound fifth wheel coast to coast, over many mountain passes, and up (and down) grades as high as 10% with my 6.5 and have been pleased with its performance

It's most important to again step back and realize that the 6.5 is NOT a Cummins nor a Duramax - it will not accelerate like them, it will not pull grades like them, and it probably won't stop as well either - so use your head!

The 6.5 is a much different engine from an architecture standpoint and was not designed (nor is it capable) to handle the heaviest trailers or loads out there, so go accordingly! In other words, don't buy an equipment float that weighs 25,000 pounds loaded and expect your 6.5 to pull it even if it's a 1-Ton dually - you'll have a bad experience and will probably end up breaking something.

There is a point where you have to ask yourself if what your'e trying to do is really safe, or even possible. If in question, ASK HERE - those with heavy hauling experience will be happy to offer our thoughts.

Lastly, your differential gear ratio will also drastically effect your towing ability. 6.5 equipped trucks with 3.42 ratios are very limited in what they can to tow, with the 3.73 ratio being better, but the 4.11 ratio being the best for towing. If you are planning to tow a heavy trailer, you want the 4.11 ratio, although for moderate or occasional towing the 3.73 ratio provides a good mix between fuel efficiency (when not towing) versus towing ability but will reduce your capacity by a few thousand pounds.

If you need help identifying your gear ratio, simply make a post here in the Diesel Place 6.5 forum, or search for previous posts on the subject using the "Search" function.

Of course, for towing heavy loads, ensuring your braking system (on both the truck and trailer) are working perfectly is essential. Be smart, be wise, be careful.

- What about glow plugs? What are they, what do they do, and what if they don't work?

Diesel engines need heat to create combustion. When the engine

is running this heat is self-generating and the engine stays running, but when cold they need a “Heat Boost” to get the fuel to ignite initially. Glow plugs are mounted in the cylinders and are turned on when you turn the key on BEFORE cranking.

See that little “Wait To Start” light on your dashboard? That’s a light indicating the glow plugs are on and heating up in preparation for you to start your engine.

If you are looking at a 6.5 to potentially buy, check that this light illuminates - it indicates at least the basics of the glow plug system is working. It doesn’t mean all the plugs are actually working, but it’s a good indicator. Ask the seller to ensure the engine is stone-cold when you go to see the truck for the first time and then pay attention to how it starts - turn the key on until the “Wait To Start” light illuminates, and when it goes off, crank while looking in the mirror at the tail-pipe - you may see a bit of white smoke but the engine should start fairly promptly and the white smoke should disappear almost immediately. The less white smoke, the better the glow plug system is working.

If the engine cranks for an extended period or a LOT of white smoke is evident at cold start the glow plug system may be problematic...if you haven’t already bought the truck you may be looking at some repairs.

If you already own a 6.5 with problematic glow plugs you may already be experiencing hard starts punctuated by a lot of white smoke, whereas once hot the engine fires right up with little hesitation. If this is the case, glow plug (or module) replacement is in your future, especially if you live in a cold climate - the 6.5 can be difficult to impossible to start in freezing temperatures without a properly functioning glow plug system.

TAKE NOTE: “Fast Charge” or “Engine start” battery chargers/boosters and glow plugs do NOT mix. If you ever need to fast charge your trucks batteries NEVER turn the key on (or attempt to start) the engine with the high-rate charger connected and actively charging - the extremely high voltages that these styles of chargers output will damage your glow plugs! Instead, charge for a period of time, then TURN THE CHARGER OFF, then attempt to start.

If you need more help related to your glow plug system, simply make a post here in the Diesel Place 6.5 forum, or search for previous posts on the subject using the “Search” function using the term “6.5 Glow plugs”.

So, there we have it - a fairly in depth overview of the most common “New Owner” questions related to the 6.5.

To summarize:

- Relocate your PMD. Being stranded is no fun, and it WILL eventually happen.

- Ensure your IP has adequate lubricity - an additive is essential!

- Inspect (and eventually replace) your oil cooler lines. Seized engine = $$$$$$

- Consider an aftermarket 4” exhaust, especially if you tow.

- Pay attention to temperatures, most importantly coolant temps.

- Your glow-plug system is your friend, make sure it’s up to snuff.

- If towing heavy, GAUGES GAUGES GAUGES!

- Check that lift pump, make sure your IP isn't sucking itself to death.

- Inspect your harmonic balancer and pulley. If showing signs of failure (or impending failure), REPLACE ASAP!

- You should never see black smoke on a 6.5 - if you do, something on your boost system is broken, and you want to fix it ASAP.

- Be careful who you let work on your 6.5 - a lot of mechanics are clueless about this engine but will be happy to take your money while they experiment and learn on it.

Mark - Courtice, Ontario, Canada.
SOLD: '97 C3500 Crew Cab Long Box Dually 6.5 Turbo Diesel.

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