



THE NUMBER ONE DODGE/CUMMINS TURBO DIESEL RESOURCE

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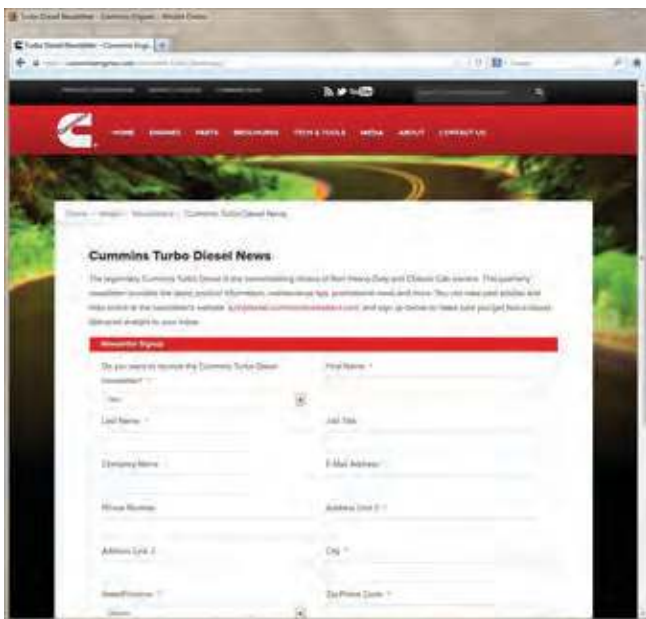
INSIDE: *Blowin' In The Wind: 2014 Ram HD and 1500 Coverage. See page 40.*



From time-to-time we are fortunate to have correspondence direct from Cummins that we can share with you. In this issue let's discuss their online newsletter and an interesting article that they recently published about operation in cold weather, titled "Cold Weather Subjects."

CUMMINS NEWSLETTER

Cummins publishes an online newsletter that is a free service that anyone can sign-up to receive. To do so, long-on to www.cumminsengines.com/newsletter-turbo-diesel.aspx and follow the prompts.



COLD WEATHER SUBJECTS by Cummins Turbo Diesel Service Group

Winter Engine Operation

Your Cummins Turbo Diesel is available with a few key features to improve the cold weather operation of your engine. These features will help to protect your engine and improve your truck's cold weather starting capabilities.

Engine Block Heater

The engine block heater is a resistance heater installed in the water jacket of the engine just above and behind the oil filter. It requires a 110- to 115-volt AC electrical outlet with a grounded, three-wire extension cord. The engine block heater is required only when ambient temperatures are below -20F (-29C), but recommended at temperatures below 0F (-18C). For full capability, once you turn on the engine block heater, it needs to run for one hour before you start your truck.

Fuel Filter Heater

A 12-volt heater built into the fuel filter housings helps prevent fuel gelling. It is controlled by a built-in thermostat.

Fast Idle

If ambient temperatures are low, the engine idle speed will slowly increase to 1,000 rpm after two minutes of idle, if the following conditions are met: Do not depress the brake or throttle pedals, the automatic transmission must be in park, and the vehicle speed must be zero. To cancel the fast idle feature, apply the throttle. For more information on the fast idle feature, consult your Owner's Manual.

Battery Blankets

A battery loses substantial cranking power as the battery temperature decreases to 0F (-18C). At 0F (-18C), and the engine requires twice as much power to crank at the same rpm. The use of 120-volt AC powered battery blankets will greatly increase starting capability at low temperatures. Suitable battery blankets are available from your authorized Mopar dealer.

Cold Weather Grille Cover

A winter front, or cold weather cover, is designed to be used in ambient temperatures below 30F; especially during extended idle conditions, to reduce condensation build-up within the engine crankcase. The cover will also drastically increase the warm rate inside the cab. The cold weather cover is available as a part of the Cold Weather Prep Package or through your authorized Mopar dealer.

Grid Heaters

Have you ever been asked to find the glow plugs in your Cummins Turbo Diesel? If so, someone is having fun with you. Since the first Cummins-powered Ram truck was produced in 1989, Cummins uses a grid heater, not a set of glow plugs, to heat the intake air.

Diesels need a cold-start aid, while gas engines don't. Gas engines use a spark to ignite a highly flammable mixture of gasoline and air. The spark is the ignition source, and is much less affected by cold air and cylinder temperatures. Diesels, on the other hand, use only compression to ignite the diesel-and-air mixture. In severe cold weather, the intake charge and fuel can be cold enough that compression alone will not create the ignition needed for combustion. This is why virtually all diesels come with some type of aid for cold starting. The two most common types seen in today's diesels are grid heaters and glow plugs. Both of these technologies serve a similar purpose, albeit with slightly different approaches.

Grid Heaters (continued)

The grid heater found in your Cummins Turbo Diesel is effectively an electrical element that sits in the entrance to the intake manifold. It is very similar in concept to what you'd find in a hair dryer, but stronger, hotter and more durable. When the engine is keyed on at cold temperatures, the "wait to start" lamp will be illuminated. During this time, the vehicle battery is being used to heat this electrical element. When the engine is cranked, air is drawn over this hot element, meaning that the air entering the cylinders is preheated, and hot enough that the diesel-and-air mix will ignite easily when compressed.

Glow plugs, on the other hand, are smaller, individual heaters that sit within each cylinder. They often look similar to an injector, with a tip that protrudes slightly into the chamber. During starting, a similar process occurs—while the "wait to start" lamp is illuminated, electrical energy from the batteries is used to heat the tips of these glow plugs. This heat is transferred directly into the combustion chamber while also creating a hot region in the combustion chamber from where the combustion itself can start.

The glow-plug system has its benefits: the smaller size means they are quicker to heat-up and they draw less amperage from the batteries. Drawbacks: the system is more complex and they are not as effective after the engine has started, meaning there is a potential for rough idle and smoke.

Grid heaters are a simple approach to heating the intake air that results in a more robust system that is less likely to fail, easier to service and leads to less complexity under the hood. The only real drawback to the grid heater is that it has a very large current draw—up to 200 amps. Furthermore, wait-to-start times can be up to 30 seconds when starting at extreme cold temperatures (-20°F), and potentially even longer if starting at high altitude and extreme cold. Grid heaters offer a secondary benefit in that they can be used after a start to help keep the intake charge warm, which reduces white smoke and gives better combustion.

Grid heaters do give our truck a unique characteristic. After start-up when the headlights are on, they blink, dim or flutter somewhat. This characteristic can be described as "normal." Do not spend effort at the dealership to correct this normal truck characteristic. It is one that has been on-going since the first Turbo Diesel truck was subjected to cold weather back in 1989. The explanation:

After the engine has been started, the post-heat cycle takes over. If the temperature is below 59°, the heaters are cycled on and off depending on air temperature and how quickly the Cummins gets warm. You will notice the voltmeter acting like a windshield wiper as the heaters are cycled. They draw 120 amps! Thus, the lights flutter as the battery is working to supply current to all circuits.

Again, this condition is normal. It occurs on all trucks manufactured from '89 to current (including the newer '07.5 and up 6.7-liter engines).

Fact or Fiction: Cycling Grid Heaters Improves Cold Starting Capabilities

This is a fact. In extremely cold weather—below 0F (-18C)—it may be beneficial to cycle the manifold grid heaters twice before attempting to start the engine. The sequence you should follow is:

- Key on.
- Let the "Wait to Start" lamp turn off.
- Turn the ignition off for 5 seconds.
- Key back on.
- Let the "Wait to Start" lamp turn off.
- Start the engine.

Please remember that excessive cycling of the grid heaters will result in damage to the heater elements, and will reduce your battery voltage.

Starting Fluids

This should be self explanatory, with the previous discussion on grid heaters you would never want to pour fuel or other flammable liquids into the throttle body air inlet opening in an attempt to start the vehicle. This could result in serious personal injury.

Temperature's Effect on Diesel Fuel

It is important to think about the effect cold weather has on your truck's fuel system. The most common issue—wax build up—has concerned diesel operators for years. Let's review Cummins Service Bulletin 3379001, learn how cold climate can affect your fuel system, and then look at any differences driven by biodiesel fuels.

Cummins engines are designed, developed, rated and built to operate on commercially available diesel fuel. However, there are some options if you're experiencing fuel gelling issues.

• Wax Build-up

All middle, or intermediate, distillate fuels, such as jet fuels, heating fuels and diesel fuels, contain paraffin wax. Paraffin wax occurs naturally in the crude oil from which fuel oils are distilled. Generally, higher-boiling distillate fuels, such as Diesel #2 (2-D), have a higher concentration of paraffin wax than lower-boiling distillate fuels, such as jet fuel.

Because of the strong relationship between temperature and solubility of wax, wax separation is a problem in handling and using diesel fuel during cold weather.

To begin, let's define several of the key terms:

- **Cloud Point:** The cloud point of fuel is the temperature at which crystals of paraffin wax first appear. The fuel cloud point should be a minimum of 11°F below the operating ambient temperature for proper flow through the fuel system.
- **Cold Filter Plugging Point (CFPP):** The temperature at which a certain fuel will become saturated with wax and causes fuel filter plugging problems per standard ASTM D6371.
- **Pour Point:** The temperature at which fuel will no longer flow per standard ASTM D97.

- **Fuel Additives**

Now that we know that, what can you do to protect your fuel system? There are a number of fuel additives available which reduce the pour point and CFPP of diesel fuel. These winter additives reduce the pour point by as much as 70F and the CFPP by as much as 30F. These additives alter the size and shape of wax crystals, allowing pumping of fuel at lower temperatures. Before purchasing such an additive to treat fuel, ask the fuel supplier whether the fuel already contains a winter additive. Depending on the amount and type of additive already in the fuel, additional additives may not be necessary.

Although certain additives can be very effective, they are not a cure all. Their performance varies depending on the paraffin type and content of the fuel treated. Although other additives are available that can provide some benefits, Cummins Filtration, Fleet-tech Winter Conditioner and Turbo Diesel All Season Fuel Additives are the only fuel additives recommended by Cummins to help prevent filter gelling in cold weather applications.

- **Low Temperature Biodiesel Performance**

Given the greater availability of biodiesel, it is important to understand how this fuel differs from ultra low sulfur diesel (ULSD) and what effect it can have on your fuel system.

Biodiesel inherently has a greater risk of wax build-up and microbial growth than ULSD at cold temperatures. The fuel properties change at low temperatures and this can pose problems for both the storage of the fuel and the operation of your truck. If using biodiesel, precautions can be necessary at low ambient temperatures. They include storing the fuel in a heated storage tank or using cold-temperature additives. The additives that can be used to improve the cold weather effect on biodiesel are Cummins Filtration, Microbicide; Cummins Filtration, Asphaltene Conditioner Base; and Cummins Filtration, Biodiesel Winter Conditioner.

As a precaution, the fuel system for your Cummins Turbo Diesel includes heated fuel filter housings to protect your filters from clogging and to prolong the life of your filters. Cold-weather waxing can be minimized by monitoring your truck's performance and watching for any electronic vehicle information center (EVIC) messages. For further information on fuel filter maintenance, consult your Ram truck Owners Manual or the Cummins Service Bulletin 3379001.

Editor's note: I reviewed the 52 page bulletin 3379001 with the latest revision being August 28, 2013. Specifically I was looking for data on fuel additives, a search that was prompted by TDR writer Scott Dalglish's discussion of products on page 95.

Actually, I was surprised to find an entire section on additives. Typically the wording on additives from Cummins goes something like this: "Cummins Inc. neither approves nor disapproves of the use of any fuel additive, fuel extender, fuel system modification, or the use of any device not manufactured or sold by Cummins Inc. or its subsidiaries. Engine damage, service issues, or performance problems that occur due to the use of these products are not considered a defect in workmanship or material as supplied by Cummins Inc. and cannot be compensated under the Cummins Inc. warranty."

"It is not our policy to recommend additives."

However, in the new bulletin it did list the aforementioned Cummins products (it is not a surprise to your editor that other brands are not tested/listed) that can be used in your engine.

Cummins Turbo Diesel Service Group



Jessie Short's First Generation truck.



John Thompson's Second Generation truck.