Cummins Westport The Natural Choice



Driver Tips

For Cummins Westport Natural Gas Truck And Bus Engines.



What You Need To Know About Your Natural Gas Engine.

Cummins Westport natural gas engines are designed with the flexibility to use compressed natural gas (CNG), liquefied natural gas (LNG) or 100 percent renewable natural gas (RNG), also called biomethane.



CNG is natural gas that has been compressed up to 3600 psi (pounds per square inch) in tanks on board the vehicle, and the pressure is regulated to the engine. CNG systems do not vent under normal operation.

There are two types of CNG fueling stations: fast-fill and time-fill. Fast-fill stations operate at higher pressures and take a similar amount of time as a diesel to fill. The amount of gas flowing through the filling lines creates some heat, which can reduce total fuel capacity.

Time-fill stations can refuel a fleet of vehicles at a single location over a longer time period. These filling stations use lower fuel pressures, with multiple vehicles being plugged in for several hours, similar to a battery on a trickle charger. This eliminates the problem of drivers waiting in line for a limited number of fuel pumps, minimizes labor, and ensures a full fill at up to 3600 psi.

Protective equipment is not required for the person filling the vehicle. CNG is infused with an odor agent so that leaks can be identified by smell.

LNG Fueling.

LNG is natural gas that has been cryogenically cooled to below -250°F (-157°C), at which point it condenses into a liquid form. LNG temperature at delivery to the vehicle is important, as "saturated", or warmer LNG is required to allow the fuel system to create pressure to meet engine requirements. Consult your fuel / fuel system supplier for details.

Because it has to be kept at such cold temperatures, LNG is stored on the vehicle in double-walled, vacuum-insulated stainless steel tanks. The tanks will hold fuel for several days, but can vent if the fuel warms and pressure builds beyond the tank limits. Because LNG is stored at extremely cold temperatures, when fueling an LNG-powered vehicle, operators must wear protective gloves and clothing to avoid freezing burns. Fueling is done through a top-mount cap, and takes a similar amount of time to fill as a diesel tank.

LNG has no odor, so a methane detection system is required in the vehicle. In both CNG and LNG fuel systems, an automatic shutoff valve is opened in the "on" key position, and closes when the key is turned off.

Items Drivers Will Notice.

Engine Noise – Natural gas engines are much quieter than diesel engines, but have power and torque similar to that of diesels. Drivers of vehicles not equipped with automatic transmissions will need to pay close attention to the tachometer initially to get adjusted to the level of engine noise that equates to the engine speed.

Engine Brake – Engine braking is an option on the ISX12 G. Engine braking performance on the ISX12 G is reduced slightly compared with that of the diesel engine. The ISL G, ISL G Near Zero (NZ), and ISB6.7 G engines don't have an engine brake option.

Throttled Engine – Cummins Westport engines use a throttle plate to control air to the engine. While throttle response is excellent, it is different from that of a diesel engine, in which fuel is injected to the cylinder. Drivers may notice a momentary delay in accelerator pedal feedback as the throttle opens or closes. This does not affect overall performance.

Turbo Noise – Cummins Westport engines use a proven Cummins wastegate turbocharger. The boost and wastegate are controlled by the Electronic Control Module (ECM), and are connected to the fuel system to provide performance throughout the operating range.

When the throttle plate is opened, boost is supplied to the air intake. When it's closed, boost is released through the wastegate. This release sounds like a puff, and is called turbo chuff. The noise can echo in some applications. This is normal and not an indication of an engine problem.

Engine Lamp Indicators.



Check Engine Lamp – This amber lamp illuminates when the engine needs service at the first available opportunity. Drivers can still operate the engine.



Stop Engine Lamp – When this lamp is illuminated, the driver should stop the engine as soon as is safely possible and keep it off until the engine can be repaired.



Low Fuel Pressure Lamp – When illuminated, this lamp indicates that the fuel-supply pressure is below the minimum requirement. Engine power will derate. Even though there may be fuel shown on the pressure gauges, it may not be at the optimal pressure for performance. Refuel as soon as possible.

Important Daily Checks And Procedures.

Make sure to visually check the following items daily and take any necessary actions as outlined in your Operation and Maintenance Manual:

- > Air cleaner restriction indicator/gauge
- > Coolant recovery tank level (fill when cold)
- > Oil level
- > Air intake piping and all clamps and connections on the air system
- > Check the radiator hose for antifreeze leaks
- > The fuel filter has a valve that must be opened daily to drain any collected water or oil. Open the drain valve by hand. There will usually be some fuel in the filter under pressure. If there is any water or oil in the filter, it will come out first. Retighten the valve by hand.

Maintenance.

Overall, maintenance for Cummins Westport natural gas engines is similar to that of diesel engines, but there are a few key differences:

 Spark plugs will need to be replaced per the maintenance schedule below. Mileage intervals vary by application.

- ISX12 G:	1,000 hours
- ISL G / ISL G NZ:	1,500 hours
- ISB6.7 G:	500 hours

- Motor oil specifically formulated for natural gas engines is required. CES 20074 and CES 20085 approved oils meet Cummins Westport natural gas engine requirements. However, lubricating oils meeting the new CES 20085 specification may provide better performance for ISB6.7 G, ISL G, ISL G NZ, and ISX12 G natural gas engines. Oil Registration lists are published on Cummins QuickServe Online (QSOL) under Service Tools. Do not use diesel engine oil in a natural gas engine. If diesel engine oil is used, valve torching, piston scuffing and reduction in spark plug life will occur.
- For the ISL G and ISL G NZ, an initial valve adjustment must be performed after 1,000 hours of operation, then every 2,000 hours. This is an important step in achieving longer engine life. The ISX12 G requires an initial valve adjustment after 1,000 hours of operation, then every 3,000 hours. For the ISB6.7 G, overhead valve adjustment is every 1,500 hours. Mileage intervals vary by application.

Because Cummins Westport engines do not require a Diesel Particulate Filter (DPF) or Selective Catalytic Reduction (SCR) systems, drivers do not need to perform regenerations, and Diesel Exhaust Fluid (DEF) is not required.

For complete maintenance interval details, refer to Cummins Westport maintenance intervals and procedures outlined in your Operation and Maintenance Manual or on QuickServe® Online (QSOL).

Cold-Weather Operation.

It's possible to operate engines in extremely cold environments if the engines are properly prepared and maintained. Cold-weather preparation/operation procedures for Cummins Westport natural gas engines are similar to those of diesel engines (block heater, coolant heater, battery warmer, radiator shutters or winter fronts, etc.). CNG filling stations should include a dryer to remove moisture from the natural gas. Dry fuel is an important consideration for cold-weather operations. It is important to consider minimizing load on the engine at start by turning off Power Take-Off (PTO) accessories such as hydraulic pumps, etc.

Natural gas fuel systems include a pressure regulator that is kept from freezing with a supply of warm engine coolant. *In cold weather, allow the engine to warm to operating temperature before operating under load. Maintain intake air temperatures above freezing through the use of winter fronts and/or warm underhood air.*

The correct engine coolant, lubricating oil and fuels must be used for the coldweather range in which the engine is being operated:

- Ambient Temperature 32°F to -25°F (0 to -32°C) Use 50 percent ethylene glycol antifreeze and 50 percent water for the engine coolant mixture.
- Ambient Temperature -25°F to -65°F (-32 to -54°C) Use 60 percent ethylene glycol antifreeze and 40 percent water for the engine coolant mixture.

Refer to Section V (Lubricating Oil Recommendations) of your Owners Manual for correct specifications.

Tips To Maximize Fuel Economy

Vehicle Spec'ing.

1. Spec gearing ratios properly.

In general, the intended use guidelines for Cummins Westport natural gas engines in vehicles are: for the ISB6.7 G - up to 33,000 lb GVW; ISL G and ISL G Near Zero - up to 66,000 lb GVW; ISX12 G - up to 80,000 lb GVW. For complete intended use guidelines, visit cumminswestport.com.

To meet expectations for durability, performance, fuel economy, startability, and gradeability, it is important to properly specify the gear ratio for each on-highway vehicle powered by a Cummins Westport natural gas engine. To help customers and Dealers review this specification, Cummins provides a free online electronic tool called PowerSpec that makes it possible to tailor the operation of Cummins engines in every on-highway engine application. PowerSpec is available at https://cumminsengines.com/powerspec.

2. Spec advanced aerodynamics.

An aerodynamic truck-and-trailer configuration versus a non-aerodynamic configuration can result in a fuel-economy improvement of approximately 13 percent at interstate speeds.

Tips For Efficient Driving.

3. Lower drive speeds.

At interstate speeds, each 1.0 mph (1.6 kph) increase equals a 0.1 mpg (0.04 km/L) decrease. For example, driving at 65 mph (104.6 kph) instead of 70 mph (112.65 kph) can save 0.5 mpg (0.21 km/L) – roughly a 7 percent improvement in fuel economy.

4. Run in top gear more than 90 percent of the time.

Every 10 percent drop in time in top gear equals approximately a 3 percent to 5 percent decrease in fuel economy.

5. Enable on Load-Based Speed Control (LBSC).

For the ISX12 G engine, using LBSC with aggressive settings of 1750 rpm can save as much as 3 percent in fuel. (Note: ISX12 G only – LBSC does not apply to the ISL G.)

6. Decrease idle rpm and idling time.

Using the lowest idle speed possible helps reduce fuel use by up to 0.5 gal/hr (1.89 L/hr). Every hour of idle time that you eliminate can raise your vehicle's fuel economy by as much as 1 percent.

7. Follow proper driving habits.

Sudden braking, rapid acceleration, early downshifting and other poor driving habits can negatively impact fuel economy by as much as 30 percent.

Measuring Fuel Economy.

8. On new vehicles, run 50,000 miles (80,467 km) before measuring fuel economy.

Early results are not an accurate representation. Tire break-in and effects of first fill can skew the results.

9. Adjust for seasonal variations.

Seasonal fluctuations from winter to summer can account for a gain of 8 percent to 12 percent in fuel economy. A comparable decrease happens when going from hot weather back to colder temperatures.

Vehicle Maintenance.

10. Tires and maintenance are critical.

Tire tread and casing design can account for a 12 percent difference in fuel economy. Proper chassis alignment and tire inflation are critical to getting better fuel economy.

For More Information.

Contact your local Cummins distributor or refer to your Owners Manual for details on all service and maintenance procedures listed here.

Learn more about engines and fuel systems at the Natural Gas Academy online at cumminswestport.com.



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