

March Edition of Natural Gas Engine Tech Talk

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Topic of the Month:

How to maximize fuel economy with your ISX12N

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Choose the right vehicle configuration. The right combination of transmission, axle, and tire can make a significant difference in fuel economy. The ISX12N is different from diesel installations and should not be geared the same or be expected to perform exactly the same. Consult [Cummins PowerSpec](#) when selecting a combination to ensure the right engine speed at vehicle cruise speed is achieved. For most applications, without steep grades, this will mean targeting 1400-1450 RPM at their intended cruise speed. Ensure all of your inputs (GVW, intended vehicle cruise speed, etc...) are correct for your application as incorrect values can result in selections that offer poor performance or fuel economy. Remember: PowerSpec recommendations are a generic guideline for the average user. The end user should take into account their specific needs and experiences, such as proven powertrain combinations and their performance metrics.

Transmission selection is another important part of vehicle configuration. Offerings such as the Eaton Endurant transmission, now available for use with the ISX12N, have a carefully selected gearset that improves performance and fuel economy over older models. An automated manual transmission (AMT) can help keep the engine in the most efficient range, much better than the driver could selecting a gear in manual mode, or with a manual transmission.

Configure your electronic settings. The vehicle's configuration extends not just to powertrain hardware, but to software as well. There is a complete suite of electronic features offered on ISX12N and the Endurant transmission that can help maximize fuel economy. This can include features such as gear down protection (GDP) that helps keep the engine in the most efficient regions, or idle shutdown that prevents excessive idle that hurts overall fuel economy. Consult your Cummins Technical Support Manager (TSM) for optimal engine and transmission feature settings for your application. Once properly configured, the engine Electronic Control Module (ECM) should be pass code locked to prevent any beneficial features from being disabled.

Minimize idle. If idle shutdown features on your engine cannot be enabled, idling should be kept to a minimum. Excess idle time can result in significantly lower overall

fuel economy due to the amount of fuel consumed while idling. Auxiliary power units (APUs) can be used to help minimize fuel consumption where vehicles might be otherwise idled for prolonged periods.

Even with the aforementioned considerations, best fuel economy will not be seen until after the break in period, much like other engines. This can be expected after roughly 1000 hours of engine operation, depending on the load/duty cycle the engine experiences.

Cummins natural gas engine ECM reports are designed to report engine fuel economy three different ways (total fuel consumed, fuel consumed at idle and fuel consumed while in motion) to assist fleet managers in managing excessive engine idle time.

Engine Oil Weight Can Make a Significant Difference in Fuel Economy

Cummins and Valvoline evaluate CES20092, Valvoline Premium Blue One Solution Gen2 10W-30 and 15W-40 natural gas engine oil. For more detailed information contact: [Michael Wedding – Valvoline Application Engineer directly at mrwedding@valvoline.com](mailto:mrwedding@valvoline.com)

SAE 10W-30: Lower viscosity, by definition, provides less resistance to flow and more fluidic efficiency. Depending upon the duty cycle, fuel efficiency gains can be in the 1-5% range. During cold cranking, 10W will flow better than 15W; "W" stands for winter and the 2 grades are tested at 5°C (9°F) apart from each other.

SAE 15W-40: will give you a thicker protective film of oil that can be beneficial when dealing with exceptionally heavy loading or severe duty cycles. The thicker oil may give slightly more oil pressure late in engine life, when the bearings may be worn and allowing oil to more freely pass between bearing and shaft.

Consolidation PBOS Gen2 allows consolidation of engine oil for diesel, CNG, and many gasoline engines. The viscosity grade you choose may allow you to consolidate more products.

**Not all engine oils are approved for diesel and gasoline engines.*

Early Life Oil Consumption

As fleets transition to our natural gas powered engines I have gotten a lot of questions about early engine life oil consumption. Usually I answer it with the info that was included in last month's tech talk, focusing on correct level checks and top offs. That information usually answers the question, however there have been times when proper trouble shooting process has been ignored resulting in an engine being torn down

looking for and not finding a failed engine part. The most likely and common causes for early engine life oil consumption:

Causes:

Oil Level too High: With the crankcase filled too high, the rods will dip into the oil and splash more. This vaporizes more oil leading to excessive oil vapor that can get into the crank case ventilation system and feed back into the intake, causing the engine to burn the oil.

High Idle Time: Units/Applications with higher idle time (30% or more) are more likely to consume oil. When idling the combustion chamber is under a vacuum condition which can cause oil to be sucked passed the rings. Reducing idle time can dramatically impact oil consumption rates.

Engine Break In: During the first 1000hrs or so, the rings are still getting worn in to match the liner and piston. Replacing rings/liners prior to this point to repair oil consumption just resets the clock on the break in and doesn't resolve the root cause for high oil consumption rate. Reminder: There are cities in the US that forbid parked vehicles idling engines to manage hotel loads (heat, A/C, electricity) of a tractor.

Crank Case Vent Drain Plugged Up: The CCV system is designed to allow oil that is separated out to drain back to the oil pan. If there is something blocking the drain back passage, either through improper hose routing, or actual plugging of the drain or filter, the oil will instead return to the intake system and be consumed by the engine.

New Renewable Natural Gas Engine Resource Webpage

Cummins has released a new Renewable Natural Gas Engine webpage featuring engine specifications, emission calculator, customer testimonial videos, engine and fuel technical documents, maintenance guidelines by engine. **Click [here](#) to access the website.**

Technical Resources:

Maintenance and Operation Quick Reference Guides:

[B6.7N](#)

[L9N](#)

[ISX12N](#)

Jason Bauer's Maintenance Tip Videos – Click Links Below

[Maintenance Intervals](#)

[Natural Gas Engine Oil](#)

[Ignition Coil Maintenance](#)

[Fuel Filter Maintenance](#)

[Spark Plug Maintenance](#)

[Tips for Success](#)

Minimum methane number requirement for Cummins Natural Gas Engines:

C Gas Plus, B Gas Plus, and L Gas Plus	65
ISL G, ISX12 G, ISB6.7 G, and all 2018 engines	75

[GHG Emissions Calculator](#)

[Fuel Quality Calculator](#)

Recommended Maximum GVW for Best Performance & Efficiency:

B6.7N	33,000lbs
L9N	66,000lbs
ISX12N	80,000lbs

CES 20092 Oil Provider Recommendations

For the latest list of recommended oil providers click [here](#).