FREQUENTLY ASKED QUESTIONS ON HVO FUEL

WHAT IS HVO?

1. **What is HVO fuel? What is it made of?** *HVO is a hydrotreated vegetable oil, which is made of paraffinic hydrocarbon. The fuel is derived from the same feedstocks used to produce biodiesel. However, instead of using transesterification process, HVO is produced via hydrotreated process.*
2. **What is the difference between HVO and biodiesel/FAME (Fatty Acid Methyl Ester)?** *Both HVO and biodiesel can be derived from the same feedstocks but through different processes. The major difference between biodiesel and HVO is biodiesel contains oxygenated groups which potentially impacts the fuel stability. However, HVO is produced via a hydrotreatment process, so there is no oxygenated group, which helps improve fuel oxidation stability.*
3. **What is the difference between HVO and GTL fuels?** *Physically and chemically, both fuels are the same fuel and meet the EN 15940 fuel specification. There are two major differences between HVO and GTL fuels. HVO is produced from renewable feedstocks. GTL is produced from a fossil fuel, natural gas. Moreover, HVO is produced via a Hydrotreated process, and GTL is produced via the Fischer – Tropsch process.*
4. **What is the reason for HVO fuel getting promoted more when compared with other renewable fuels?** *HVO is being promoted due to its very low carbon content which helps operators meet their carbon reduction goals. Unlike biodiesel, HVO has good oxidation stability and is not prone to bacterial growth making HVO suitable for standby applications.*
5. **What are the differences between HVO Fuel and Diesel Fuel?** *HVO chemically and physically is very similar to diesel fuel. There are couple differences, HVO has (1) ~ 7% less fuel density, (2) limited aromatic content, (3) limited sulfur content, (4) higher cetane value, (5) a bit higher H/C (Hydrogen/Carbon) ratio.*

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CUMMINS APPROVAL AND WARRANTY

6. **Does Cummins approve the use of HVO fuel on Cummins generator sets?** *Cummins approves use of HVO fuel in all* generator sets.*
7. **Does Cummins approval cover engines used in G-Drive application?** *Engines used in G-Drive applications are approved provided the application is standby.*
8. **Is there a Cummins recommendation for HVO fuel specification?** *Cummins requires that HVO fuel comply with the requirements of EN15940.*
9. **Can we purchase HVO fuel from any manufacturer?** *HVO may be sourced from any supplier provided that the fuel complies with EN15940.*
10. **Are Cummins products covered under warranty using HVO fuel?** *Warranty is covered for all products listed for use with HVO fuel on the Cummins fuels bulletin. This includes all standby generator sets typically used in data center applications.*
11. **What is the procedure that we should be following to use HVO fuel on a product that is not approved by Cummins?** *Contact your Cummins distributor or account manager.*
12. **Our local regulation has a higher min. flash point requirement than what is stated in EN15940 (e.g. Local Regulation - Min flash Point is 65 deg C vs EN15940 - Min flash point is 55 deg C). Can this fuel be used?** *Yes, fuel with higher flash point then the min requirement by EN15940 can be used. Confirm with supplier that it meets the local regulations.*

PERFORMANCE

13. **What is the performance difference using HVO fuel compared to standard Diesel Fuel?** *With the exception of fuel consumption there are no inherent differences in generator set performance between diesel and HVO beyond normal site and unit to unit variation. There is a potential mechanical power loss of 1 – 2% due to the lower energy density of HVO fuel. At most generator set power nodes there is sufficient margin between engine power rating (after auxiliary losses and derates) and the generator set rating so that no generator set derate will be required.*
14. **What is the difference between standard fuel and HVO fuel in fuel consumption?** *HVO fuel will have up to 5% higher fuel consumption than what is documented on the data sheet. Add 5% to data sheet values for application needs.*
15. **What are the typical failures for Cummins Engines running with HVO fuel?** *There are no anticipated failures attributed to running the generator sets with HVO fuel.*
16. **Can we mix HVO fuel with Diesel Fuel in the fuel tank?** *Any blend of diesel and HVO is acceptable with no anticipated difference in engine behavior except for slightly greater fuel consumption.*

EMISSIONS COMPLIANCE

17. **Is there any impact to emissions performance when using HVO?** *NOx emissions are comparable and PM emissions are lower when using HVO fuel compared to diesel.*
18. **Is there any impact to Emissions Certifications?** *EPA Tier 2 certification and TA Luft 2g compliance are not impacted by using HVO fuel. (EPA certification requires a specific blend for certification and publishes requirements for fuels to be used in the field. HVO meets those requirements.)*
19. **Are there separate emissions data sheets for HVO?** *No, standard emissions data sheets are to be used for submittals and permitting.*

20. **Is there any impact to site permitting?** *There are no expected differences in emissions performance between diesel and HVO. HVO may result in slightly higher fuel consumption than diesel, so that will have to be accounted for in permits that call for measuring fuel consumption. Site permits are issued at the discretion of local authorities. Cummins will support our data center customers in working with authorities on defining and complying with permit requirements.*

OPERATION AND MAINTENANCE

21. **What are the recommendations for maintenance, storage and fuel polishing of HVO?** *Maintenance, fuel polishing and storage recommendations are the same for diesel and HVO*. Most fuel polishing systems will work with either diesel or HVO without modification. HVO fuel sources from reputable suppliers will tend to form less sediment than with traditional ULSD when stored for long periods of time. The potential for other contaminants such as water & environmental debris (dirt & dust) to contaminate fuel remains the same. Cummins recommends similar fuel polishing and storage recommendations for HVO vs. traditional ULSD however if fuel test data can show a trend where fuel is clean, dry & sediment free, fuel polishing frequency could be reduced.*
22. **Is bacterial growth a concern with HVO as it is with biodiesel?** *No, HVO is a more stable fuel than biodiesel and is not susceptible to bacterial growth and oxidation stability concerns.*
23. **What are the considerations regarding cold weather operability with HVO?** *Confirm with the fuel supplier that the HVO purchased will work at all site ambient conditions. Note that traditional methods of fuel blending or anti-gelling agents may not be effective.*
24. **Are there any differences between HVO and diesel in terms of what additives can be used?** *In general Cummins neither approves nor disapproves of additives, however many diesel additives can be used with HVO. There are only two additives endorsed by Cummins for use with either diesel or HVO: PowerService Diesel Kleen +Cetane Boost and PowerService Diesel Fuel Supplement +Cetane Boost. Check with your fuel supplier to confirm the effectiveness of other additives.*
25. **Can fuel heaters be used with HVO?** *Yes*

*With the exception of some configuration of QSX15 powered generator sets. Consult the Cummins fuels bulletin for details.

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