

## Diesel Retrofit Project Pre-Installation Checklist for On-Road DPFs

The following list outlines minimum generic guidelines for assessing an on-road diesel retrofit candidate engine that must be checked prior to installation of a verified diesel particulate filter (DPF) emission control device on a vehicle. Please consult with the retrofit device manufacturer for their specific pre-assessment requirements.

Verification Terms and Conditions	Yes	No
Does the candidate engine meet all the terms and conditions of the verification letter (model year, engine family, engine configuration) for the retrofit device being considered?		
Is the engine's engine family name approved for use with the chosen DPF? (Use exact engine information from engine label and engine serial number – do not assume engine family name from engine manufacturer and model)		
Was the minimum exhaust temperature criteria met? (Required for passive filters, must follow manufacturers installation evaluation criteria for active applications)		
<input type="checkbox"/> Is engine in original certified configuration with no added aftermarket parts or special modifications that are not direct replacement parts. <input type="checkbox"/> Does the engine meets the equipment criterion set forth for DOCs, EGR, etc in the EO terms and conditions		
<b>Data-logging:</b> Was data logging taken within 6 inches of location of filter? Data collected every 5 seconds for 24 hours of operation?		
<b>Data-logging not required for application</b> (active devices must follow manufacturers criteria).		
<b>Duty Cycle evaluation:</b> The data-logging should be performed on a worst case duty cycle over which the vehicle will be operated. <input type="checkbox"/> The same cycle all the time <input type="checkbox"/> Variable: Advise fleet how changing the duty cycle (vehicle operation) affects filter performance and regeneration cycles of DPF. <input type="checkbox"/> Talked to end-user about the effect of duty cycle on filter regeneration and cleaning.		
<b>Fuel:</b> Does the diesel fuel used comply with terms and conditions of retrofit device verification letter (sulfur level, biodiesel specification, fuel additives)?		
Fuel rated 15 ppm sulfur or less		
Visually inspect fuel sample from fuel tank. Is fuel cloudy or Grey/Black in color?		

	Yes	No
Are oil or fuel additives, or detergents being used by the fleet that are not listed in the terms and conditions of the verification  Note: Advise end-user that additives and detergents will increase filter cleaning frequency		
___ <b>If allowed, biodiesel meets ASTM D6751 and is 20 percent or less of fuel</b>		

<b>Engine Condition (wear and tear)</b>	Yes	No
___ <b>Exhaust peak opacity (per SAE J1667 protocol):</b> _____ Generally opacity values must be less than 20% for most pre 2002 engines. Most newer engines have been certified to peak opacities < 10%. Consult with VDECS manufacturer as to what opacity limit is required for their specific device before installing the retrofit.		
<b>Engine Oil Consumption Rate?</b> Request oil consumption records. Is oil consumption rate < 500 miles/qt.  If records are not available, consult with VDECS manufacturer.  Inform customer that DPF cleaning frequency depends on oil consumption rate and will be more frequent if consumption is greater than one quart every 500 mi.		
___ <b>Engine mileage accumulation:</b> _____ Is engine mileage accumulation greater than the following values?  If yes, the installer must consult with VDECS manufacturer on how to proceed and notify the owner that the higher rate of spontaneous engine component failures may result in unwarranted failure of the emission control device:  <ul style="list-style-type: none"> <li>• Class 8 (&gt;33,000 lbs.): &gt;600,000 miles</li> <li>• Class 6 &amp; 7 (19,501-33,000 lbs.): &gt;200,000 miles</li> <li>• Class 4 &amp; 5 (14,001-19,500 lbs.): &gt;150,000 miles</li> </ul>		
<b>Are HEUI (hydraulically controlled injectors) used in the engine?</b>  May lead to greater incidents of lube oil leaks into cylinders and high PM, Notify device manufacturer and owner.		
<b>Engine Control Module (ECM)</b> For electronically controlled engines, download fault codes from ECM and retain copy. Are there active fault codes? Correct all active faults before proceeding.		

<b>Visual Inspection:</b> If any of the checked boxes in this section are shaded, the problem must be corrected before proceeding with installation	<b>Yes</b>	<b>No</b>
Is there available space for the retrofit?		
Are there any visual integrity problems in the exhaust system (exhaust leaks – manifold to tailpipe)?		
At normal engine temperature and following snap to idle, is there visible white or blue smoke exiting tailpipe?		
Are there any visible indications of air intake system leaks (visible signs of leaks at seal connectors, visible cracks in the charge air cooler, audible turbo spooling problems)?		
Is the intake air filter Clean? Last replaced?		
Are there any audible combustion problems?		
Are there any visible signs of engine oil or diesel fuel present in exhaust system?		
Are there any visible signs of leaks from the turbocharger seals?		
Are there any visible signs of excessive crankcase vent tube emissions or dripping oil at the vent tube?		
Has the fuel pump, governor setting, or EGR valve been tampered with?		

<b>Maintenance History and Practices</b>	<b>Yes</b>	<b>No</b>
Is the engine operating on CJ-4 oil? Notify fleet that operating the engine on low ash (CJ-4) producing oil will extend the cleaning interval for the DPF		
Is there a history of turbocharger replacements? More than two in past 3 years? Turbocharger seals must be inspected, adjusted and replaced if necessary?		
Is there a history of fuel injector replacements? More than two in past 3 years? Have the fuel injectors been cleaned and tested according to the engine manufacturer's maintenance schedule? Are the injectors set at manufacturer specifications?		
Is there a history of EGR component replacements? More than once in past 3 years?		
Is there a history of cylinder valve replacements? More than once in past 3 years?		

**If any of the shaded boxes have been checked, the engine/vehicle fails the pre-assessment and should not be retrofit without further consultation with the diesel retrofit device manufacturer. Notify the customer of any necessary repairs that must be made prior to installing the retrofit.**

### **Other Considerations:**

\_\_\_\_\_ **Conduct safety analysis:** Evaluate the location of the retrofit device installation and consider its impact on:

- Visibility
- Location of device relative to fuel lines
- Structural integrity of framework or vehicle stability
- Exposure of hot surfaces that may lead to thermal hazards and the need for heat shield

Be aware that some states or jurisdictions may have regulations governing the safe installation of diesel retrofit devices that must be considered as part of this safety analysis.

The state of California has specific requirements for the safe retrofitting of school buses as directed by the California Highway Patrol, please review and follow these requirements.

**This is a basic engine assessment to identify obvious engine conditions that may impact the performance of the retrofit device at the time of the assessment. This assessment may not identify all engine problems and/or conditions that may impact the performance of the retrofit device and will not identify engine problems and/or conditions that develop after this assessment. Level 3+ particulate reduction systems will capture essentially all “engine out” particulate and as such, any condition that results in increased engine out particulate will likely require correction for the retrofit device to operate as designed and verified.**

Inspection performed by: \_\_\_\_\_

Customer signature: \_\_\_\_\_ on \_\_\_\_/\_\_\_\_/\_\_\_\_