

# DPF Maintenance For Your School Bus

Cummins recognizes the challenge of the traditional school bus duty cycle when it comes to maintaining an aftertreatment Diesel Particulate Filter (DPF). Such as relatively high idle times, frequent stop and start events, lack of consistent engine and vehicle speeds, and light engine load. All play a role in dictating maintenance intervals. With specific feature parameter settings, routine regenerations and the use of genuine ReCon® Diesel Particulate Filters from Cummins, operators, transportation directors and maintenance/service personnel can rest easier.

The secret to diesel particulate filter life and continual performance is to provide enough constant heat to the DPF during regeneration events. Unlike over-the-road linehaul trucks that typically have consistent engine speeds, loads and heat, school buses frequently vary in terms of heat supplied to the aftertreatment system. Because of this, passive regenerations (frequent on linehaul trucks) are less common for school buses and may require more active regenerations to effectively maintain the DPF.

To ensure healthy operation and avoid unplanned downtime, operators should understand how to address the DPF lamp if and when it illuminates. This lamp indicates when the engine needs to regenerate the filter but does not have the proper duty cycle to start the process, or an inhibit switch is active. First, ensure the inhibit switch is off. If it is not, disable it and wait for the engine to start regeneration. If the switch is already off, or disabling it did not work, the duty cycle may not meet the conditions required for the engine to regenerate the filter. The least involved way to meet the necessary conditions is to run highway speed for about 20 minutes. This should allow the engine to run a regeneration. Finally, if this condition is not an option or if the lamp persists, a Cummins certified technician should be consulted on how to induce a stationary regeneration via a service tool such as INSITE. Understanding the duty cycle of the fleet, adjusting routes, or driving in a way to incorporate more time at high speed/load may alleviate chronic DPF lights.



To extend maintenance intervals between regeneration events, some best practice operations should be followed. One of the best practices to prolong DPF life is to minimize idle times. On hot or cold days, additional idle time to improve student comfort makes perfect sense, but on nice days when the electrical system or heating ventilation and air conditioning (HVAC) systems are not necessary, try to reduce idle times as much as possible. The issue with high idle times is that the engine operates at low speeds (RPM) with low engine loads, significantly reducing the amount of heat naturally generated by vehicle operation.

Cummins provides the ability to adjust and tailor select electronic engine features that can assist with improving school bus operation and improve DPF aftertreatment life. This includes the Idle Shutdown (and its many adjustable settings) and Diesel Particulate Filter Regeneration Stay Warm features.

The following provides a list and definitions of some Idle Shutdown features that should be considered:

- The Idle Shutdown feature allows the engine to idle for a pre-determined time interval before automatically shutting it down. A warning lamp will begin to flash during the last 30 seconds of the programmed idle time. This feature will need to be turned on, as the default setting is for the Idle Shutdown feature to be turned off.

- The Idle Shutdown Timer feature limits the amount of time an engine can idle. For 2013 and newer model year vehicles, this feature may be enabled for Green House Gas credits and is called “Green House Gas Idle Shutdown.” The Green House Gas Idle Shutdown feature establishes a specific Idle Timer that can only be adjusted by the bus manufacturer. The default setting is 60 minutes but can be adjusted to 30 seconds if the “Green House Gas Idle Shutdown” feature is not enabled.
- The Idle Shutdown Ambient Air Temperature Override feature provides a specific type of Idle Shutdown Override that is dependent on the temperature of the air outside of the cab. To appropriately set this feature, the following temperature ranges must be set:
  - Idle Shutdown Hot Ambient Air Temperature – the lowest “Hot” value
  - Idle Shutdown Intermediate Air Temperature - middle value between “Hot” and “Cold”
  - Idle Shutdown Cold Ambient Air Temperature - highest “Cold” value

The Idle Shutdown Hot Ambient Air Temperature Override value provides the ability for the engine to continue to idle once this “hot temperature value” threshold has been crossed. For instance, if the school district wants all buses to run and cool the bus once the outside temperature reaches 80°F (26.7 °C), the Idle Shutdown Hot Ambient Air Temperature value should be set to 79.

The Cold Ambient Air Temperature value provides the ability for the engine to continue to idle once this “cold temperature value” threshold has been crossed. For instance, if the school district wants buses to idle to increase the internal bus temperature once outside temperatures drop below 50°F (10°C), the Idle Shutdown Hot Ambient Air Temperature value should be set to 50.

The Intermediate Air Temperature value is the middle value between the Hot and Cold values provided. In this case, it would be 65°F (18.3°C). During this range, the driver can manually override an idle shutdown based on the timer set above.

The idle shutdown features listed above can be programmed with Cummins PowerSpec and/or INSITE. For more information on PowerSpec and INSITE,

please visit <https://www.cummins.com/parts-and-service/electronic-service-tools/powerspec> or <https://www.cummins.com/parts-and-service/electronic-service-tools/insite>.

Another feature that should be considered is the Diesel Particulate Filter Regeneration Stay Warm. By default, this feature should be enabled, but may be disabled on some buses. The DPF Regeneration Stay Warm feature allows the DPF to stay warm when, during an in-motion regeneration event, the vehicle speed drops below a specified threshold. When enabled, the engine will continue to provide additional heat to the DPF and assist with the regeneration event until the moving speed target is met. Enabling the Diesel Particulate Filter Regeneration Stay Warm feature can potentially eliminate the need for stationary regeneration.

To enable the DPF Regeneration Stay Warm feature, INSITE must be used. Therefore, contact your School Bus Manufacturer for availability and activation of the DPF Regeneration Stay Warm feature.



Another consideration regarding overall aftertreatment health is taking advantage of the Cummins ReCon® Diesel Particulate Filters program. With a core exchange program, the ReCon DPF provides an efficient and cost-effective method for DPF maintenance and service requirements. Each ReCon DPF requires an imaging test to verify soot capacity. Using a ReCon DPF means less time in the shop (a swap vs full cleaning) and is covered by a 1-year/100,000-mile warranty.

Lastly, now available for 2017 Cummins B6.7™ and L9™ engines is aftertreatment extended coverage. The Diesel Particulate Filter (DPF) and Selective Catalytic Reduction (SCR) elements are fully covered, as are all the mounting hardware and gaskets. In order to purchase aftertreatment extended coverage, a comparable Protection Plan Plus extended coverage must be purchased first. Full engine and aftertreatment coverage are now available for up to 10 years with unlimited miles.