

**To: PlymoVent Customers**

**Re: EPA07 News Bulletin**

There are many questions pertaining to the new Environmental Protection Agency (EPA) 2007 Highway Diesel Rule referred to in this news bulletin as EPA07 diesel emission standards. The intent of this update is to help provide you with recent information and frequently asked questions and answers to date relative to the new EPA07 diesel emission standards for vehicles and PlymoVent's exhaust extraction systems.

PlymoVent recommends that you read this document to better inform yourself of the various subjects that accompany the implementation of the new EPA07 diesel emission standards. We will bring you further news and details of EPA07 emissions standards and our efforts.

We hope you find the enclosed information useful, and should you have additional questions, please feel free to contact your local PlymoVent Dealer or PlymoVent Corp.'s Engineering Department at [epa07@plymovent.com](mailto:epa07@plymovent.com).

### **1) What is EPA07 diesel emission standards?**

EPA07 is a standard written by the United States Environmental Protection Agency (EPA) mandating stricter requirements for diesel emissions, effective January 1, 2007. The new EPA07 diesel emission standards are being implemented to improve air quality.

Diesel engines manufactured as of January 1, 2007 are required to meet the new EPA07 diesel emission standards. The new standard includes:

- a reduction in nitrogen oxides (NOx) emissions to 1.1 g/bhp-hr (over 50% reduction).

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- a reduction of particulate matter (PM) emissions to .01 g/bhp-hr (90% reduction). Particulate matter is composed of carbonaceous material, unburned fuel and lubrication oil, water from combustion and sulfate from fuel. PM is also known as soot.

For further detailed information about EPA07 diesel emission standards refer to the EPA website at <http://www.epa.gov/otaq/highway-diesel/index.htm>

## **2) How are Apparatus Manufacturers addressing the new EPA07 diesel emission standards?**

To meet the new EPA07 emission standards, diesel apparatuses produced on/or after January 1, 2007 have:

- Modified engine designs.
- Modified exhaust systems in which a new After-Treatment Device (ATD) will be installed in place of the current muffler, and in addition the exhaust system and tailpipe downstream from the ATD may also be modified.

## **3) What is an After-Treatment Device (ATD)?**

Engine manufacturers have introduced the use of an After-Treatment Device (ATD), in which the ATD has essentially replaced the muffler. The particulate matter, which consists primarily of soot and ash, will be reduced through the use of an ATD.

The majority of After-Treatment Devices consist of a Diesel Oxidation Catalyst (DOC) and a Diesel Particulate Filter (DPF) to remove and reduce particulate matter from the exhaust gas.

- DOC - A flow-through honey comb ceramic substrate with a catalytic coating applied to the surface.
- DPF - A device designed to physically remove and reduce the particulate matter.

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**Exhaust System Illustrations with After-Treatment Device**

Diagram 1: Freightliner; FL EPA07 Exhaust Guide

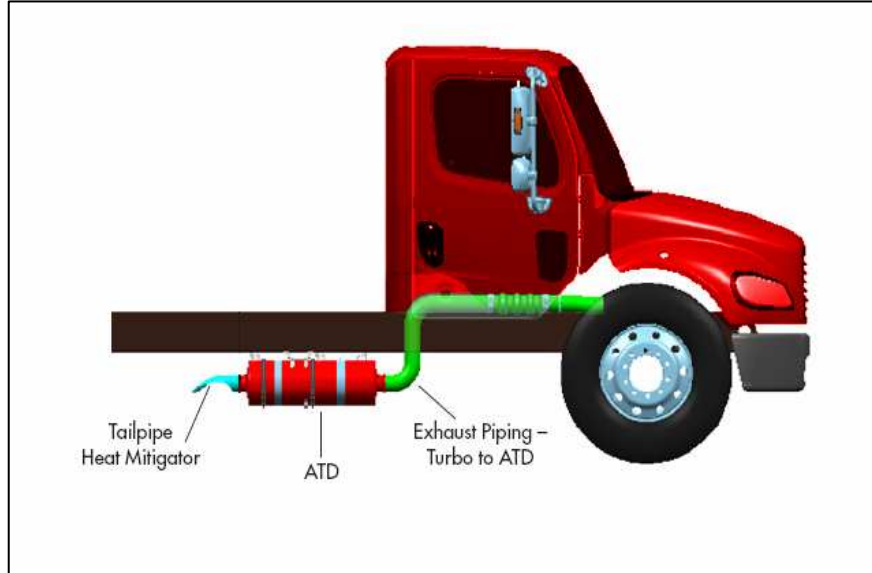
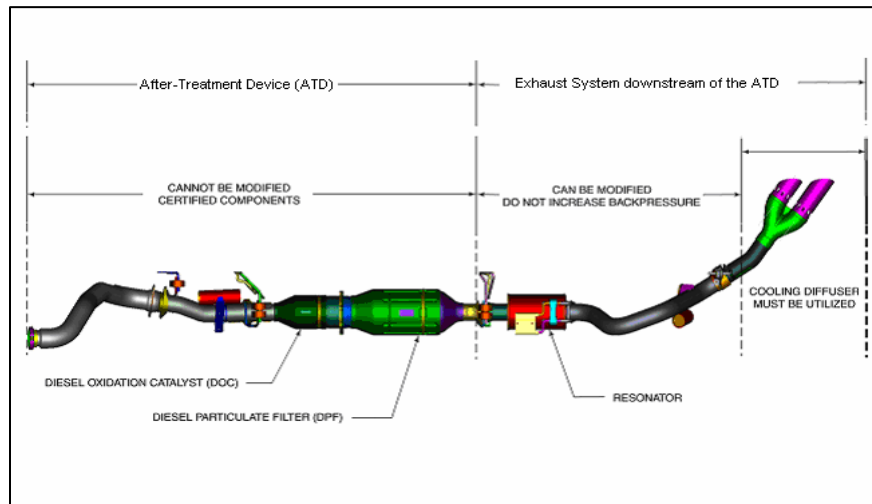


Diagram 2: Ford F Series Superduty Technical Data Guide




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The DPF is used as a trap to collect particulate matter prior to release into the open air. When the DPF becomes loaded with particulate matter, sensors such as an exhaust gas temperature (EGT) sensor or pressure sensor can detect that the DPF needs to be cleaned. This cleaning process is known as "regeneration". A variety of EGT sensors or pressure sensors can be used in the ATD, and will vary between engine manufacturers.

It is PlymoVent's understanding that there is presently no industry standard ATD design and configuration. Each light, medium and heavy duty engine manufacturer is addressing the EPA07 diesel emission standards in its own way. The result is a number of manufacturer proprietary ATD systems, in which the initiation of the regeneration process will vary from manufacturer to manufacturer.

*If you own an EPA07 compliant diesel vehicle model, refer to your vehicle owner's manual(s) or contact your certified dealer for further information regarding your vehicle's After-Treatment Device.*

#### **4) What is Regeneration?**

The process used to burn-off or oxidize the particulate matter collected in the Diesel Particulate Filter (DPF) is called regeneration. During normal operation, diesel vehicles with the After-Treatment Device (ATD) experience little to no change in operation. However, during regeneration, the DPF is cleaned by adding fuel to incinerate the trapped particulate at extremely high temperatures. The expected effects on the vehicle's operation during the regeneration process can be an increase in the vehicle's exhaust gas temperature (EGT) up to approximately 1400° Fahrenheit (760° Celsius).

A small amount of residual ash will remain in the DPF after regeneration. The DPF will need to be periodically cleaned and may need to be eventually replaced. The EPA set minimum limits of 110,000 to more than 150,000 miles between cleanings, depending on the size of the vehicle. The exact details of the regeneration process, along with how often the DPF should be cleaned or replaced will vary between manufacturers.

*If you own an EPA07 compliant diesel vehicle model, refer to your vehicle owner's manual(s) or contact your certified dealer for further information regarding your vehicle's After-Treatment Device and regeneration process.*

## 5) What are the Types of Regeneration?

There are three types of regeneration to eliminate particulate matter from the After-Treatment Device (ATD):

- **Passive Regeneration** - occurs when the exhaust gas temperature (EGT) exceeds approximately 750° Fahrenheit (400° Celsius) in the Diesel Oxidation Catalyst (DOC) / Diesel Particulate Filter (DPF), in which the particulate matter automatically oxidizes. This process does not affect engine performance and is transparent to the driver.
- **Active Regeneration** - occurs when the EGT is insufficient to achieve passive regeneration. Electronic or pressure sensors detect the need to automatically inject a small quantity of fuel (better known as fuel dosing) upstream of the DPF to raise the exhaust temperature and achieve successful regeneration. During active regeneration, EGT can reach up to approximately 1400° Fahrenheit (760° Celsius). Regeneration is expected only to occur while the vehicle is in motion.
- **Stationary Active Regeneration** - is expected to be necessary in very few customer applications. This process requires the vehicle to be parked, and in most cases a qualified technician initiates the regeneration process.

It is PlymoVent's understanding that each engine manufacturer has proprietary ATD systems, in which initiation of the regeneration process will vary from manufacturer to manufacturer.

If you own an EPA07 compliant diesel vehicle model, refer to your vehicle owner's manual(s) or contact your certified dealer for specific details about your vehicle's After-Treatment Device and regeneration process.

## 6) Will the exhaust gas temperature (EGT) at the end of the exhaust system (tailpipe) be affected by the After-Treatment Device (ATD)?

During normal operation, it is PlymoVent understanding diesel apparatuses with an After-Treatment Device experience little to no change in exhaust gas temperatures. Although many rumors in the market have speculated that very high exhaust gas temperature levels are venting out of the tailpipe, this is the case only during the regeneration process, when the exhaust gas reaches temperatures of up to 1400° Fahrenheit (760° Celsius).

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**7) Can you modify the After-Treatment Device (ATD)?**

No. Engine manufacturers' After-Treatment Devices have been specifically designed to meet the new EPA07 emission standards, and are part of the EPA certification. Altering the ATD can affect vehicle performance and emissions, and in turn vehicle warranty. Therefore, the ATD should not be altered or modified.

If you own an EPA07 compliant diesel vehicle model, refer to your vehicle owner's manual(s) or contact your certified dealer for further information regarding your vehicle's After-Treatment Device.

**8) Should Regeneration take place in the station?**

No. It is PlymoVent's position that no vehicle should engage and undergo the regeneration process in the station, where the exhaust gas temperature (EGT) level can be unsafe within uncontrolled environments.

**9) What are Apparatus and Chassis Manufacturers doing to reduce the exhaust gas temperatures (EGT) at the tailpipe?**

Apparatus and chassis manufacturers are, and will continue to address the extremely high exhaust gas temperatures caused by the regeneration process by developing and releasing new proprietary exhaust systems downstream of the After-Treatment Device. This includes exhaust dilutors and various tailpipe designs. Some of these new exhaust tip designs may present a challenge to existing exhaust extraction systems.

If you own a EPA07 compliant diesel vehicle model, refer to your vehicle owner's manual(s) or contact your certified dealer for further information regarding your vehicle's After-Treatment Device and regeneration process.

**10) With the new EPA07 diesel emission standards, will you still need an exhaust extraction system?**

Yes. The EPA07 standard is a reduction in the diesel particulate matter and nitrous oxide (NOx) vehicle emission levels. The new standard does not address the hazards of other gases and constituents relevant to diesel exhaust emissions indoors (i.e. within a station or facility). Vehicles returning to the station and shutting down may off-gas into the station or facility from the high concentration of diesel soot held within the Diesel

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Particulate Filter (DPF) unit. Diesel exhaust is defined as a carcinogen, exposure to which should be limited to the lowest feasible concentration levels. To continue to protect the members of your department from diesel exhaust inside the station, source capture is still required.

**11) Will your new 2007 compliant diesel apparatus connect to your standard PlymoVent Straight Rail (STRA) or Sliding Balancer Track (SBTA) system?**

At present, PlymoVent's standard exhaust extraction systems can be immediately connected to a number of 2007 compliant diesel apparatuses. PlymoVent is currently addressing EPA07 compliant diesel models from Ford, Freightliner, General Motors, International and Pierce with alternate tailpipe designs and PlymoVent product modifications. PlymoVent engineering will be releasing technical bulletins updating progress as we address the products of each of these manufacturers.

**12) Can you modify the Exhaust System and tailpipe downstream of the After-Treatment Device (ATD)?**

On EPA07 non-compliant vehicles (vehicles with diesel engines manufactured prior to January 1, 2007 without an After-Treatment Device), you can modify the exhaust system using the PlymoVent Standard Operating Procedure (SOP) 001 "Tailpipe Modification".

On EPA07 compliant vehicles (vehicles with diesel engines manufactured after January 1, 2007 with an After-Treatment Device), it is not in your best interest to design or alter yourself the exhaust system downstream of the After-Treatment Device. Designing or altering the exhaust system yourself, can affect apparatus performance including back pressure and exhaust gas temperatures (EGT), and in turn apparatus warranty. Currently, there are third party aftermarket exhaust manufacturers who have begun introducing exhaust system kits for various EPA07 compliant vehicles. Some of these exhaust kits will enable the PlymoVent Grabber system to connect to the vehicle's exhaust tip.

You can not modify EPA07 compliant vehicles exhaust systems using the existing PlymoVent Standard Operating Procedures (SOP) 14-A, 6-A or 001 "Tailpipe Modification". PlymoVent continues to address manufacturers with non conventional tailpipe configurations that include designs to reduce exhaust gas temperatures such as Ford, Freightliner, General Motors, International and Pierce.

PlymoVent will not warrant any product, or be liable for potential harm caused by the modification of an EPA07 compliant vehicle's tailpipe design.

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PlymoVent engineering will be releasing technical bulletins related to EPA07.

**13) Will the regeneration process affect the PlymoVent STRA or SBTA exhaust extraction system?**

Yes. Standard PlymoVent exhaust extraction systems are designed with continuous temperature ratings of 400°F, with an intermittent rating of 500°F, and are to be connected and used only under normal station operations. Normal station operation does not include the vehicles' regeneration process leading to Exhaust Gas Temperature (EGT) ratings that could reach up to approximately 1400°F (760° Celsius).

It is PlymoVent's position that no vehicle should engage and undergo the regeneration process in the station, where the EGT level can be unsafe within uncontrolled environments.

If the vehicle goes into regeneration while sitting stationary within a facility/station, severe damage could occur to the surrounding environment (i.e. building, adjacent apparatus, turn out gear, exhaust extraction equipment, etc...) due to the increased exhaust temperatures.

If the regeneration process is initiated while connected to the PlymoVent system, the PlymoVent equipment will not be covered under warranty if failure occurs.

**14) How is PlymoVent continuing to address the new EPA07 standards?**

PlymoVent continues to investigate how the EPA07 Diesel emission standards will affect its systems within the light, medium and heavy duty apparatus markets. Due to the absence of a current industry standard After-Treatment Device or tailpipe design, and the lack of consistent information and data because of on-going changes in the marketplace, PlymoVent is addressing the EPA07 topic and related issues case-by-case to solve customers' requirements.

If you have further questions regarding EPA07, and your PlymoVent exhaust extraction system compatibility regarding light-to-medium duty vehicles, please refer to the upcoming PlymoVent Technical Bulletin ENG001 and/or contact your local PlymoVent dealer.

Please complete the PlymoVent EPA07 Heavy Duty Vehicle Questionnaire for heavy duty inquiries, and either email (**EPA07@PlymoVent.com**) or fax (609) 655.0569 to PlymoVent Corporation for review and input.

**15) What actions should you take if you plan to purchase or receive a new EPA07 compliant diesel vehicle?**

You should contact the vehicle dealer / manufacturer if you are considering a new purchase.

- *Ask the dealer / manufacturer to provide the vehicle already modified to be attached to the PlymoVent exhaust extraction system.*

If you have already taken delivery of an EPA07 vehicle, contact the vehicle dealer / manufacturer asking the following:

- *Can you provide me with a modification to my tailpipe, so that I can connect my tailpipe to the PlymoVent exhaust extraction system?*

As indicated the EPA07 topic is an elaborate topic with many different factors influencing the final results. With developments still taking place which influence the possible solution(s), we are closely monitoring and testing the various applications and also cooperating with the various manufacturing parties to find a satisfying permanent solution.

At this moment PlymoVent is confident that a solution is available and as the first results are coming in, we will inform you as soon as possible about this. Until then please feel free to contact us if you have any further questions so that we might learn and provide answers from and for each other.



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