Diesel Retrofits
Frequently Asked Questions

Q: What is a diesel retrofit?
Diesel retrofits are a type of control device that can be installed on diesel powered engines to reduce exhaust emissions. Diesel retrofit control technologies include diesel particulate filters (DPF), diesel oxidation catalysts (DOC), closed crankcase ventilation system (CCV), exhaust gas recirculation (EGR), selective catalytic reduction (SCR) devices, and lean NOx catalysts (LNCs). The most commonly installed retrofits are DOCs and CCVs. DOCs and CCVs are sometimes installed together with anti-idling technology called fuel-operated heaters (FOHs).

A DOC is a device that uses chemical processes to break down pollutants in the exhaust stream into less harmful components. The device is made of a porous ceramic honeycomb-like structure that is coated with materials that catalyze a chemical reaction, reducing harmful pollution.

A CCV is designed to capture and return the crankcase gases that have leaked through the engine piston rings. These crankcase emissions can be substantial, thus a CCV is used to control the flow of gases and return the emissions to the engine for combustion. This effectively prevents the crankcase emissions from entering the atmosphere.

A FOH is a lightweight heater that burns fuel from the main engine fuel supply or a separate fuel reserve. It provides heat and can be used in conjunction with cooling systems if needed. The purpose of a FOH is to provide necessary climate control within the cab of a vehicle without having to idle the engine.

Q: What are the benefits of DOC and CCV retrofits?
DOCs reduce PM2.5 emissions by about 30 percent as well as reduce emissions of HCs by 50 percent and CO by 40 percent. CCVs reduce PM2.5 by 10-25 percent, HCs by 30-50 percent, and CO by 50-90 percent.

Q: Which products are EPA verified or certified by the California Air Resource Board (CARB)?
For the Clean Diesel Grant Program, DEQ’s Air Quality Division requires products that have been verified by EPA and/or CARB. For a complete list please check the EPA Verified Retrofits Technologies List or the CARB Diesel Reduction Program, verified technology at:

https://www.epa.gov/verified-diesel-tech
http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm
Q: How does a Diesel Oxidation Catalyst (DOC) work?
A DOC is a form of bolt on technology that uses a chemical process to reduce the concentration of pollutants in the diesel exhaust. They replace mufflers on vehicles, and require no modifications. More specifically, this is a honeycomb type structure that has a large area coated with an active catalyst layer. As carbon monoxide and other gaseous hydrocarbon particles travel along the catalyst, they are oxidized thus reducing pollution.

Q: How does a Closed Crankcase Ventilation System work?
Engine combustion produces crankcase emissions. These emissions are typically composed of particulate matter, unburned fuel, and hydrocarbon vapor. CCVs effectively close off this crankcase, thus eliminating the emissions without impacting engine performance. The general maintenance of the CCV system involves replacing the filter, similar to what is done when changing the engine oil. Higher mileage on-road engines will typically need maintenance every 25,000 miles, while low-mileage vehicles are recommended to have annual maintenance.

Q: What are the maintenance requirements for DOC and CCV?
DOCs essentially require no maintenance except for a periodic visual inspection of brackets and hangers. CCVs require periodic filter replacement.

If you have further questions, please contact the Oklahoma Department of Environmental Quality Air Quality Division at (405) 702-4100.