

**Frequently Asked Questions
Regulation for In-Use Off-Road Diesel-Fueled Fleets
(Off-Road Regulation)**

VDECS Credit

Revised December 2015

Q – How would installing a diesel particulate filter (DPF) help me comply with the Off-Road Regulation?

A – As amended in December 2010, the Regulation for In-Use Off-Road Diesel-Fueled Fleets (Off-Road Regulation) no longer requires the installation of a Verified Diesel Emission Control Strategy (VDECS), an exhaust retrofit, such as a DPF evaluated and verified by the California Air Resources Board (CARB) to reduce particulate matter (PM) and/or oxides of nitrogen (NO_x) emissions, on a fleet's engines. However, fleets still have the option to install VDECS as part of their overall compliance strategy. For more information, please see the VDECS Frequently Asked Questions (FAQ), available on the Frequently Asked Questions page in the [Off-Road Zone](http://www.arb.ca.gov/offroadzone) at www.arb.ca.gov/offroadzone.

In some cases, fleets may find that the installation of VDECS is the lowest cost compliance option to meet either the fleet average target or Best Available Control Technology (BACT) requirement. By installing a VDECS before the early credit deadlines, fleets can earn double credit for the VDECS installed. Additionally, vehicles that have the highest level PM VDECS¹ installed prior to January 1, 2013 for medium and large fleets, or at any time for small fleets, may be eligible for an exemption from turnover requirements for the life of the vehicle or VDECS, if certain conditions are met. For more information on this exemption, please see the BACT Exemptions FAQ, available on the Frequently Asked Questions page in the [Off-Road Zone](http://www.arb.ca.gov/offroadzone) at www.arb.ca.gov/offroadzone.

Q – How would installing a VDECS change my fleet average?

A – Vehicles with VDECS installed are given an emissions reduction factor (VDECS factor), which lower a fleet's fleet average index to help meet its fleet average targets. The VDECS factor assigned depends on the PM level of the VDECS and whether or not the VDECS achieves NO_x reductions. The VDECS level defined by the emissions reductions achieved as verified by CARB is as follows:

- Level 1 PM VDECS achieve at least 25% PM emission reductions

¹ A Level 2 VDECS is considered the highest level PM VDECS if it is the highest level available at the time of installation. A Level 1 VDECS is never considered the highest level PM VDECS.

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- Level 2 achieve at least 50% PM reductions, and
- Level 3 achieve at least 85% PM reductions.

If the VDECS is also verified to reduce NOx emissions, the percentage of NOx emissions reduction verified is included in the VDECS factor determination. The higher the PM or NOx reduction level, the more it helps the fleet average.

An installed VDECS on a vehicle lowers a fleet’s overall fleet average index by adjusting the vehicle’s emission factor as shown in the equation below:

$$\text{Fleet average index} = \frac{\text{[SUM of (Max hp for each engine in fleet x Emission Factor x VDECS Factor for each engine in fleet) for all engines in fleet]}}{\text{[SUM of (Max hp) for all engines in fleet]}}$$

The Emission Factor and VDECS Factor to use are shown in Appendix A and Table 2 of the Off Road Regulation.

As shown in **Table 1** below, the VDECS factor varies depending on the level of PM VDECS and whether the VDECS is also verified to reduce NOx. A Level 3 PM VDECS, for example, lowers a vehicle’s emission factor by 30 percent (because it has a VDECS factor of 0.7).

Table 1: VDECS Factor

VDECS	VDECS Factor
No VDECS Installed or Level 1 VDECS	1
Level 2 PM VDECS, not Highest level	0.82
Level 2 PM VDECS, not Highest level, with NOx Reduction	1 Minus (0.18 + (Verified Percent NOx Reduction divided by 170))
Highest Level PM VDECS	0.7
Highest Level PM VDECS with NOx Reduction	1 Minus (0.3 + (Verified Percent NOx Reduction divided by 170))
NOx Reduction only	1 Minus (Verified Percent NOx Reduction divided by 170)

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Q – Will I accrue BACT credit for installing a VDECS? If so, how much credit can I earn?

A – Yes, in addition to lowering a fleet’s fleet average, installing a VDECS may provide a fleet with BACT credit. By installing a highest level PM VDECS or a VDECS verified to reduce NOx prior to the early credit deadlines, as shown in **Table 2** below, a fleet can receive double credit for installing that VDECS.

Table 2: Double Credit for Early VDECS Installations 2249.1(b)(15)

Before 1/1/13 (Large)	Highest level PM = 2 x max hp of vehicle
Before 1/1/16 (Medium)	NOx + PM (not highest level) = 2 x (NOx % ÷ 60%) x hp
Before 1/1/18 (Small)	NOx + highest level PM = 2 x (NOx % ÷ 120%) x hp ²

For more information and the specific formulas to use, please see 13 C.C.R. § 2449.1(b)(15).

Example 1: A large fleet installs a Level 3 (the highest level) PM VDECS on a 100 hp engine in 2012. The fleet would receive 200 hp BACT credit (2 x 100).

Example 2: A medium fleet installs a Level 2 PM VDECS (not highest level) that is verified to achieve 30% NOx reductions on a 100 hp engine in 2015. The fleet would receive 100 hp BACT credit (2 x (0.30 ÷ 0.60) x 100).

Example 3: In 2017, a small fleet installs a Level 3 PM VDECS that is also verified to reduce NOx by 40% on a 200 hp engine. The fleet would receive BACT credit equal to 533 hp ([2 x (0.40 ÷ 1.20) x 200]) + (2 x 200)).

On or after the early credit deadlines, shown in **Table 2**, fleets are eligible to receive single BACT credit for each VDECS installed, as summarized in **Table 3** below. For example, if the large fleet described in Example 1 above waits until 2016 to install a Level 3 PM VDECS on its 100 hp engine, it would receive 100 hp BACT credit.

² Applied in addition to early credit for highest level PM VDECS.

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Table 3: BACT Credit earned for PM VDECS and NOx VDECS 2449.1(b) (10)

Highest Level PM	hp of engine retrofitted
NOx + PM (not highest level)	(% NOx reduction ÷ 60%) x hp of engine retrofitted
NOx + Highest Level PM ³	(% NOx reduction ÷ 120%) x hp of engine retrofitted

For more information and the specific formulas to use, please see 13 C.C.R. § 2449.1(b)(10).

Q – Can installing VDECS help me avoid future requirements to turn over vehicles?

A – First, as detailed above, if a fleet installs VDECS, its fleet average index (overall emission rate) is lowered. This will help a fleet move closer to meeting its annual fleet average target. Once a fleet meets that target for a particular year, it is in compliance for that year and would not be required to take further action for that year, including having to turn over any vehicles.

Second, as described above, installing VDECS earns a fleet BACT credit, which can satisfy a fleet’s annual BACT requirements, which the fleet can meet if it is unable to meet the fleet average requirements. For example, if the medium fleet mentioned above receives 200 hp in BACT credit for installing a VDECS early, it can use that credit in a later compliance year to meet 200 hp of its emission requirements, e.g. in lieu of turning over 200 hp.

Finally, upon installing a highest level PM VDECS⁴ on a vehicle, the fleet can exempt that vehicle from the Off-Road Regulation’s turnover, or BACT, requirements. For medium and large fleets, if a highest level PM VDECSⁱ is installed on a vehicle after January 1, 2013, that vehicle is temporarily exempt from the BACT turnover requirements for six years. If the highest level PM VDECS was installed prior to January 1, 2013, for medium and large fleets the exemption from BACT turnover requirements is effectively permanent for the

³ Applied in addition to credit for highest level PM VDECS.

⁴ Highest level VDECS means the highest level PM VDECS verified by CARB to reduce PM. A Level 3 is higher than a Level 2.

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first 15 percent of a fleet's total horsepower retrofitted with the highest level PM VDECS, as long as the highest level PM VDECS remain on the vehicles. The remainder of vehicles in the fleet with early VDECS installed would still receive the six-year exemption. For small fleets, if a highest level PM VDECS is installed on a vehicle in their fleet that vehicle is exempt from BACT requirements, as long as the highest level PM VDECS remain on the vehicles.

Q – What happens to my credits if I sell a vehicle that has been retrofitted with a VDECS?

A – As stated, a fleet can generate BACT credit by retrofitting a vehicle with a VDECS. This credit stays with that fleet until they use the credit to meet BACT requirements, even if the fleet subsequently sells the vehicle. If the vehicle is sold, the credit is not transferred to the vehicle buyer but the buyer will still benefit from the lowered NOx emission factor of the installed VDECS. In addition, if the buyer is a small fleet and the VDECS installed was the highest level PM VDECS available at the time of installation, the vehicle effectively retains its exemption from future BACT requirements.

For example, a large fleet (Fleet A) installed a Level 3 PM VDECS on their 400 hp excavator in 2012. The fleet earned 800 hp in BACT credit for installing the VDECS prior to January 1, 2013 (the double credit deadline). Additionally, the VDECS factor was added to Fleet A's fleet average index calculation, reducing the fleet's overall fleet average. The fleet used the 800 hp of BACT credit to meet their compliance requirement on January 1, 2014. Fleet A subsequently sold the excavator with the VDECS still installed to a small fleet, Fleet B, in February 2015. Fleet B does not earn any BACT credit, as Fleet A already used it. However, the VDECS factor will now be included in Fleet B's (not Fleet A's) fleet average index calculations, resulting in a reduced fleet average for Fleet B. Lastly, as a small fleet, Fleet B effectively gets a permanent BACT exemption for that vehicle during each year in which the VDECS remains on the excavator because the VDECS installed by Fleet A on the excavator was the highest level PM VDECS available at the time Fleet A installed it.

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