

## **Frequently Asked Questions In-Use Off-Road Diesel Vehicle Regulation**

### **On-road engines in off-road vehicles FAQ Revised May 2011**

**Q - Can off-road vehicles, with off-road engines, be repowered with on-road engine?**

A – Yes. Construction companies are starting to consider and undertake projects that utilize on-road engines to replace existing off-road engines. The on-road certified diesel engines used in such projects to date, model year 2007, were manufactured to more stringent emissions standards than 2007 off-road diesel engines. Repowering scrapers with on-road engines has provided the construction fleets with a cost effective means of lowering their emissions and meeting the upcoming regulation requirements.

Both on-road diesel engine manufacturers and end users who elect to utilize this compliance alternative should be aware that this alternative may affect the on-road engine's emission control system warranty required by title 13, California Code of Regulations (CCR) section 2035 et seq, as discussed further below.

**Q - What are the benefits of repowering off-road vehicles with on-road engines?**

A - The differences between on-road and off-road certified engines will vary depending on the year and horsepower, however for some model years an on-road certified engine may emit up to 90 percent less the particulate matter (PM) and 70 percent less nitrogen oxides (NOx) as a comparable off-road engine. Repowering a vehicle with an on-road engine may allow a fleet to meet the emissions targets in the off-road diesel regulation by completing fewer engine repowers or vehicle replacements than would be required if they had used off-road engines.

Additionally, some new on-road certified engines come with a diesel particulate filter (DPF) included by the manufacturer. Repowers using an engine with a DPF will grant credit toward the off-road regulation as if the fleet had installed a verified exhaust retrofit device that reduces PM. Additionally, if the repower is completed by a large<sup>1</sup> fleet before January 1, 2013, or was purchased before November 1, 2012, ARB will grant the fleet double credit towards the retrofit requirements in the regulation.

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<sup>1</sup> For medium fleets, the repower would need to be completed by January 1, 2016, or purchased before November 1, 2015. For small fleets, the repower would need to be completed by January 1, 2018, or purchased before November 1, 2017.

*While this document is intended to assist fleets with their compliance efforts, it is the sole responsibility of fleets to ensure compliance with the In-Use Off-Road Diesel Vehicle Regulation.*

**Q - Is it cost-effective to repower with an on-road engine?**

A - In some cases, yes. For one construction company using on-road certified engines in their scrapes, repowering with a 2007 on-road certified engine that came with a DPF cost approximately substantially less than the combined cost of repowering with an off-road engine and installing an exhaust retrofit (see figure below), however this may vary by application. The on-road engines also had substantially lower emissions than the off-road engine would have had even after a retrofit was installed.



657E scraper with a 2007 Caterpillar C15 On-Road Engine

**Q - How do I receive compliance credit towards the off-road regulation for repowering with an on-road engine?**

A - To receive credit for the reduced emissions an on-road engine provides compared to a an off-road engine, the fleet must report the emissions standard the on-road engine was certified to as well as the certification executive order (EO) or the certificate number. A list of executive orders is available from ARB's certification database, available at: [www.arb.ca.gov/msprog/onroad/cert/cert.php](http://www.arb.ca.gov/msprog/onroad/cert/cert.php)

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An example of the emissions information in an on-road engine EO is shown below, with the applicable data shown in bold. A fleet repowering with this engine would report a NOx emission factor of 0.2 g/bhp-hr:

	NMHC		NOx		NMHC+NOx		CO		PM		HCHO	
	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO
<b>STD</b>	0.02	0.14	<b>0.2</b>	.25	.	.	15.5	15.5	0.01	0.01	.	.
<b>FEL</b>	.	.	.	.	.	.	.	.	.	.	.	.
CERT	0.02	0.03	.15	0.15	.	.	1.7	0.1	0.01	0.01	.	.

**Q - How will repowering with an on-road engine affect the warranty of my engine?**

A- All fleets and installers who choose to pursue this compliance option should be aware of the possible implications to the engine’s emissions control system warranty, as outlined in Title 13, CCR. Specifically, 13 CCR 2036(j)(1) states that “[t]he repair or replacement of any warranted part otherwise eligible for warranty coverage under subsection (d) or (i), shall be excluded for such warranty coverage if the vehicle or engine manufacturer demonstrates that the vehicle or engine has been abused, neglected, or improperly maintained, and that such abuse, neglect, or improper maintenance was the direct cause of the need for the repair or replacement of the part.”

Therefore, if an engine manufacturer demonstrates that installing an on-road engine into an off-road application constitutes “abuse, neglect, or improper maintenance” that directly causes damage to a warranted part, it could refuse to repair or replace any warranted part on the on-road engine.

**Q - Are there safety concerns to be aware of when repowering with an on-road engine?**

A - Vehicle owners should be aware of several important safety issues before pursuing this option, and the vehicle owner should ensure they are working with experienced mechanics who understand both the on-road engine requirements and the use of the vehicle in question. Possible issues include making sure that the off-road application provides sufficient cooling for the on-road engine, and that the structure of the vehicle is not impaired by the modification necessary to install the on-road engine.

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