

Appendix D

VDECS Available for Installation on Cargo Handling Equipment

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VEDCES Available for Installation on Cargo Handling Equipment

When ARB verifies a diesel emissions control strategy (VDECS), the operational parameters of the engine(s) the device is verified for are spelled out in the Executive Order documenting the verification. The table below provides a list of the VDECS a CHE owner or operator can consider when planning to install an aftertreatment control device to comply with the CHE regulation. The device parameters provided include the level of control the device is verified to (Level 3 – greater than 85 percent, Level 2 – greater than 50 percent but less than 85 percent, Level 1 – greater than 25 percent but less than 50 percent), the device manufacturer, the device name (if applicable), and details about the required engine operating parameters necessary for that device. The operating parameters can include the type of equipment, the engine model year, the horsepower range, the certified diesel PM emissions limits, whether the engine has exhaust gas recycling or not, etc.

ARB staff highly recommend that a CHE owner or operator work closely with any aftertreatment control provider to ensure that the recommended device is the one that will match their engines and operate appropriately.

**Currently Verified Diesel Emission Control Strategies (VDECS)
for Off-Road Engines**

Level	Device	Details
3	Caterpillar DPF (passive)	1996-2005 MY; rubber-tired vehicles; 175-600hp; ≤13L; ≤0.2g PM; no EGR; 4-stroke; 240°C exhaust temp profile (40% of time); Tier 1 engines must be cert to ≥3.8g NMHC+NOx with PM NOx ratio ≥25;
	Cleaire Allmetal* (passive)	1996-2010 MY; specified engine families; tracked and rubber-tired vehicles; 150-600hp; 6.7-18.2L; 4-stroke; ≤0.2g PM; no EGR or DOC; 260°C exhaust temp profile (55% of time) for engines ≤0.15g PM
	Cleaire Lonestar* (passive DPF)	1996-2009 MY; rubber-tired vehicles; 150-350hp; 5.9-11L; ≤0.12g PM; no EGR; 4-stroke; 260°C exhaust temp profile (70% of time)
	Cleaire Phoenix* (active DPF)	1996-2010 MY; rubber-tired vehicles; 3.4-12L; 100-450 hp; ≤0.20g PM; no EGR or DOC; 4-stroke
	DCL Mine-X Sootfilter (passive DPF)	1996-2010 MY; rubber-tired vehicles; 100-1000hp; ≤0.2g PM; no EGR or DOC; 4-stroke
	ECS Combifilter (active DPF)	Through 2007 MY; ≤0.45g PM; ≤12L; no EGR or DOC; requires plug-in; ≤600 hp; 4-stroke
	ECS Purifilter* (passive)	1996-2008 MY; 4-stroke; 50-750hp heavy heavy-duty; ≤0.2g PM; no EGR; temp profile requirements
	ESW Canada ThermaCat (active DPF)	1996-2010 MY; 4-stroke; 100-350hp; 5-15.2L; ≤0.2g PM; no EGR or DOC
	HUSS FS-MK Series DPF (active)	Through 2010 MY; no DOC or external EGR; excluded engine family list
2	Rypos ActiveDPF/C	Both diesel-electric and diesel-hydraulic rubber tired gantry (RTG) cranes; CARB diesel; biodiesel.
1	ECS: AZ Purifier & Purimuffler (DOC)	1996-2002 MY Cummins, Navistar, Case, and Komatsu; 4-stroke
	Extengine: DOC + SCR	1991-1995 MY Cummins 5.9L engine
	Vycon REGEN System: Energy Storage Device	Tier 0, 1, 2, 3 RTG cranes only
	Donaldson: 6000+ Spiracle (DOC + crankcase filter)	1996-2003 MY specific Case, Caterpillar, Cummins, Detroit, Komatsu; 150-600hp; 4-stroke; turbocharged

* Conditionally verified.

NOTES:

- If retrofitting to comply with Cargo Handling Equipment regulation, highest level available VDECS is required.
- Conditionally verified devices may be used for regulatory compliance.
- VDECS are not currently an option for yard trucks.
- Other restrictions and/or limitations may apply; please refer to the Executive Order and/or Verification Letter for each device.
- Please view the source for the most accurate, up-to-date information, requirements, and limitations: <http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm> (ARB, 2011m) & <http://www.arb.ca.gov/diesel/verdev/level3/level3.htm>
- EGR = exhaust gas recirculation;
- DOC = diesel oxidation catalyst
- Searchable verification database: <http://www.arb.ca.gov/diesel/verdev/vdb/disclaimer.php>

References:

(ARB, 2011m) California Air Resources Board, *Verification Procedure – Currently Verified*, July 2011.

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