

Reno DPM Workshop
January 24/25
2007

2007 On-Highway Pickup Truck Engine Technology



**Rocky
Mountain**

30 CFR § 57.5067 Engines.

(a) Any diesel engine introduced into an underground area of a mine covered by this part after July 5, 2001, other than an engine in an ambulance or fire fighting equipment which is utilized in accordance with mine fire fighting and evacuation plans, must either:

(1) Have affixed a plate evidencing approval of the engine pursuant to subpart E of Part 7 of this title or pursuant to Part 36 of this title; or

(2) Meet or exceed the applicable particulate matter emission requirements of the Environmental Protection Administration listed in Table 57.5067-1, as follows:

Table 57.5067-1

EPA requirement	EPA category	PM limit
40 CFR 86.094-8(a)(1)(i)(A)(2).....	light duty vehicle.....	0.1 g/mile.
40 CFR 86.094-9(a)(1)(i)(A)(2).....	light duty truck.....	0.1 g/mile.
40 CFR 86.094-11(a)(1)(iv)(B).....	heavy duty highway engine.....	0.1 g/bhp-hr.
40 CFR 89.112(a).....	nonroad (tier, power range).....	varies by power range:
	tier 1 kW<8 (hp<11).....	1.0 g/kW-hr (0.75 g/bhp-hr).
	tier 1 8≤kW<19 (11≤hp<25).....	0.80 g/kW-hr (0.60 g/bhp-hr).
	tier 1 19≤kW<37 (25≤hp<50).....	0.80 g/kW-hr (0.60 g/bhp-hr).
	tier 2 37≤kW<75 (50≤hp<100).....	0.40 g/kW-hr (0.30 g/bhp-hr).
	tier 2 75≤kW<130 (100≤hp<175).....	0.30 g/kW-hr (0.22 g/bhp-hr).
	tier 1 130≤kW<225 (175≤hp<300).....	0.54 g/kW-hr (0.40 g/bhp-hr).
	tier 1 225≤kW<450 (300≤hp<600).....	0.54 g/kW-hr (0.40 g/bhp-hr).
	tier 1 450≤kW<560 (600≤hp<750).....	0.54 g/kW-hr (0.40 g/bhp-hr).
	tier 1 kW>560 (hp>750).....	0.54 g/kW-hr (0.40 g/bhp-hr).

2007 On-Highway Pickup Truck Engine Technology

Ford
Powerstroke
International

GM
Duramax
Isuzu

Dodge
ISB
Cummins

2007 EPA Requirements

- Meet 2007 EPA Standards For NOx and PM
- Ultra Low Sulfur Diesel Fuel
- Low Ash Content Oils - CJ-4
- Closed Crankcase Ventilation Systems
- Additional After Treatment

2007 EPA Standards

- **Require 90% Reduction In NOx – PM (2004 Levels)**
 - **NOx + NMHC Must Be Reduced To 0.2-g/hp-hr**
 - **PM Must Be Reduced To 0.01-g/hp-hr**

EPA has allowed for NOx to be phased in from 2007 through 2009. During which time, 50% of the engines produced must meet the 0.2-g/hp-hr NOx standard, while 50% may continue to meet the 2.5-g/hp-hr NOx standard of 2004. Provision For Averaging at 1.2-g/hp-hr

The PM level is not phased in, 0.01-g/hp-hr beginning 1/07

Required Technology
Meeting 2007 Standards
Ford - GM - Dodge

- High Pressure Fuel Systems – HPCR
- Cooled Exhaust Gas Recirculation (NOx) – CEGR
- Diesel Oxidation Catalyst – DOC
- Diesel Particulate Filter – DPF
- Advanced Electronics
- Variable Geometry Turbochargers

	Power Stroke	Duramax	CTD
Power	350 hp	365 hp	350 hp
Torque	650 lb-ft	660 lb-ft	650lb-ft
Displacement	6.4L	6.6L	6.7L
Turbo	2 in series, fixed LP + VGT HP	VGT	Holset VGT
Fuel System	Piezo HPCR (Siemens)	Bosch HPCR	Bosch HPCR
Oil Change	10,000 miles	Oil Change Monitor	Oil Change Monitor
Fuel Filter	20,000 miles	N/A	15,000 miles
After Treatment	DOC + DPF	DOC + DPF	NAC + DPF
CEGR	Dual Coolers	Single Cooler	Single Cooler

Regeneration Events 2007 Pickups

- Passive
- Active
- Service

Additional Service Events

- Ash Disposal – DPF
 - 120,000 Miles – 150,000 Miles
 - Duty Cycle Dependent
 - Strategy Currently Not Available/Defined

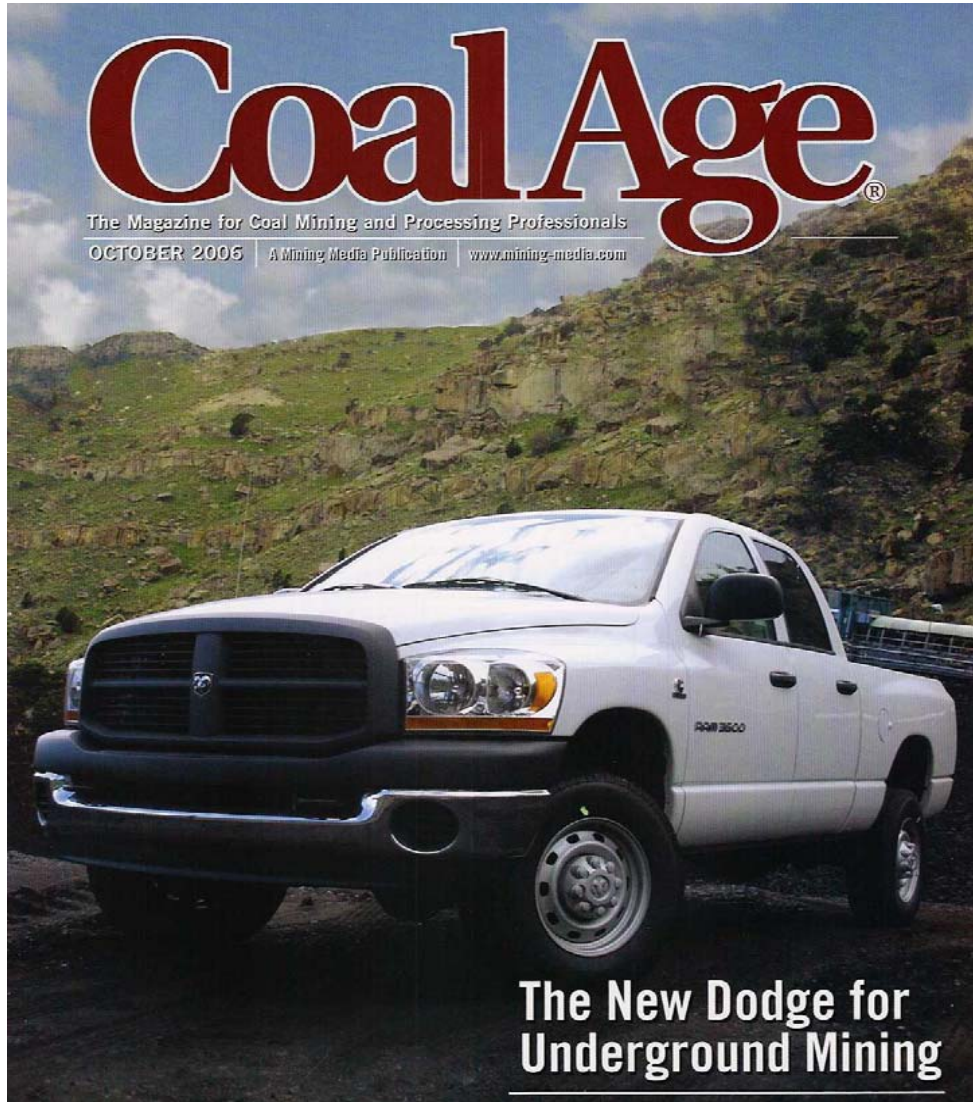
- ## Considerations
- ### 2007 On-Highway Pickup Truck
- Regeneration Capability - Duty Cycle
 - Heat
 - NO₂

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Dodge - Cummins Turbo Diesel For Underground

MSHA Certification

				<u>Ventilation Rate</u>	<u>Particulate Index</u>
07-ENA040015	CUMMINS	ISB-325	325 @ 2900	13000	13000
07-ENA040015-1	CUMMINS	ISB-215	215 @ 2900	9000	9500

Dodge - Cummins Turbo Diesel For Underground

Original Approval

- 325 HP
- 13000 CFM VENT RATE
- 21 g/hr

Dodge - Cummins Turbo Diesel For Underground

Revised Approval

- 215 HP (Derated to 175hp for Altitude)
- 9000 CFM VENT RATE
- 15 g/hr

APPROVED ENGINE LIST (Model Year)

- 2004 ISB325 ONLY (CUMMINS 600)

- 2005 ALL

- 2006 ALL

- **2003 THRU 2004 (NON CUMMINS 600) ARE NOT APPROVED!*

Speed Limiting

- 2004 THRU 2005 - 25 MPH ONLY
- 2006 - 25 MPH OR 45 MPH AVAILABLE

ECM Calibration Change To Change MPH.

2007

Dodge - Cummins Turbo Diesel For Underground

- What Happens To 2006 Dodge – CTD in 2007?

Continue To Be Offered Thru Mid 2009

– Available For International Sales

- Mexico
- Argentina

– Available For Sale In Underground Mining (off Highway)

- US
- Canada

	Powerstroke	Duramax	CTD	UGMI CTD
Power	350 hp	365 hp	350 hp	215 hp
Torque	650 lb-ft	660 lb-ft	650lb-ft	467 lb-ft
Displacement	6.4L	6.6L	6.7L	5.9L
Turbo	2 in series, fixed LP + VGT HP	VGT	Holset VGT	Holset WG
Fuel System	Piezo HPCR (Siemens)	Bosch HPCR	Bosch HPCR	Bosch HPCR
Oil Change	10,000 miles	Oil Change Monitor	Oil Change Monitor	15,000 miles
Fuel Filter	20,000 miles	N/A	15,000 miles	15,000 miles
After Treatment	DOC + DPF	DOC + DPF	NAC + DPF	DOC
CEGR	Dual Coolers	Single Cooler	Single Cooler	No

Dodge Ram CTD Offers UGMI

- The Only MSHA Certified HD Pickup Available
 - Established Ventilation Rate
 - Established Particulate Index

- An Ongoing Commitment to Meet UGMI Needs
 - CTD 5.9L Engine Thru Mid 2009
 - Working On Plans For 2009 And Beyond
 - Continued Involvement With – MSHA – Mining
 - Future Products To Meet Mining's Needs

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