

State of California  
AIR RESOURCES BOARD

EXECUTIVE ORDER U-R-1-37

Relating to Certification of New Heavy-Duty Off-Road Equipment Engines

CATERPILLAR, INC.

Pursuant to the authority vested in the Air Resources Board by Sections 43000.5, 43013 and 43018 of the Health and Safety Code; and,

Pursuant to the authority vested in the undersigned by Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-45-9;

IT IS ORDERED AND RESOLVED: That the following Caterpillar, Inc. 1997 model-year engine, with rated power between 175 and 750 horsepower, and exhaust emission control systems are certified as described below for use in heavy-duty off-road equipment:

Typical Equipment Usage: Industrial Equipment, Agricultural Tractor

Fuel Type: Diesel

<u>Engine Family</u>	<u>Liters (Cubic Inches)</u>	<u>Exhaust Emission Control Systems and Special Features</u>
VCP10.RZDARK	10.3 (629)	Turbocharger Charge Air Cooler Engine Control Module

Engine models and codes are listed on attachments. Production engines shall be in all material respects the same as those for which certification is granted.

The total hydrocarbons (THC), carbon monoxide (CO), nitrogen oxides (NOx), and particulate matters (PM) certification exhaust emission standards, in grams per brake horsepower-hour (g/bhp-hr), and the opacity of smoke emission standards, in percent (%), during acceleration (Accel), lugging (Lug), and peak (Peak) modes, for this engine family are (Title 13, California Code of Regulations, Section 2423):

<u>Exhaust Emissions (g/bhp-hr)</u>				<u>Smoke Opacity (%)</u>		
<u>THC</u>	<u>CO</u>	<u>NOx</u>	<u>PM</u>	<u>Accel</u>	<u>Lug</u>	<u>Peak</u>
1.0	8.5	6.9	0.4	20	15	50

The THC, CO, NOx and PM exhaust emission certification values, in g/bhp-hr, and the opacity of smoke emission certification values, in percent (%), for this engine family are:

<u>Exhaust Emissions (g/bhp-hr)</u>					<u>Smoke Opacity (%)</u>		
<u>Engine Family</u>	<u>THC</u>	<u>CO</u>	<u>NOx</u>	<u>PM</u>	<u>Accel</u>	<u>Lug</u>	<u>Peak</u>
VCP10.RZDARK	0.9	2.2	6.6	0.1	8	2	16

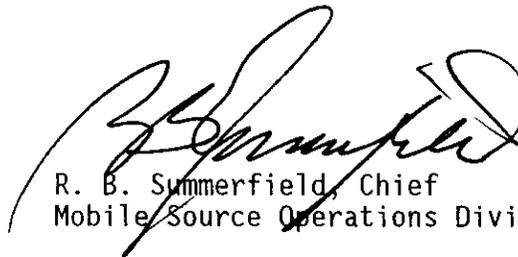
BE IT FURTHER RESOLVED: That the listed engine models comply with the "Exhaust Emission Standards and Test Procedures--Heavy-Duty Off-Road Diesel Cycle Engines" (Title 13, California Code of Regulations, Section 2423) for the aforementioned model year.

BE IT FURTHER RESOLVED: That the listed engine models also comply with the "Emission Control Labels--1996 and Later Heavy-Duty Off-Road Diesel Cycle Engines" (Title 13, California Code of Regulations, Section 2424) for the aforementioned model year.

BE IT FURTHER RESOLVED: That for the listed engine models, the manufacturer has submitted the materials to demonstrate certification compliance with the Board's emission control system warranty provisions (Title 13, California Code of Regulations, Section 2425 et seq.).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

Executed at El Monte, California this 11<sup>th</sup> day of December 1996.



R. B. Summerfield, Chief  
Mobile Source Operations Division

**1997 AIR RESOURCES BOARD SUPPLEMENTAL DATA SHEET  
HEAVY-DUTY OFF-ROAD DIESEL ENGINES**

Manufacturer Caterpillar Inc. Engine Family VCP10.RZDARK  
 Displacement 10.3 / 629 Liters/Cubic Inches Engine Configuration: I6  
 All Codes in Eng. Family: CA 49S 50S XX Cert Test Procedures: ARB XX EPA XX  
 Valves/Ports per Cylinder 4 valve/cyl Strokes per Combustion Cycle: 4  
 Maximum Rated Power: 425 HP ( 317 KW) @ 2100 RPM  
 Ignition: Compression XX Compression with Glow Plug Spark  
 Fuel Type (s): Dedicated CNG Flex-Fuel LNG Dual-Fuel LPG Diesel XX M100 M85  
 Diesel Cert Fuel: 40 CFR 86.1313-94 XX Other (specify) \_\_\_\_\_  
 Primary Service Equipment: Industrial, Belted Agricultural Tractor, Excavator, Combine  
 Exhaust ECS (e.g., MFI, TC, CAC): EM, TC, CAC, DI, ECM

(Use abbreviations per SAE J1930 JUN93)

Engine Model (Eng. Code)	Rated HP @ RPM	Fuel Rate @ Rated HP mm <sup>3</sup> /stroke (lbs/hr)	Fuel Pump & Injector Part No.	ECM/PCM Part No.	EGR Valve Part No.	PTOX / Catalytic Converter Part No.
3176 (1)	MAX 425 @ 2100	210 (148.2)	1168799/1168799	1170554	----	----
3176 (2)	400 @ 2100	192 (135.9)	1168799/1168799	1221726	----	----
3176 (3)	390 @ 2100	182 (128.3)	1168799/1168799	1170551	----	----
3176 (4)	365 @ 2100	177 (124.9)	1168799/1168799	1025872	----	----
3176 (5)	365 @ 2100	176 (124.3)	1168799/1168799	1108830	----	----
3176 (6)	340 @ 2100	160 (113.2)	1168798/1168798	1260590	----	----
3176 (7)	335 @ 2100	161 (113.7)	1168799/1168799	1072221	----	----
3176 (8)	335 @ 2100	159 (112.5)	1168799/1168799	1041921	----	----
3176 (9)	MIN 310 @ 2100	147 (104.1)	1168799/1168799	1182143	----	----
3176 (10)	365 @ 1800	204 (123.8)	1168799/1168799	1108830	----	----
3176 (11)	342 @ 1800	182 (110.2)	1168887/1168887	1145549	----	----
3176 (12)	312 @ 2000	148 (99.3)	1168886/1168886	1279943	----	----
3176 (13)	400 @ 2100	192 (135.9)	1168798/1168798	1486539	----	----
3176 (14)	365 @ 2100	176 (124.3)	1168798/1168798	1486536	----	----
3176 (15)	365 @ 2100	177 (124.9)	1168798/1168798	1451232	----	----
3176 (16)	310 @ 2100	151 (106.8)	1168798/1168798	1469329	----	----
3176 (17)	340 @ 2100	167 (118.2)	1168798/1168798	1469354	----	----

ISSUE DATE	03 SEPT 96						
REVISION NO.	1	2	3				
REVISION DATE	04FEB97	12MAY97	26JUN97				

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 HEAVY-DUTY OFF-ROAD DIESEL ENGINES**

Manufacturer Caterpillar Inc. Engine Family VCP10.RZDARK  
 Displacement 10.3 / 629 Liters/Cubic Inches Engine Configuration: I6  
 All Codes in Eng. Family: CA 49S 50S XX Cert Test Procedures: ARB XX EPA XX  
 Valves/Ports per Cylinder 4 valve/cyl Strokes per Combustion Cycle: 4  
 Maximum Rated Power: 425 HP ( 317 KW) @ 2100 RPM  
 Ignition: Compression XX Compression with Glow Plug Spark  
 Fuel Type (s): Dedicated XX Flex-Fuel XX Dual-Fuel XX Diesel XX M100 XX M85 XX  
                   CNG XX LNG XX LPG XX Other (specify) \_\_\_\_\_  
 Diesel Cert Fuel: 40 CFR 86.1313-94 XX Other (specify) \_\_\_\_\_  
 Primary Service Equipment: Industrial, Belted Agricultural Tractor, Excavator, Combine  
 Exhaust ECS (e.g., MFI, TC, CAC): EM, TC, CAC, DI, ECM

(Use abbreviations per SAE J1930 JUN93)

Engine Model (Eng. Code)	Rated HP @ RPM	Fuel Rate @ Rated HP mm <sup>3</sup> /stroke (lbs/hr)	Fuel Pump & Injector Part No.	ECM/PCM Part No.	EGR Valve Part No.	PTOX / Catalytic Converter Part No.
3176 (18)	325 @ 2100	161 (113.6)	1168886/1168886	1476902	----	----
3176 (19)	365 @ 2100	185 (130.9)	1168886/1168886	1525555	----	----

ISSUE DATE	03 SEPT 96						
REVISION NO.	4						
REVISION DATE	07 AUG 97						