

State of California  
AIR RESOURCES BOARD

EXECUTIVE ORDER U-R-1-48

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: Track-Type Tractor, Motor Grader, Scraper, Industrial Equipment

Fuel Type: Diesel

<u>Engine Family</u>	<u>Liters</u>	<u>(Cubic Inches)</u>	<u>Exhaust Emission Control Systems and Special Features</u>
VCP27.RZDARN	27.0	(1649)	Turbocharger Engine Control Module Charge Air Cooler

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-hp)</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>Engine Family</u>	<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>
VCP27.RZDARN	0.1	1.0	6.2	0.3	12	2	35

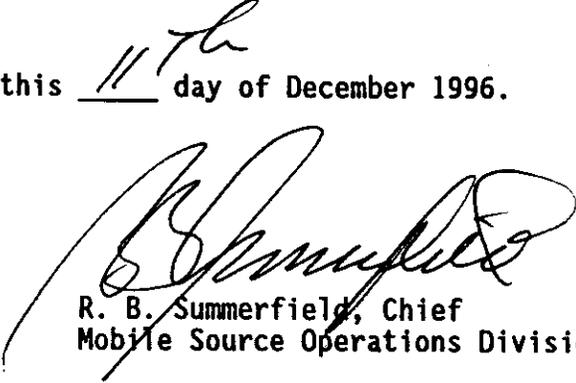
BE IT FURTHER RESOLVED: That the listed engine models comply with the "Exhaust Emission Standards and Test Procedures--Heavy-Duty Off-Road Diesel Cycle Engines" (Title 13, California Code of Regulations, Section 2423) for the aforementioned model year.

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 VCP27.RZDARN  
 Displacement 27.0 / 1649 Liters/Cubic Inches Engine Configuration: V12  
 All Codes in Eng. Family: CA 49S 50S XX Cert Test Procedures: ARB EPA XX  
 Valves/Ports per Cylinder 2valves/cyl. Strokes per Combustion Cycle: 4  
 Maximum Rated Power: 750 HP ( 559 KW) @ 2100 RPM  
 Ignition: Compression XX Compression with Glow Plug \_\_\_\_\_ Spark \_\_\_\_\_  
 Fuel Type (s): Dedicated XX Flex-Fuel \_\_\_\_\_ Dual-Fuel \_\_\_\_\_ Diesel XX M100 \_\_\_\_\_ M85 \_\_\_\_\_  
                   CNG \_\_\_\_\_ LNG \_\_\_\_\_ LPG \_\_\_\_\_ Other (specify) \_\_\_\_\_  
 Diesel Cert Fuel: 40 CFR 86.1313-94 XX Other (specify) \_\_\_\_\_  
 Primary Service Equipment: Industrial, Track Type Tractor, Motor Grader, Scraper  
 Exhaust ECS (e.g., MFI, TC, CAC): EM, TC, DI, ECM, CAC

(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.
3412 (1)	577 @ 1900	165 (210.6)	1313098/1313098	1366050	----	----
3412 (2)	613 @ 1900	176 (224.9)	1313098/1313098	1267525	----	----
3412 (3)	540 @ 2000	154 (207.5)	1313098/1313098	1366051	----	----
3412 (4)	531 @ 2000	144 (193.9)	1313098/1313098	1299428	----	----
3412 (5)	550 @ 1800	164 (198.8)	1313098/1313098	1305809	----	----
3412 (6)	580 @ 1800	170 (206.0)	1313098/1313098	1305809	----	----
3412 (7)	650 @ 2000	180 (242.7)	1313098/1313098	1305809	----	----
3412 (8)	680 @ 2000	191 (257.1)	1313098/1313098	1305809	----	----
3412 (9)	700 @ 1800	210 (254.4)	1313098/1313098	1305809	----	----
3412 (10)	729 @ 1800	221 (267.5)	1313098/1313098	1305809	----	----
3412 (11)	700 @ 2100	191 (270.5)	1313098/1313098	1305809	----	----
3412 (12)	MAX 750 @ 2100	205 (289.6)	1313098/1313098	1305809	----	----
3412 (13)	650 @ 2100	175 (247.0)	1313098/1313098	1305813	----	----

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REVISION NUMBER								
REVISION DATE								

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

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.
3412 (14)	600 @ 2100	170 (239.7)	1313098/1313098	1305813	----	----
3412 (15)	575 @ 2100	161 (227.0)	1313098/1313098	1305813	----	----
3412 (16)	650 @ 1800	192 (233.1)	1313098/1313098	1305813	----	----
3412 (17)	600 @ 1800	178 (215.1)	1313098/1313098	1305813	----	----
3412 (18)	550 @ 1800	163 (197.1)	1313098/1313098	1305813	----	----
3412 (19)	600 @ 2000	167 (225.0)	1313098/1313098	1305813	----	----
3412 (20)	550 @ 1800	152 (204.3)	1313098/1313098	1305813	----	----
3412 (21)	MIN 500 @ 1800	151 (183.3)	1313098/1313098	1305813	----	----
3412 (22)	577 @ 1900	164 (210.2)	1313098/1313098	1547013	----	----
3412 (23)	632 @ 1900	177 (226.9)	1313098/1313098	1547013	----	----

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REVISION DATE	22 OCT 97						