

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER U-R-1-36

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, Wheel Loader, Wheel Tractor, Motor Grader, Excavator, Generator, Pipelayer, Scraper, Agricultural Tractor, Articulated Truck

Fuel Type: Diesel

<u>Engine Family</u>	<u>Liters</u>	<u>(Cubic Inches)</u>	<u>Exhaust Emission Control Systems and Special Features</u>
VCP10.RZDARG	10.5	(638)	Turbocharger Smoke Puff Limiter 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>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.RZDARG	0.3	1.6	6.5	0.2	16	4	36

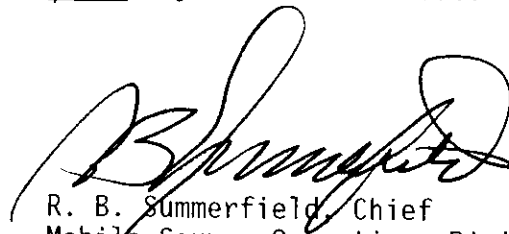
BE IT FURTHER RESOLVED: That the listed engine models comply with the "Exhaust Emission Standards and Test Procedures--Heavy-Duty Off-Road Diesel Cycle Engines" (Title 13, California Code of Regulations, Section 2423) for the aforementioned model year.

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 11th 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.RZDARG
 Displacement 10.5 / 638 Liters/Cubic Inches Engine Configuration: I6
 All Codes in Eng. Family: CA 49S 50S XX Cert Test Procedures: ARB EPA XX
 Valves/Ports per Cylinder 2 valve/cyl Strokes per Combustion Cycle: 4
 Maximum Rated Power: 362 HP (164 KW) @ 2600 RPM
 Ignition: Compression XX Compression with Glow Plug _____ Spark _____
 Fuel Type (s): Dedicated _____ 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, Wheel Loaders, Wheel Tractors, Excavator, Track Loader, Motor Grader,
Track Type Tractors, Pipelayers, Scrapers, Ag Tractors, Articulated Trucks, Gen Sets
 Exhaust ECS (e.g., MFI, TC, CAC): EM, TC, SPL, DI

(Use abbreviations per SAE J1930 JUN93)

Engine Model (Eng. Code)	Rated HP @ RPM	Fuel Rate @ Rated HP mm ³ /stroke (lbs/hr)	Fuel Pump & Injector Part No.	ECM/PCM Part No.	EGR Valve Part No.	PTOX / Catalytic Converter Part No.
3306 (1)	300 @ 2200	154 (114.0)	1113768/1007563	----	----	----
3306 (2)	300 @ 2200	154 (114.0)	1209931/1007563	----	----	----
3306 (3)	275 @ 2200	140 (103.4)	1209931/1007563	----	----	----
3306 (4)	300 @ 2100	160 (112.7)	1209931/1007563	----	----	----
3306 (5)	279 @ 2200	149 (110.1)	1209931/1007563	----	----	----
3306 (6)	270 @ 2200	139 (102.6)	1209931/1007563	----	----	----
3306 (7)	285 @ 2200	148 (109.5)	1209931/1007563	----	----	----
3306 (8)	246 @ 2200	128 (94.8)	1278154/7W7045	----	----	----
3306 (9)	245 @ 2200	130 (96.0)	1157536/7W7045	----	----	----
3306 (10)	240 @ 2200	130 (96.0)	1157536/7W7045	----	----	----
3306 (11)	229 @ 2200	120 (89.0)	1411226/7W7045	----	----	----
3306 (12)	255 @ 2200	136 (100.5)	1157536/7W7045	----	----	----
3306 (13)	257 @ 2100	139 (98.4)	1113768/7W7045	----	----	----
3306 (14)	247 @ 2100	134 (94.3)	1113768/7W7045	----	----	----
3306 (15)	229 @ 1850	134 (83.1)	1306002/1007552	----	----	----

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**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 ³ /stroke (lbs/hr)	Fuel Pump & Injector Part No.	ECM/PCM Part No.	EGR Valve Part No.	PTOX / Catalytic Converter Part No.
3306 (16)	236 @ 1800	140 (84.6)	1288806/1007552	---	---	---
3306 (17)	236 @ 1800	141 (85.5)	1288806/1007552	---	---	---
3306 (18)	221 @ 1900	127 (80.8)	1288806/1007552	---	---	---
3306 (19)	214 @ 1900	122 (77.8)	1288806/1007552	---	---	---
3306 (20)	270 @ 2200	142 (104.8)	1113768/1007563	---	---	---
3306 (21)	266 @ 2200	139 (103.2)	1113768/1007563	---	---	---
3306 (22)	275 @ 2200	144 (106.2)	1113768/1007563	---	---	---
3306 (23)	343 @ 1800	205 (124.2)	1310189/1007559	---	---	---
3306 (24)	314 @ 1800	185 (112.0)	1310189/1007559	---	---	---
3306 (25)	336 @ 1800	201 (121.4)	1310189/1007559	---	---	---
3306 (26)	306 @ 1800	180 (108.9)	1310189/1007559	---	---	---
3306 (27)	349 @ 1800	210 (127.1)	1310189/1007559	---	---	---
3306 (28)	308 @ 1800	182 (109.9)	1310189/1007559	---	---	---
3306 (29)	325 @ 2100	174 (122.6)	1312649/1007559	---	---	---
3306 (30)	335 @ 2000	182 (122.6)	1312649/1007559	---	---	---
3306 (31)	330 @ 2000	179 (120.5)	1312649/1007559	---	---	---
3306 (32)	325 @ 2000	194 (130.3)	1312649/1007559	---	---	---
3306 (33)	290 @ 2000	160 (107.4)	1312649/1007559	---	---	---
3306 (34)	275 @ 2000	149 (100.1)	1312649/1007559	---	---	---
3306 (35)	MAX 362 @ 1800	220 (133.2)	1312649/1007559	---	---	---
3306 (36)	335 @ 1800	205 (124.3)	1312649/1007559	---	---	---
3306 (37)	330 @ 1800	202 (122.5)	1312649/1007559	---	---	---
3306 (38)	325 @ 1800	198 (119.8)	1312649/1007559	---	---	---
3306 (39)	270 @ 1800	159 (96.3)	1312649/1007559	---	---	---
3306 (40)	240 @ 1800	141 (85.3)	1312649/1007559	---	---	---
3306 (41)	335 @ 2200	176 (130.0)	1312650/1007563	---	---	---
3306 (42)	320 @ 2200	167 (123.7)	1312650/1007563	---	---	---
3306 (43)	310 @ 2200	164 (121.7)	1312650/1007563	---	---	---
3306 (44)	300 @ 2200	159 (117.9)	1312650/1007563	---	---	---

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**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 ³ /stroke (lbs/hr)	Fuel Pump & Injector Part No.	ECM/PCM Part No.	EGR Valve Part No.	PTOX / Catalytic Converter Part No.
3306 (45)	290 @ 2200	153 (113.0)	1312650/1007563	---	---	---
3306 (46)	285 @ 2200	146 (108.2)	1312650/1007563	---	---	---
3306 (47)	275 @ 2200	141 (104.4)	1312650/1007563	---	---	---
3306 (48)	260 @ 2200	134 (99.0)	1312650/1007563	---	---	---
3306 (49)	310 @ 2100	167 (117.9)	1312650/1007563	---	---	---
3306 (50)	300 @ 2100	161 (113.5)	1312650/1007563	---	---	---
3306 (51)	270 @ 2100	146 (103.3)	1312650/1007563	---	---	---
3306 (52)	330 @ 2000	186 (125.3)	1312650/1007563	---	---	---
3306 (53)	310 @ 2000	173 (116.2)	1312650/1007563	---	---	---
3306 (54)	290 @ 2000	160 (107.6)	1312650/1007563	---	---	---
3306 (55)	275 @ 2000	151 (101.8)	1312650/1007563	---	---	---
3306 (56)	310 @ 1850	181 (112.7)	1312650/1007563	---	---	---
3306 (57)	300 @ 1850	176 (109.5)	1312650/1007563	---	---	---
3306 (58)	335 @ 1800	204 (123.4)	1312650/1007563	---	---	---
3306 (59)	310 @ 1800	186 (112.8)	1312650/1007563	---	---	---
3306 (60)	300 @ 1800	181(109.5)	1312650/1007563	---	---	---
3306 (61)	300 @ 1800	180 (108.9)	1312650/1007563	---	---	---
3306 (62)	290 @ 1800	173 (104.8)	1312650/1007563	---	---	---
3306 (63)	285 @ 1800	170 (102.8)	1312650/1007563	---	---	---
3306 (64)	260 @ 1800	154 (93.3)	1312650/1007563	---	---	---
3306 (65)	250 @ 2300	120 (92.5)	1312651/7W7045	---	---	---
3306 (66)	275 @ 2200	144 (106.2)	1312651/7W7045	---	---	---
3306 (67)	265 @ 2200	138 (102.4)	1312651/7W7045	---	---	---
3306 (68)	270 @ 2200	140 (104.0)	1312651/7W7045	---	---	---
3306 (69)	260 @ 2200	135 (99.7)	1312651/7W7045	---	---	---
3306 (70)	250 @ 2200	130 (96.4)	1312651/7W7045	---	---	---
3306 (71)	230 @ 2200	120(89.2)	1312651/7W7045	---	---	---
3306 (72)	225 @ 2200	118 (87.3)	1312651/7W7045	---	---	---
3306 (73)	210 @ 2200	112 (82.7)	1312651/7W7045	---	---	---
3306 (74)	250 @ 2100	137 (96.8)	1312651/7W7045	---	---	---
3306 (75)	275 @ 2000	159 (107.0)	1312651/7W7045	---	---	---

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1997 AIR RESOURCES BOARD SUPPLEMENTAL DATA SHEET *VC-P10.RZDARG*
HEAVY-DUTY OFF-ROAD DIESEL ENGINES

Engine Model (Eng. Code)	Rated HP @ RPM	Fuel Rate @ Rated HP mm ³ /stroke (lbs/hr)	Fuel Pump & Injector Part No.	ECM/PCM Part No.	EGR Valve Part No.	PTOX/ Catalytic Converter Part No.
3306 (76)	265 @ 2000	153 (103.2)	1312651/7W7045	---	---	---
3306 (77)	260 @ 2000	151 (101.3)	1312651/7W7045	---	---	---
3306 (78)	250 @ 2000	144 (97.1)	1312651/7W7045	---	---	---
3306 (79)	230 @ 2000	133 (89.4)	1312651/7W7045	---	---	---
3306 (80)	210 @ 2000	122 (82.1)	1312651/7W7045	---	---	---
3306 (81)	275 @ 1800	170 (103.2)	1312651/7W7045	---	---	---
3306 (82)	275 @ 1800	170 (103.2)	1312651/7W7045	---	---	---
3306 (83)	265 @ 1800	164 (99.5)	1312651/7W7045	---	---	---
3306 (84)	265 @ 1800	164 (99.5)	1312651/7W7045	---	---	---
3306 (85)	260 @ 1800	161 (97.5)	1312651/7W7045	---	---	---
3306 (86)	260 @ 1800	161 (97.5)	1312651/7W7045	---	---	---
3306 (87)	250 @ 1800	155 (93.7)	1312651/7W7045	---	---	---
3306 (88)	245 @ 1800	151 (91.7)	1312651/7W7045	---	---	---
3306 (89)	245 @ 1800	151 (91.7)	1312651/7W7045	---	---	---
3306 (90)	230 @ 1800	142 (86.1)	1312651/7W7045	---	---	---
3306 (91)	230 @ 1800	142 (86.1)	1312651/7W7045	---	---	---
3306 (92)	MIN 210 @ 1800	130 (78.8)	1312651/7W7045	---	---	---
3306 (93)	295 @ 2000	159 (107.0)	1312651/7W7045	---	---	---
3306 (94)	285 @ 2200	148 (109.5)	1188674/1007563	---	---	---
3306 (95)	236 @ 1800	137 (83.1)	1081548/1049453	---	---	---

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