California Environmental Protection Agency AIR RESOURCES BOARD	CATERPILLAR, INC	EXECUTIVE ORDER A-013-0194 New On-Road Heavy-Duty Engines

Pursuant to the authority vested in the Air Resources Board by Health and Safety Code Division 26, Part 5, Chapter 2; and pursuant to the authority vested in the undersigned by Health and Safety Code Sections 39515 and 39516 and Executive Order G-02-003;

IT IS ORDERED AND RESOLVED: The engine and emission control systems produced by the manufacturer are certified as described below for use in on-road motor vehicles with a manufacturer's GVWR over 14,000 pounds. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	ENGINE SIZES (L)	FUEL TYPE [1]	STANDARDS & TEST PROCEDURE	INTENDED SERVICE CLASS [2]	ECS & SPECIAL FEATURES [3]	IDLING EMISSIONS CONTROL [5]
2008	8CPXH0928E1X	15.1	Diesel	Diesel	HHDD	DDI, TC(2), CAC, ECM, EGR-C, PTOX	ESS

ENGINE (L)	ENGINE MODELS / CODES (rated power, in hp)
15.1	See attachment for engine models and ratings

* =not applicable; **GVWR**=gross vehicle weight rating; **13 CCR xyz**=Title 13, California Code of Regulations, Section xyz; **40 CFR 86.abc**=Title 40, Code of Federal Regulations, Section 86.abc; **L**=liter; **hp**=horsepower; **kw**=kilowatt; **hr**=hour;

[1] **CNG/LNG**=compressed/liquefied natural gas; **LPG**=liquefied petroleum gas; **E85**=85% ethanol fuel; **MF**=multi fuel a.k.a. **BF**=bi fuel; **DF**=dual fuel; **FF**=flexible fuel;

[2] **L/M/H HDD**=light/medium/heavy heavy-duty diesel; **UB**=urban bus; **HDO**=heavy duty Otto;

[3] **ECS**=emission control system; **TWC/OC**=three-way/oxidizing catalyst; **NAC**=NOx adsorption catalyst; **SCR-U / SCR-N**=selective catalytic reduction – urea / – ammonia; **WU (prefix)** =warm-up catalyst; **DPF**=diesel particulate filter; **PTOX**=periodic trap oxidizer; **HO2S/O2S**=heated/oxygen sensor; **HAFS/AFS**=heated/air-fuel-ratio sensor (a.k.a., universal or linear oxygen sensor); **TBI**=throttle body fuel injection; **SFI/MFI**=sequential/multi port fuel injection; **DGI**=direct gasoline injection; **GCARB**=gaseous carburetor; **IDI/DDI**=indirect/direct diesel injection; **TC/SC**=turbo/super charger; **CAC**=charge air cooler; **EGR / EGR-C**=exhaust gas recirculation / cooled EGR; **PAIR/AIR**=pulsed/secondary air injection; **SPL**=smoke puff limiter; **ECM/PCM**=engine/powertrain control module; **EM**=engine modification; **2 (prefix)**=parallel; **(2) (suffix)**=in series;

[5] **ESS**=engine shutdown system (per 13 CCR 1956.8(a)(6)(A)(1); **30g**=30 g/hr NOx (per 13 CCR 1956.8(a)(6)(C); **ALT**=alternative method (per 13 CCR 1956.8(a)(6)(D); **Exempt**=exempted per 13 CCR 1956.8(a)(6)(B) or for CNG/LNG fuel systems; **N/A**=not applicable (e.g., Otto engines and vehicles);
(Rev.: 2007-12-20)

Following are: 1) the FTP exhaust emission standards, or family emission limit(s) as applicable, under 13 CCR 1956.8; 2) the EURO and NTE limits under the applicable California exhaust emission standards and test procedures for heavy-duty diesel engines and vehicles (Test Procedures); and 3) the corresponding certification levels, for this engine family. "Diesel" CO, EURO and NTE certification compliance may have been demonstrated by the manufacturer as provided under the applicable Test Procedures in lieu of testing. (For flexible- and dual-fueled engines, the CERT values in brackets [ ] are those when tested on conventional test fuel. For multi-fueled engines, the STD and CERT values for default operation permitted in 13 CCR 1956.8 are in parentheses.).[4]

in g/bhp-hr	NMHC		NOx		NMHC+NOx		CO		PM		HCHO	
	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO	FTP	EURO
STD	0.14	0.14	*	*	*	*	15.5	15.5	0.01	0.01	*	*
FEL	*	*	1.16	1.16	1.3	1.3	*	*	*	*	*	*
CERT	0.02	0.03	0.85	0.76	0.9	0.8	1.6	0.1	0.007	0.007	*	*
NTE	0.21		1.74		2.0		19.4		0.02		*	

[4] **g/bhp-hr**=grams per brake horsepower-hour; **FTP**=Federal Test Procedure; **EURO**=Euro III European Steady-State Cycle, including **RMCSET**=ram mode cycle supplemental emissions testing; **NTE**=Not-to-Exceed; **STD**=standard or emission test cap; **FEL**=family emission limit; **CERT**=certification level; **NMHC/HC**=non-methane/hydrocarbon; **NOx**=oxides of nitrogen; **CO**=carbon monoxide; **PM**=particulate matter; **HCHO**=formaldehyde;

BE IT FURTHER RESOLVED: Certification to the FEL(s) listed above, as applicable, is subject to the following terms, limitations and conditions. The FEL(s) is the emission level declared by the manufacturer and serves in lieu of an emission standard for certification purposes in any averaging, banking, or trading (ABT) programs. It will be used for determining compliance of any engine in this family and compliance with such ABT programs.

BE IT FURTHER RESOLVED: The listed engine models have been certified to the split engine family standards under 13 CCR 1956.8(b) [diesel engines] or 13 CCR 1956.8(d) [Otto engines] and the incorporated 40 CFR 86.007-15(m)(9).

BE IT FURTHER RESOLVED: For the listed engine models the manufacturer has submitted the materials to demonstrate certification compliance with 13 CCR 1965 (emission control labels) and 13 CCR 2035 et seq. (emission control warranty).

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

The Bureau of Automotive Repair will be notified by copy of this Executive Order.

Executed at El Monte, California on this 15 day of February 2008.

Annette Hebert

Annette Hebert, Chief
Mobile Source Operations Division

Engine Model Summary Template

Engine Family	1.Engine Code	2.Engine Model	3.BHP@RPM (SAE Gross)	4.Fuel Rate: mm/stroke @ peak HP (for diesel only)	5.Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6.Torque @ RPM (SEA Gross)	7.Fuel Rate: mm/stroke@peak torque	8.Fuel Rate: (lbs/hr)@peak torque	9.Emission Control Device Per SAE J1930
8CPXH0928E1X	CERT ENG	C15	625@1800	401	243.1	2155@1200	427	172.2	EM, DI, TC,
8CPXH0928E1X	1	C15	550@1800	330	199.6	1850@1200	343	138.5	EM, DI, TC,
8CPXH0928E1X	2	C15	550@1800	330	198.7	1850@1200	353	138.3	EM, DI, TC,
8CPXH0928E1X	3	C15	490@1800	296	179.4	1850@1200	344	139.0	EM, DI, TC,
8CPXH0928E1X	4	C15	490@1800	307	185.7	1850@1200	352	142.1	EM, DI, TC,
8CPXH0928E1X	5	C15	490@1800	298	180.2	1650@1200	306	123.6	EM, DI, TC,
8CPXH0928E1X	6	C15	490@1800	309	187.0	1650@1200	312	126.1	EM, DI, TC,
8CPXH0928E1X	7	C15	490@1800	296	179.4	1850@1200	344	139.0	EM, DI, TC,
8CPXH0928E1X	8	C15	490@1800	307	185.7	1850@1200	352	142.1	EM, DI, TC,
8CPXH0928E1X	9	C15	490@1800	309	187.0	1650@1200	312	126.1	EM, DI, TC,
8CPXH0928E1X	10	C15	490@1800	296	179.4	1850@1200	344	139.0	EM, DI, TC,
8CPXH0928E1X	11	C15	490@1800	309	187.0	1650@1200	312	126.1	EM, DI, TC,
8CPXH0928E1X	12	C15	450@1800	275	166.4	1650@1200	312	125.9	EM, DI, TC,
8CPXH0928E1X	13	C15	450@1800	288	174.2	1650@1200	309	124.6	EM, DI, TC,
8CPXH0928E1X	14	C15	450@1800	291	175.9	1550@1200	293	118.1	EM, DI, TC,
8CPXH0928E1X	15	C15	450@1800	277	167.5	1750@1200	337	136.1	EM, DI, TC,
8CPXH0928E1X	16	C15	450@1800	291	175.9	1550@1200	293	118.1	EM, DI, TC,
8CPXH0928E1X	17	C15	450@1800	277	167.5	1750@1200	337	136.1	EM, DI, TC,
8CPXH0928E1X	18	C15	450@1800	290	175.8	1750@1200	333	134.5	EM, DI, TC,
8CPXH0928E1X	19	C15	450@1800	291	175.9	1550@1200	293	118.1	EM, DI, TC,
8CPXH0928E1X	20	C15	450@1800	274	165.6	1550@1200	291	117.4	EM, DI, TC,
8CPXH0928E1X	21	C15	450@1800	291	175.9	1550@1200	293	118.1	EM, DI, TC,
8CPXH0928E1X	22	C15	450@1800	275	166.4	1650@1200	312	125.9	EM, DI, TC,
8CPXH0928E1X	23	C15	450@1800	288	174.2	1650@1200	309	124.6	EM, DI, TC,
8CPXH0928E1X	24	C15	490@1800	295	178.4	1850@1200	328	132.3	EM, DI, TC,
8CPXH0928E1X	25	C15	490@1800	307	185.7	1750@1200	331	133.5	EM, DI, TC,
8CPXH0928E1X	26	C15	490@1800	309	187.0	1650@1200	312	126.1	EM, DI, TC
8CPXH0928E1X	27	C15	515@1800	312	188.9	1850@1200	336	143.5	EM, DI, TC,

DDI, TC(2), CAC, ECM, EGR-C, PTOX, SPL

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Engine Model Summary Template

Engine Family	1.Engine Code	2.Engine Model	3.BHP@RPM (SAE Gross)	4.Fuel Rate: mm/stroke @ peak HP (for diesel only)	5.Fuel Rate: (lbs/hr) @ peak HP (for diesels only)	6.Torque @ RPM (SEA Gross)	7.Fuel Rate: mm/stroke@peak torque	8.Fuel Rate: (lbs/hr)@peak torque	9.Emission Control Device Per SAE J1930
8CPXH0928E1X	28	C15	515@1800	316	191.5	1850@1200	352	142.1	EM, DI, TC,
8CPXH0928E1X	29	C15	450@1800	274	165.6	1550@1200	291	117.4	EM, DI, TC,
8CPXH0928E1X	30	C15	450@1800	291	175.9	1550@1200	293	118.1	EM, DI, TC,
8CPXH0928E1X	31	C15	515@1800	313	189.7	1650@1200	319	128.8	EM, DI, TC,
8CPXH0928E1X	32	C15	625@1800	377	228.3	2050@1200	395	159.3	EM, DI, TC,
8CPXH0928E1X	33	C15	625@1800	377	228.3	2050@1200	395	159.3	EM, DI, TC,
8CPXH0928E1X	34	C15	600@1800	354	214.4	1850@1200	350	141.3	EM, DI, TC,
8CPXH0928E1X	35	C15	600@1800	354	214.4	1850@1200	350	141.3	EM, DI, TC,
8CPXH0928E1X	36	C15	600@1800	361	218.5	2050@1200	395	159.3	EM, DI, TC,
8CPXH0928E1X	37	C15	600@1800	361	218.5	2050@1200	395	159.3	DDE, EM, DI, TC,
8CPXH0928E1X	38	C15	600@1800	366	221.4	1850@1200	358	144.4	TCD, EM, DI, TC,
8CPXH0928E1X	39	C15	600@1800	366	221.4	1850@1200	358	144.4	AC, EM, DI, TC,
8CPXH0928E1X	40	C15	600@1800	361	218.5	2050@1200	395	159.3	EGM, EM, DI, TC,
8CPXH0928E1X	41	C15	600@1800	361	218.5	2050@1200	395	159.3	EGRL, EM, DI, TC,
8CPXH0928E1X	42	C15	625@1800	377	228.3	2050@1200	395	159.3	PTOX, EM, DI, TC,
8CPXH0928E1X	43	C15	625@1800	377	228.3	2050@1200	395	159.3	SPL EM, DI, TC,
8CPXH0928E1X	44	C15	625@1800	386	233.7	1900@1200	374	150.8	EM, DI, TC,
8CPXH0928E1X	45	C15	625@1800	386	233.7	1900@1200	374	150.8	EM, DI, TC,
8CPXH0928E1X	46	C15	515@1800	313	189.4	1650@1200	308	124.5	EM, DI, TC,
8CPXH0928E1X	47	C15	515@1800	317	192.1	1650@1200	312	125.9	EM, DI, TC,
8CPXH0928E1X	48	C15	490@1800	303	183.2	1650@1200	332	134.1	EM, DI, TC,
8CPXH0928E1X	49	C15	490@1800	301	183.2	1850@1200	374	150.9	EM, DI, TC,
8CPXH0928E1X	50	C15	550@1800	330	199.6	1850@1200	372	150.0	EM, DI, TC,
8CPXH0928E1X	51	C15	600@1800	371	224.5	1850@1200	359	145.0	EM, DI, TC,
8CPXH0928E1X	52	C15	600@1800	371	224.5	1850@1200	359	145.0	EM, DI, TC,

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