California Environmental Protection Agency Air Resources Board	CATERPILLAR INC.	EXECUTIVE ORDER U-R-001-0548 New Off-Road Compression-Ignition Engines

Pursuant to the authority vested in the Air Resources Board by Sections 43013, 43018, 43101, 43102, 43104 and 43105 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-14-012;

IT IS ORDERED AND RESOLVED: That the following compression-ignition engines and emission control systems produced by the manufacturer are certified as described below for use in off-road equipment. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	DISPLACEMENT (liters)	FUEL TYPE	USEFUL LIFE (hours)
2018	JCPXL12.5HTF	12.5	Diesel	8000

SPECIAL FEATURES & EMISSION CONTROL SYSTEMS	TYPICAL EQUIPMENT APPLICATION
Electronic Direct Injection, Turbocharger, Charge Air Cooler, Oxidation Catalyst, Engine Control Module, Exhaust Gas Recirculation, Periodic Trap Oxidizer, Selective Catalytic Reduction-Urea, Ammonia Oxidation Catalyst	Loader, Tractor, Agricultural Combine, Scraper, Excavator, Motor Grader, Commercial Equipment

The engine models and codes are attached.

The following are the exhaust certification standards (STD), or family emission limit(s) (FEL) as applicable, and certification levels (CERT) for non-methane hydrocarbon (NMHC), oxides of nitrogen (NOx), or non-methane hydrocarbon plus oxides of nitrogen (NMHC+NOx), carbon monoxide (CO), and particulate matter (PM) in grams per kilowatt-hour (g/kw-hr), and the opacity-of-smoke certification standards and certification levels in percent (%) during acceleration (Accel), lugging (Lug), and the peak value from either mode (Peak) for this engine family (Title 13, California Code of Regulations, (13 CCR) Section 2423):

RATED POWER CLASS	EMISSION STANDARD CATEGORY		EXHAUST (g/kw-hr)					OPACITY (%)		
			NMHC	NOx	NMHC+NOx	CO	PM	ACCEL	LUG	PEAK
130 ≤ kW ≤ 560	Tier 4 Final	STD	0.19	0.40	N/A	3.5	0.02	N/A	N/A	N/A
		FEL	N/A	N/A	--	N/A	0.01	N/A	N/A	N/A
		CERT	0.05	0.26	--	0.02	0.01	--	--	--

BE IT FURTHER RESOLVED: That the family emission limit(s) (FEL) is an emission level declared by the manufacturer for use in any averaging, banking and trading program and in lieu of an emission standard for certification. It serves as the applicable emission standard for determining compliance of any engine within this engine family under 13 CCR Sections 2423 and 2427.

BE IT FURTHER RESOLVED: That for the listed engine models, the manufacturer has submitted the information and materials to demonstrate certification compliance with 13 CCR Section 2424 (emission control labels), and 13 CCR Sections 2425 and 2426 (emission control system warranty).

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

This Executive Order is only granted to the engine family and model-year listed above. Engines in this family that are produced for any other model-year are not covered by this Executive Order.

Executed at El Monte, California on this 22 day September 2017.

Annette Hebert, Chief
Emissions Compliance, Automotive Regulations and Science Division

ATTACHMENT 1 OF 2 **Engine Model Summary Template** U-R-001-0548
R/C 12/18/2018

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 J193(
JCPXL12.5HTF	Cert Test 1	C13	519@2100	263	186	1752@1400	338	159	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	Cert Test 2	C13	503@1500	344.7	173.9	NA	NA	NA	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	01	C13	527@1870	289.2	181.9	1750@1400	335.5	158.0	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	02	C13	479@1870	258.3	162.5	1635@1400	314.2	148.0	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	03	C13	421@1870	232.1	146.0	1434@1400	277.1	130.5	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	04	C13	375@2000	196.9	132.5	1575@1300	302.3	132.2	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	05	C13	384@2100	192.6	136.1	1297@1400	245.7	115.7	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	06	C13	414@2100	207.4	146.5	1398@1400	267.5	126.0	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	07	C13	439@2100	219.2	154.9	1482@1400	280.9	132.3	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	08	C13	473@2100	239.1	168.9	1601@1400	308.6	145.3	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	09	C13	519@2100	262.7	185.6	1752@1400	338.2	159.3	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	10	C13	355@2050	184.4	127.2	1564@1200	301.9	121.9	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	11	C13	425@1800	245.0	148.4	1338@1650	258.8	143.7	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	11a	C13	425@1800	245.0	148.4	1338@1650	258.8	143.7	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	12	C13	416@2100	216.4	152.9	1612@1200	310.3	125.2	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	13	C13	429@2100	229.6	162.2	1612@1200	313.0	126.3	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	14	C13	527@1870	289.2	181.9	1750@1400	335.5	158.0	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	15	C13	479@1870	258.3	162.5	1635@1400	314.2	148.0	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	16	C13	421@1870	232.1	146.0	1434@1400	277.1	130.5	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	17	C13	363@2000	190.1	127.9	1351@1000	268.4	90.3	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX

ATTACHMENT 2 OF 2 **Engine Model Summary Template** UR-001-0548
RC 12/18/2018

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 J193(
JCPXL12.5HTF	18	C13	307@1850	174.5	108.5	1194@1200	233.8	94.4	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	19	2206	439@2100	219.2	154.8	1482@1400	280.8	132.2	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	20	2206	473@2100	239.0	168.8	1600@1400	308.5	145.3	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	21	2206	519@2100	262.6	185.5	1752@1400	338.2	159.2	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	22	C13	503@1500	344.7	173.9	NA	NA	NA	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	23	C13	567@1800	331.9	201.0	NA	NA	NA	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	24	2206	384@2100	192.6	136.1	1297@1400	245.7	115.7	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	25	2206	414@2100	207.4	146.5	1398@1400	267.5	126.0	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	26	2206	439@2100	219.2	154.9	1482@1400	280.9	132.3	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	27	C13	439@2100	219.2	154.8	1482@1400	280.8	132.2	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	28	C13	473@2100	239.0	168.8	1600@1400	308.5	145.3	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	29	C13	519@2100	262.6	185.5	1752@1400	338.2	159.2	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	30	C13	355@2050	184.4	127.2	1564@1200	301.9	121.9	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	31	C13	429@2100	229.6	162.2	1612@1200	313.0	126.3	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	32*	C13	425@1800	245.2	148.4	1609@1200	312.7	126.2	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	33*	2206	503@1500	344.7	173.9	NA	NA	NA	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
JCPXL12.5HTF	34*	2206	567@1800	331.9	201.0	NA	NA	NA	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX

* New engine code