

 <b>CALIFORNIA</b> AIR RESOURCES BOARD	<b>CATERPILLAR INC.</b>	<b>EXECUTIVE ORDER U-R-001-0608</b> New Off-Road Compression-Ignition Engines
--	-------------------------	---

Pursuant to the authority vested in California 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)
2019	KCPXL18.1HTF	18.1	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, Excavator, Off-road Truck, Paver, 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	0.04	0.11	--	0.01	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 11<sup>th</sup> day of December 2018.

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

ATTACHMENT 1 OF 2

**Engine Model Summary Template** U-R-001-0608

Re  
12/2/2019

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 J193C
KCPXL18.1HTF	Cert Test 1	C18	552@1900	336.1	214.8	2248@1300	430.9	188.4	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U.AMOX
KCPXL18.1HTF	1	C18	552@1900	336.1	214.8	2248@1300	430.9	188.4	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U.AMOX
KCPXL18.1HTF	2	C18	552@1900	336.1	214.8	2248@1300	430.9	188.4	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U.AMOX
KCPXL18.1HTF	3	C18	527@1700	321.0	183.6	2201@1200	412.9	166.7	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U.AMOX
KCPXL18.1HTF	4	C18	574@2000	306.2	206.0	1983@1300	378.9	165.7	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U.AMOX
KCPXL18.1HTF	5	C18	598@2000	321.1	216.0	2069@1300	395.8	173.1	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U.AMOX
KCPXL18.1HTF	6	C18	629@2000	342.6	230.5	2173@1300	417.9	182.8	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U.AMOX
KCPXL18.1HTF	7	C18	570@1900	330.4	211.2	2200@1200	412.1	166.4	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U.AMOX
KCPXL18.1HTF	8	C18	460@1800	270.8	163.9	1823@1250	347.5	146.1	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U.AMOX
KCPXL18.1HTF	9	C18	543@1900	314.9	201.2	1817@1400	344.3	162.2	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U.AMOX
KCPXL18.1HTF	10	C18	481@1900	274.4	175.4	1910@1200	360.0	145.3	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U.AMOX
KCPXL18.1HTF	11	C18	629@1900	352.1	225.1	2172@1300	417.7	182.7	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U.AMOX
KCPXL18.1HTF	12	C18	554@1900	322.8	206.3	2020@1300	380.6	166.5	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U.AMOX
KCPXL18.1HTF	13	2806F	574@2000	306.2	206.0	1983@1300	378.9	165.7	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U.AMOX
KCPXL18.1HTF	14	2806F	598@2000	321.1	216.0	2069@1300	395.8	173.1	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U.AMOX
KCPXL18.1HTF	15	2806F	629@2000	342.6	230.5	2173@1300	417.9	182.8	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U.AMOX
KCPXL18.1HTF	16	C18	481@1900	274.4	175.4	1910@1200	360.0	145.3	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U.AMOX
KCPXL18.1HTF	17	C18	527@1700	321.0	183.6	2201@1200	412.9	166.7	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U.AMOX
KCPXL18.1HTF	18	C18	543@1900	314.9	201.2	1817@1400	344.3	162.2	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U.AMOX
KCPXL18.1HTF	19	C18	629@2000	342.6	230.5	2173@1300	417.9	182.8	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U.AMOX

ATTACHMENT 2 OF 2

**Engine Model Summary Template** U-R-001-0608

R/c

12/2/2019

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 J193C
KCPXL18.1HTF	20	C18	468@1750	276.8	163.0	2010@1300	373.7	163.4	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
KCPXL18.1HTF	21*	C18	570@1900	330.4	211.2	2200@1200	412.1	166.4	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
KCPXL18.1HTF	22x	C18	629@2000	342.6	230.5	2173@1300	417.9	182.8	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX
KCPXL18.1HTF	19A*	C18	629@2000	342.6	230.5	2173@1300	417.9	182.8	DFI,TC,ECM,CAC,EGR,PTOX, OC,SCR-U,AMOX

\* New engine code