

Pursuant to the authority vested in California 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-19-095;

**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 <sup>1</sup>	STANDARDS & TEST PROCEDURE	INTENDED SERVICE CLASS <sup>2</sup>	ECS & SPECIAL FEATURES <sup>3</sup>	DIAGNOSTIC <sup>6</sup>
2021	MCEXH0540LCA	8.9	Diesel	Diesel	MHDD	DDI, TC, CAC, ECM, EGR, OC, PTOX, SCR-U, AMOX	OBD(\$)
PRIMARY ENGINE'S IDLE EMISSIONS CONTROL <sup>5</sup>		ADDITIONAL IDLE EMISSIONS CONTROL <sup>5</sup>					
30g		N/A					
ENGINE (L)	ENGINE MODELS / CODES (rated power, in hp)						
8.9	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;  
<sup>1</sup> 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;  
<sup>2</sup> L/MH HDD=light/medium/heavy heavy-duty diesel; UB=urban bus; HDO=heavy duty Otto;  
<sup>3</sup> 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;  
<sup>5</sup> ESS=emission shutdown system (per 13 CCR 1956.8(a)(6)(A)(1)); 30g=30 g/hr NOx (per 13 CCR 1956.8(a)(6)(C)); APS =internal combustion auxiliary power system; 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);  
<sup>6</sup> EMD=engine manufacturer diagnostic system (13 CCR 1971); OBD(F) / (P) / (\$) =full / partial / partial with a fine / on-board diagnostic;

Following are: 1) the FTP exhaust emission standards, or family emission limit(s) as applicable, under 13 CCR 1956.8; 2) the SET 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, SET 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.) <sup>4</sup>

in g/bhp-hr	NMHC		NOx		NMHC+NOx		CO		PM		HCHO	
	FTP	SET	FTP	SET	FTP	SET	FTP	SET	FTP	SET	FTP	SET
STD	0.14	0.14	0.20	0.20	*	*	15.5	15.5	0.01	0.01	*	*
CERT	0.03	0.03	0.09	0.04	*	*	0.1	0.00	0.005	0.004	*	*
NTE	0.21		0.30		*		19.4		0.02		*	

<sup>4</sup> g/bhp-hr=grams per brake horsepower-hour; FTP=Federal Test Procedure; SET=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:** The manufacturer has demonstrated compliance with the Greenhouse Gas Emission Standards as specified in Title 13 CCR 1956.8 and the incorporated "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy Duty Diesel-Engines and Vehicles" (HDDE Test Procedures) adopted December 12, 2002, as last amended April 18, 2019.

PRIMARY INTENDED SERVICE CLASS: Tractor/Vocational				
In g/bhp-hr	CO <sub>2</sub>		CH <sub>4</sub>	N <sub>2</sub> O
	FTP	SET		
STD	545	473	0.10	0.10
FCL	525	492	*	*
FEL	541	507	0.10	0.15
CERT	523	492	0.02	0.15

<sup>4</sup> g/bhp-hr=grams per brake horsepower-hour; FTP=Federal Test Procedure; SET=Supplemental emissions testing; STD = standard or emission test cap; FEL=family emission limit; FCL=family certification level; CERT=certification level; CO<sub>2</sub>=carbon dioxide; CH<sub>4</sub>=methane; N<sub>2</sub>O=nitrous oxide; VOCATIONAL=vocational engine; TRACTOR=tractor engine

**BE IT FURTHER RESOLVED:** Certification to the FEL(s) / FCL(s) listed above, as applicable, is subject to the following terms, limitations and conditions. The FEL(s) / FCL(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:** For the listed engine models the manufacturer has submitted the materials to demonstrate certification compliance with 13 CCR 1965 (emission control labels), 13 CCR 1971.1 (on-board diagnostic, full or partial compliance) and 13 CCR 2035 et seq. (emission control warranty).

**BE IT FURTHER RESOLVED:** That the manufacturer has elected to include engine models in this engine family which are identified for "emergency vehicle use only". These "emergency vehicle use only" engines are exempt from requirements imposed pursuant to California law and the regulations adopted pursuant thereto for motor vehicle pollution control devices per California Vehicle Code Section 27156.2. The manufacturer must clearly label these engines for "emergency vehicle use only" on the engines' emission control label.

**BE IT FURTHER RESOLVED:** Except in vehicle applications exempted per 13 CCR 1956.8(a)(6)(B), engines in this engine family certified under 13 CCR 1956.8(a)(6)(C) [30 g/hr NO<sub>x</sub>] and section 35.B.4 of the incorporated "California Exhaust Emissions Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles" (HDDE Test Procedures) adopted December 12, 2002, as last amended April 18, 2019, shall be provided with an approved "Certified Clean Idle" label that shall be affixed to the vehicle into which the engine is installed.

**BE IT FURTHER RESOLVED:** The listed engine models L9 450, L9 400, L9 380, L9 370, PX-9 450, PX-9 400, PX-9 380, PX-9 370, L9 450 EV, L9 400 EV, L9 380 EV, L9 370 EV, PX-9 450EV, PX-9 400EV, PX-9 380EV, and PX-9 370EV are conditionally certified in accordance with 13 CCR Section 1971.1 (k) (deficiency and fines provisions for certification of malfunction and diagnostic system) because the heavy-duty on-board diagnostic (HD OBD) system has been determined to have four deficiencies, and therefore is approved subject to the manufacturer paying a fine of \$75 per engine for the third through fourth deficiencies in the listed engine family that is produced and delivered for sale in California. Furthermore, the remaining listed engine models are conditionally certified in accordance with 13 CCR Section 1971.1 (k) (deficiency and fines provisions for certification of malfunction and diagnostic system) because the heavy-duty on-board diagnostic (HD OBD) system has been determined to have five deficiencies, and therefore is approved subject to the manufacturer paying a fine of \$125 per engine for the third through fifth deficiencies in the listed engine family that is produced and delivered for sale in California. On a quarterly basis, the manufacturer shall submit to California Air Resources Board reports of the number of engines produced and delivered for sale in California and pay the full fine owed for that quarter pursuant to this conditional certification. Payment shall be made payable to the State Treasurer for deposit in the Air Pollution Control Fund no later than thirty (30) days after the end of each calendar quarter during the 2021 model-year production period. Failure to pay the quarterly fine, in full, in the time provided, may be cause for the Executive Officer to rescind this conditional certification, effective from the start of the quarter in question, in which case all engines covered under this conditional certification for that quarter and all future quarters would be deemed uncertified and subject to a civil penalty of up to \$37,500 per engine pursuant to HSC Section 43154.

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 on this 17<sup>th</sup> day of September 2020.



Allen Lyons, Chief  
Emissions Certification and Compliance Division

# Engine Model Summary Template

9/9/2020

Engine Family	1.Engine Code	2.Engine Model	3.BHP@RPM (SAE Gross)	4.Fuel Rate:	5.Fuel Rate:	6.Torque @ RPM (SEA Gross)	7.Fuel Rate:	8.Fuel Rate:	9.Emission Control
				mm/stroke @ peak HP (for diesel only)	(lbs/hr) @ peak HP (for diesels only)		mm/stroke@peak torque	(lbs/hr)@peak torque	Device Per SAE J1930
MCEXH0540LCA	LM1	L9 450	450@2100	225	160	1250@1200	237	96	DDI, TC, CAC, ECM, EGR, OC, PTOX, SCR-U, AMOX
MCEXH0540LCA	LM2	L9 400	400@2200	190	141	1250@1200	237	96	
MCEXH0540LCA	LM3	L9 380	380@2100	186	132	1250@1200	237	96	
MCEXH0540LCA	LM4	L9 380	380@2200	181	134	1150@1200	216	87	
MCEXH0540LCA	LM5	L9 370	370@2100	177	126	1250@1200	237	96	
MCEXH0540LCA	LM6	L9 360	360@2200	179	133	1150@1200	213	86	
MCEXH0540LCA	LM7	L9 350	350@2200	173	128	1050@1200	191	77	
MCEXH0540LCA	LM8	L9 330	330@2200	160	119	1000@1200	180	73	
MCEXH0540LCA	LM9	L9 300	300@2200	146	108	860@1200	142	57	
MCEXH0540LCA	LM10	L9 270	270@2200	130	96	860@1200	142	57	
MCEXH0540LCA	LM11	L9 260	260@2200	125	93	860@1200	142	57	
MCEXH0540LCA	LM1	PX-9 450	450@2100	225	160	1250@1200	237	96	
MCEXH0540LCA	LM2	PX-9 400	400@2200	190	141	1250@1200	237	96	
MCEXH0540LCA	LM3	PX-9 380	380@2100	186	132	1250@1200	237	96	
MCEXH0540LCA	LM4	PX-9 380	380@2200	181	134	1150@1200	216	87	
MCEXH0540LCA	LM5	PX-9 370	370@2100	177	126	1250@1200	237	96	
MCEXH0540LCA	LM6	PX-9 360	360@2200	179	133	1150@1200	213	86	
MCEXH0540LCA	LM7	PX-9 350	350@2200	173	128	1050@1200	191	77	
MCEXH0540LCA	LM8	PX-9 330	330@2200	160	119	1000@1200	180	73	
MCEXH0540LCA	LM9	PX-9 300	300@2200	146	108	860@1200	142	57	
MCEXH0540LCA	LM10	PX-9 270	270@2200	130	96	860@1200	142	57	
MCEXH0540LCA	LM11	PX-9 260	260@2200	125	93	860@1200	142	57	
	Emergency	Vehicle	Ratings	Below					
MCEXH0540LCA	LME1	L9 450 EV	450@2100	225	160	1250@1200	237	96	↓
MCEXH0540LCA	LME2	L9 400 EV	400@2200	190	141	1250@1200	237	96	
MCEXH0540LCA	LME3	L9 380 EV	380@2200	181	134	1150@1200	216	87	
MCEXH0540LCA	LME4	L9 370 EV	370@2100	177	126	1250@1200	237	96	

Engine Model Summary Template

9/9/2020

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
MCEXH0540LCA	LME5	L9 350 EV	350@2200	173	128	1050@1200	191	77	DDI, TC, CAC, ECM, EGR, OC, PTOX, SCR-U, AMOX
MCEXH0540LCA	LME6	L9 330 EV	330@2200	160	119	1000@1200	180	73	
MCEXH0540LCA	LME7	L9 300 EV	300@2200	146	108	860@1200	142	57	
MCEXH0540LCA	LME8	L9 270 EV	270@2200	130	96	800@1200	142	57	
MCEXH0540LCA	LME1	PX-9 450EV	450@2100	225	160	1250@1200	237	96	
MCEXH0540LCA	LME2	PX-9 400EV	400@2200	190	141	1250@1200	237	96	
MCEXH0540LCA	LME3	PX-9 380EV	380@2200	181	134	1150@1200	216	87	
MCEXH0540LCA	LME4	PX-9 370EV	370@2100	177	126	1250@1200	237	96	
MCEXH0540LCA	LME5	PX-9 350EV	350@2200	173	128	1050@1200	191	77	
MCEXH0540LCA	LME6	PX-9 330EV	330@2200	160	119	1000@1200	180	73	
MCEXH0540LCA	LME7	PX-9 300EV	300@2200	146	108	860@1200	142	57	
MCEXH0540LCA	LME8	PX-9 270EV	270@2200	130	96	800@1200	142	57	