CALIFORNIA AIR RESOURCES BOARD	CUMMINS INC.	EXECUTIVE ORDER A-021-0716 New On-Road Heavy-Duty Engines Page 1 of 2 Pages

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 [1]	STANDARDS & TEST PROCEDURE	INTENDED SERVICE CLASS [2]	ECS & SPECIAL FEATURES [3]	DIAGNOSTIC [6]
2020	LCEXH0721XAG	11.8	Diesel	Diesel	HHDD-UB	DDI, TC, CAC, ECM, EGR, OC, PTOX, SCR-U, AMOX	OBD($)

PRIMARY ENGINE'S IDLE EMISSIONS CONTROL [5]	ADDITIONAL IDLE EMISSIONS CONTROL [5]
30g	N/A

ENGINE (L)	ENGINE MODELS / CODES (rated power, in hp)
11.8	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 e.k.e. **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)**=parellel; **(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); **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);

[6] **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.). [4]

in g/bhp-hr	NMHC		NOx		CO		PM		HCHO	
	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	0.01	0.01	0.17	0.16	0.4	0.00	0.004	0.003	*	*
NTE	0.21		0.30		19.4		0.02		*	

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 using the 2014 model year National Heavy-Duty Engine and Vehicle Greenhouse Gas Program as specified in Section 1036.108 of the HDDE Test Procedures. The manufacturer has submitted the required information and therefore has met the criteria necessary to receive a California Executive Order based on the Environmental Protection Agency's Certificate of Conformity for the above listed engine family.

	EPA CERTIFICATE OF CONFORMITY		PRIMARY INTENDED SERVICE CLASS	
	LCEXH0721XAG-012		TRACTOR / VOCATIONAL	
In g/bhp-hr	CO_2		CH_4	N_2O
	FTP	SET		
STD	555	460	0.10	0.10
FCL	509	465	*	*
FEL	524	479	0.10	0.13
CERT	509	465	0.02	0.09

[4] **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_2**=carbon dioxide; **CH_4**=methane; **N_2O**=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: 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 NOx] 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: 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: The 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 of the listed engine models has been determined to have six deficiencies. The listed engine models are approved subject to the manufacturer paying a fine of $150 per engine for the third through sixth 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 2020 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 at El Monte, California on this 18TH day of December 2019.

Allen Lyons, Chief
Emissions Certification and Compliance Division

EO#: A-021-0716

12/17/2019

Attachment: Page 1 of 2

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
CEXH0721XAG	5580;FR21169	X12 350	350@1761	190	113	1350@1000	241	81	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21170	X12 370	370@1761	201	119	1350@1000	241	81	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21171	X12 380	380@1761	206	122	1450@1000	262	88	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21177	X12 400ST	400@1761	218	129	1700@1000	308	104	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21172	X12 410	410@1761	223	133	1450@1000	262	88	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21173	X12 410	410@1761	223	133	1650@1000	300	101	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21179	X12 410ST	410@1761	223	133	1650@1000	300	101	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21174	X12 430	430@1761	235	139	1550@1000	283	95	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21175	X12 430	430@1761	235	139	1650@1000	300	101	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21178	X12 455	455@1761	251	149	1700@1000	308	104	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21176	X12 455ST	455@1761	251	149	1700@1000	308	104	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21182	X12 350	350@1761	190	113	1350@1000	241	81	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21200	X12 350	350@1761	189	112	1450@1000	262	88	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21190	X12 365	365@1716	191	111	1250@1000	222	75	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21183	X12 370	370@1761	201	119	1350@1000	241	81	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21184	X12 380	380@1761	206	122	1450@1000	262	88	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21185	X12 410	410@1761	223	133	1450@1000	262	88	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21186	X12 430	430@1761	235	139	1550@1000	283	95	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21187	X12 430	430@1761	235	139	1650@1000	300	101	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21188	X12 455	455@1761	251	149	1550@1000	283	95	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21196	X12 455	455@1761	251	149	1700@1000	308	104	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21180	X12 475	475@1761	266	158	1700@1000	308	104	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21181	X12 500	500@1761	284	169	1695@1000	306	103	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21189	X12 350	350@1761	190	113	1350@1000	241	81	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21235	X12 350	350@1761	189	112	1450@1000	262	88	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21191	X12 365	365@1716	191	111	1250@1000	222	75	DDI,TC,CAC,ECM,E
CEXH0721XAG	5580;FR21192	X12 380	380@1761	206	122	1450@1000	262	88	DDI,TC,CAC,ECM,E
	Emergency	Ratings	Below						

DDI, TC, CAC, ECM, EGR, OC, PTOX, SCR-U, AMOX

Attachment: Page 2 of 2

EO#: A-021-0716

12/17/2019

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
LCEXH0721XAG	5580;FR21195	X12 455	455@1761	251	149	1550@1000	283	95	DDI,TC,CAC,ECM,E
LCEXH0721XAG	5580;FR21198	X12 500	500@1761	284	169	1695@1000	306	103	DDI,TC,CAC,ECM,E
	Urban Bus	Ratings	Below						
LCEXH0721XAG	5580;FR21199	X12 410	410@1761	223	133	1450@1000	262	88	DDI,TC,CAC,ECM,E

DDI, TC, CAC, ECM, EGR, OC, PTOX, SCR-U Amox