CALIFORNIA AIR RESOURCES BOARD	LIEBHERR MACHINES BULLE SA	EXECUTIVE ORDER U-R-018-0173 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-19-095;

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)
2020	LLHAL7.96SQC	7.964	Diesel	8000

SPECIAL FEATURES & EMISSION CONTROL SYSTEMS	TYPICAL EQUIPMENT APPLICATION
Turbocharger, Charge Air Cooler, Electronic Control Module, Electronic Direct Injection, Selective Catalyst Reduction-Urea, Ammonia Oxidation Catalyst, DEF Quality Sensor	Crane, Loader, Dozer, Excavator

The engine models and codes are attached.

The following are the exhaust certification standards (STD) 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
		CERT	0.02	0.36	--	0.5	0.02	--	--	--

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 31st day of December 2019.

Kim Pryor

for Allen Lyons, Chief
Emissions Certification and Compliance Division

ATTACHMENT 1 OF 1

Engine Model Summary Template

U-R-018-0173
12/13/19

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
LLHAL7.96SQC	R04KQ7101	D944 A7-04	308@1900	260@308	109	1068@1350	300@1068	89	TC, CAC, ECM, DDI, SCR-U, AMOX, DQS
LLHAL7.96SQC	R04KQ7102	D944 A7-04	268@1900	225@268	94	1044@1350	295@1044	88	TC, CAC, ECM, DDI, SCR-U, AMOX, DQS
LLHAL7.96SQC	R04KQ7104	D944 A7-24	295@1900	245@295	103	1044@1350	300@1068	89	TC, CAC, ECM, DDI, SCR-U, AMOX, DQS
LLHAL7.96SQC	R04KQ7103	D944 A7-24	268@1900	225@268	94	1044@1350	300@1068	89	TC, CAC, ECM, DDI, SCR-U, AMOX, DQS