



AIR RESOURCES BOARD

LIEBHERR MACHINES BULLE SA

EXECUTIVE ORDER U-R-018-0102
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-02-003;

IT IS ORDERED AND RESOLVED: That the following compression-ignition engine and emission control system 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)
2010	ALHAL10.5LPA	10.5	Diesel	8,000
SPECIAL FEATURES & EMISSION CONTROL SYSTEMS			TYPICAL EQUIPMENT APPLICATION	
Electronic Direct Injection, Turbocharger, Charge Air Cooler, Electronic Control Module, Smoke Puff Limiter			Crane, Loader, Dozer, Compressor	

The engine models and codes are attached.

The following are the exhaust certification standards (STD) and certification levels (CERT) for hydrocarbon (HC), 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 (%)		
			HC	NOx	NMHC+NOx	CO	PM	ACCEL	LUG	PEAK
75 ≤ kW < 130	Tier 3	STD	N/A	N/A	4.0	5.0	0.30	20	15	50
130 ≤ kW < 450	Tier 3	STD	N/A	N/A	4.0	3.5	0.20	20	15	50
		CERT	--	--	3.7	0.8	0.15	8	2	10

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 26 day of January 2010.

Annette Hebert, Chief
Mobile Source Operations Division

Liebherr Machines Bulle SA

Engine Model Summary Template

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ATTACHMENT 1 OF 3

12/13/10

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
ALHAL10.5LPA	NA	D 936 R06L61021	365@2000	203@365	NA	1265@1300	259@1265	NA	IAT, TC, CAC, ECM, MAP, ECT, RPM, SPL, DDI
ALHAL10.5LPA	NA	D 936 R06L61015	365@2000	203@365	NA	1266@1300	259@1266	NA	IAT, TC, CAC, ECM, MAP, ECT, RPM, SPL, DDI
ALHAL10.5LPA	NA	D 936 R06L61020	257@2000	153@257	NA	907@1300	184@907	NA	IAT, TC, CAC, ECM, MAP, ECT, RPM, SPL, DDI
ALHAL10.5LPA	NA	D 936 R06L61023	257@2000	153@257	NA	907@1300	184@907	NA	IAT, TC, CAC, ECM, MAP, ECT, RPM, SPL, DDI
ALHAL10.5LPA	NA	D 936 R06L61018	237@2000	139@237	NA	818@1500	171@818	NA	IAT, TC, CAC, ECM, MAP, ECT, RPM, SPL, DDI
ALHAL10.5LPA	NA	D 936 R06L61017	284@2000	161@284	NA	941@1300	192@944	NA	IAT, TC, CAC, ECM, MAP, ECT, RPM, SPL, DDI
ALHAL10.5LPA	NA	D 936 R06L61016	271@2000	160@271	NA	935@1300	197@935	NA	IAT, TC, CAC, ECM, MAP, ECT, RPM, SPL, DDI
ALHAL10.5LPA	NA	D 934 R04L61005	244@1900	218@244	NA	841@1500	255@841	NA	IAT, TC, CAC, ECM, MAP, ECT, RPM, SPL, DDI
ALHAL10.5LPA	NA	D 934 R04L61008	204@2000	175@204	NA	702@1500	216@702	NA	IAT, TC, CAC, ECM, MAP, ECT, RPM, SPL, DDI
ALHAL10.5LPA	NA	D 936 R06L61019	325@1800	196@325	NA	1125@1500	224@1125	NA	IAT, TC, CAC, ECM, MAP, ECT, RPM, SPL, DDI
ALHAL10.5LPA	NA	D 936 R06L61024	325@1800	196@325	NA	1125@1500	224@1125	NA	IAT, TC, CAC, ECM, MAP, ECT, RPM, SPL, DDI

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Engine Model Summary Template

ATTACHMENT 2 OF 3

12/13/10

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
ALHAL10.5LPA	NA	D 934 R04L61007	204@1800	186@204	NA	706@1500	219@706	NA	IAT, TC, CAC, ECM, MAP, ECT, RPM, SPL, DDI
ALHAL10.5LPA	NA	D 934 R04L61009	190@2000	168@190	NA	660@1500	217@660	NA	IAT, TC, CAC, ECM, MAP, ECT, RPM, SPL, DDI
ALHAL10.5LPA	NA	D 934 R04L61001	184@1800	162@184	NA	637@1500	207@637	NA	IAT, TC, CAC, ECM, MAP, ECT, RPM, SPL, DDI
ALHAL10.5LPA	NA	D 934 R04L61010	190@2000	168@190	NA	660@1500	217@660	NA	IAT, TC, CAC, ECM, MAP, ECT, RPM, SPL, DDI
ALHAL10.5LPA	NA	D 936 R06L61026	338@2000	187@338	NA	1170@1500	232@1170	NA	IAT, TC, CAC, ECM, MAP, ECT, RPM, SPL, DDI
ALHAL10.5LPA	NA	D 934 R04L61011	244@2000	206@244	NA	797@1500	242@797	NA	IAT, TC, CAC, ECM, MAP, ECT, RPM, SPL, DDI
ALHAL10.5LPA	NA	D934 R04L61014	173@1800	161@173	NA	601@1500	183@601	NA	IAT, TC, CAC, ECM, MAP, ECT, RPM, SPL, DDI
ALHAL10.5LPA	NA	D934 R04L61015	241@1900	221@241	NA	845@1500	255@845	NA	IAT, TC, CAC, ECM, MAP, ECT, RPM, SPL, DDI

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Engine Model Summary Template

ATTACHMENT 3 OF 3

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
ALHAL10.5LPA	NA	D 934 R04L61016	194@1800	182@194	NA	683@1500	217@683	NA	IAT, TC, CAC, ECM, MAP, ECT, RPM, SPL, DDI