



California Environmental Protection Agency

**AIR RESOURCES BOARD**

LIEBHERR MACHINES BULLE SA

EXECUTIVE ORDER U-R-018-0067

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)
2005	5LHAL10.5LPA	10.5	Diesel	8000
SPECIAL FEATURES & EMISSION CONTROL SYSTEMS			TYPICAL EQUIPMENT APPLICATION	
Direct Diesel 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 (NO<sub>x</sub>), or non-methane hydrocarbon plus oxides of nitrogen (NMHC+NO<sub>x</sub>), 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):

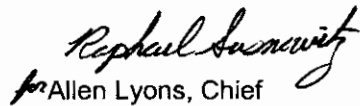
RATED POWER CLASS	EMISSION STANDARD CATEGORY		EXHAUST (g/kW-hr)					OPACITY (%)		
			HC	NO <sub>x</sub>	NMHC+NO <sub>x</sub>	CO	PM	ACCEL	LUG	PEAK
225 ≤ kW < 450	Tier 2	STD	N/A	N/A	6.4	3.5	0.20	20	15	50
		CERT	--	--	4.0	1.1	0.16	18	3	36

**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 22<sup>nd</sup> day of December 2005.

  
for Allen Lyons, Chief  
Mobile Source Operations Division

# Engine Model Summary Form

U-R-018-0067

ATTACHMENT

Manufacturer: **Liebherr Machines Bulle SA**  
 Engine category: **Nonroad CI**  
 EPA Engine Family: **5LHAL10.5LPA**  
 Mfr Family Name: **NA**  
 Process Code: **New Submission**

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 Device Per SAE J1930	9. Emission Control
NA	D 936 R06L61003	365@2000	190@365	NA	1268@1500	247@1268	NA	NA MAP, IAT, TC, CAC, ECM
NA	D 936 R06L61022	365@2000	197@365	NA	1265@1300	246@1265	NA	SPL, RPM IAT, TC, CAC, ECM, MAP, ECT

# Engine Model Summary Form

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ATTACHMENT 2 OF 3

Manufacturer: **Liebherr Machines Bulle SA**  
 Engine category: **Nonroad CI**  
 EPA Engine Family: **5LHAL10.5LPA**  
 Mfr Family Name:  
 Process Code: **Running Change**

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
NA	D 936 R06L61017	284@2000	152@284	NA	941@1300	182@941	NA	IAT, TC, CAC, FCM, MAR, FOT
NA	D 936 R06L61016	271@2000	145@271	NA	935@1300	173@935	NA	IAT, TC, CAC, FCM, MAR, FOT
NA	D 936 R06L61013	325@1800	180@325	NA	1122@1500	209@1122	NA	IAT, TC, CAC, FCM, MAR, FOT
NA	D 934 R04L61003	204@1800	192@204	NA	706@1500	231@706	NA	IAT, TC, CAC, FCM, MAR, FOT
NA	D 934 R04L61006	204@2000	185@204	NA	706@1500	231@706	NA	IAT, TC, CAC, FCM, MAR, FOT

# Engine Model Summary Form

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ATTACHMENT 3 OF 3

Manufacturer: **Liebherr Machines Bulle SA**  
 Engine category: **Nonroad CI**  
 EPA Engine Family: **5LHAL10.5LPA**  
 Mfr Family Name:  
 Process Code: **Running Change**

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
NA	D 936 R06L61021	365@2000	203@365	NA	1265@1300	259@1265	NA	IAT, TC, CAC, ECM, MAP, FOT
NA	D 936 R06L61014	365@1900	203@365	NA	1269@1300	259@1269	NA	IAT, TC, CAC, ECM, MAP, FOT
NA	D 934 R04L61005	244@1900	211@244	NA	845@1500	254@845	NA	IAT, TC, CAC, ECM, MAP, FOT
NA	D 936 R06L61015	365@2000	203@365	NA	1266@1300	259@1266	NA	IAT, TC, CAC, ECM, MAP, FOT