

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER U-R-18-20
Relating to Certification of New Heavy-Duty Off-Road Equipment Engines

LIEBHERR MACHINES BULLE SA

Pursuant to the authority vested in the Air Resources Board at Sections 43000.5, 43013, and 43018 of the Health and Safety Code; and

Pursuant to the authority vested in the undersigned at Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-45-9; and

IT IS ORDERED AND RESOLVED: That the following diesel engines and exhaust emission control systems produced by the manufacturer are certified as described below for use in heavy-duty off-road equipment:

Model Year: 2000

Typical Equipment Usage: Tractor, Loader, Dozer, Compressor and Crane

Engine Power Ratings Range: 175 – 750 horsepower, inclusive

Fuel Type: Diesel

<u>Engine Family</u>	<u>Displacement</u>		<u>Exhaust Emission Control Systems and Special Features</u>
	<u>Liters</u>	<u>Cubic Inches</u>	
YLHAL17.2ARA	12.9/17.2	786/1048	Smoke Puff Limiter Turbocharger Charge Air Cooler

The engine models and codes are listed on attachments. Production engines shall be in all material respects the same as those for which certification is granted.

The exhaust emission certification standards and certification values in grams per brake horsepower-hour (g/bhp-h) for total hydrocarbons (THC), carbon monoxide (CO), nitrogen oxides (NOx), and particulate matter (PM), and the opacity-of-smoke certification standards and certification values in percent (%) during acceleration (Accel), lugging (Lug), and the peak-values from either mode (Peak) for this engine family are as follows (Title 13, California Code of Regulations, Section 2423):

	<u>Exhaust Emissions (g/bhp-h)</u>				<u>Smoke Opacity (%)</u>		
	<u>THC</u>	<u>CO</u>	<u>NOx</u>	<u>PM</u>	<u>Accel</u>	<u>Lug</u>	<u>Peak</u>
Standard	1.0	8.5	6.9	0.4	20	15	50
Certification	0.3	0.5	4.0	0.1	10	8	30


BE IT FURTHER RESOLVED: That the listed engine models comply with "Exhaust Emission Standards and Test Procedures—Heavy-Duty Off-Road Diesel-Cycle Engines" (Title 13, California Code of Regulations, Section 2423) for the aforementioned model-year.

BE IT FURTHER RESOLVED: That the listed engine models also comply with "Emission Control Labels—1996 and Later Heavy-Duty Off-Road Diesel-Cycle Engines" (Title 13, California Code of Regulations, Section 2424) for the aforementioned model-year.

BE IT FURTHER RESOLVED: That for the listed engine models, the manufacturer has submitted the materials to demonstrate certification compliance with the Board's emission control system warranty provisions (Title 13, California Code of Regulations, Sections 2425 *et seq.*).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

Executed at El Monte, California this 28th day of December 1999.


for R. B. Summerfield, Chief
Mobile Source Operations Division

LARGÉ ENGINE MODEL SUMMARY

E.O.: U-R-1820

Process Code: New Submission

Manufacturer: LIEBHERR MACHINES BULLE SA

Manufacturer Family Name: YLHAL17.2ARA

EPA Engine Family: YLHAL17.2ARA

1. Engine Code 2. Engine Model 3. BHP @ RPM (SAE Gross) 4. Fuel Rate: mm³/stroke @ peak HP (for diesel only) 5. Fuel Rate: (lbs/hr) @ peak HP (for diesels only) 6. Torque @ RPM (SEA Gross) 7. Fuel Rate: mm³/stroke @ peak torque 8. Fuel Rate: (lbs/hr) @ peak torque 9. Emission Control Device Per SAE J1930

NA	D9408T1-E	571@2100	238@571	NA	1741@1200-155	254@1741	NA	SPL, TC, CAC,
NA	D9408T1-E	542@2100	227@542	NA	1668@1575	241@1668	NA	SPL, TC, CAC,
NA	D9408T1-E	540@1900	230@540	NA	1711@1500	247@1711	NA	SPL, TC, CAC,
NA	D9408T1-E	460@1900	191@460	NA	1564@1250	217@1564	NA	SPL, TC, CAC,
NA	D9408T1-E	443@1800	195@443	NA	1585@1200	220@1585	NA	SPL, TC, CAC,
NA	D9408T1-E	477@1800	205@477	NA	1660@1200	230@1660	NA	SPL, TC, CAC,
NA	D9408T1-E	536@2000	230@536	NA	1682@1500	250@1682	NA	SPL, TC, CAC,
NA	D9406T1-E	408@2100	214@408	NA	1254@1500	236@1254	NA	SPL, TC, CAC,
NA	D9406T1-E	356@1900	198@356	NA	1192@1300	226@1192	NA	SPL, TC, CAC,
NA	D9406T1-E	348@1800	198@348	NA	1187@1300	220@1187	NA	SPL, TC, CAC,
NA	D9406T1-E	356@1800	200@356	NA	1180@1200	228@1180	NA	SPL, TC, CAC,
NA	D9406T1-E	408@1900	228@408	NA	1276@1400	240@1276	NA	SPL, TC, CAC,
NA	D9406T1-E	361@1800	204@361	NA	1239@1200	231@1239	NA	SPL, TC, CAC,
NA	D9406T1-E	335@1800	192@335	NA	1151@1150	216@1151	NA	SPL, TC, CAC,
NA	D9406T1-E	402@2000	214@402	NA	1232@1500	228@1232	NA	SPL, TC, CAC,
NA	D9408T1-E	408@1800	178@408	NA	1361@1400	192@1361	NA	SPL, TC, CAC,