

State of California  
AIR RESOURCES BOARD

EXECUTIVE ORDER U-R-18-9

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 by Sections 43000.5, 43013 and 43018 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-45-9;

IT IS ORDERED AND RESOLVED: That the following Liebherr Machines Bulle SA 1998 model-year engine, with rated power between 175 and 750 horsepower, and exhaust emission control systems are certified as described below for use in heavy-duty off-road equipment:

Typical Equipment Usage: Compressor, Loader, Dozer, Rough Terrain Crane

Fuel Type: Diesel

<u>Engine Family</u>	<u>Liters (Cubic Inches)</u>	<u>Exhaust Emission Control Systems and Special Features</u>
WLHAL9.96ARA	9.9/6.6 (608/405)	Turbocharger Smoke Puff Limiter Charge Air Cooler

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

<u>Exhaust Emissions (g/bhp-hr)</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>
1.0	8.5	6.9	0.4	20	15	50

The THC, CO, NOx and PM exhaust emission certification values, in g/bhp-hr, and the opacity of smoke emission certification values, in percent (%), for this engine family are:

<u>Exhaust Emissions (g/bhp-hr)</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>
0.3	0.5	4.2	0.1	15	6	44

BE IT FURTHER RESOLVED: That the listed engine models comply with the "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 the "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, Section 2425 et seq.).

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

Executed at El Monte, California this 11<sup>th</sup> day of June 1998.



R. B. Summerfield, Chief  
Mobile Source Operations Division

# LARGE ENGINE MODEL SUMMARY

3/27/98

EO: U-R-18-9

Process Code: New Submission

Manufacturer: LIEBHERR MACHINES BULLE SA

Manufacturer Family Name: WLHAL9.96ARA

EPA Engine Family: WLHAL9.96ARA

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	D926TI-E	314@2100	164@314	NA	878@1400-1600	166@878	NA	SPL, TC, CAC
NA	D926TI-E	294@2000	152@294	NA	915@1300	175@915	NA	SPL, TC, CAC
NA	D926TI-E	240@1800	134@240	NA	811@1100-1300	152@811	NA	SPL, TC, CAC
NA	D926TI-E	272@2000	142@272	NA	863@1200-1300	201@863	NA	SPL, TC, CAC
NA	D926TI-E	306@1800	173@306	NA	1062@1100-1300	202@1062	NA	SPL, TC, CAC
NA	D926TI-E	294@1800	165@294	NA	855@1200-1300	188@855	NA	SPL, TC, CAC
NA	D926TI-E	327@1800	191@327	NA	1121@1150	215@1121	NA	SPL, TC, CAC
NA	D926TI-E	256@2000	133@256	NA	811@1100	155@811	NA	SPL, TC, CAC
NA	D924TI-E	174@1800	150@174	NA	553@1300-1400	158@553	NA	SPL, TC, CAC
NA	D924TI-E	204@1800	173@204	NA	664@1200-1400	192@664	NA	SPL, TC, CAC
NA	D924TI-E	205@2000	173@205	NA	641@1200	186@641	NA	SPL, TC, CAC
NA	D924TI-E	185@2000	146@185	NA	568@1200-1400	162@568	NA	SPL, TC, CAC
NA	D924TI-E	192@2000	149@192	NA	601@1200-1300	173@601	NA	SPL, TC, CAC