

State of California  
AIR RESOURCES BOARD

EXECUTIVE ORDER U-R-18-8

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>
WLHAL9.96ASA	9.9/6.6 (608/405)	Turbocharger Smoke Puff Limiter

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	4.7	0.1	5	5	14

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: 4-R-18-8

Manufacturer: **LIEBHERR MACHINES BULLE SA** Process Code: **New Submission**

EPA Engine Family: **WLHAL9.96ASA** Manufacturer Family Name: **WLHAL9.96ASA**

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	D926T-E	227@2000	128@227	NA	708@1100 -	142@708	NA	SPL, TC
NA	D926T-E	232@1800	139@232	NA	804@1200	146@804	NA	SPL, TC
NA	D926T-E	182@1800	109@182	NA	612@1200	117@612	NA	SPL, TC
NA	D924T-E	168@2000	145@168	NA	516@1300	160@516	NA	SPL, TC
NA	D924T-E	164@1800	147@164	NA	531@1200-1400	163@531	NA	SPL, TC
NA	D924T-E	156@2000	125@156	NA	516@1200-1300	154@516	NA	SPL, TC
NA	D924T-E	138@1800	120@138	NA	461@1300-1400	134@461	NA	SPL, TC
NA	D924T-E	137@2000	110@137	NA	431@1300-1400	127@431	NA	SPL, TC
NA	D924T-E	134@2000	109@134	NA	435@1400	126@435	NA	SPL, TC
NA	D924T-E	118@2000	97@118	NA	384@1200-1400	111@384	NA	SPL, TC
NA	D924T-E	106@2000	67@106	NA	354@1400	102@354	NA	SPL, TC
NA	D924T-E	91@2000	76@91	NA	310@1400	89@310	NA	SPL, TC
NA	D924T-E	125@2100	97@125	NA	406@1400	118@406	NA	SPL, TC