

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER U-R-18-7

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>
WLHAL17.2ARA	12.9/17.2 (786/1048)	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	4.0	0.1	10	8	30

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 11th day of June 1998.



R. B. Summerfield, Chief
Mobile Source Operations Division

LARGE ENGINE MODEL SUMMARY

3/27/98

EO: U-R-18-7

Process Code: Running Change

Manufacturer: **LIEBHERR MACHINES BULLE SA**

EPA Engine Family: **WLHAL17.2ARA** Manufacturer Family Name: **WLHAH17.2ARA**

1.Engine Code	2.Engine Model	3.BHP@RPM (SAE Gross)	4.Fuel Rate: mm ³ /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 ³ /stroke@peak torque	8.Fuel Rate: (lbs/hr)@peak torque	9.Emission Control Device Per SAE J1939
NA	D9408TI-E	571@2100	238@571	NA	1741@1200-155	254@1741	NA	SPL, TC, CAC
NA	D9408TI	542@2100	227@542	NA	1668@1575	241@1668	NA	SPL, TC, CAC
NA	D9408TI-E	540@1900	230@540	NA	1711@1500	247@1711	NA	SPL, TC, CAC
NA	D9408TI-E	460@1900	191@460	NA	1564@1250	217@1564	NA	SPL, TC, CAC
NA	D9408TI-E	443@1800	195@443	NA	1585@1200	220@1585	NA	SPL, TC, CAC
NA	D9408TI-E	477@1800	205@477	NA	1650@1200	230@1660	NA	SPL, TC, CAC
NA	D9408TI-E	536@2000	230@536	NA	1682@1500	250@1682	NA	SPL, TC, CAC
NA	D9406TI	408@2100	214@408	NA	1254@1500	236@1254	NA	SPL, TC, CAC
NA	D9406TI-E	358@1900	198@356	NA	1192@1300	226@1192	NA	SPL, TC, CAC
NA	D9406TI-E	348@1800	198@348	NA	1187@1300	220@1187	NA	SPL, TC, CAC
NA	D9406TI-E	356@1800	200@356	NA	1180@1200	228@1180	NA	SPL, TC, CAC
NA	D9406TI-E	408@1900	228@408	NA	1276@1400	240@1276	NA	SPL, TC, CAC
NA	D9406TI-E	361@1800	204@361	NA	1239@1200	231@1239	NA	SPL, TC, CAC
NA	D9406TI-E	335@1800	192@335	NA	1151@1150	216@1151	NA	SPL, TC, CAC
NA	D9406TI-E	402@1800	214@402	NA	1232@1500	228@1232	NA	SPL, TC, CAC