

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER U-R-18-5

Relating to Certification of New Heavy-Duty Off-Road Equipment Engines

LIEBHERR MACHINES BULLE

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 1997 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: Excavator, Loader, Tractor, Rough Terrain Crane

Fuel Type: Diesel

<u>Engine Family</u>	<u>Liters (Cubic Inches)</u>	<u>Exhaust Emission Control Systems and Special Features</u>
VLH9.9R6DASA	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 matter (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-hp)</u>				<u>Smoke Opaciity (%)</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	15

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 4th day of February 1997.



R. B. Summerfield, Chief
Mobile Source Operations Division

1997 AIR RESOURCE BOARD SUPPLEMENTAL DATA SHEET
HEAVY-DUTY OFF-ROAD DIESEL ENGINES

Manufacturer : Liebherr Machines Bulle Engine Family : VLH9.9R6DASA
 Displacement : 9.96 (608) / 6.64 (405) Liters / Cubic Inches Engine Conf : 16 (14)
 Valves / Ports per Cylinder : 2 valves per cylinder Stroke per Combustion Cycle : 4-stroke
 All codes in Eng. Family : CA 49S 50Sxx Cert Stds & Test Procedures : CAxx EPAxx
 Maximum Rated Power : 231 HP @ 1800 RPM (172 KW @ 1800 RPM)
 Ignition : Compression xx Compression with Glow Plug _____ Spark _____
 Fuel Type(s) : Dedicated xx Flex Fuel _____ Dual-Fuel _____ Diesel xx M100 _____ M85 _____
 CNG _____ LNG _____ LPG _____ Other (specify) : _____
 Diesel Cert Fuel : 40 CFR 86.1313-94 B2 Other (specify) : _____
 Primary Service Equipment : Excavator, Loader, Tractor, Rough Terrain Crane, etc.
 Exhaust ECS (e.g. OC, TWC, PTOX, IFI, TC, CAC) SPL, TC
 (Use abbreviations per SAE J1930 Jun93)

Engine Model	Rated HP @RPM	Fuel Rate @ Rated HP mm3 /stroke	Fuel Pump & Injector Part No.	ECM / PCM Part No.	EGR Valve Part No.	PTOX / Catalytic Converter Part No.
D 926 T-E	227 @ 2000	126 ± 4	0 403 474 112 KBEL 84 P 148 DLLA 145 P 632	N/A	N/A	N/A
D 926 T-E	231 @ 1800	140 ± 5	0 403 474 112 KBEL 84 P 148 DLLA 145 P 632	N/A	N/A	N/A
D 926 T-E	183 @ 1800	110 ± 4	0 403 474 112 KBEL 84 P 148 DLLA 145 P 632	N/A	N/A	N/A

Date Issued : 12/01/1996

Revision : 1