



Linda S. Adams  
Secretary for  
Environmental Protection

# Air Resources Board

Mary D. Nichols, Chairman  
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Sacramento, California 95812 • [www.arb.ca.gov](http://www.arb.ca.gov)



Arnold Schwarzenegger  
Governor

November 22, 2010

Mr. Jeff Moser  
Aftermarket Product Manager  
Electro Motive  
9301 West 55<sup>th</sup> Street  
LaGrange, IL 60525

Dear Mr. Moser:

The California Air Resources Board (ARB or CARB) staff reviewed the emissions testing data submitted for an Electro Motive Diesel (EMD) turbocharged 645EB engine rebuilt with your Tier 2 U.S. Environmental Protection Agency (EPA) Marine Rebuild Kit identified with the new engine family designation \*EMDN211.TT2. The "\*" at the beginning of the engine family represents various letters that correlate to the appropriate model year. The EMD 645EB Tier 2 U.S. EPA Marine Rebuild Kit satisfies the ARB's Commercial Harbor Craft Regulation<sup>1</sup> Tier 2 or equivalent compliance requirements. ARB is not certifying the engine rebuild kit. Rather, we are approving engines rebuilt with this kit to be used to comply with Tier 2 marine emission standard requirement in the Commercial Harbor Craft Regulation when used with CARB diesel fuel. The rebuilt engine will have a new engine family label attached identifying the engine as rebuilt with this EMD 645EB Tier 2 U.S. EPA Marine Rebuild Kit.

EMD staff submitted emissions tests for their EMD 645EB Tier 2 U.S. EPA Marine Rebuild Kit that had emission rates either at or below the Tier 2 marine emission standards. EMD performed the emissions tests using the ISO 8178 E3 marine propeller duty cycle, the D2 5-mode constant speed duty cycle, and the E2 marine variable pitch duty cycle. The emissions tests results for particulate matter (PM), nitrogen oxides plus hydrocarbons (NO<sub>x</sub>+HC), and carbon monoxide (CO) meet the Tier 2 marine emission standards for a marine category 2 diesel engine displacing 10.57 liters per cylinder.

Based on the emissions tests results presented in the table that follows, the EMD Tier 2 U. S. EPA Marine Rebuild Kit reduces emissions from the EMD 645EB engine to below U.S. EPA Tier 2 marine emission standard levels. Therefore, ARB staff finds that the

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<sup>1</sup> Commercial Harbor Craft Regulation (section 93118.5, title 17, California Code of Regulations (CCR)).

*The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website: <http://www.arb.ca.gov>.*

Mr. Jeff Moser  
November 22, 2010  
Page 2

EMD 645EB Tier 2 U.S. EPA Marine Rebuild Kit can be used to comply with the emission standard requirement in the Commercial Harbor Craft Regulation for Tier 2 engines.

**EMD 645EB Tier 2 U. S. EPA Marine Rebuild Kit Emissions**

Test	CO (g/hp-hr)	PM (g/hp-hr)	NOx+HC (g/hp-hr)
Tier 2 Kit E3 cycle	0.23	0.12	5.2
Tier 2 Kit D2 cycle	0.35	0.13	5.3
Tier 2 Kit E2 cycle	0.26	0.13	5.1
Tier 2 Marine Standards	3.7	0.2	5.8

The component parts lists for this engine rebuild kit are attached to provide a means to identify the individual parts specific to this rebuild kit. The components parts lists for the different engine configurations are identified with kit part numbers 40176528, 40176539, 40177683, and 40177684. When using this rebuild kit, the parts identified in the associated component parts lists need to be installed to be compliant with the Commercial Harbor Craft Regulation. These component parts lists will be used by enforcement personnel to determine that the proper rebuild kit was installed.

Also attached is the U.S. EPA Certificate of Conformity for engine family AEMDN211.TT2 which complies with the terms of 40 CFR 1042.101(e). This defines the minimum emissions warranty period to be 10,000 hours of operation or 5 years (1/2 of the U.S. EPA defined useful life), which ever comes first.

Should you have any questions or comments, please contact Mr. John Lee, Air Resources Engineer at (916) 327-5975.

Sincerely,

/s/

Daniel E. Donohoue, Chief  
Emissions Assessment Branch

Attachments

cc: John Lee  
Air Resources Engineer  
Control Strategies Section