STATEMENT
OF THE
MANUFACTURERS OF EMISSION CONTROLS ASSOCIATION
ON THE CALIFORNIA AIR RESOURCES BOARD'S
AMENDMENTS TO THE CURRENT SPARK-IGNITED INBOARD AND STERNDRIVE BOAT REGULATIONS

November 17, 2005

The Manufacturers of Emission Controls Association (MECA) is pleased to provide comments in support of the California Air Resources Board's (CARB) amendments to the current spark-ignited inboard and sterndrive boat regulations.

MECA is a non-profit association made up of the world's leading manufacturers of emission control technology for on-road and off-road vehicles and engines, as well as stationary IC engines. MECA's member companies have over 30 years of experience and a proven track record in developing and commercializing emission control technologies for a wide range of vehicles and engines. These companies have developed control technologies for gasoline, diesel, and alternative-fueled engines. MECA's comments are specific to the technical feasibility of the use of three-way catalysts in meeting CARB's 5 g/kW-hr HC+NOx emission standards for spark-ignited inboard and sterndrive marine engines. The amendments under consideration by the Board would provide manufacturers with the option of implementing this standard under the current 2007-2009 phase-in timeframe, or by opting for 100% compliance on all applicable engines starting in 2008.

The technology to reduce emissions from spark-ignited inboard and sterndrive marine engines will be based on automotive-type three-way catalyst close-loop technology. This technology has been used on well over 300,000,000 automobiles with outstanding results and the same technologies can be adapted to marine engines. MECA and some of our member companies participated with CARB, the U.S. EPA, and the National Marine Manufacturers Association (NMMA) in a highly successful catalyst demonstration program during 2003-2004. This fresh water-based test program confirmed that three-way catalysts (TWCs) can be

effectively integrated into marine inboard and sterndrive engines, and TWCs have the necessary mechanical integrity and catalytic durability to perform with high emission conversion efficiencies throughout the entire 480-hour useful life emissions requirement for these marine engines. Important results from this demonstration program included the design and integration of exhaust manifolds with TWCs that provided relatively low exhaust manifold surface temperatures (through the use of a water-jacketed exhaust system) and minimized the potential for water ingestion into the region of the manifolds that contained the TWCs (through a novel "dam" design modification inside the exhaust tube). Both ceramic-based and metallic-based substrates (supplied by MECA members) were used to display a range of three-way catalyst formulations (supplied by MECA members) as a part of this durability test program, all with good results. All post-durability inspections of the catalysts used in this durability test program showed no evidence of mechanical failures or corrosion. Thus, a variety of TWC technology options used successfully in automotive applications were shown to be effective in these marine engine applications.

In comments, both to ARB and EPA submitted as part of the EPA waiver hearing on ARB's sterndrive/inboard marine engine standards, NMMA cited potential problems with catalyst durability and performance in salt water environments as an unresolved issue. Salt water application of TWCs will pose some different challenges for catalysts compared to fresh water systems, but MECA believes that these challenges can be met with proper catalyst design and integration on the marine engine. And, in fact, MECA is participating in the salt water portion of the ARB/EPA/NMMA test program through the supply of catalysts similar to those used successfully in the fresh water phase of the program. TWCs in the automotive environment are designed to deal with a variety of potential catalyst poisoning agents (e.g., calcium, magnesium, phosphorus, and heavy metals from motor oils or exhaust component scale) that are present in the exhaust stream, as well as frequent exposure to condensate as the exhaust gases cool following engine shut-down. Catalyst design features used in automotive TWCs (e.g., thermally stable, high surface area support materials and promoters) can also be used in TWCs designed for marine applications to minimize catalyst deactivation mechanisms associated with condensation, poison accumulation on the catalyst, or exposure to salt water. Manifold designs,

similar to those used in the CARB/MECA/NMMA demonstration test program, can also minimize or eliminate ingestion of salt water into TWCs used on marine engines. It is MECA's understanding that at least one manufacturer of personal watercraft (PWC) is already supplying some models with TWCs with no restrictions on the use of these catalyst-equipped PWCs in salt water.

In closing, MECA believes that TWC technology based on automotive applications can provide a durable, high performance solution for controlling HC and NOx emissions from spark-ignited, inboard and sterndrive marine engines. The ability to meet CARB's 5 g/kW-hr HC+NOx emission standard for these marine engines was clearly demonstrated with the use of available TWC technology in the CARB/NMMA/MECA fresh water test program. Concerns with applications in salt water can be met with available TWC design and system integration engineering principles. MECA members are committed to work with the marine industry to provide proven emission solutions to meet California's emission standards.

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