

**WRITTEN COMMENTS  
OF THE  
MANUFACTURERS OF EMISSION CONTROLS ASSOCIATION  
IN RESPONSE TO EPA'S REQUEST FOR COMMENTS ON CONTROL OF  
EMISSIONS FROM SPARK-IGNITION MARINE ENGINES**

**Docket No. A-2000-02**

**October 21, 2002**

The Manufacturers of Emission Controls Association (MECA) is please to respond to EPA's request for strategies for reducing emissions from marine SI engines. We believe that improved engine/fuel management combined with catalyst technology can provide significant emission reductions from sterndrive and inboard SI engines, as well as outboard motors and personal watercraft. We also believe this technology can be designed to be durable and cost-effective. California's Air Resources Board (ARB) has already adopted stringent emission standards for these categories of engines, relying in part on a finding that catalyst technology can be applied to these engines. We recommend that EPA should harmonize with California's standards.

MECA and its members are currently working with the ARB, EPA, and NMMA on a comprehensive test program to demonstrate the technological feasibility of closed-loop three-way catalyst technology on SI sterndrive and inboard engines. We believe the results of that program will confirm the effectiveness and durability of catalyst technology in this application.

MECA would welcome the opportunity to work with ARB, EPA and the marine industry to conduct a demonstration program to demonstrate the effectiveness of catalyst technology on both two-stroke and four-stroke engines used in outboard motors and personal watercraft.

By way of background, MECA is a non-profit association of the world's leading manufacturers of mobile source emission control technology. MECA's member companies have over 30 years of experience and a proven track record in developing and commercializing emission control technologies for motor vehicles. A number of our members have extensive experience in the development, manufacture, and commercial application of emission control technologies for small two-stroke and four-stroke (SI) engines. Our comments are based on research and development work being conducted by our members and their extensive experience in the field of mobile source emission control.



## **Sterndrive and Inboard Engines**

EPA identified in the Federal Register notice, 67 FR at 53072, three issues in conjunction with applying catalyst technology in the marine environment that would need to be addressed: 1) durability, 2) developing the technology to ensure that salt water does not reach the catalyst, and 3) potential safety concerns. In July 2002, ARB after receiving extensive input and comments from numerous stakeholders had sufficient confidence that these issue could be addressed and set very stringent emission standards for SI sterndrive and inboard marine engines based on the capability of close-loop three-way catalyst technology. The ARB's decision was supported by a very thorough and fair analysis of the emission control issues prepared by the ARB staff.

MECA concurs with the ARB that the emission standards California adopted are technologically feasible. Our member companies are committed to invest the resources necessary to help insure that effective, durable emission control technology is available for these engines.

The technology that will be utilized to reduce emissions from spark-ignited inboard and sterndrive marine engines will be based on automotive-type three-way catalyst close-loop technology. Indeed, 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. Although SI marine engine applications pose unique engineering challenges such as the possibility of water ingestion into the exhaust systems, special temperature requirements, and packaging issues, we believe a properly engineered and designed system will successfully address these issues. MECA strongly supports the ARB consumer/environmental label requirements.

## **Outboard Engines and Personal Watercraft**

As ARB concluded in adopting stringent emission standards for outboard and personal watercraft (PWC) engines, catalyst technology can be designed and applied to these categories of engines. The catalyst technology that can be applied to these marine SI engines will be based on over 30 years of development, experience, and highly successful application of catalyst technology in a variety of mobile source applications. Catalyst technology can be applied to both carbureted and direct injection marine SI two-stroke engines. In fact, direct injection technology greatly facilitates the use of catalyst technology. Catalysts can be designed to provide varying HC reductions depending on the reduction required to meet the target emission level of a particular engine design. Reductions from 50 percent to in excess of 80 percent can be achieved if the catalyst is properly integrated with the engine for which it is applied. As the ARB staff noted in the technical report supporting adoption of the stringent emission standards for outboards and PWC, catalyst technology can be designed to work effectively in the temperature range seen by marine SI engines. As is the case with other engine applications, the key to applying catalyst technology to marine SI engines is to take a systems approach optimizing the engine and the catalyst to work together.

Years of development effort and experience have yielded catalyst technology which can withstand the operating environment of marine SI engines. For example, catalyst technology available today is capable of withstanding exposures up to 1100 degrees C without a loss of catalytic performance and catalyst technology should have no difficulty surviving the expected temperature operating ranges of marine SI engines. Integration with the engine includes tailoring the catalyst's efficiency to ensure that the exotherm created by the destruction of the harmful emissions will not harm the catalyst.

Exposure to water is another design consideration in applying catalyst technology to marine engines. The components of the catalytic unit are composed of excellent thermal shock resistant materials, including the catalyst layer and catalyst substrate. Engineered solutions exist for proper packaging of the catalyst to minimize exposure to water.

Catalyst technology has been designed to avoid the issue of potential lubricating contamination. Also, catalyst technology has demonstrated its mechanical integrity and robustness in the rigorous operating environments of both large and small motorcycles on which catalyst technology has been utilized.

As noted above, MECA and its members would welcome the opportunity to work with EPA and others to demonstrate the effectiveness of applying catalyst technology to outboard and PWC engines.

### **Labeling and Voluntary Blue Sky Standards**

MECA supports a mandatory product labeling requirement for recreational SI marine engines like the program adopted by EPA in September 2002 for land-based recreational equipment. MECA believes it is extremely important to provide the consumer with information regarding emission levels of the product being purchased. In addition to giving special recognition to cleaner engines, a labeling requirement will promote the development, introduction and purchase of marine equipment with lower polluting engines. We also support the concept of voluntary Blue Sky standards similar to those adopted for off-road CI engines. Voluntary low emission standards also will create an incentive to produce low emitting products.

### **Conclusions**

In closing, we would welcome the opportunity to work with EPA and the marine industry to demonstrate the capabilities of catalyst and other technologies to reduce emissions from the range of recreational marine SI engines.

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