

## **Procedures for utilization of Auxiliary Engine Cooling**

California Exhaust Emission Standards and Test Procedures for 2005 and Later small off-road engines discuss the conditions for the usage of auxiliary engine cooling during the certification and production line testing. Based on the test procedures, the use of auxiliary engine cooling must be indicated in the certification application, and the manufacturer must justify the need for such cooling strategies to the satisfaction of the Executive Officer.

This document is intended to provide further guidance to the manufacturers with regards to the use of auxiliary engine cooling systems/fans.

Manufacturers must provide answers to the following questions for each engine family:

- a) During certification testing, was any cooling strategy/fan employed? Yes No
- b) If Yes to (a), was the intent to simulate real world, in-use operation/effects?  
Yes No
- c) During certification testing, were any test procedures, strategies or equipment employed that may have the unintended effect of cooling the engine, including, but not limited to circulating fans to maintain test cell temperature, or air-conditioning vents directed towards the engine? Yes No

If yes to any of the above questions, please provide information demonstrating that such cooling is representative of in-use operation. Such information must include, but not be limited to, specifications of fans/blowers/air conditioning used in the test cell (size, flow, etc.), diagrams indicating the layout of the test cell and the layout of fan/blower/air conditioning, air flow direction relative to the engine, and inlet air temperature impacts with and without the cooling strategy.

Generally, the Air Resources Board (ARB) considers the use of auxiliary engine cooling during certification (including service accumulation) and production line testing to be inappropriate. Manufacturers are only allowed to use auxiliary engine cooling if they can show, using data and/or good engineering judgment, that the use of such cooling represents the conditions that the engine encounters during real life, in-use conditions. Manufacturers must provide sufficient data to the ARB to justify their claim during the certification process. The demonstration should take into account the variety of applications the engine will be used in. Demonstration work focused on the worst case application (e.g., the application with the lowest cooling rate) will suffice for the engine family as a whole.

Due to the potentially complex nature of the evaluation phase for cooling fan utilization, manufacturers are strongly encouraged to submit their requests and

engineering analysis and data to ARB prior to submittal of the certification applications. This will allow the ARB to approve/deny such requests without lengthening the certification timeline.

ARB will consider requests for carry-over/carry-across of engineering analysis and data from other engine families on a case by case basis.

**Manufacturer:** \_\_\_\_\_

**Engine families:** \_\_\_\_\_

\_\_\_\_\_

**Name:** \_\_\_\_\_

**Signature:** \_\_\_\_\_

**Date:** \_\_\_\_\_