California’s Spark-Ignition Marine Watercraft Regulation
Evaporative Emission Standards & Certification Process

2016 NMMA Boatbuilder Webinar
April 27/May 4 2016

Provided by the California Air Resources Board
Presentation Outline

Section 1: Background

Section 2: Component Certification

Section 3: Boat Certification
Cooperation with NMMA/ABYC to Date

• NMMA has been actively engaged with CARB
  – Working with CARB since 2006
  – Actively participated in all CARB marine workshops
  – Helped to understand the unique manufacturing process of the boat building industry
  – Organized face-to-face meeting with ABYC, industry representatives, and boat builders
  – Organized boat builder manufacturing tour
  – Helped streamline CARB marine certification
  – Provided information about current NMMA certification process
Introduction

• This presentation provides an overview of CARB’s new evaporative emission standards and regulations for spark-ignition marine watercraft (boats) for Model Year (MY) 2018
• Provides an overview of CARB’s certification process for emissions components and boats
Disclaimer

Note: All references citing manufacturers of marine watercraft, engines and related equipment in this presentation are for informative and illustrative purposes only. Their use in this presentation does not constitute an endorsement of these manufacturers or their products by the State of California or the California Air Resources Board.
What is the California Air Resources Board?

• ARB’s mission is to promote and protect public health, welfare and ecological resources through the effective and efficient reduction of air pollutants in recognition and consideration of the effects on the economy of the state

• Examples of mobile sources regulated by CARB include cars, trucks, lawn mowers, off-road recreational vehicles, and boats
Purpose of CARB Regulation

• California has the worst air quality in the nation

• CARB develops regulations to comply with the federal Clean Air Act requirements

• Regulates all air pollution sources to meet emission reduction goals

• CARB’s new evaporative regulations for boats fulfills a legal commitment included in California’s State Implementation Plan

• This regulation will help California obtain the emission reductions needed to attain federal ozone standards
Focus of Regulation

New regulation focuses on mitigating diurnal evaporative emissions

Evaporative emissions are the escape of gasoline molecules through open exposure to atmosphere or through the walls of plastic materials through daily temperature variations

Previous regulations mitigated exhaust emissions
Evaporative Emission Sources from Watercraft

- Fuel tank and fuel hose permeation
- Carburetor and connector seepage
- Fuel tank venting
Applicability

- CARB’s new evaporative emissions regulation applies to all MY 2018 spark-ignition marine watercraft with permanently installed fuel tanks sold in California
  - Marine watercraft that use engines > 40HP must meet the more stringent CA standards
  - Marine watercraft that use engines ≤ 40HP must meet harmonized U.S. EPA standards
  - Portable marine tank regulations have not changed
Pathways to Compliance

CARB’s new regulation has two options for demonstrating compliance (13 CCR 2855 (a)):

1. Design-Based – Requires marine watercraft manufacturer to use specific CARB-certified components for:
   - Fuel injection
   - Low permeation fuel hoses
   - Low permeation fuel tank
   - Passively-purged carbon canister or pressure relief valve

2. Performance Alternative – Requires manufacturers to meet one standard for the complete boat or fuel system, based on a 24-hour diurnal test (TP-1501)
Design-Based Standards: ≤ 30 kW (40 HP)

- All evaporative emission standards and test procedures have been harmonized with U.S. EPA

<table>
<thead>
<tr>
<th>Standards for MY2018 and later</th>
<th>Fuel Hose Permeation (grams/m²/day ROG)</th>
<th>Fuel Tank Permeation (grams/m²/day ROG)</th>
<th>Diurnal Requirement (grams/gallon/day HC)</th>
<th>Fuel Injection or Equivalent (grams/hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.0</td>
<td>1.5</td>
<td>0.4</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Test Procedure</td>
<td>40 CFR §1060.515</td>
<td>40 CFR §1060.520¹</td>
<td>40 CFR §1060.525</td>
<td>None</td>
</tr>
</tbody>
</table>

¹ As an alternative, fuel tanks can be certified to 2.5 grams/m²/day at 40°C
Design-Based Standards: > 30 kW (40 HP) Trailerable

- Applicable to marine watercraft ≤ 26 ft. in length and ≤ 8.5 ft. in width

<table>
<thead>
<tr>
<th>Fuel Hose Permeation (grams ROG/m²/day)</th>
<th>Fuel Tank Permeation (grams ROG/m²/day)</th>
<th>Diurnal Tank Venting Loss Requirement (grams HC/gallon/day)</th>
<th>Meet Fuel Injection Definition or Equivalent Performance Standard (grams HC/hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standards for MY2018 and MY2019</strong></td>
<td>10.0</td>
<td>0.70</td>
<td>0.25 65% reduction from uncontrolled HC emissions 0.4</td>
</tr>
<tr>
<td><strong>Standards for MY2020 and later</strong></td>
<td>5.0²</td>
<td>0.70</td>
<td>0.25 65% reduction from uncontrolled HC emissions 0.4</td>
</tr>
<tr>
<td><strong>Test Procedure</strong></td>
<td>TP-1504 or SAE J1737</td>
<td>TP-1504³</td>
<td>TP-1503 TP-1502</td>
</tr>
</tbody>
</table>

1 Canisters may be certified by design as an option. Canisters must have a minimum butane working capacity of 3.8 grams/gallon
2 Must be performed at 40°C
3 As an alternative, fuel tanks can be certified to 1.4 grams/m²/day at 40°C
Design-Based Standards:  
> 30 kW (40 HP) Non-Trailerable

- Applicable to marine watercraft > 26 ft. in length or > 8.5 ft. in width

<table>
<thead>
<tr>
<th>Standards for MY 2018 and 2019</th>
<th>Fuel Hose Permeation (grams ROG/m²/day)</th>
<th>Fuel Tank Permeation (grams ROG/m²/day)</th>
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<th>Meet Fuel Injection Definition or Equivalent Performance Standard (grams HC/hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10.0</td>
<td>0.70</td>
<td>0.16</td>
<td>65% reduction from uncontrolled HC emissions</td>
</tr>
<tr>
<td>Standards for MY 2020 and later</td>
<td>5.0²</td>
<td>0.70</td>
<td>0.16</td>
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</tr>
</tbody>
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1 Canisters may be certified by design as an option. Canisters must have a minimum butane working capacity of 1.5 grams/gallon
2 Must be performed at 40°C
3 As an alternative, fuel tanks can be certified to 1.4 grams/m²/day at 40°C
4 U.S. EPA Gasoline
Performance Standard: 
> 30 kW (40 HP)

- Alternative to design-based certification
- Complete boat or fuel system test rig must be tested in a Sealed Housing for Evaporative Determination (SHED)
- Testing is conducted over a 24-hour diurnal cycle following TP-1501

<table>
<thead>
<tr>
<th>Marine Boat Type</th>
<th>Model Year Effective Date</th>
<th>Diurnal Standard (grams HC/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Marine Boats With Engines &gt; 30 kW (40 HP)</td>
<td>2018 and later</td>
<td>0.048 * Tank Volume (liters) + 0.97</td>
</tr>
</tbody>
</table>
Performance-Based SHED Testing
Presentation Outline

Section 1: Background

Section 2: Component Certification

Section 3: Boat Certification
Certification Process
(How it works)

Hose is Certified by Component Manufacturer

Tank is Certified by Component Manufacturer

Canister is Certified by Component Manufacturer

Pressure Relief Valve is Certified by Component Manufacturer

Certified Components will be Listed on the SIMW Component Web Page

Boat Builder Installs and References Components on Certified List

ARB Certifies Boat Using Component EOs
Component Certification

• What is component certification?
  – Component certification is the certification of fuel hoses, fuel tanks, carbon canisters, and pressure relief valves by ARB
  – Certification means that the component manufacturers have demonstrated that their product meets applicable design and performance requirements
Component Certification Process
(Continued)

• Who is expected to apply for a component EO?
  – Fuel hose manufacturers like Shields Marine, Trident Marine, and Gates Corp.
  – Fuel tank manufacturers like Moeller Marine, Ameri-Kart, and Walbro
  – Carbon canister manufacturers like Delphi, Attwood
  – Pressure relief valve manufacturers like Perko, Attwood
Component Certification Process

(Continued)

• How is component certification useful?
  – Allows boat builders to reference a pre-certified component EO in a certification application when certifying by design
  – Multiple OEMs can rely on same component EOs
  – Expedites certification process by eliminating the need to review component compliance data
  – An example of a list of EOs can be found on the web at: http://arb.ca.gov/msprog/offroad/sore/sorectp/sorectp.htm
Component Manufacturer’s Responsibilities
After Certification

• CARB may conduct compliance testing on components
• Component manufacturer and boat builder will be notified if a component fails compliance testing
  – EO may be revoked
  – Penalties may be imposed on component manufacturer
  – Boatbuilder does not need to take any action
• Component EO is valid until revoked
• Any emissions-related change to the component must be submitted and reviewed by CARB
  – For example: thickness of barrier, type of barrier material, etc.
  – Non-emissions related changes could include label change, address change, etc.
Presentation Outline

Section 1: Background

Section 2: Component Certification

Section 3: Boat Certification
CARB Boat Certification

• What is boat certification?
  – Boat builders demonstrate their product meets evaporative requirements
    • Upon completion, a CARB EO is issued to allow sale of boat into California
  – Boat builders certify an evaporative family
    • One application per evaporative family
    • An evaporative family can cover many models that utilize same type of components
Evaporative System Certification Overview

• What needs to be certified?
  – All marine watercraft with installed fuel tanks that use spark-ignition marine engines sold in California must be certified annually

• Who can certify?
  – Engine manufacturers (Honda Marine, Mercury Marine, Yamaha, etc.), or
  – Boat builders (Crestliner, Bayliner, Mastercraft, etc.)
  – Fuel System Builders/Integrators
  – Dealers
CARB Boat Certification Process

• How do I certify my boat?
  − Get manufacturer code from U.S. EPA
  − Plan model(s) design
  − Group models into an evaporative family
  − Submit application
  − Receive Executive Order
  − Sell boat in California

• Why is CARB boat evaporative certification required?
  − Provides a formal legal document (EO) showing that the boat is compliant with CARB evaporative requirements

• A boat builder may build the boat at any point in the process, however the boat must be certified before it is sold in California
CARB Boat Evaporative Certification Process
Design-Based

ARB

CARB evap component (i.e. tank, hose, canister) approval process
- Evap components that meet California requirements are issued a CARB Component EO

CARB reviews if evap application meets California regulations?

NO

YES

CARB issues EO to Boat Builder

Evap System Builder (e.g. Boat Builder)

START

Plan model design, select CARB approved evap components from CARB Component EO list, and use CARB approved warranty/label template

Boat Builder submits evap application to CARB

Boat may be sold in California

END

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Boat Builder Planning

• Boat builders should plan the design of the evaporative system in advance
  – May have third party design evaporative system
  – If models remain the same as previous year, boat builders may submit previous information

• Once a design has been established, the boat builder can apply for certification
Boat Builder Responsibilities

• Boat builders demonstrate their evaporative system meets requirements
  – Design fuel system using CARB certified components
  – Placement and integration of evaporative components
  – Proper installation of complete evaporative system
  – Labeling and warranty
  – Other requirements
  – Obtain CARB EO
Boat Builder Application Timing

- Design-Based Application - Start of Model Year
  - Boat builders submit one application for each evaporative family
  - Boat builder may submit an application at any time after they know the model design
  - On the application, reference the component EO numbers applicable to each evaporative component used in the evaporative family
  - Submit the application electronically to CARB
  - CARB reviews application and, if compliant, issues an EO
Evaporative Family

• What is an evaporative family?
  – Evaporative family means a class of evaporative components used on boats with similar fuel system characteristics
  – Evaporative families have similar fuel hose types, fuel tank types, carbon canister sizes, etc.

• Characteristics of evaporative families
  – Vented control: carbon canister vs. pressure relief valve
  – Fuel tank types: metal vs. plastic
  – Fuel hose types: U.S. EPA vs. CARB
  – Boat size: trailerable vs. nontrailerable
Evaporative Family

Example – Single Evaporative Family

<table>
<thead>
<tr>
<th>Fuel System Design</th>
<th>Evaporative Family Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel Hose Type</td>
<td>A1-15</td>
</tr>
<tr>
<td>Fuel Tank Type</td>
<td>Plastic</td>
</tr>
<tr>
<td>Vent Type</td>
<td>Carbon Canisters</td>
</tr>
<tr>
<td></td>
<td>0.5L – 0-60 gallons</td>
</tr>
<tr>
<td></td>
<td>0.75L – 62-93 gallons</td>
</tr>
<tr>
<td></td>
<td>1.0L – 93-124 gallons</td>
</tr>
<tr>
<td>Trailerable or Nontrailerable</td>
<td>Trailerable</td>
</tr>
</tbody>
</table>

• All models that have these characteristics are considered **one** evaporative family and need only one certification application
Evaporative Family

Example – Two Evaporative Families

<table>
<thead>
<tr>
<th>Fuel System Design</th>
<th>Evaporative Family Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel Hose Type</td>
<td>A1-15</td>
</tr>
<tr>
<td>Fuel Tank Type</td>
<td>Plastic or Metal</td>
</tr>
<tr>
<td>Vent Type</td>
<td>Carbon Canisters</td>
</tr>
<tr>
<td></td>
<td>0.5L – 0-60 gallons</td>
</tr>
<tr>
<td></td>
<td>0.75L – 62-93 gallons</td>
</tr>
<tr>
<td>Trailerable/Nontrailerable</td>
<td>Trailerable</td>
</tr>
</tbody>
</table>

- Models using plastic tanks will be in one evaporative family; models using metal tanks will be in a second family
Evaporative Family Naming Convention

- Aligned with EPA’s 12-digit family naming convention
- Example:

  JBCXPVSSLAAA

  “J” “BCX” “P” “VSSL” “AAA”

  1  2 3 4  5  6 7 8 9  10 11 12

  - Position 1: Model year code (e.g. “J”=2018, “K”= 2019, “L”=2020)
  - Position 2-4: EPA assigned 3-character manufacturer code
  - Position 5: “P” for permeation family
  - Position 6-9: “VSSL” for vessel certification
  - Position 10-12: Any combination of alphanumeric characters chosen by the manufacturer (to differentiate between families)

http://www3.epa.gov/otaq/verify/mfr-code.htm
Design-Based System Certification

• How is design-based certification useful?
  – Allows boat builders to show compliance **without** testing the complete evaporative system in a sealed housing for evaporative determination (SHED) enclosure
  – Reduces costs of testing
  – Reduces lead testing time

• Potential Issues
  – Boat builders must ensure that certified components are carefully assembled and evaporative system is leak tight
Optional Design-Based Conditional EO Certification Process

1. Boat builder submits a compliance letter and requests a conditional EO

2. CARB quickly issues EO within 30 days so boat builder can sell in CA without delay

3. Boat builder must submit full design-based application within 90 days
   - If boat builder does not submit full design-based application within 90 days, CARB revokes EO
Boat Label & Warranty

• Labels and warranty statements may be approved ahead of time

• Approval remains valid for future model years provided no changes are made

• CARB has provided templates for evaporative emissions labels and warranty statements
Sample Boat Label

U.S. COAST GUARD
MAXIMUM CAPACITIES

8 PERSONS OR 1500 LBS.
2600 POUNDS, PERSONS, MOTOR, GEAR
150 HORSEPOWER MOTOR

THIS BOAT COMPLIES WITH U.S. COAST GUARD SAFETY STANDARDS IN EFFECT ON THE DATE OF CERTIFICATION

EMISSION CONTROL INFORMATION

MEETS U.S. EPA EVAP STANDARDS USING CERTIFIED COMPONENTS AND MEETS YYYY MY CALIFORNIA EVAP EMISSION REGULATIONS FOR SPARK-IGNITION MARINE WATERCRAFT

MANUFACTURER:
MODEL:

CALIFORNIA EVAP FAMILY:
EMISSION CONTROL SYSTEM:

DESIGN COMPLIANCE WITH NMMA REQUIREMENTS IS VERIFIED. MANUFACTURER RESPONSIBLE FOR PRODUCTION CONTROL.

NATIONAL MARINE MANUFACTURERS ASSOCIATION
Performance-Based System Certification

• An alternative certification procedure for evaporative systems

• Not anticipated to be commonly used
  – More expensive and time consuming than design-based approach
  – Involves testing the complete evaporative system in SHED following TP-1501

• May be useful for certain boat builders
  – Does not require the use of certified components
  – Allows more flexibility for evaporative system design
Evaporative System Certification
(Peformance-Based System Certification Process)

- Application process is similar to design-based certification
- Application letter must include:
  - diurnal emissions data generated following TP-1501
  - engineering description of evaporative control system
  - sample label and information
- Application Submitted to ECARS
- ECARS Reviews Application
- ECARS Issues Executive Order of Certification
Boat Builder Responsibilities after Certification

• Must re-apply for certification each model year
• Notify CARB of changes using running change process
  – Changes to evaporative design
  – Model additions
• CARB may request a boat for compliance testing
• Boat builder will be notified if a boat fails compliance testing
  – EO may be revoked
  – Penalties may be imposed
• Component EO Holder is responsible for noncompliant component and not the boat builder
• Any emissions-related change to the boat must be submitted and reviewed by CARB
Boat Certification Application Templates

• Application, label, and warranty templates for design-based boat certification are available for download and use on SIMW website

• You can download the documents here: https://www.arb.ca.gov/msprog/offroad/recmarine/recmarine.htm
Boat Certification Application Templates

DESIGN-BASED CERTIFICATION APPLICATION
(APPLICABLE TO 2018 MY & LATER WATERCRAFT)

Date
Chief, Emissions Compliance, Automotive Regulations and Science Division
Air Resources Board
9480 Telstar Avenue, Suite 4
El Monte, California 91731

Evaporative Family Name: XXXXXXXXXXX Application Type: ___ New, ___ Running Change
___ Field Fix

XYZ Company hereby submits the certification application and makes the following statements of compliance regarding the 20XX model year certification of its spark-ignition marine watercraft.

1) Conformance with the general standards and requirements as required in Title 13, Chapter 15, Article 4, Sections 2850-2869 of the California Code of Regulations.

2) Conformance with the applicable fuel system requirements as required in 13 CCR, Section 2855(b), (including Deck Fill Plate Compatibility Standard, California Fuel Compatibility Standard, and Primer Bulb Requirements)

3) Conformance with the labeling and warranty requirements as required in 13 CCR, Sections 2859, 2860, 2861, and 2862.

4) Conformance with the fuel injection definition or equivalent performance standard and tamper resistance requirements as required in 13 CCR, Sections 2855(a) and 2856(e), respectively.

5) Production evaporative systems shall be in all material respects the same as those for which certification is granted.

6) Installation will be completed as directed by the component manufacturer and will adhere to the specifications within the referenced component Executive Order(s).
# Boat Certification Application Templates

## Table

<table>
<thead>
<tr>
<th>D1. Fuel Tank Executive Order(s)</th>
<th>D2. Fuel Line Executive Order(s)</th>
<th>D3. Carbon Canister/Venting System (Diurnal) Executive Order(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>List ARB EO number(s)</td>
<td>List ARB EO number(s)</td>
<td>D3a. List ARB EO number(s)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D3b. List Fuel Tank Range</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D3a. List ARB EO number(s)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D3b. List Fuel Tank Range</td>
</tr>
</tbody>
</table>

## D4. Manufacturer Contact
Contact:  
Title:  
Company:  
Address:  
City, State, Zip  
Phone No.:  
Fax No.:  
Email:  

## D5. Production Plant Location/Contact
Contact:  
Title:  
Company:  
Address:  
City, State, Zip  
Phone No.:  
Fax No.:  
Email:  

## D6. Watercraft Type
- Personal Watercraft  
- Outboard  
- Inboard  
- Sterndrive  
- Jetboat  
- Other:  

## D7. Watercraft Specifications
- Trailerable (<26ft)  
- Nontrailerable (>26ft)  
- Less than 30kW  
- Greater than 30kW  

## D8. Evaporative Warranty/Label Approvals
Label Approval #: NMC-2018-XXXX  
Warranty Approval #: NMC-2018-XXXX  

## D9. Confidential Information
D9a. Projected California sales (units):  
D9b. Projected 50-State Sales (units):  
D9c. Introduction into commerce date:  

If you have any questions, please contact me at xxx-xxx-xxxx.

Sincerely,  
Manufacturer Representative’s Name  
Title  

For ARB use only  
EO #:  
Processed by:  
Reviewed by:  

Page 1 of 2  
Revised 4/4/16
## Boat Certification Application Templates

### MODEL SUMMARY

<table>
<thead>
<tr>
<th>Evaporative Family Name:</th>
<th>X</th>
<th>X</th>
<th>X</th>
<th>X</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea Ray 210 Select</td>
<td>X</td>
<td>151</td>
<td>HDPE</td>
<td>Multi-Layer</td>
<td>C-U-028-939</td>
<td>C-U-493-92</td>
<td>C-U-39-299</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Sea Ray 230 Sundance</td>
<td>X</td>
<td>208</td>
<td>HDPE</td>
<td>Multi-Layer</td>
<td>C-U-028-939</td>
<td>C-U-493-92</td>
<td>C-U-39-299</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Sea Ray 255 Sundancer</td>
<td>X</td>
<td>261</td>
<td>HDPE</td>
<td>Multi-Layer</td>
<td>C-U-028-939</td>
<td>C-U-493-92</td>
<td>C-U-39-299</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
Common Issues to Check For  
(Design-Based Certification Application)

- Check whether components used on your boat are listed on ARB’s approved component EO website
- Check that components meet current applicable standards based on model year, power category, and trailerable/non-trailerable (e.g. 10g vs 15g fuel hose)
- Verify that your fuel tank volume is below the maximum allowed volume listed on carbon canister component EO
- If you have pre-approved label and warranty, list the ARB issued approval numbers on application
Anticipated Implementation Schedule

- **Early 2016:** Begin Testing Components
- **Mid 2016:** Begin Submitting Component Applications
- **Late 2016:** Begin Submitting Watercraft Applications
- **2017:** SIMW Regulation Implemented
- **MY 2018:**
CARB Staff Contact and Additional Information

- Scott Monday – Regulations and Test Procedures
  (916) 445-9319, scott.monday@arb.ca.gov

- Michele Dunlop – Component Certification
  (916) 323-8971, michele.dunlop@arb.ca.gov

- Kevin Curley – Boat Certification
  (626) 350-6418, kevin.curley@arb.ca.gov

- Details about the new evaporative requirements, test procedures, and application process can be found on CARB’s Recreational Marine Activities website:
  - http://www.arb.ca.gov/msprog/offroad/recmarine/recmarine.htm