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?

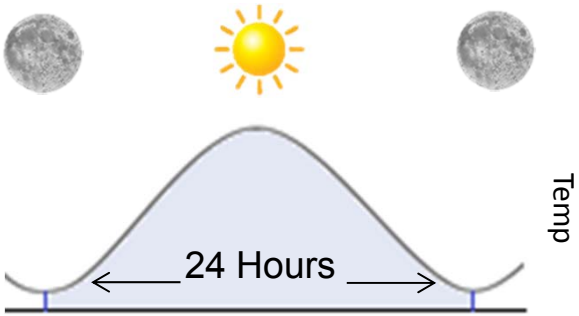
- ARB's mission is to promote and protect public health, welfare and ecological resources through the effective and efficient reduction of air pollutants in recognition and consideration of the effects on the economy of the state

- 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



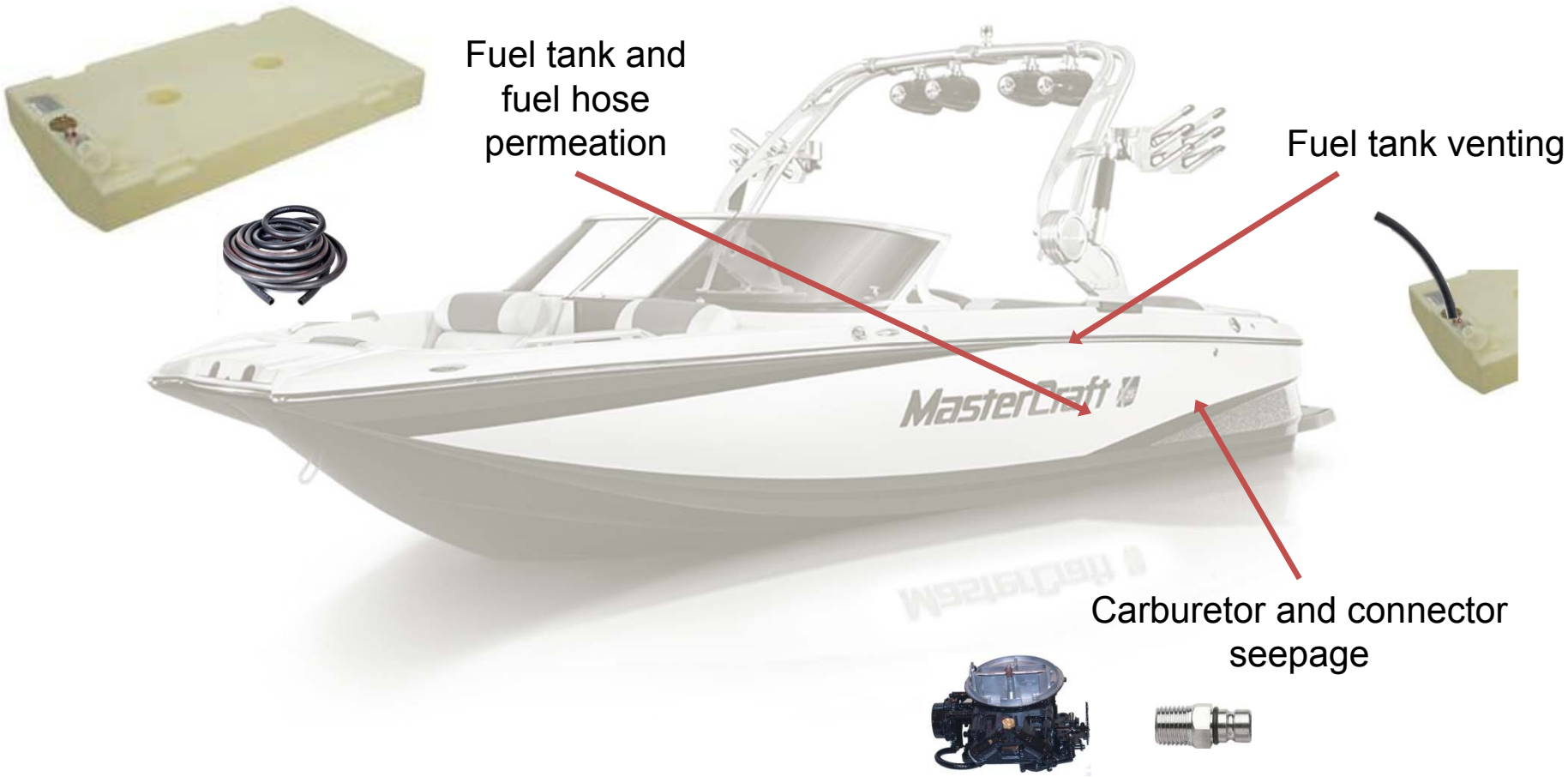
Diurnal Profile

New regulation focuses on mitigating diurnal evaporative emissions

Previous regulations mitigated exhaust 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

Evaporative Emission Sources from Watercraft



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

	Fuel Hose Permeation (grams/m^2/day ROG)	**Fuel Tank Permeation (grams/m^2/ day ROG)**	**Diurnal Requirement (grams/gallon/ day HC)**	**Fuel Injection or Equivalent (grams/hour)**
Standards for MY2018 and later	15.0	1.5	0.4	None
Test Procedure	40 CFR §1060.515	40 CFR §1060.520[1]	40 CFR §1060.525	None

[1] As an alternative, fuel tanks can be certified to 2.5 grams/m^2/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

	Fuel Hose Permeation (grams ROG/m²/day)	**Fuel Tank Permeation** (grams ROG/m²/day)	**Diurnal Tank Venting Loss Requirement** (grams HC/gallon/day)		**Meet Fuel Injection Definition or Equivalent Performance Standard** (grams HC/hour)
			Canister[1]	Non-Canister	
Standards for MY2018 and MY2019	10.0	0.70	0.25	65% reduction from uncontrolled HC emissions	0.4
Standards for MY2020 and later	5.0[2]	0.70	0.25	65% reduction from uncontrolled HC emissions	0.4
Test Procedure	TP-1504 or SAE J1737	TP-1504[3]	TP-1503		TP-1502

[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

	Fuel Hose Permeation (grams ROG/m²/day)	**Fuel Tank Permeation** (grams ROG/m²/day)	**Diurnal Tank Venting Loss Requirement** (grams HC/gallon/day)		**Meet Fuel Injection Definition or Equivalent Performance Standard** (grams HC/hour)
			Canister[1]	Non-Canister	
Standards for MY 2018 and 2019	10.0	0.70	0.16	65% reduction from uncontrolled HC emissions	0.4
Standards for MY 2020 and later	5.0[2]	0.70	0.16	65% reduction from uncontrolled HC emissions	0.4
Test Procedure	TP-1504 or SAE J1737	TP-1504[3]	TP-1503[4]		TP-1502

[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

Marine Boat Type	Model Year Effective Date	Diurnal Standard (grams HC/day)
All Marine Boats With Engines > 30 kW (40 HP)	2018 and later	0.048 * Tank Volume (liters) + 0.97

Performance-Based SHED Testing

Presentation Outline

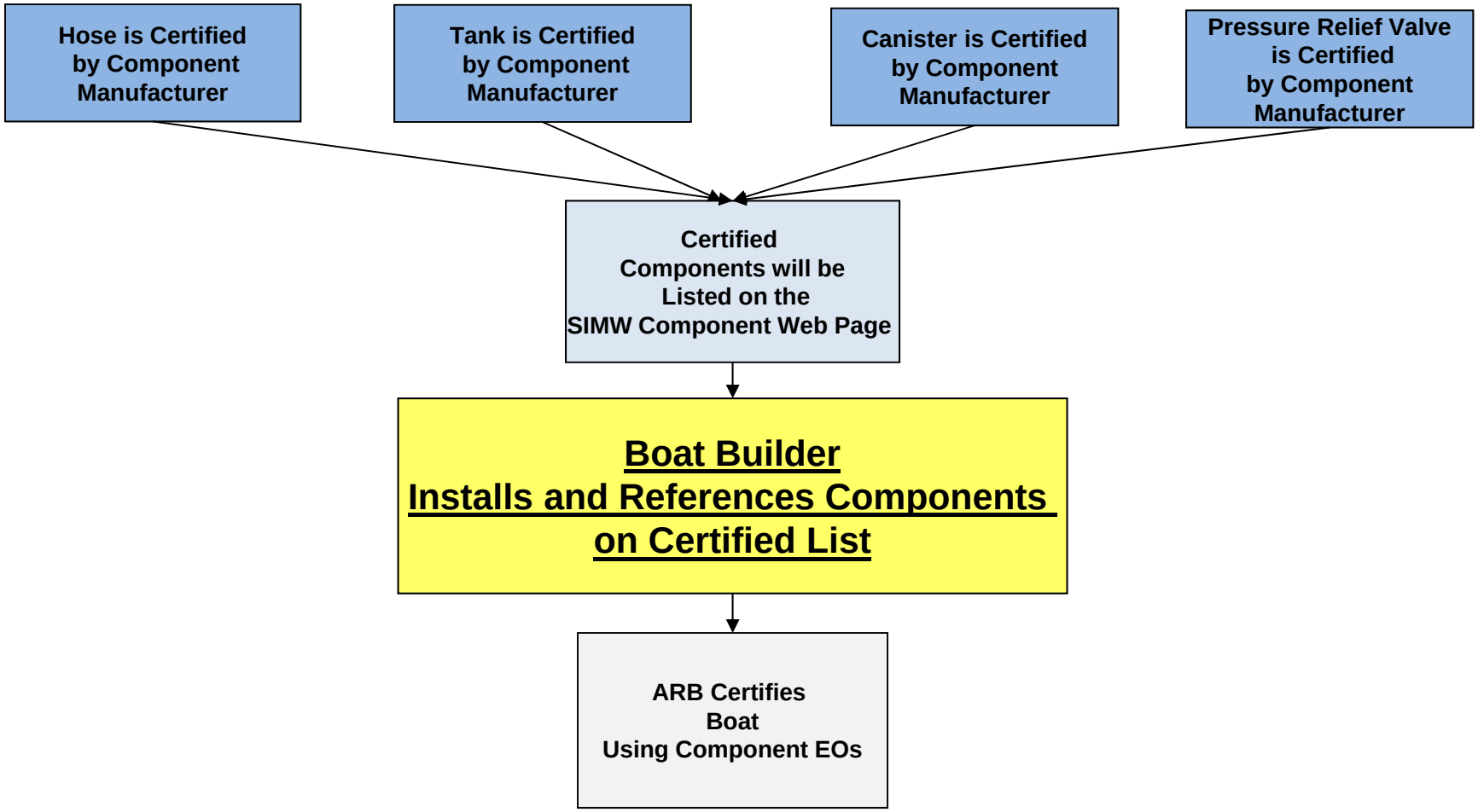
Section 1: Background

Section 2: Component Certification

Section 3: Boat Certification

Certification Process

(How it works)



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

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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

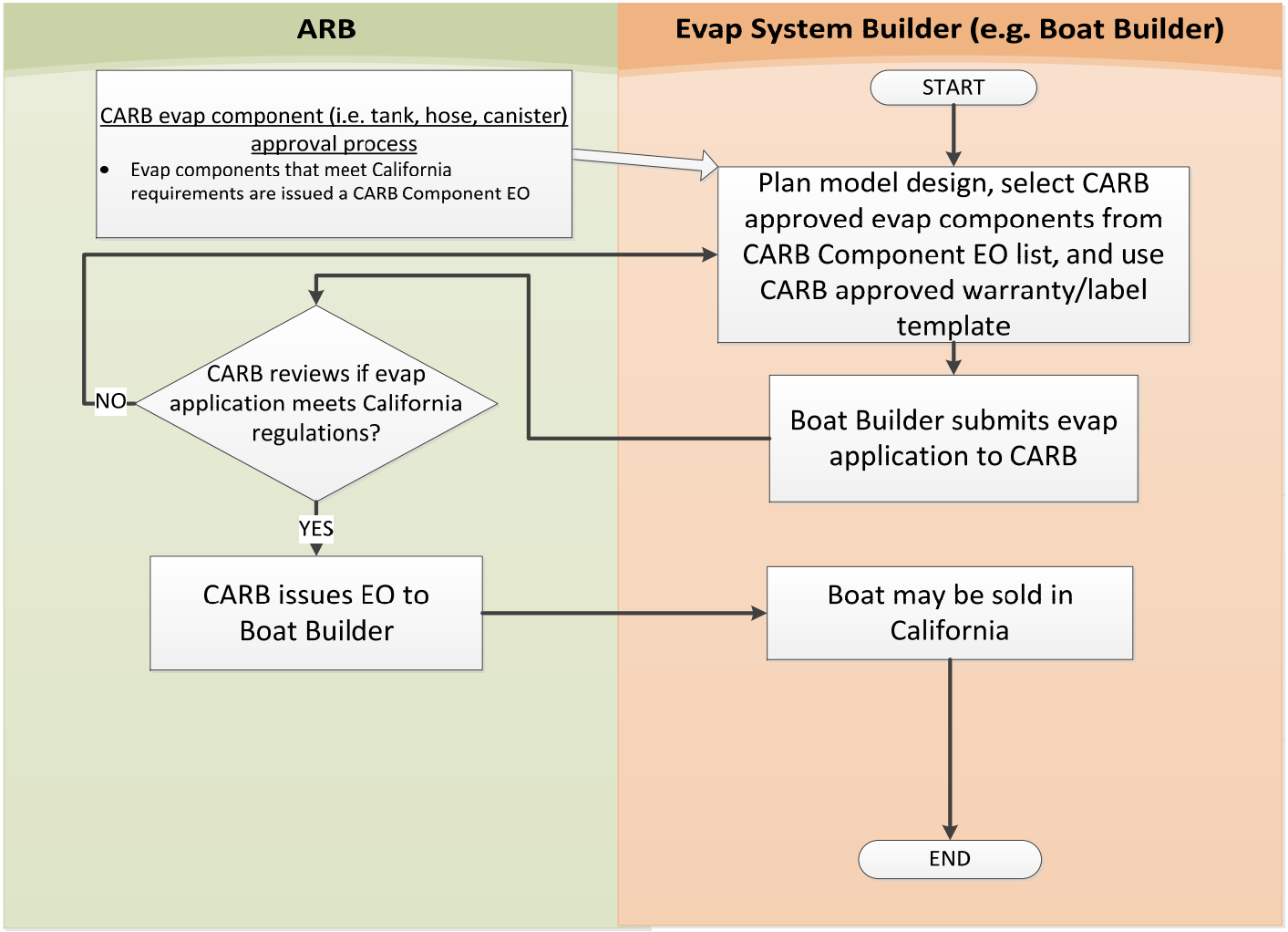
- What needs to be certified?
  - All marine watercraft with installed fuel tanks that use spark-ignition marine engines sold in California must be certified annually
- Who can certify?
  - Engine manufacturers (Honda Marine, Mercury Marine, Yamaha, etc.), or
  - Boat builders (Crestliner, Bayliner, 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



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

Fuel System Design	Evaporative Family Type
Fuel Hose Type	A1-15
Fuel Tank Type	Plastic
Vent Type	Carbon Canisters 0.5L – 0-60 gallons 0.75L – 62-93 gallons 1.0L – 93-124 gallons
Trailerable or Nontrailerable	Trailerable

- All models that have these characteristics are considered **<u>one</u>** evaporative family and need only one certification application

Evaporative Family

Example – Two Evaporative Families

Fuel System Design	Evaporative Family Type
Fuel Hose Type	A1-15
Fuel Tank Type	Plastic or Metal
Vent Type	Carbon Canisters 0.5L – 0-60 gallons 0.75L – 62-93 gallons
Trailerable/Nontrailerable	Trailerable

- 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.

NMMA CERTIFIED using ABYC standards

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
(Performance-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: XXXXXXXXXXXX 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

D1. Fuel Tank Executive Order(s)	D2. Fuel Line Executive Order(s)	D3. Carbon Canister/Venting System (Diurnal) Executive Order(s)	
List ARB EO number(s)	List ARB EO number(s)	D3a. List ARB EO number(s)	D3b. List Fuel Tank Range
		D3a. List ARB EO number(s)	D3b. List Fuel Tank Range

D4. Manufacturer Contact	D5. Production Plant Location/Contact
Contact: Title: Company: Address: City, State, Zip Phone No.: Fax No.: Email:	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): _____ D9c. Introduction into commerce date: _____	D9b. Projected 50-State Sales (units): _____

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

Sincerely,
Manufacturer Representative's Name
Title

For ARB use only
E.O.#: _____
Processed by: _____
Reviewed by: _____

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Revised 4/4/16

Boat Certification Application Templates

Evaporative Family Name: XXXXXXXXXXXX

MODEL SUMMARY

D10. Marine Watercraft or Boat Model	D11. Sales Codes		D12. Fuel Tank Nominal Vol. (Liters)	D13. Fuel Tank Material	D14. Fuel Line Type	D15. Fuel Tank Executive Order	D16. Fuel Line Executive Order	D17. Carbon Canister/Venting System Executive Order	D18. Meets Canister Fuel Tank Volume Reqs?	D19. Auxiliary Engine Installed*
	CA Only	50-State								
Sea Ray 210 Select	X		151	HDPE	Multi-Layer	C-U-028-939	C-U-493-92	C-U-39-299	Yes	No
Sea Ray 230 Sundeck		X	208	HDPE	Multi-Layer	C-U-028-939	C-U-493-92	C-U-39-299	Yes	No
Sea Ray 255 Sundancer		X	261	HDPE	Multi-Layer	C-U-028-939	C-U-493-92	C-U-39-299	Yes	No

DRAFT

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

Mid 2016:
Boat Certification Workshops

2017:
Begin Submitting Watercraft Applications

Early 2016:
Begin Testing Components

Late 2016:
Begin Submitting Component Applications

MY 2018:
SIMW Regulation Implemented

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