Control of Emissions from Marine SI and Small SI Engines, Vessels, and Equipment

Summary and Analysis of Comments

Chapter 4
Evaporative Emissions

Assessment and Standards Division
Office of Transportation and Air Quality
U.S. Environmental Protection Agency

United States
Environmental Protection
Agency

EPA420-R-08-016
September 2008

4 Evaporative Emission Standards and Related Requirements for Nonroad SI Engines and Equipment

What We Proposed:

The comments in this section generally correspond to Sections VI and VII of the preamble to the proposed rule, where we describe the proposed emission standards and certification procedures associated with evaporative emissions from Small SI equipment and Marine SI vessels. The applicable regulatory provisions for these proposed requirements are in 40 CFR parts 90, 1045, 1054, and 1060. The Regulatory Impact Analysis describes the feasibility of these standards, special provisions that apply to small businesses, and alternative standards under consideration in Chapters 5, 10, and 11, respectively.

See Chapter 1 of this document for a discussion of issues related to Large SI engines and equipment and to recreational vehicles.

4.1 General approach

4.1.1 Support proposed standards

What Commenters Said:

EMA supported the basic evaporative standard requirements proposed by EPA. EMA specifically requested that EPA make additional efforts to harmonize test methods with the California ARB Tier III requirements. Harmonizing soak temperatures, tolerances, measurement methods, and reporting requirements would substantially reduce regulatory burden without reducing environmental benefit.

California ARB recommended that EPA either modify its proposal to match the California program or allow California test results to meet the EPA requirements.

NACAA supported EPA's inclusion of evaporative emission standards for all nonroad spark-ignition equipment and watercraft covered by this rule. NACAA noted that it is pleased that EPA has proposed fuel line controls in 2008 for Class I and II small spark-ignition engines and tank permeation, diffusion and running loss standards, as well. Likewise, for marine spark-ignition engines, NACAA supported the evaporative emission standards included in the proposal and encouraged EPA to implement these standards on the schedule identified.

Pennsylvania DEP supported the proposed standards and implementation schedule for marine spark-ignition engines and vessels. MARC AQ Forum supported the evaporative emissions standards included in this proposed rule for non-road spark ignition and marine engines.

NESCAUM supported EPA's effort to harmonize the federal emissions standards with those standards already adopted in California. However, NESCAUM commented that the

effective dates for the evaporative emissions standards should be sooner and should match the effective dates of the comparable California standards or follow California by no more than one year.

Environmental Defense applauded EPA's proposal to establish for the first time evaporative emission standards for spark-ignition marine and small engines. Reducing the vaporous air toxics and other pollutants emitted from SI engines will greatly reduce the inhalation based cancer and non-cancer health risks posed from these sources. Environmental Defense commented that they believe all types of evaporative emissions should be reduced from all sources.

Delphi generally supported the proposed evaporative emission requirements for nonroad SI engines and equipment.

Trident Rubber commented that it agreed with and supported most of the EPA's proposal to control evaporative and exhaust emissions from SI engines and fuel systems on boats. They particularly supported the proposed provisions related to low permeation marine fuel line hose and assemblies.

Letters:

Commenter	Document #
NACAA	0651
Environmental Defense	0648
NESCAUM	0641
MARC AQ Forum	0696
California ARB	0682
Delphi	0638
Trident Rubber	0636
Pennsylvania DEP	0676
EMA	0691

Our Response:

We are largely finalizing the evaporative emission standards as proposed. In several cases we adjusted regulatory provisions in response to public comments. Some of the changes in the final rule are based on new information since the proposal was published. These modifications are discussed, in the appropriate sections, throughout this chapter.

Several issues have been raised by commenters related to the harmonization of federal and California standards, test procedures, and other requirements. These comments are addressed throughout this chapter. Although California has evaporative emission standards for Small SI equipment, it should be noted that California has not yet established evaporative emission standards for marine vessels.

4.1.2 Applicability and general concerns

What Commenters Said:

EMA commented that engines utilized for auxiliary power in highway products should be specifically excluded from §1060.1. For example, generators for motor homes where the fuel is supplied from the main vehicle fuel tank should not be covered by the proposed rule. If EPA does not exclude such engines/equipment from the final rule, EMA commented that the only requirement that should apply is the requirement that addresses the fuel line used to connect the engine to the vehicle fuel tank. Further, if such engines/equipment are not excluded, EMA commented that EPA must clarify that vehicle manufacturers producing equipment that utilize such engines are not required to certify to the Small SI engine related provisions.

EMA noted that §1060.5(e)(3) refers the engine manufacturer to 40 CFR Part 1054, and Part 1054 refers back to Part 1060. EMA commented that these circular references are confusing and unnecessary. In order to provide a clear and concise regulatory scheme, all evaporative requirements should be included in Part 1060.

NMMA commented that NMMA members have only a few remaining concerns regarding the technology required by the proposal. Catalysts, carbon canisters, and low permeation hoses are available and can be incorporated into marine exhaust and fuel systems. However, what does concern NMMA and its members is that these components are not necessarily at the point at which they are either commercially available or tested sufficiently in the field to assure boating safety or consumer choice. To address these concerns, NMMA recommends additional lead time for the implementation of certain aspects of the exhaust and evaporative emission standards or a phase-in approach. As NMMA testified to at the public hearing, there are 3,000 boat builders in the U.S.; only 400 of these are NMMA members. For the remaining boat builders, they cannot say with any certainty whether these businesses are even aware of this rulemaking. Thus, they cannot stress enough the importance of EPA giving sufficient lead time for compliance to assure that the Agency has the opportunity to perform the necessary outreach and education to ensure that small businesses are aware of the rule requirements and understand the regulatory compliance obligations.

Letters:

Commenter	Document #
EMA	0691
NMMA	0688

Our Response:

The proposed rule included language in §1054.20 to specifically state that the new Small SI evaporative requirements do not apply to engines used for auxiliary power on motor vehicles (or marine vessels). We agree that this is necessary to avoid overlapping or conflicting requirements where these fuel systems could already be subject to other standards. We would still expect engine manufacturers to use fuel tanks and fuel lines that meet Small SI standards to the extent they install these components and are unsure that the engines will be installed in motor vehicles

(or marine vessels). We have added language to §1060.1 to further clarify the applicability of standards for these products.

The regulatory approach for our nonroad evaporative standards is to include in part 1060 everything that one would need to know for meeting applicable requirements. This is especially designed to allow component manufacturers to have all applicable requirements included on one location as much as possible. In some cases, this involves a reference to an exhaust standard-setting part such as part 1054 for detailed provisions that apply uniquely for a particular category of engines. The most prominent example of this is related to emission credits. Provisions for emission credits apply only for equipment manufacturers (not component manufacturers) and emission credits are generally not exchangeable across engine categories, so these are not included in part 1060. We include a summary of the evaporative emission standards in the exhaust standard-setting parts to accommodate a similar interest for engine manufacturers to have ready access to a description of what standards apply for their products. EPA and manufacturers will gain much experience in the coming years regarding the certification practices. We will be ready to help people understand their compliance obligations and may revise the regulations in the future to avoid confusion if it becomes clear that certain changes are needed.

We address NMMA's concerns about lead time for the various requirements in the following sections. We agree that we will need to make an extensive effort to help boat builders and others understand the new requirements and look forward to working with NMMA toward that end.

4.2 Small SI standards and lead time

4.2.1 Components covered

What Commenters Said:

EMA and OPEI supported EPA's proposed requirement that fuel line permeation standards apply only to liquid fuel lines. EMA and OPEI noted that EPA's own data confirms the fact that permeation emissions from vapor lines and very small surface area components (such as primer bulbs) do not require controls. EMA and OPEI suggested that vapor lines and filler necks that may be in constant contact with liquid fuel should be held to the same permeation requirement as other fuel lines. However, filler neck and tank assemblies that include features to limit the possibility of liquid fuel being in constant contact with the filler neck (e.g. overfill valves, venting arrangements, and filler necks above the maximum fuel level in the tank) should be considered vent line and should not be subjected to permeation requirements.

EMA also commented that the proposed language in §90.3 includes a definition of "Fuel Line" pursuant to 40 CFR Part 1054.801. EMA commented that the proposed wording in §90.127(a)(1) could be confusing and should be revised to reference the proposed fuel line definition. Accordingly, §90.127(a)(1) should be revised to read as follows: "... This standard applies to any fuel line."

Honda requested that EPA allow engines less than 80cc to comply with both handheld exhaust and evaporative emission standards. Honda agreed with the proposal as written that

engines less than 80cc should be handheld and asked that the language on evaporative emissions be clarified to include these engines.

Letters:

Commenter	Document #
EMA	0691
OPEI	0675
Honda	0705

Our Response:

The new standards will apply to fuel lines, including hose or tubing that contains liquid fuel. This includes fuel supply lines but not vapor lines or vent lines that are not normally exposed to liquid fuel (see the definition of "fuel line" in §1054.801). We consider fuel return lines for handheld engines to be vapor lines, not fuel lines. Data in Chapter 5 of the Final RIA suggest that permeation rates through vapor lines and vent lines are already lower than the new standard; this is due to the low vapor concentration in the vapor line. In contrast, permeation rates for materials that are consistently exposed to saturated fuel vapor are generally considered to be about the same as that for liquid fuel. The new standards also do not apply to primer bulbs exposed to liquid fuel only for priming, but would apply to primer bulbs directly in the fuel supply line. For comparison, this standard will apply to marine filler necks that are filled or partially filled with liquid fuel after a refueling event where the operator fills the tank as full as possible. In the case where the fuel system is designed to prevent liquid fuel from standing in the fill neck, the fill neck will be considered a vapor line and not subject to the new fuel line permeation standard (see Section 4.3.2).

We agree with EMA that the language at the end of §90.127(a)(1) is duplicative because it is included in the definition of "fuel line" and have modified the text to specify "any fuel line."

We have clarified the regulations stating that all Small SI engines at or below 80cc may certify to the handheld evaporative standards, regardless of the type of application into which the engine is ultimately placed.

4.2.2 Fuel line permeation standards and lead time

What Commenters Said:

EMA commented that the final regulation will not be implemented in time for manufacturers to incorporate the fuel line requirements for nonhandheld engines into 2008 model year engines. However, EMA member companies, and a significant percentage of equipment manufacturers that utilize EMA member company engines, will use low permeation fuel lines on a voluntary basis during the 2008 model year (which will provide substantial environmental benefits). Due to the negative lead time associated with the implementation of the final rule, EMA commented that EPA must provide the flexibility necessitated by the situation. Engine manufacturers can't be required to comply with retroactive standards that have not yet been implemented.

Honda also requested that EPA recognize that the requirement for compliance in 2008 with certain provisions may not be feasible for 100 percent of engines or products. Section 90.127(a) and (b)(1) requires demonstration of compliance with fuel line permeation from nonhandheld engines and equipment for the 2008 model year. In some cases, manufacturers may produce both California and 49-state compliant product for 2008, therefore compliance with this proposed requirement would not be feasible. Honda suggested that 2009 should apply to all engine and equipment manufacturers, not just small volume producers.

OPEI commented that due to the expected effective date of the final rule and the imminent date of the engine manufacturer's 2008 model year, it is more than likely that the final rule will provide negative lead time for implementation of the fuel line permeation standards for nonhandheld products. As a result, OPEI commented that certification of compliance with such standards is not feasible and the regulatory requirements must be delayed until the 2009 model year. While OPEI member companies, and a significant percentage of equipment manufacturers that utilize OPEI member company engines, will use low permeation fuel lines on a voluntary basis during the 2008 model year (which will provide substantial environmental benefits), OPEI commented that EPA must nonetheless delay the effective date of such regulations.

OPEI supported EPA's reasoning for the given timing for implementing low permeation fuel lines on handheld products. Manufacturers need sufficient lead-time to safely design, select, manufacture, test and implement these new lines.

California ARB noted that EPA has proposed a fuel line permeation standard of 15 g/m^2/day that is the same as those for recreational vehicles. The small off-road engine/equipment program has implemented this standard since 2006. California ARB commented that its component certification data for fuel hoses (included in Attachment 1 of California ARB's comments) supports setting a lower standard. Therefore California ARB recommended a more stringent standard of 5 g/m^2/day at 40°C.

NACAA commented that they are pleased EPA has proposed fuel line controls in 2008 for Class I and II small spark-ignition engines.

Environmental Defense commented that they support EPA's [fuel line permeation] standard for Small SI engines as it is identical to California's. They also supported EPA's near-term implementation dates of 2008 and 2009. As EPA recognizes, California currently requires the use of a low-permeation fuel line in Small SI equipment such as walk-behind lawn-mowers. Manufacturers of fuel lines used in SI small equipment will be able to draw from readily available technology used to meet the CA standard. NACAA commented that they believe a lead time of two years provides the manufacturers ample time in which to design fuel lines that will meet the proposed standard and would strongly oppose the adoption of any later implementation date. Indeed, we would like to see evaporative emission standards for all types and classes of SI small and marine engines implemented in the shortest time period feasible.

Briggs and Stratton commented that the proposed fuel tank and fuel line permeation levels are acceptable.

Letters:

Commenter	Document #
OPEI	0675
Environmental Defense	0648
Suzuki	0698
California ARB	0682
Briggs and Stratton	0657
EMA	0691
Honda	0705

Our Response:

We are finalizing the proposed fuel line standard of 15 g/m^2/day for Small SI equipment. This permeation rate is at 23°C on a test fuel containing 10 percent ethanol. This hose permeation standard is consistent with the existing recreational vehicle standard and the new standard for marine vessels being finalized in this rule. The move toward low-permeation fuel lines in recreational vehicles—and further development work in this area since the first proposed rule for marine evaporative emissions—demonstrates that low-permeation fuel lines are available on the market today for Small SI equipment. In addition, many manufacturers are already using low-permeation technologies in response to permeation standards in California. However, we recognize that this rule has not been finalized until well into 2008. We are therefore requiring that the hose permeation standard apply beginning January 1, 2009 for nonhandheld Small SI equipment.

4.2.3 Fuel line permeation– cold-weather fuel lines

What Commenters Said:

OPEI commented that low-permeation fuel lines should not be used on cold weather products (like chainsaws and ice augers) because the stiffer lines would be much more likely to crack and break during high-vibration uses (such as chainsaws) at cold temperatures. Accordingly, OPEI strongly urged EPA to finalize the proposed, more appropriate permeation standards and related effective dates for fuel line used on cold-weather, handheld products. Lines with permeation levels at 175 grams should provide the needed mechanical flexibility in material to comply. Because manufacturers must use lines with perm levels at about 175 g/m^2/day, using ABT to offset the credits needed if the standard on these product types was 15 g/m^2/day, would not be possible.

OPEI commented that the products outlined in the definition of cold weather provided for in part 1060 are acceptable and necessary for safety reasons. All of the indicated products are used in extremely cold environments.

After the comment period closed, OPEI commented that the data they had submitted on handheld product fuel line permeation rates, prior to the NPRM, was based on a test fuel of 90 percent gasoline and 10 percent ethanol (E10). However, the proposed fuel line permeation

standards were based on fuel CE10,[1] which results in significantly higher permeation rates. Further, OPEI provided additional test data on permeation rates from cold weather fuel lines tested on either E10, CE10, or both test fuels.[2] Based on this test data, OPEI recommended that the permeation standard for cold-weather fuel lines be 290 g/m^2/day with E10 as a test fuel. OPEI stated that the higher permeation limit was necessary to account for high variability in the test results. They further commented that a standard of 225 g/m^2/day would be possible if coupled with an averaging program.

Letters:

Commenter	Document #
OPEI	0675
OPEI	0811

Our Response:

Handheld equipment manufacturers have raised concerns that fuel lines constructed of available low-permeation materials may not perform well in some handheld applications under extreme cold weather conditions such as below -30°C. These products often use injected molded fuel lines with complex shapes and designs needed to address the unique equipment packaging issues and the high vibration and random movement of the fuel lines within the overall equipment when in use. Industry has expressed concern and the data in Chapter 5 of the Final RIA suggest that durability issues may occur from using certain low-permeation materials in these applications when the weather is extremely cold and that these could lead to unexpected fuel line leaks. Handheld equipment types that could be considered as cold-weather products include cut-off saws, clearing saws, brush cutters over 40cc, commercial earth and wood drills, ice augers, and chainsaws.

As discussed in the Final RIA, rubbers with high acrylonitrile (ACN) content are used in some handheld applications. These materials have about half the permeation of lower ACN-content rubbers also used in handheld applications. To capture the capability of these materials to reduce permeation emissions without creating other issues for cold weather products, we are adopting a set of declining fuel line permeation standards for cold-weather products that would phase in from 2012 to 2016. The standard for cold-weather products starts at 290 g/m^2/day in 2012 and decline to 275 g/m^2/day in 2013, 260 g/m^2/day in 2014, 245 g/m^2/day in 2015. The standard for 2016 and later model years is 225 g/m^2/day. The standards would apply to all cold-weather products, including small volume families. Manufacturers would be allowed to demonstrate compliance with the 2012 through 2015 standards with a fuel line averaging program for cold-weather products. Beginning in 2016, fuel line averaging would no longer be available for cold-weather products and all fuel lines on cold-weather products would have to comply with the 225 g/m^2/day standard. These standards are based on testing with E10 test fuel (not CE10), consistent with the data used to establish the emission standards. For any future emission standards for cold-weather fuel lines, we would consider aligning fuel specifications (and emission levels) with those established for other fuel lines.

[1] Fuel CE10 denotes 90% ASTM Fuel C (50% isooctane, 50% toluene) and 10% ethanol

[2] "Discussions with Handheld Manufacturers on Cold-Weather Fuel Lines," EPA memo from Phil Carlson to Docket OAR-2004-0008, May 30, 2008.

4.2.4 Tank permeation standards and lead time

What Commenters Said:

Environmental Defense stated that it supports the proposed fuel tank permeation standards as they are consistent with the California standards. Environmental Defense recommended earlier implementation dates for the tank permeation standards. They commented that an earlier implementation date of 2008, rather than 2009, is feasible for those handheld equipment manufacturers currently using low-permeation fuel tanks in products sold in California. They also requested that the tank permeation implementation dates for other handheld equipment manufacturers be moved up by at least a year. Environmental Defense also argued that the implementation dates for fuel tanks on nonhandheld equipment are too delayed. Environmental Defense commented that coordinating tank permeation implementation dates with SI small engine exhaust implementation dates is unnecessary. First, they noted that they object to the much delayed implementation dates for the engine exhaust standards and do not believe EPA has adequately explained the basis for the proposed long lead times. Second, they see no reason why the implementation timetable for evaporative controls must be tied to that for exhaust controls because EPA nowhere states that newer low-permeation fuel tanks used to reduce evaporative emissions cannot be combined with advanced fuel injection technology or catalysts used to reduce exhaust emissions.

The California Air Resources Board expressed support of fuel tank permeation standards but stated that the standard of 1.5 g/m^2/day should be based on testing on CE10 at 40°C rather than at 28°C. California ARB commented that component certification data from the small off-road engine program in California supports setting a lower standard. California ARB also commented that the phased-in schedule to meet the fuel tank permeation standards is too lengthy and that two years is sufficient time to allow manufacturers to design and produce equipment meeting the new evaporative standards. California ARB pointed out that the control technology is readily available and currently used in lawn and garden equipment in California.

Arkema commented that it supplies PetroSeal technology and is eager to work with tank manufacturers to help them meet the tank permeation standards. This technology is a two-layer fuel tank. The inner layer is Rilsan Polamide 11, which is an engineered polymer which may be used to create a permeation barrier in rotation-molded fuel tanks. Arkema stated that this specialty nylon, which is used in automotive fuel lines, gives excellent resistance to fuel permeation, and is a tough, impact-resistant polymer. Arkema commented that this material is dimensionally stable, molds very easily and is manufactured from a renewable resource (100 percent bio based from a vegetable oil). In a low-permeation, roto-molded fuel tank, the the outer side of the layer is metallized polyethylene which has an excellent resistance to alcohol permeation and molds very easily. The inner layer is the PA11 which is designed to adhere with the outer layer to ensure the structural integrity of the tank and to ensure minimal permeation. As a result, Arkema concludes that tanks manufactured with PetroSeal are very low permeation, very tough and cost-effective.

Arkema commented that the PetroSeal technology meets current EPA permeation regulations as tested by EPA laboratories (see the RIA) and has received a California ARB

exemption for the small off road and recreational vehicle tanks. Arkema also stated that the tanks using this construction have been demonstrated to meet US Coast Guard requirements for mechanical strength and fire resistance for permanently installed marine fueled tanks. Arkema had a ten gallon and 40 gallon fuel tank manufactured and tested by Imanna labs. In addition, a lawn and garden fuel tank using this technology passed the SAE J288 snowmobile impact test. Arkema commented that PetroSeal is a commercially active technology today and they are selling this material for use in motorcycle fuel tanks.

Solar Plastics commented that they have conducted an active research and development effort for many years and that numerous tooling, material, and processing concepts have been invented, evaluated, or optimized in their test facility. Solar has been working with Arkema and now produces multi-layer rotation-molded fuel tanks. Solar Plastics commented that it has established safe, reliable, and consistent processes to mold the two layer PetroSeal material system. Solar asserted that these molded tanks exhibit excellent adhesion between layers, impact strength that meets various industry standards, and permeation resistance well within proposed standards. PetroSeal fuel tanks molded by Solar Plastics satisfy durability requirements adopted by the marine, and lawn and garden equipment industries. These include ambient and cold temperature impacts, and burn tests. Molding methods are cost efficient, and utilize the same tooling and machinery that produce single layer tanks. Based on these considerations, Solar Plastics concluded that technology is available today to rotation-mold fuel tanks that meet the proposed evaporative emissions standards.

Centro commented that, in anticipation of low permeation requirements for fuel tanks for Small SI equipment and for boats, they have worked hard over the last five years to develop a solution that meets all requirements. Centro stated that they have a solution that is as durable as current rotation-molded tanks and meets all other criteria. Centro commented that they have invested hundreds of thousands of dollars in successfully developing and testing this technology, and that it would be a disservice to the environment to delay tank permeation standards.

Briggs & Stratton commented that they find the proposed fuel tank and fuel line permeation levels to be acceptable. OPEI commented that the effective dates for fuel tank standards on handheld tanks are very aggressive (phase-in begins in 2009) and that this will require accelerated development and negotiation with production sources. OPEI stated that it accepts the aggressive effective dates.

EMA, OPEI and Briggs & Stratton commented that the proposed alternative fuel tank standard of 2.5 g/m^2/day standard at 40°C is not supported by theory or literature to be equivalent to the 1.5 g/m^2/day standard at 25°C. They stated that the alternative standard should be changed to 3.0 g/m^2/day at 40°C. OPEI and Briggs & Stratton commented that, for handheld structurally integrated tanks, the 40°C requirement should be 5.0 g/m^2/day. California ARB commented that the alternative of 2.5 g/m^2/day at 40°C suggested by U.S. EPA should not be an option because this standard is too lenient based on certification data which supports a tougher standard.

OPEI submitted an additional comment after the close of the comment period regarding rotation-molded fuel tanks. They supported a delay in the permeation requirements for rotation-

molded fuel tanks instead of allowing a certain number of noncompliant tanks in coordination with the Transition Program for Equipment Manufacturers.

Letters:

Commenter	Document #
OPEI	0675
Environmental Defense	0648
California ARB	0682
Briggs and Stratton	0657
EMA	0691
Arkema (hearing)	0642
Solar Plastics (hearing)	0642
Centro	0737
OPEI	0793

Our Response:

During the development of the proposed rule, we worked closely with the fuel tank industry to understand their products, business practices, and production processes. Information gathered from these interactions was used to craft the proposed regulatory provisions related to controlling gasoline fuel tank permeation emissions. During these discussions, important issues were identified with respect to concerns regarding the timing and technical feasibility of controlling permeation emissions from fuel tanks on Small SI equipment. We have concluded that the final fuel permeation standards are technologically feasible and appropriate for Small SI fuel tanks. This conclusion is supported by data presented in the Regulatory Impact Analysis by comments from fuel tank manufacturers. Issues specific to rotation-molded fuel tanks are discussed, in more detail, under Section 4.3.5.

We are finalizing the fuel tank permeation implementation dates as proposed. In response to comments requesting an earlier implementation date, given the timing of this final rule, an implementation date of 2008 is clearly not feasible, even for fuel tanks already certified in California. We also do not believe that the standards for other fuel tanks should be pulled ahead, relative to the proposal. Our final implementation dates are based on our best estimate of how much lead time is necessary to bring low permeation fuel tanks to production, especially given the large number of fuel tank manufacturers that are small businesses. We considered that some manufacturers may be capable of bringing part of their product line in compliance with the fuel tank permeation standards early. In order to provide an incentive for these early reductions, we finalized an early credit program.

We are finalizing the optional alternative standard of 2.5 g/m^2/day at 40°C as proposed. This alternative standard is intended to provide flexibility to manufacturers that wish to perform a single permeation test for certification to EPA standards and for use in certifying to the California ARB Small SI standards. The intent of the higher limit of 2.5 g/m^2/day is to account for increased permeation rates at elevated temperature. This increased limit is not intended to represent how an average tank may perform, but rather to provide reasonable assurance that a tank certified at the higher temperature would pass the primary standard of 1.5 g/m^2/day at 28°C.

This adjusted standard at 40°C is based on data presented in the RIA and is intended to account for variability in how different materials will respond to increases in temperature.

We respond to OPEI's comment related to lead time for rotation-molded fuel tanks in Section 2.7.6.

4.2.5 Tank permeation– structurally integrated fuel tanks

What Commenters Said:

OPEI expressed support for EPA's proposed permeation standards and flexibilities for "structurally integrated" fuel tanks, which are also subject to unique production and operating conditions, including cold-weather and high vibration. They commented that the flexibilities EPA has provided for, while challenging in terms of permeation reduction, should allow manufacturers to engineer safe, practical and cost effective solutions.

Environmental Defense objected to the fuel tank permeation standard proposed for structurally integrated fuel tanks on handheld equipment stating that it was too lax. They noted that California's standard requires fuel tanks to emit no more than 2.0 grams per square meter per day and that EPA's proposed standard of 2.5 grams per square meter per day falls short of this standard by a factor of 25%. Environmental Defense commented that the California ARB standards represent an essential benchmark necessary to protect human health and that therefore the federal standards should be at least as stringent. They also requested that the implementation dates for structurally integrated fuel tanks be moved up by at least a year to 2010.

Letters:

Commenter	Document #
OPEI	0675

Our Response:

We tested structurally integrated fuel tanks from four handheld equipment manufacturers at 29°C on both gasoline and s 10 percent ethanol blend. The test results, which are presented in Chapter 5 of the RIA, suggest that structurally integrated fuel tanks are capable of meeting the standards using their current materials. In the cases where the permeation rates were higher than the standards, it was observed that the fuel cap seals had large exposed surface areas on the O-rings, which were not made of low permeation materials. Further data was collected by the handheld equipment industry after the proposal. In this testing, they investigated the effect of fuel type and gasket material on the permeation results. These test results suggested that permeation can be reduced significantly by using a low permeation material, such as FKM, for the seal on the fuel cap. In addition, data on aged tanks suggested that NBR o-rings may deteriorate in-use such that the permeation rate (or vapor leak rate) through the seal increases greatly. Based on this test data, we are finalizing a more stringent fuel tank permeation standard of 1.5 g/m^2/day for structurally integrated fuel tanks. However, we are retaining the 2011 implementation date in the proposal to give manufacturers sufficient time to address any design changes, especially for fuel cap seals, that may be necessary.

Manufacturers have expressed concerns with the long term durability of known low-permeation elastomers in cold-weather applications. At the same time, manufacturers have commented that existing fuel cap gasket/o-ring materials may degrade in the field after one year (depending on weather and fuel type) in such a way as to have excessively high permeation rates, but still prevent liquid fuel leaks. To address this issue, we are allowing manufacturers to treat fuel cap seals, on cold-weather equipment, as allowable maintenance items that should be replaced annually. In the case of an in-use evaluation, any elastomeric fuel cap seal, over one year old, on cold-weather handheld equipment would be replaced prior to preconditioning the tank for permeation testing if the manufacturer specified this scheduled maintenance for the fuel cap. At the same time, it is not certain that low-permeation materials will deteriorate when used for fuel cap seals in cold-weather products. We intend to perform testing on fuel cap seals to determine the appropriateness of allowing manufacturers to specify scheduled maintenance to address these concerns. In the event that durable materials are identified, we may remove the provision allowing for this scheduled maintenance for purposes of compliance with fuel tank permeation standards.

4.2.6 Tank permeation– fuel caps

What Commenters Said:

EMA, OPEI and Briggs & Stratton commented that EPA should not impose separate and additional regulation (beyond CARB) of fuel cap permeation under the final Phase 3 rule. They argued that the emission contributions for fuel caps are very small compared to the overall fuel tank-control achieved. EMA and Briggs & Stratton commented that the permeation contributions of the caps may be accurately estimated to range from 0.021 and 0.086 g/day, for a typical Class I engine and the largest Class II engines, respectively, at 40°C. This estimate assumed that fuel caps are made of untreated HDPE (~14 g/m^2/day), though they commented that most fuel caps are made of lower permeating materials.

EMA and OPEI commented that engine and equipment manufacturers that certify products to the CARB standards already will have significant tank permeation testing data that does not include the fuel tank cap. Due to the difficulties involved with stabilization of the tank and the integrity testing requirements, they commented that such fuel tank permeation testing requires a substantial investment of time and effort on the part of the manufacturer. They concluded that the additional testing requirements would be unduly burdensome with diminished environmental benefits.

If fuel cap testing is absolutely deemed necessary, OPEI believes that allowing fuel caps to be tested separately from fuel tanks for permeation emission adds flexibility with no degradation to the environment. A single fuel cap may be used on several different fuel tank families. Fuel caps and fuel tanks may be molded by different manufacturers who then must submit the certification on their products and obtain the certificates of conformity.

OPEI noted that fuel tank caps can affect control of running loss emissions and/or diffusion emissions. Because fuel caps are generally produced by a different manufacturer than the fuel tank, OPEI argued that the proposed rule would require the fuel cap to be certified

separately from the fuel tank. However, the engine or equipment manufacturer that is responsible for certification of the running loss and diffusion control requirements dictates the features associated with the fuel cap design. Accordingly, the fuel cap manufacturer would be responsible for certifying a product the design of which it does not control. In order to rectify this situation, OPEI recommended that either the engine or equipment manufacturer that is responsible for the compliance of the running loss and/or diffusion control requirements should simply include the fuel cap information within their certification documentation. Under any scenario, OPEI commented that EPA should not require fuel tanks to be tested and certified with a fuel cap. EMA commented that, if the final regulation does include a fuel tank cap certification and compliance requirement, compliance with such requirement should be the responsibility of the entity that is responsible for compliance with the running loss and/or diffusion control requirements.

Letters:

Commenter	Document #
OPEI	0675
Briggs and Stratton	0657
EMA	0691

Our Response:

We consider the fuel cap, when directly mounted on the fuel tank, to be part of the fuel tank. The fuel cap will therefore be included in the tank permeation standard and test. We understand that a given fuel cap may be used in several tank designs. In addition, the fuel cap may be constructed by a different manufacturer than the fuel tank. Therefore, we have included certification testing flexibility that will allow manufacturers to determine the best approach, for their individual business situations, to certifying their tanks and fuel caps to the permeation standard. These alternatives to testing the fuel tank with the cap in-place are listed below.

- The fuel cap manufacturers may test their caps and certify them separately to a separate 1.5 g/m^2/day cap permeation standard. In this case, the fuel tank could be certified separately with a sealed opening, similar to the California ARB testing.

- Manufacturers may, optionally, test the cap separately from the tank and combine the results to determine the total tank permeation rate. This option would allow for fuel caps that do not meet the 1.5 g/m^2/day standard, but would still make up a small enough part of the tank surface area such that the tank/cap combination would still comply with the permeation standard.

- The manufacturer may also opt to use a default permeation rate of 30 g/m^2/day. To be eligible for this default rate, the seal on the fuel cap must be made of a low-permeation material, such as a fluoroelastomer. The surface area associated with this default value is the cross sectional area of the opening that is sealed by the fuel cap. If this default value were used, the fuel fill would be sealed with a non-permeable plug during the tank permeation test, and the default permeation rate would be factored into the final result.

4.2.7 Running loss control

What Commenters Said:

The California Air Resources Boards supported control of running loss emissions from Small SI equipment, but recommended setting performance standards.

Environmental Defense expressed support for the proposed design-based approach to reduce running loss emissions from small engines. One of the options available to manufactures is the use of carbon canisters which are in use in California today. However, they urged EPA to adopt more immediate implementation dates. Environmental Defense argued that the proposal provides manufacturers ample flexibility in complying with the running loss standard as they may choose from four different design approaches and that this choice to utilize any of a range of evaporative control designs militates in favor of near-term implementation dates.

In contrast, EMA and OPEI commented that the running loss control requirement should be implemented at the same time as both the evaporative permeation control requirements and the exhaust emission requirements for nonhandheld equipment. OPEI commented that implementation of even the most basic running loss system would require a significant investment in terms of development and tooling. OPEI argued that EPA should not impose such requirements without adequate substantiation of effectiveness, function and safety. OPEI commented that EPA performed very little practical testing with running loss systems in place. In addition, OPEI stated that the significant challenges related to safety and function associated with these new control techniques (such as increased fuel tank pressure) are not addressed in the proposed rule's preamble or Impact Analysis. Running an engine or piece of equipment in a lab is very different from actual use conditions and OPEI contends that EPA has not adequately considered the costs and challenges associated with the proposed modifications.

OPEI further commented that the proposed rule specifically states that an actively purged canister would qualify as a means to reduce running loss; however, CARB has data that demonstrates that a passively purged canister also provides effective running loss control. EMA and OPEI requested that EPA broadly accept any system that utilizes an HC adsorption media in the fuel tank vent system as an acceptable running loss control system. EMA and OPEI also requested that products that meet the California ARB Tier 3 diurnal and running loss requirements automatically be deemed compliant with EPA's Phase 3 running loss regulations.

EMA commented that the proposed ability to demonstrate running loss control by compliance with the 8°C temperature rise requirement was based on very limited testing. EMA recommended increasing the maximum temperature rise to 10°C to meet the running loss requirement. EMA commented that the fuel tank bladder running loss control method lacks sufficient definition to meet the requirements of a clear and evenly applied standard and that additional refinement of this option is necessary. EMA also noted that options to control running loss through increased fuel tank pressures could be viable in some cases; however, they expressed concern that a large number of fuel tanks cannot utilize increased tank pressure as a control technology exclusively. As an example, EMA stated that many Small SI fuel tanks will change shape significantly at internal pressures less than 7 kPa resulting in fuel tank interference with moving parts in proximity of the tank.

OPEI commented that no running loss emissions standards are needed for handheld equipment. OPEI stated that, due to space, multi-position use, and weight constraints, the application of carbon canisters or other measures to reduce running losses from handheld equipment are not feasible.

Letters:

Commenter	Document #
OPEI	0675
Environmental Defense	0648
California ARB	0682
EMA	0691

Our Response:

We are establishing standards to control running loss emissions from nonhandheld Small SI equipment beginning in the same year as the Phase 3 exhaust emission standards—2012 for Class I engines and 2011 for Class II engines. Because the running loss control technology is integral to the fuel system, we believe it is appropriate to implement these standards in the same year as for the fuel tank permeation requirements. This will help minimize costs in that manufacturers will be able to transition to a single new fuel system design.

We have measured fuel temperatures from several Small SI equipment types and found that, in most cases, significant fuel heating occurred during engine operation. Emission tests were then performed on fuel tanks for this equipment by heating the fuel to the same temperature profile as was observed in-use. This testing, which is described in more detail in the RIA, support our finding that running loss emissions from Small SI equipment are significant.

There are several different design approaches that will reliably and effectively control running losses. However, it is very difficult to define a measurement procedure to consistently and accurately quantify running losses. Also, a performance standard with such a procedure introduces a challenging testing requirement for hundreds of small-volume equipment manufacturers. Moreover, we believe that the design approaches are straight-forward and can be clearly described and easily installed. We are therefore not controlling running losses using the conventional approach of establishing a procedure to measure running losses and adopting a corresponding emission standard. Manufacturers can choose from one of the following approaches to meet this requirement:

- Vent running loss fuel vapors from the fuel tank to the engine's intake manifold in a way that burns the fuel vapors in the engine instead of venting them to the atmosphere. The use of an actively purged carbon canister will qualify under this approach.
- Use a sealed fuel tank. A fuel bladder could be used to minimize fuel vapor volume in a sealed fuel tank without increasing tank pressure.
- Use a system with an approved executive order from the California Air Resources Board. An example of this would be a design in which a fuel cap is fitted with a small carbon canister and mounted on a tank that is not exposed to excessive engine heat.

With regard to bladder fuel tanks, this is offered only as one suggestion of a technology that could be used in conjunction with a sealed fuel tank as a strategy for minimizing pressure buildup in the tank. In a bladder fuel tank, the bladder collapses around the fuel, preventing the formation of fuel vapor and the associated pressure increase. Because this is simply an example of a technology that could be used with a sealed fuel tank, we do not believe that it is necessary to describe this technology in the regulations as suggested by EMA.

In the NPRM, we proposed another running loss design option whereby manufacturers could demonstrate, through testing, that the fuel temperature in the tank does not increase by more than 8°C during normal operation. Manufacturers commented that the temperature testing associated with this design option was too complex, the temperature limit was too low, and the associated diffusion requirements were infeasible. In later conversations, industry stated that they would not use the temperature design option, largely due to the complexity of the associated diffusion standards that would be necessary; therefore, we are not finalizing this option.

We are not applying the running loss requirements to handheld Small SI engines. We believe running loss emission standards should not apply to handheld engines at this time because the likely approach to controlling running losses could require that manufacturers revisit their design for controlling exhaust emissions. As described above, we are not changing the exhaust emission standards for handheld engines in this rulemaking. In addition, there are some technical challenges that will require further investigation. For example, the compact nature of the equipment makes it harder to isolate the fuel tank from the engine and the multi-positional nature of the operation may prevent a reliable means of venting fuel vapors into the intake manifold while the engine is running.

4.2.8 Diffusion

What Commenters Said:

Environmental Defense expressed support for standards to reduce diffusion emissions, stating that both performance and design based standards are effective in controlling evaporative emissions. However, they stated that implementation date for the diffusion standard was delayed to far into the future.

EMA, OPEI, and Briggs & Stratton commented that they do not support the inclusion of diffusion emission control in the final rulemaking. They argued that the testing performed to date over-estimates the diffusion emission contribution to total evaporative emissions, and that if tested in a manner more representative of the real in-use environment, it is unlikely that the diffusive emissions would be significant enough to warrant control. EMA offered the following specific comments on the diffusion testing performed by EPA: The conditions in the SHED enclosure are not representative of in-use conditions. Specifically, the air motion necessary to ensure good mixing and temperature control in the SHED enclosure causes higher emissions than actual in-use conditions. Most small engine equipment is stored in a quiescent atmosphere (shed or garage) in which concentration gradients are static and rarely disturbed. In a SHED enclosure, the required air motion disturbs the concentration gradient and amplifies the diffusive forces. Additionally, small variations in SHED enclosure temperature inherent to the temperature control systems will cause a diurnal action in the tank as the tank vapor space

temperature changes. This cyclic temperature variation does not commonly occur in normal small engine storage. It is an artifact of the test method that tends to increase the measured emissions, but is not indicative of a true diffusion process. While the high fuel fill level in the proposed test method was included to counteract this diurnal effect, no testing was actually performed to determine if the fill level requirement had a significant effect on reducing the influence of the temperature fluctuation.

EMA, OPEI and Briggs & Stratton also argued that there is very little data to support the technical feasibility or impact of the 0.8 g/day requirement because the testing was performed on a small subset of fuel system configurations that did not adequately address the breadth of product variables or the inherent test-to-test variation. EMA and OPEI commented that, in the event diffusion is demonstrated to be a significant emissions factor, additional study is needed to develop reasonable requirements. If there is a need to control diffusion emissions independently, EMA and OPEI commented that a design standard approach would be more appropriate as quantification of diffusion emissions through a prescriptive test method would not significantly enhance the emission inventory reduction associated with the implementation of the regulation, but would significantly increase the cost of compliance.

Further, EMA and OPEI commented that the proposed control of running losses will substantially control the diffusion emissions and thereby making separate diffusion control requirements redundant and unnecessary. They recommended that EPA recognize the interaction between running loss control and diffusion control in either regulatory or preamble language in order to assure that actively controlled running loss systems, including those approved by the California ARB certification process, will provide sufficient diffusion control without requiring further demonstration.

OPEI also commented that the caps and tanks for handheld products should be exempt from the diffusion control requirements. Due to space, multi-position use, and weight constraints, OPEI argued that the application of carbon canisters or other measures to handheld products are not feasible, and that handheld engines and equipment already have a form of diffusion control since fuel tanks have no direct uncontrolled openings.

Letters:

Commenter	Document #
OPEI	0675
OPEI	0675
Environmental Defense	0648
Briggs and Stratton	0657
EMA	0691

Our Response:

We did not propose diffusion standards for handheld equipment. Handheld equipment uses fuel caps that are either sealed or have tortuous venting pathways to prevent fuel from spilling during operation. We believe these fuel cap designs limit diffusion emissions sufficiently so that we do not need to establish a diffusion standard for this equipment.

Similarly, we are not finalizing the proposed diffusion standards for nonhandheld Small SI equipment. We believe that the final running loss design standards will effectively control diffusion emissions because there will be no direct path for vapor to escape through diffusion. Under the proposed running loss standards, one of the design options for running loss emissions control was an open vent system with limits on fuel temperature increases during operation. Under that option, diffusion emissions could occur through the open vent. However, because this temperature-based option for running loss control is not included in the final standards, we believe that a separate diffusion standard would be redundant.

We disagree with the commenter's assessment of our characterization of diffusion emissions or of the testing performed to measure diffusion from Small SI equipment. The fuel tanks selected for the Small SI diffusion testing were from four high sales volume lawnmowers, representing a large share of Class I equipment sales. Testing was performed both in stock configurations and with a vent hose, such as may be expected in equipment with running loss emission control. Testing was also performed under variable temperature (diurnal) conditions and at constant temperature to quantify temperature effects. The proposed standard was based on actual test data, and therefore accounted for any temperature fluctuation or air mixing effects that may occur during testing. The results from this testing, which are described in more detail in Chapter 5 of the RIA, suggest that some common fuel cap designs result in an order of magnitude higher diffusion emissions than other common fuel cap designs.

4.2.9 Diurnal

What Commenters Said:

Several commenters stated that EPA should establish diurnal emission controls for small spark-ignition engines, noting that the California Air Resources Board has already done so. These commenters included NACAA, MARC AQ Forum, NESCAUM, and the Wisconson DNR. In addition, Environmental Defense noted that the California ARB rules provide manufacturers with a choice of either certifying to a performance or design standard that utilizes carbon canisters. They cited the preamble to the proposed rule in which EPA states that the use of passive purging carbon canisters "could reduce diurnal emissions by 50 to 60 percent" while active purging could produce even greater reductions. Environmental Defense argued that the national standards should be at least as stringent as those adopted by California and therefore objected to the omission of a diurnal standard for small engines from the proposed rules.

The California Air Resources Board recommended that a diurnal performance standard be set for the most representative small spark-ignition engines. Without a performance standard, California ARB argued that the U.S. EPA cannot validate emission reductions because a design-only standard cannot take into account connector losses, carburetor emissions, and leaks from poorly designed integrated engines. They commented that the diurnal standard should measure emissions from complete evaporative emission systems, be measured over three days (without a carbon canister) or seven days (with a carbon canister), and be based on tank volume, noting that his would be consistent with on-road vehicle test procedures. California ARB believes that two years is sufficient time for meeting the diurnal emission standards.

EMA and OPEI presented their opinion that the test data generated by EPA during the regulatory development process confirmed that Small SI equipment would not provide significant benefit from the addition of a diurnal standard requirement. They commented that the proposed combination of permeation control and running loss control will provide a significant reduction in evaporative emissions from these products, while providing the flexibility for each manufacturer to determine the most appropriate means to achieve these controls.

Letters:

Commenter	Document #
Wisconsin DNR	0663
OPEI	0675
NACAA	0651
Environmental Defense	0648
NESCAUM	0641
MARC AQ Forum	0696
California ARB	0682
EMA	0691

Our Response:

We did not propose, and are not finalizing, diurnal emission standards for Small SI equipment. Compared to other evaporative emission standards we are finalizing in this rule, diurnal emission control would be significantly more expensive on a cost per ton basis. This is described in more detail in Chapter 11 of the RIA. This cost sensitivity is especially noteworthy given the relatively low diurnal emission levels (on a per-equipment basis) from such small fuel tanks. However, we will continue to monitor the progress of diurnal emission control systems, such as those applied to equipment certified in California. If new designs lead to more cost effective control measures, or the environmental need justifies further controls, we will revisit this issue in the future.

Although we are not finalizing diurnal emission standards for Small SI equipment, in response to comments received, we are permanently adopting the provision allowing manufacturers to use the SHED-based procedures and standards adopted by California ARB for nonhandheld Small SI equipment. Under this approach, the evaporative emission test would be for the whole equipment rather than based on the component approach to meeting evaporative emission standards. Manufacturers expressed an interest in indefinitely preserving the option to comply with diurnal emission standards using the SHED test to be able to certify and sell products for sale in all 50 states. The SHED-based approach might allow for use of fuel tanks or fuel lines that exceed the component standards, but we believe the overall emission control (including control of diurnal emissions) will be at least as great from systems that have been tested and certified using SHED-based procedures. We have therefore incorporated the California ARB SHED procedure by reference and allow for certification using those procedures.

4.3 Marine SI standards and lead time

4.3.1 Fuel line permeation standards and lead time

What Commenters Said:

ABYC commented that it is publishing an early revision (July 2007, effective July 2008) to its gasoline fuel system standard H-24 that includes a provision for low permeation fuel hose. Concurrently ABYC has worked with the Society of Automotive Engineers to produce a now published standard on qualification testing for the low-permeation hose to meet the rule.

NMMA commented that January 1, 2009 is the appropriate compliance date for low-permeation fuel lines. The ABYC recently incorporated low-permeation fuel line requirements into the industry guidance document H-24, Gasoline Fuel Systems, and these requirements will be effective July 31, 2008. While this document serves as guidance for the industry, compliance with H-24 (as well as other ABYC specifications) is a condition of membership for NMMA. NMMA commented that the incorporation of the federal requirements into the ABYC document and NMMA's efforts to mandate compliance with those standards will help transition the entire marine industry to the use of low-permeation fuel lines. However, NMMA also stated that it will take a great deal of outreach on the part of EPA and NMMA to ensure that the recreational marine industry is aware of these new requirements and understands how to certify to the standards. For these reasons, NMMA commented that he hose standards should not be pulled ahead earlier because adequate time for the implementation of low-permeation fuel lines is critical to ensure that both engine manufacturers and boat builders are aware of the new requirements.

Sixteen boat builders commented on the implementation date for the marine hose permeation standards. In general, they commented that January 2009 would be a reasonable implementation date for these standards. Boat builders commented that an earlier date would not be feasible because EPA needs to communicate effectively to thousands of small businesses to ensure all boat manufacturers become aware of the new requirements for low-permeation fuel lines. Although compliance to ABYC H-24 is a condition of membership in NMMA, this only affects 400 or so out of 3000 manufacturers of boats in the US. In addition, boat manufacturers commented that they will need adequate time to delete their inventory. Boat builders commented that they will begin deplete inventory once final rule passed, but they would need 8-12 months after the final rule to be 100 percent compliant. Boat builders expressed support of placing the responsibility on component vendors to have parts certified to meet emission requirements.

Lowe Boats commented that, other than for fuel feed hose on pontoon boats powered by sterndrive engines, it does not have any experience in certification or testing of low permeation fuel systems. Therefore, an implementation date of January 2008 would not be feasible due to a lack of training to understand the details of the ruling and time to deplete inventory of existing fuel system components. On the other hand, Godfrey commented that it has already switched to low permeation hoses.

NMMA provided comment on how a pull-ahead for low-permeation fuel lines would be implemented given that the fuel line from the tank to the engine is typically installed by the boat builder, while the under-cowl hoses are installed by the engine manufacturer. Two suggestions are provided by EPA for implementation: (1) the engine manufacturer could specify low-permeation fuel line in the installation instructions beginning in 2008; (2) the engine manufacturer could refuse to sell engines to boat builders who do not begin using low-permeation fuel lines in 2008. NMMA stated that, assuming the compliance date is changed from 2008 to 2009, the first suggestion is the only approach of the two provided that is at all workable for engine manufacturers to accomplish the goal of the pull-ahead. Further, NMMA commented that, while including the specification for a low-permeation fuel line in the installation instructions will inform the boat builder of the requirements, there is no way for the engine manufacturer to control what the boat builder will do with the fuel lines. In recognition of this fact, NMMA recommended that EPA should include in the evaporative emissions requirements a “safe harbor” similar to that discussed above in the context of the exhaust emission standards and the OBD system under the SD/I engine manufacturer section. Under this provision, so long as the engine manufacturer includes a specification for low-permeation fuel lines, the compliance obligation with the rule would be met.

Sierra currently distributes marine fuel hose under the Shields Marine Hose brand name. Shields Marine Hose commented that these fuel lines are manufactured by a major rubber hose manufacturer who deals in automotive and industrial hose and that all of the major current suppliers of marine fuel feed lines are dependent on similar companies for their product. Shields commented that that low permeation marine fuel line is currently available from a single vendor at this time, but their factory is working on developing a cost competitive low permeation hose. Due to the time needed to develop and test new products, and the lack of priority given to marine hose by automotive suppliers, Shields commented the compliance date should be January 1, 2009. Shields stated that this implementation date will allow complete availability of tested compliant hoses from all vendors and that the time will be used to allow builders and suppliers to balance inventories. Shields further commented that builders will also need this time to make sure the less flexible low permeation hose can be routed correctly and to match fittings and hose to make sure of adequate coupling retention.

Trident Rubber and Parker Hannifin commented that there is no compelling reason to delay the hose permeation standards beyond the earliest practicable timeline. Low permeation "barrier style" marine fuel line hose (now designated and labeled "Type A1-15" as per SAE J1527 and ABYC H24 Standards) has been abundantly available, and successfully used on the majority of U.S. boats over the past 12 years. Trident stated that its factory records indicate that over 43 million feet of this hose has been supplied to the marine industry during this period. So there is strong industry awareness of and experience with this hose. Regarding the boat builders need to deplete their inventories of non-complaint fuel hose, Trident and Parker commented that this is not a problem because the majority of boat builders stock hose inventories of one month or less of their usage, and the fuel line hose is sold in quantities as small as 25 feet. Trident and Parker commented that it is logical for the EPA to have a compliance date for low permeation fuel line hose no later than the July 31, 2008 effective compliance date for ABYC and NMMA. Parker commented that guidance is necessary to ensure that the entire recreational marine industry is fully aware of these new requirements, but given the vast informational and

educational vehicles currently available to boat manufacturers such as trade and consumer shows and commercial advertising, educating boat manufacturers should not be an issue.

Attwood commented that it provides fuel hose assemblies, fuel fills, ventilation components, tanks, surge protectors and fittings that total well over a hundred different products. Attwood commented that an implementation date of January 1, 2008 for fuel hose standards would be too soon considering that the EPA will not have a final ruling on the fuel hose permeation until just before the January 1, 2008 mandate. Atwood stated that it would need more time to understand and react to assure that the final product produced not only adheres to the standard but is of the highest quality as well. Aggressive timing may force Attwood, due to engineering resource concerns, make a decision that in the face of the high competition in this product category that Attwood would be better off dropping out of this product category and focus Attwood's resources on our other categories with much higher returns.

Honda commented that the implementation date for fuel filler pipe/tube permeation standards should be delayed until 2011, or at a minimum two model years of lead time from the final rule effective date and should be the same year as for fuel tanks. Referring to Section 1045.107 (a), a fuel fill pipe that is exposed to liquid fuel is considered to be fuel line according to the proposal. Honda argued that, unlike the normal fuel supply line, extra time will be needed to modify the fuel tank, design, validate and find a supplier for the larger diameter fill pipe.

California ARB commented that the fuel line permeation standard of 15 grams per square meter per day ($g/m^2/day$) is the same as those for recreational vehicles and that the California small off-road engine/equipment program has implemented this standard since 2006. California ARB further commented that its component certification data for fuel hoses supports setting a lower standard, and recommended a more stringent standard of 5 $g/m^2/day$ at 40 degrees Celsius.

NMMA: The boat builders start building for their model year in July. If EPA finalizes a rule in June or July that requires that low-permeation hose be required starting on January 1, 2009 it is already too late to build this into their product. It is also going to take quite some time before the 2000+ motorized boat builders even know that they need to do this. NMMA would recommend that EPA either put some enforcement discretion language in the preamble that explains that boat builders be required to begin installing low-permeation fuel hose in 2009 for 2010 model boats. The materials for 2009 design boats were ordered at the time of the 2007 IBEX trade show. Orders for 2010 were placed around the time of the 2008 IBEX trade show.

St. Gobain: A situation has evolved with what could be an excess of a relatively expensive raw material near the end of the year when the change-over to a new low-permeation fuel hose is required. It involves just one product type for a key OEM customer. Is there a way that EPA could accommodate a manufacturer's need to avoid scrapping unused raw material or finished goods such as fuel line? If the tubing has a manufactured date in 2008, can the engine builder use it after Jan. 1, 2009? This critical plastic raw material has a high minimum order quantity due to the reactor size used to make it. It is a unique material that is only made for us.

Letters:

Commenter	Document #
NMMA	0688
Sea Ray	0683
Honda	0705
California ARB	0682
Trident Rubber	0636
Parker Hannifin	0672
Attwood	0653
ABYC (hearing)	0642
Sea Ray	0683
S2Yachts	0697
Grady-White Boats	0677
North American Sleekcraft	0666
Triton	0656
Lund Boat Co	0655
Brunswick Corporation	0695
Brunswick Commercial and Government Products	0652
Lowe Boats	0660
Godfrey	0645
American Marine Sports	0639
Cigarette Racing	0637
Regal Marine Industry	0635
Massachusetts Marine Trade Association	0634
Regulator Marine Inc.	0632
Chaparral/Robalo Boats	0630
Ranger Boats	0628
Premier Marine Inc,	0613
Hallett	0713
Skeeter	0706
Yellowfin	0681
NMMA	0792
St. Gobain	0796

Our Response:

As proposed, the permeation standard is 15 g/m^2/day for marine fuel lines. This standard is supported by test data presented in the Final RIA on low-permeation marine fuel lines. The implementation date for this standard is January 1, 2009. This means that any boat, portable fuel tank or outboard engine manufactured on or after this date would need to use fuel lines compliant with this standard. We allow for production of noncompliant fuel lines to serve as replacement parts as described in Section 4.7.10.

There are two exceptions to the above implementation date. First, as discussed below in Section 4.3.3, we are providing additional lead time for under-cowl fuel lines on outboard marine

engines. Second, we will allow boat builders to use up their existing inventory of fuel lines provided under normal business practices, even beyond the standard date. However, manufacturers would not be permitted to circumvent the standards by stockpiling noncompliant hose just prior to the implementation of the standards.

Low-permeation marine fuel lines and fill neck hose are already commercially available. In fact, many manufacturers already use low-permeation fuel lines on their boats. In addition, ABYC recently incorporated low-permeation fuel line requirements into the industry guidance document H-24, Gasoline Fuel Systems, and these requirements will be effective July 31, 2008 and are mandatory for NMMA certification.

We first proposed these standards in 2002. We reproposed these standards in 2007, with the clear understanding that low-permeation was now readily available and would be expected for the 2009 model year. The delayed timing of the final rule requires that we specify January 1, 2009 as the start date rather than the 2009 model year. While we are prepared to accommodate existing inventories of fuel lines, we find it highly problematic to learn that manufacturers are admitting that they are continuing to order significant quantities of high-permeation fuel line in October 2007 and plan to continue to order high-permeation fuel line in October 2008 such that they will be unable to comply with standards using normal inventory practices until the 2011 model year. Based on the information supplied by Trident regarding normal inventory practices, we expect that inventories of high-permeation fuel line will generally be depleted within 30 days following the effective date of the regulation. Any high-permeation fuel lines installed in vessels after this time would be determined to violate the stockpiling prohibition unless the manufacturer could demonstrate that unusual circumstances caused the inventory of high-permeation fuel lines to exceed a 30-day supply. The circumstances described by St. Gobain would appear to qualify for an allowance for extended inventories. Placing routine orders for high-permeation fuel lines in 2007 and 2008 in such that inventories of these fuel lines would allow for continued production more than 30 days after the effective date of the regulation where low-permeation fuel lines were also available would clearly not be an acceptable demonstration in this regard.

4.3.2 Fuel line permeation- fill neck

What Commenters Said:

NMMA expressed concern about including filler necks, under certain conditions, in the fuel line definition. NMMA commented that the inclusion of the filler neck in the definition for "fuel line" is contrary to their understanding of what is supposed to constitute a fuel line. They argued that filler necks are not intended to store fuel, which is further demonstrated by the applicable ABYC standards. NMMA stated that evaporative emissions from filler necks are very low, and referenced testing performed in 2005 that demonstrates this. Given the characteristics of a filler neck and the low evaporative emissions associated with this component, NMMA recommended that EPA delete the language in § 1045.801 which says "if any portion of the filler neck material continues to be exposed to liquid fuel after a refueling event in which an operator fills the tank as full as possible."

Yamaha provided further explanation on the above concern expressed by NMMA regarding the fuel line definition. Yamaha stated that Federal regulations (33CFR Subpart J 183.501~183.590) and ABYC H24 require marine fuel fill hoses be "self draining" and installed at or above the top most portion of the fuel tank. Also H24.5 requires a 5 percent vapor space be applied to the tank for compliance for fuel expansion. Yamaha commented that there is no available or feasible technology today to prevent a consumer from overfilling a designed system on a boat or for current automotive except for education and warnings. Yamaha provides, in the Owners Manual, directions for proper filling. These directions state that the owner should not fill the fuel fill hose with gasoline and, for PWCs, to stop filling the tank at least 2" (inches) from the top surface of the tank. When the engine hatch is open, Yamaha stated that there is a visual indication of fill level for their PWCs. Yamaha requested that the last sentence under the definition for fuel line be stricken because this is a consumer tampering issue that is uncontrollable through boat design.

Letters:

Commenter	Document #
NMMA	0688
Yamaha	0721

Our Response:

The purpose of this definition was to include fuel lines exposed to liquid fuel and exclude fuel lines exposed only to fuel vapor (or short wettings in the case of fill necks). Data in the RIA suggests that vent lines and fuel fill necks generally have relatively low permeation when exposed to fuel vapor under normal fuel system configurations. At the same time, data in the RIA shows that vent lines and fill neck hose have relatively high permeation when exposed to liquid fuel. In the case where a vent line or fuel fill neck stores liquid fuel after a refueling event, we believe that these components should be covered by the fuel line permeation standards. For this reason, we specifically added a reference to vent lines that fill with fuel after a refueling event in the definition of fuel lines.

We agree with the comment that the definition of fuel lines should not be based on operator behavior. Therefore we revised the definition of fuel lines to focus on the design of the fuel system rather than operator behavior. In the case where a fuel system is designed such that, under a normal fuel filling event, the vent line and fill neck are not exposed to liquid fuel, then they would not be considered to be fuel line for the purposes of the permeation standards. For example, a fuel system can be designed to work with a fuel shut-off control on the fuel fill nozzle such that the nozzle shuts off before the tank completely fills. This would provide the vapor space specified in ABYC H24 and prevent the vent line and fill neck from storing fuel. We would not consider the vent line and fill neck to be subject to the permeation standards in this design. We recognize that, under this design, an operator could fill the tank higher by repeatedly restarting the fuel pump after it shuts off. In this case, we would expect the manufacturer supplied directions for proper filling to state that the owner should not restart the pump after automatic shut off.

4.3.3 Fuel line permeation– under-cowl fuel lines

What Commenters Said:

Several manufacturers commented that additional lead time would be necessary for fuel lines used under the cowl on outboard marine engines. These manufacturers included NMMA, Mercury, Suzuki, Yamaha, Honda, Sea Ray, American Marine Sports, Cigarette Racing, Yellowfin, Parker-Hannifin, and Trident Rubber.

Manufacturers commented that, despite the fact that low-permeation hoses are commercially available, a major concern for OB engine manufacturers is the ability to meet the requirement to use low permeation hoses under the engine cowl, on outboard engines, by 2009. These smaller hose sections between the engine mounted fuel-system components and connectors are preformed or injection- molded. Manufacturers insisted that a model year 2009 compliance date for these under-cowl hoses is simply not feasible given that hundreds of hose parts will have to be redesigned and manufactured and stated that the alternative proposal in the preamble to allow the under-cowl hoses additional time for compliance is therefore necessary and appropriate. NMMA and Mercury expressed support for the concept of EPA's optional approach for implementation that would allow under-cowl hoses delayed implementation in exchange for an earlier compliance date for low-permeation fuel line from the fuel tank to the engine. However, given that the promulgation of the final rule will not occur until the end of this year at the earliest, NMMA and Mercury recommended that EPA finalize a revised schedule that would account for the one year delay. Using EPA's proposed approach, the revised schedule would be January 1, 2009 for implementation of low-permeation fuel lines and a phase-in of 30-60-90 percent for under-cowl hoses between model year 2010 and 2012 and 100 percent compliance in model year 2015. This phase-in schedule was also specifically supported by Suzuki, Yamaha, and Honda

Suzuki recommended a single year averaging approach is appropriate for compliance under the proposed phase-in concept. This would consist of calculating the total interior surface area of the under-cowl fuel line installed on each model variation in a manufacturer's full product line, determining the total hose surface area from projected sales by engine family and model, and implementing complaint hose as necessary for a given model year and phase-in percentage. Under this approach, the manufacturer would have the flexibility to select which fuel lines can most appropriately be revised in a cost-effective manner while ensuring overall compliance with the standards.

Letters:

Commenter	Document #
NMMA	0688
Yamaha	0721
Mercury	0693
Suzuki	0698
Trident Rubber	0636
Parker Hannifin	0672
Yamaha (hearing)	0642
Sea Ray	0683
Brunswick Corporation	0695
Brunswick Commercial and Government Products	0652
American Marine Sports	0639
Cigarette Racing	0637
Yellowfin	0681

Our Response:

Outboard engine manufacturers have expressed concern that it will be difficult for them to meet final 2009 date for the sections of fuel lines that are mounted on their engines under the engine cowl. While some sections of straight-run fuel line are used on the outboards, many of the smaller sections between engine mounted fuel-system components and connectors are preformed or even injection-molded parts. Outboard engine manufacturers stated that they will need additional time to redesign and perform testing on low-permeation fuel lines under the cowl. To address this issue, we are finalizing a phase-in of under cowl fuel line permeation standards. For each engine, we are adopting a phase-in, by hose length, of 30 percent in 2010, 60 percent in 2011, 90 percent in 2012-2014 and 100 percent in 2015 and later. This will allow manufacturers to transition to the use of low-permeation fuel lines in an orderly fashion.

In the NPRM, we asked for comment on an optional program whereby manufacturers would have to offset this delay in hose permeation control by pulling ahead straight-run fuel lines exterior to the cowl. We are not finalizing this phase-in as being dependent on a pull ahead of straight-fuel lines for two reasons. First, the implementation would be difficult given that the outboard engine manufacturer installs the under cowl fuel lines, while, in most cases, the boat builder installs the straight-run fuel lines from the engine to the fuel tank. Second, given the timing of the final rule, there is little opportunity for pulling ahead the use of low permeation fuel lines.

In the NPRM, we also discussed basing the phase-in on a per-engine basis or a per-manufacturer basis. Suzuki commented that the phase-in be calculated across the manufacturer's full product line based on inside surface area of the under cowl fuel lines. We believe that this approach is overly complex for this transitional program. Instead, we are basing the phase-in on length of the fuel lines for each engine. By using this approach, it removes the need to establish a credit trading program between engine models and greatly simplifies implementation of this program.

4.3.4 Fuel line permeation– primer bulbs

What Commenters Said:

Several manufacturers commented that additional lead time would be necessary for primer bulbs. NMMA, Mercury, Suzuki, Yamaha, Trident Rubber, Shields Marine Hose, Parker Hannifin, Attwood, Sea Ray, Grady-White, Triton, Brunswick Corporation, Lowe Boats, Godfrey, Regulator Marine. NMMA commented that, for small business boat builders that are unfamiliar with the certification process, certifying a bulb as part of the fuel system will be difficult.

Manufacturers stated that the implementation date for the proposed permeation standard for fuel lines in causes concern for OB manufacturers in the context of the primer bulbs. Manufacturers argued that there are currently no low-permeation primer bulbs available in the marketplace. To require low-permeation primer bulbs in model year 2009 would mean that this product would have to be available next year. Manufacturers insisted that this compliance deadline will be impossible for industry to meet given that manufacturers would have to design, test and produce the requisite product by next year. In light of the lack of a compliant product, several manufacturers recommended a model year 2011 compliance date for primer bulbs. NMMA stated that this date would give industry a two-year lead time from the date the rule is finalized, which should provide industry with enough time to develop primer bulbs that can meet the EPA standards. Other manufacturers, stating similar reasons, recommended an implementation date of 2010 for primer bulbs.

Yamaha commented that it has been researching various materials for permeation compliance and to increase the ability of a primer bulb to withstand federal fire test standards for under deck installation. Yamaha stated that its testing has shown that current fluorination processes to NBR material (FKM product) produces some desired effects however low temperature operation is greatly diminished when temps fall at around 20°F. Since a primer bulb is used in a very diverse market, Yamaha commented that this current technology may have its place but unfortunately use and durability in the colder climates are jeopardized. Yamaha stated that it will continue testing to achieve a balance in both use and durability and permeation compliance. Suzuki commented that it has already identified some promising materials and designs; however it is too early to know if these materials will actually function as desired. Assuming that a suitable material is identified, Suzuki stated that the primer bulb will still need to be designed, validated and produced in quantity. It is expected that this process will take a minimum of two years to complete. Yamaha and Suzuki recommended that EPA revise the effective date for implementation of low-permeation primer bulbs until the 2011 model year, which will allow a minimal two years of lead-time to develop the appropriate new products.

Sierra Marine hose stated that it currently manufacturers primer bulbs and primer bulb assemblies for the marine industry. Sierra stated that permeation resistant compounds such as FKM are available to make low permeation primer bulbs; however, permeation is not the only criteria needed to produce usable safe fuel primer bulbs. Primer bulbs must also be ultraviolet light resistant, have high shear strength and be abrasion resistant. The material must also remain flexible over a wide temperature range. Studies must be run to examine swell, heat ageing and

coupling retention. Sierra stated that it needs to have time to do all of the testing and possibly need to build new tooling or purchase new production equipment. In addition to the above, Sierra commented that a non-fire retardant SAE J 1527 hose needs to be developed as none currently are available. The complete hose assemblies then must be tested for all of the above criteria. Sierra must also develop new production lines to assemble the bulbs and fuel line assemblies. New packaging will also be required.

Atwood commented that there is not a primer bulb on the market which will meet EPA's current proposal. Again, the engineering time associated with the development of a "white space" product is somewhat lengthy due to the fact that possible new materials and/or manufacturing processes may be required to meet the constraints of the new ruling. Atwood state that its current endeavors in the design and possible manufacturing of a new primer bulb to meet the requirements of the ruling is more on track for the 2010 timeframe. Even then, Atwood expressed concern that there are a lot of unknowns that could delay a new primer bulb introduction.

Mercury commented that some small outboards utilize an engine mounted, push primer such as those that were excluded from evaporative emissions standards for small nonroad engines. Mercury stated that it is appropriate to also exclude them on small outboard engines as well because the evaporative emissions from these primers would be extremely small, have not been quantified, and there is no development work done to date as to whether there is a need or a technology to reduce permeation from these components.

Letters:

Commenter	Document #
NMMA	0688
Sea Ray	0683
Yamaha	0721
Mercury	0693
Trident Rubber	0636
Shields Marine Hose	0624
Attwood	0653
NMMA (hearing)	0642
Sea Ray	0697
Grady-White Boats Inc.	0677
Triton	0656
Brunswick Corporation	0695
Brunswick Commercial and Government Products	0652
Lowe Boats	0660
Godfrey	0645
Regulator Marine Inc	0632

Our Response:

At the time of the proposal, we agreed that low permeation marine primer bulbs were not commercially available. However, we also stated our belief that low permeation fuel line

materials were available and could be used for manufacturing primer bulbs. In the proposal, we specifically identified FKM, which is an elastomer that has long been used in fuel line applications. Many grades are available that range in permeation resistance, cold weather properties, and flexibility. We recognized that some development time would be necessary to develop primer bulbs of this (or other) low permeation fuel materials.

Since the NPRM, we have received information supporting the proposed position; a new primer assembly has been developed that meets the fuel line permeation standards. This assembly uses a spring loaded piston as the pumping device rather than depending on the flexibility of the housing material. In appearance, it is similar to existing primer bulbs. This product is not yet commercially available, but serves as an example of how technology progresses, given sufficient incentive and time.

We agree with manufacturers that additional lead time is necessary to design, validate, and produce low permeation primer bulbs. Therefore, we are finalizing an implementation date of 2011 for primer bulbs. Mercury commented that engine mounted, push primers are not included in the fuel line definition for Small SI equipment and should not be included for marine products as well. We excluded these primers for Small SI engines because fuel drains from them after priming and they are not usually exposed to liquid fuel. We agree with Mercury that these primers should be excluded from the fuel line definition for marine products as well.

4.3.5 Tank permeation standards and lead time

What Commenters Said:

Environmental Defense stated that it is pleased that EPA has chosen to adopt fuel tank standards for SI small and marine engines. The California Air Resources Board expressed support of fuel tank permeation standards but stated that the standard of 1.5 g/m^2/day should be based on testing on CE10 at 40°C rather than at 28°C. California ARB commented that component certification data from the small off-road engine program in California supports setting a lower standard. California ARB also commented that the phased-in schedule to meet the fuel tank permeation standards is too lengthy and that two years is sufficient time to allow manufacturers to design and produce equipment meeting the new evaporative standards. California ARB pointed out that the control technology is readily available and currently used in lawn and garden equipment in California.

Trident Rubber commented that more time is necessary for development and availability of compliant fuel tanks but the early use of low permeation fuel line hose and vent line hoses will provide evaporative emissions reductions that can enable time extensions for fuel tanks.

NMMA stated that it can support the requirement for low permeation plastic fuel tanks, with the reservation that any new technology can meet marine durability standards. NMMA commented that it does not dispute that the level of the standard is feasible and the implementation date for PWCs and portable tanks is achievable; however, NMMA expressed concern that the implementation date for SD/I and larger OB fuel tanks is overly ambitious. NMMA asserted that trials run by tank manufacturers using multi-layer construction technology

have indicated the following problems: inconsistent impact strength, fitting leaks, processing difficulties, tank brittleness, and inability to repeat processing to provide adequate and uniform second layer construction. Based on concerns that there are no commercially available rotational-molded tanks that could meet the proposed standards and that additional testing and trials must be conducted, NMMA stated that it has serious reservations about imposing a 2012 compliance deadline for rotational-molded tanks. To address these concerns, NMMA recommended that EPA perform a technical review in 2010 and impose an implementation date based on the findings.

Brunswick commented that the advent of cross linked polyethylene tanks offered boat builders with an alternative material to ensure tank longevity. Brunswick stated that the current permeation requirements still have not yielded a commercially viable solution other than a whole scale return to aluminum. Brunswick expressed concern that, while many larger tanks are still made of aluminum, the increase in bio fuels will bring about larger water content in the fuel tanks based on the known properties of ethanol and that increased water brings corrosion concerns that we must deal with. Brunswick recommended that we consider a standard for tanks similar to that of fuel hoses in order to explore these issues.

Inca commented that when cross-link polyethylene was first introduced into the marine market, fuel tanks began failing in the field and resulted in a national recall and all the tanks had to be removed out of the boats. Inca stated that it pioneered the first successful plastic fuel tank by researching, redeveloping, and building on the mistakes the first manufacturer made. Inca commented that, even then, the plastic tanks were phased in slowly to provide field experience to gain confidence and make any necessary adjustments. Inca stated that a similar process is necessary for the implementation of low permeation marine fuel tanks.

Inca argued that the many experimental products and processes used to manufacture low-permeation tanks have not demonstrated the characteristics needed to consistently manufacture fuel containment products with the confidence that is needed to avoid fuel spillage and insure safety to users of marine vessels and other original equipment products. Inca stated that it has had extensive material trial experiences with Arkema, Exxon/Cyclics, Ticona, Solvay, Fluro-Seal, and A. Schulman. Inca reported problems they have encountered which included: fitting leaks, holes, brittleness, repeatability (high scrap rates up to 75%), constant reformulations in materials, machinery modification issues that require untested maintenance practices, premature second layer kick off resulting in commingled layers, difficult process changes that are not realistic in a major production setting, and bulk storage problems of the second layer materials. Due to these kinds of problems, the Inca concluded that the industry does not have a commercially proven product (raw material) that will enable them to manufacture roto-molded Marine fuel tanks to 1.5 g/m^2/day.

Inca made several recommendations for what is needed before they will be able to produce low-permeation marine fuel tanks. They stated that material suppliers need to continue refining their materials. Inca claimed that no materials are commercially available or readily processable, although some have passed California ARB requirements. Inca stated that more time for internal testing to see that the multi-layer materials hold up to the demanding areas of the process variables, mold variables, and design variables that Inca works with day in and day

out. Inca stated that it needs more external testing data on multi-layer tank models from outside labs on mechanical strength tests that are required by H-24. Inca commented that it takes time and cumulative experience and knowledge to get it right. Finally, Inca stated that it needs marine field testing data and a phase-in period to limit the number of new tanks going into the field in order to contain its risks of unexpected performance issues that may arise from uncharted waters of rotation-molded multi-layer fuel containment. Due to these concerns, Inca recommended that EPA perform a technical review in 2010.

Promens commented that some barrier layer materials may increase the brittleness of plastic marine fuel tanks, thus lowering the impact needed to create a ductile failure of the tank shell. Promens performed dart impact testing on one low permeation barrier approach and saw that the effect of the peculiar barrier layer causes significant flexibility changes in the cross link polyethylene shell, lowering its impact resistance. Promens commented that we should not degrade personal safety for environmental benefits and that impacts to the tank such as mishandling, poor transportation, manufacturing accidents, or in-field use should not result in a lower expectation of performance.

Grady White requested that EPA withdraw 2012 implementation date, revisit the technology in 2010, and set an implementation date at that time. Grady White commented that time is needed to develop, test, and field prove new technologies and that the proposed implementation schedule is too aggressive considering there are no permanently installed, field-proven, low permeation tanks currently in-use. Grady White stated that a number of issues have been communicated from tank molders including ability to warrant barrier layer, lack of field experience, impact resistance, processing expense, and processing control.

Arkema commented that it supplies PetroSeal technology and is eager to work with tank manufacturers to help them meet the tank permeation standards. This technology is a two-layer fuel tank. The inner layer is Rilsan Polamide 11, which is an engineered polymer which may be used to create a permeation barrier in rotation-molded fuel tanks. Arkema stated that this specialty nylon, which is used in automotive fuel lines, gives excellent resistance to fuel permeation, and is a tough, impact-resistant polymer. Arkema commented that this material is dimensionally stable, molds very easily and is manufactured from a renewable resource (100 percent bio based from a vegetable oil). In a low-permeation, roto-molded fuel tank, the the outer side of the layer is metallized polyethylene which has an excellent resistance to alcohol permeation and molds very easily. The inner layer is the PA11 which is designed to adhere with the outer layer to ensure the structural integrity of the tank and to ensure minimal permeation. As a result, Arkema concludes that tanks manufactured with PetroSeal are very low permeation, very tough and cost-effective.

Arkema commented that the PetroSeal technology meets current EPA permeation regulations as tested by EPA laboratories (see the RIA) and has received a California ARB exemption for the small off road and recreational vehicle tanks. Arkema also stated that the tanks using this construction have been demonstrated to meet US Coast Guard requirements for mechanical strength and fire resistance for permanently installed marine fueled tanks. Arkema had a ten gallon and 40 gallon fuel tank manufactured and tested by Imanna labs. In addition, a lawn and garden fuel tank using this technology passed the SAE J288 snowmobile impact test.

Arkema commented that PetroSeal is a commercially active technology today and they are selling this material for use in motorcycle fuel tanks.

Solar Plastics commented that they have conducted an active research and development effort for many years and that numerous tooling, material, and processing concepts have been invented, evaluated, or optimized in their test facility. Solar has been working with Arkema and now produces multi-layer rotation-molded fuel tanks. Solar Plastics commented that it has established safe, reliable, and consistent processes to mold the two layer PetroSeal material system. Solar asserted that these molded tanks exhibit excellent adhesion between layers, impact strength that meets various industry standards, and permeation resistance well within proposed standards. PetroSeal fuel tanks molded by Solar Plastics satisfy durability requirements adopted by the marine, and lawn and garden equipment industries. These include ambient and cold temperature impacts, and burn tests. Molding methods are cost efficient, and utilize the same tooling and machinery that produce single layer tanks. Based on these considerations, Solar Plastics concluded that technology is available today to rotation-mold fuel tanks that meet the proposed evaporative emissions standards.

Centro commented that, in anticipation of low permeation requirements for fuel tanks for Small SI equipment and for boats, they have worked hard over the last five years to develop a solution that meets all requirements. Centro stated that they have a solution that is as durable as current rotation-molded tanks and meets all other criteria. Centro commented that they have invested hundreds of thousands of dollars in successfully developing and testing this technology, and that it would be a disservice to the environment to delay tank permeation standards.

Briggs and Stratton and EMA commented that the proposed alternative fuel tank standard of 2.5 g/m^2/day standard at 40°C is not supported by theory or literature to be equivalent to the 1.5 g/m^2/day standard at 25°C. They stated that the alternative standard should be changed to 3.0 g/m^2/day at 40°C. California ARB commented that the alternative of 2.5 g/m^2/day at 40°C suggested by U.S. EPA should not be an option because this standard is too lenient based on certification data which supports a tougher standard.

Letters:

Commenter	Document #
NMMA	0688
Environmental Defense	0648
California ARB	0682
Trident Rubber	0636
Inca Molded Products	0700
Briggs and Stratton	0657
Brunswick (hearing)	0642
Grady-White Boats	0677
Arkema (hearing)	0642
Solar Plastics (hearing)	0642
Inca Molded Products (hearing)	0642
Promens (hearing)	0642
EMA	0691
Centro	0737

Our Response:

During the development of the proposed rule, we worked closely with the recreational marine fuel tank industry to understand their products, business practices, and production processes. Information gathered from these interactions was used to craft the proposed regulatory provisions related to controlling gasoline fuel tank permeation emissions. During these discussions, important issues were identified with respect to concerns regarding the technical feasibility of controlling permeation emissions from the cross-link polyethylene (XLPE) rotation-molded tanks.

Manufacturers assert that the availability of rotation-molded fuel tanks is critical to the marine industry. This type of fuel tank is installed in many recreational marine vessels powered by SD/I and outboard engines. The rotational molding process, which has low capital costs relative to injection molding, facilitates the economical production of fuel tanks in the low production volumes as required by boat builders. Furthermore, plastic fuel tanks offer advantages over metal fuel tanks, both in terms of cost and corrosion resistance. The advantages of XLPE over other plastics used in fuel tanks today such as HDPE are its compatibility with the rotational molding process and the ability of XLPE fuel tanks to meet the U.S. Coast Guard safety tests, especially the flame resistance test.

We have concluded that the 2012 fuel permeation standards are technologically feasible and appropriate for rotation-molded marine fuel tanks. This conclusion is supported by data presented in the Regulatory Impact Analysis from comments submitted by two fuel tank manufacturers after the proposal. Since we initially proposed tank permeation standards for marine fuel tanks in 2002, several manufacturers have shown progress in the development of low permeation, rotation-molded tanks. In addition, this rule provides about 36 months of lead time for rotation-molded tank manufacturers to address remaining technology issues and to certify their products.

However, commenters expressed a concern that some rotation-molded tank manufacturers are not as far along in their technological progress toward meeting the standards and are not certain about their ability to meet the EPA requirements in 2012. To address this situation, these manufactures have requested that EPA perform a technical review in 2010 to determine whether the compliance dates should be adjusted. However, we believe that the tank permeation standards have been demonstrated to be technologically feasible in the 2012 time frame. The RIA identifies several technologies that could be used to reduce emissions from rotation-molded tank including barrier materials and post processing coatings. In addition, alternative construction methods may be used such as low-permeation fiberglass. Finally, if the boat building industry were to accept standardized fuel tank sizes, fuel tank manufacturers may be able to make use of higher production volume, low permeation, manufacturing processes such as coextrusion blow-molding. Therefore, we do not believe that a technology review of the permeation standard is necessary or appropriate.

Nevertheless, we are concerned about the potential long-term impacts on the small businesses that have not yet developed technology that meets the requirements. Although marine fuel tanks must comply with Coast Guard safety regulations, marine fuel tank manufacturers have never been required to certify to permeation standards. The rotation-molded tank manufacturers are generally small businesses who have limited engineering staffs and are dependent on materials suppliers for their raw materials.

During the next few years, EPA intends to hold periodic progress reviews with small businesses that manufacture rotation-mold fuel tanks. The purpose of these progress reviews will be to monitor the progress of individual companies towards compliance with the tank permeation standards and to provide feedback as needed. Rather than conducting a broad program with the entire industry, we will conduct separate, voluntary reviews with each interested company. These sessions will be instrumental to EPA in following the progress for these companies and assessing their efforts and potential problems.

To help address small-business concerns, we are relying on the hardship relief provisions for small-volume manufacturers in 40 CFR 1068.250. In the event that a small-volume manufacturer is unsuccessful in the 2012 model year and seeks hardship relief, these progress reviews would provide an important foundation in determining whether a manufacturer has taken all steps to comply with the permeation standards in a timely and orderly manner.

We are finalizing the optional alternative standard of 2.5 g/m^2/day at 40°C as proposed. This alternative standard is intended to provide flexibility to manufacturers that wish to perform a single permeation for certification to EPA standards and for use in certifying to the California ARB Small SI standards. The intent of the higher limit of 2.5 g/m^2/day is to account for increased permeation rates at elevated temperature. This increased limit is not intended to represent how an average tank may perform and is not intended to be mathematically equivalent to the primary standard, but it is rather intended to provide reasonable assurance that a tank certified at the higher temperature would pass the primary standard of 1.5 g/m^2/day at 28°C. This adjusted standard at 40°C is based on data presented in the RIA and is intended to account for variability in how different materials will respond to increases in temperature.

4.3.6 Tank permeation– under-cowl fuel tanks

What Commenters Said:

Yamaha commented it is unclear in the proposal if small, engine mounted fuel tanks would be subject to the proposed permeation standards. NMMA and Brunswick commented that there is no specific mention of these small tanks in §1060.103, as proposed. Yamaha stated that there is no credible evidence to show that small on engine mounted tanks are a contributor to HC emission losses during non-running/storage conditions. NMMA, Yamaha, and Brunswick argued that it is common industry practice for these small engine-mounted tanks to be drained of fuel prior to storage resulting in very low evaporative emissions. As an example of this, NMMA and Yamaha provided an excerpt from outboard engines owner's manual which specified that the owner drain the gasoline from the tank when the engine is stored for prolonged periods of time (2 months or longer).

Yamaha also commented that their portable engines with engine mounted tanks are dual fuel capable. What this means is Yamaha includes is a selector valve inline that provides for 2 sources of fuel supply. The operator can select either a larger 3 or 6 gallon portable tank, or the much smaller available 1.2 liter on-engine tank. Based on their experience, Yamaha stated that most operators choose the external portable tank for its volume for extended operation and never use the engine mounted version. Due to their light weight, Yamaha claimed that these engines are normally removed for transportation and for storage both in boats and home garages.

Brunswick and Yamaha recommended that EPA exclude engine-mounted tanks, 2.0 liters and under, from the fuel tank permeation standards.

Letters:

Commenter	Document #
Sea Ray	0683
Suzuki	0698
EMA	0691
Yamaha	0721
Mercury	0693

Our Response:

The proposed regulatory text clearly included engine-mounted fuel tanks under the proposed tank permeation standards. Proposed §1045.107 stated that "Other installed fuel tanks must meet permeation standards starting in the 2012 model year." Proposed §1060.801 defined installed fuel tanks as "any fuel tank designed for delivering fuel to a Marine SI engine, excluding portable nonroad fuel tanks." Due to the confusion expressed by commenters, we are adding a clarifying statement to §1060.103 that states that engine-mounted fuel tanks are an example of Marine SI fuel tanks.

We do not believe that it is appropriate to rely on operator behavior as a control strategy for permeation emissions. Even in the cases where the operator drains the fuel tank prior to

storage, it is unlikely the tank will be drained completely. Any fuel or vapor left in the fuel tank would have the potential to permeate. In addition, the maintenance instructions provided by Yamaha and NMMA only suggest that the fuel tank be drained for prolonged storage. Other maintenance recommended for long storage included draining oil, fogging the engine, draining the cooling system, and greasing the spark-plug threads. These maintenance steps are clearly not intended to be performed after each engine use. Fuel would likely permeate through the fuel tank whenever the engine is not being put into long term storage. Although a 2.0 liter fuel tank is small compared to most marine fuel tanks, it is comparable in size to fuel tanks used on many Small SI applications, many of which are engine-mounted. As with Small SI fuel tanks, we believe that Marine SI fuel tanks, even engine-mounted tanks, contribute to HC emissions in our nation's air. Therefore, we are finalizing the tank permeation standards for all Marine SI fuel tanks, including engine-mounted fuel tanks.

4.3.7 Diurnal – installed fuel tanks

What Commenters Said:

The California Air Resources Board (ARB) commented that that the proposed lead time for the implementation of passively purged carbon canisters is also too lengthy. ARB argued that this technology is widely used and has been proven by the automotive industry and recommended that the diurnal standards be implemented with the 2009 model year. ARB also noted that actively purged canisters could further reduce vented emissions. ARB recommended that a diurnal performance standard be set for high production volume marine spark-ignition vessel manufacturers, arguing that, without a performance standard, U.S. EPA cannot validate emission reductions. ARB stated that a design-only standard would not take into account connector losses, carburetor emissions, and leaks from poorly designed integrated engines. As a result, they recommended that the diurnal standard include emissions from complete evaporative emission systems, to be measured over three days (without a carbon canister) or seven days (with a carbon canister), and be based on tank volume. This is consistent with on-road vehicle test procedures.

Environmental Defense expressed support of EPA's proposed diurnal standard and for a near term implementation date for marine fuel tanks. Environmental Defense noted that the proposed diurnal standard for marine engines will control diffusion emissions from recreational boats sufficiently. However, if EPA were not to finalize the diurnal standard, then Environmental Defense would object to the omission of a diffusion standard for marine engines. Because EPA did not propose running loss standards for marine engines, and diurnal emission control would help control running loss emissions, Environmental Defense commented that EPA should finalize a diurnal standard immediately.

Delphi commented that many factors will affect the efficiency of the evaporative emissions system, including canister size, configuration (length vs. cross-section), carbon type, operating temperature, fuel vapor flow rate, and other factors which impact the HC adsorption capabilities of the canister. Delphi stated that proper installation and use of carbon canisters in marine applications (where diurnal emissions regulations are proposed) will effectively reduce evaporative emissions. Delphi expressed support for a useful life of five years. They commented

that this useful life period is consistent with Delphi's long-term experience with automotive canisters

Delphi also stated that the proposed implementation date of 2010 is acceptable from a canister component perspective. Carbon canisters are a fairly mature technology. The canister designs currently intended for marine use are relatively simple designs. Delphi said that it will continue to work with NMMA and ABYC to define the canister design requirements and proper installation and use. Delphi did note that, input from NMMA and/or ABYC may indicate system-related challenges that may require additional time to solve. Delphi expressed support for the proposed requirement to design the system to prevent liquid fuel from entering the canister, noting that exposure to liquid fuel will significantly reduce the ability of the canister to adsorb HC vapors. Delphi stated that, following exposure to liquid fuel, purging the canister, particularly in a passive purge system as proposed for marine applications, would be a lengthy process, and permanent degradation in canister working capacity may result. Delphi also expressed support for the proposed alternative standard for non-trailerable boats because fuel temperature variation, and thus diurnal emissions will be less than that experienced on trailerable boats.

NMMA said that they had performed successful in-use tests on carbon canisters installed on boats and had data showing sufficient emission reductions from passively purged canisters to meet the proposed standards. However, NMMA expressed concern that more time may be necessary to ensure that these systems are properly installed. One issue that manufacturers raised was that if the liquid fuel separator were to clog, or if the carbon canister were to be exposed to liquid fuel and clog, that this could result in pressurization of the fuel system. NMMA also stated that 3,000 boat builders would be potentially required to install carbon canisters and time would be necessary for the industry to develop installation standards that could be used by all boat builders to ensure that they are properly installing the carbon canisters in their boats.

Several other fuel system component manufacturers and boat builders commented that the proposed diurnal emission standards are feasible, given enough lead time. However, they commented on a number of technical challenges that they would need to address. Boat builders commented that adequate space must be dedicated and that space will need to be located above the plane of the top surface of the fuel tank. In addition, the canister would need to be high enough to prevent liquid fuel from entering the canister during expected changes to the vessel's attitude during normal use. An alternative, presented in the comments, is the use of a liquid/vapor separator device. While effective, commenters expressed concern that the component would add complexity and cost-location for both items will have to allow access to the fittings for inspection to meet ABYC standards. Therefore, installation and access would need to be designed to be within the vessel's appearance. In addition, boat builders commented that a high number of different sized canisters would be burdensome. Several boat builders commented that further research and testing must be performed to ensure safe and effective installation of carbon canisters on boats. Inca recommended that the EPA provide a technical review of carbon-canister technology in 2010.

ABYC testified that the well-established technology of automotive carbon canisters is presenting many challenges when adapted to the marine environment. ABYC established a carbon canister working group in 2006 including Delphi, Meade-Westvaco, the US Coast Guard Office of Boating Safety and industry fuel component experts to discuss, and eventually overcome, the safety issues surrounding this solution. ABYC stated that they began writing a marine focused standard to address all aspects of a canister on board a boat due to the absence of a universally accepted standard on the construction and installation of a canister on a boat. As part of this effort, ABYC explained that size, construction, shock, vibration, installation, and service environments are all concerns that are being addressed. ABYC commented that the nature of the carbon and the canister itself causes some unique issues that could result in pressurization of a marine fuel tank which violates the 33 CFR regulations that apply to recreational boats fuel systems. ABYC referred to this issue as a challenge to overcome that will take time to effectively solve.

The Coast Guard expressed concerns with the proposed option regarding the pressurizing of the fuel system, especially for large non-metallic fuel tanks (even to one psi), to meet the diurnal standards. Coast Guard stated that pressurizing non-metallic marine fuel tanks causes them to expand like a balloon which, among other problems caused by the expansion, may easily lead to fuel leaks in the tanks. Coast Guard also expressed concerns that the use of carbon canisters in fuel vent lines is not yet a proven marine technology. While they have been assured that the canisters can pass the battery of tests required of fuel system components, they have not yet seen test results. Coast Guard stated that they are continuing to work with a canister manufacturer in conducting appropriate testing but have not yet seen whether satisfactory results are achievable. Coast Guard commented that their main concern with the carbon canister option is the necessity for installing a check valve in the vent line to prevent liquid fuel from entering the canister. Coast Guard explained that the installation of this check valve may require the reconfiguration of the fuel systems in many boat models to prevent blockage of the vent line by liquid fuel when the boat is at an other than static float plane attitude which may in-turn require changes to the current industry fuel system standards. Additionally, there are no carbon canister construction or installation standards which Coast Guard believes may be critical safety considerations. Coast Guard stated that they remain optimistic that all of their concerns can eventually be satisfactorily addressed but we are commented that they believed more time may be needed for implementation of the diurnal standards.

During the comment period, NMMA recommended model year 2011 as the appropriate implementation date for diurnal emission standards and commented that this would provide industry with sufficient time for sorting through the remaining technical issues associated with carbon canisters on boats. Several boat builders and other NMMA members requested additional lead time, many of which also recommended a 2011 implementation date. Brunswick commented in favor of a 2011 implementation date, but also recommended a phase-in approach so that ABYC could work on a standard for the canister, and address the possible pressurization issue.

After the comment period closed, Brunswick provided more detailed information on a phase-in approach. Specifically, Brunswick recommended a phase-in of 40/80/100 percent of

their boats in the 2011 through 2013 model years.[3] When this approach was presented to EPA, it was also supported by NMMA and Genmar, who were in attendance. Brunswick commented that this phase-in was necessary for three reasons. First, they (and other large boat builders) have a large number of boat models that are independently designed and produced under individual brands. Brunswick commented that these brands, in many ways, each operate similar to a smaller business. Second, some of the boat designs have very limited space for the installation of canisters and would need substantial design changes, and therefore require more time. Third, Brunswick commented that a phase-in of the standards would allow them to better balance the demand for engineering resources.

We also received comments regarding additional lead time for small businesses. This issue is discussed in Section 4.9, below.

Letters:

Commenter	Document #
NMMA	0688
Environmental Defense	0648
Yamaha	0721
Suzuki	0698
California ARB	0682
U.S. Coast Guard	0631
Delphi	0638
Trident Rubber	0636
Inca Molded Products	0700
NMMA (hearing)	0642
ABYC (hearing)	0642
Sea Ray	0683
S2Yachts	0697
Grady-White Boats	0677
North American Sleekcraft	0666
Triton	0656
Lund Boat Co	0655
Brunswick Corporation	0695
Brunswick Commercial and Government Products	0652
Lowe Boats	0660
Godfrey	0645
American Marine Sports	0639
Cigarette Racing	0637
Regal Marine Industry	0635
Massachusetts Marine Trade Association	0634
Regulator Marine Inc.	0632
Ranger Boats	0628

[3] Brunswick Boat Group, "Brunswick Boat Group Diurnal Emission Controls," Presentation to U.S. EPA, April 4, 2008.

Larson/Glastron Boats	0626
Four Winns Boats	0650
Premier Marine Inc,	0613
Skeeter	0706
Yellowfin	0681
NMMA	0739
Grady-White	0750
Four Winns	0625

Our Response:

We are finalizing the diurnal emission standards, as proposed, for installed fuel tanks. In addition, we are finalizing provisions to allow for design-based certification to the diurnal emission standard. Due to the large variation in boat designs, we believe that design-based certification is valuable tool for reducing testing burden. To certify their products using design-based certification, manufacturers will describe, from an engineering perspective, how their fuel systems meet the applicable design specifications. We believe there are several designs that use established technologies that are well understood to have certain emission characteristics. At the same time, while design-based certification is a useful tool for reducing the test burden associated with certification, this does not remove a manufacturer's liability for meeting all applicable requirements throughout the useful life of the engine, equipment or vessel.

The primary evaporative emission control device used in automotive applications is a carbon canister. With this technology, vapor generated in the tank is vented to a canister containing activated carbon. The fuel tank must be sealed such that the only venting that occurs is through the carbon canister. This prevents more than a minimal amount of positive or negative pressure in the tank. The activated carbon collects and stores the hydrocarbons. The activated carbon bed in the canister is refreshed by purging. This same basic technology may be used in marine applications as well. However, in a marine application, an engine purge is less practical than in automotive applications because of the potential complications with the engine and tank created by the variety of manufacturers and engine/tank configurations in the fleet each year. In addition, boat engines are not operated as regularly as automotive engines, causing extended periods between active purges. Even without an active purge, carbon canisters may be used to significantly reduce diurnal emissions because the canister is purged sufficiently during cooling periods ("passive purge"). When the fuel in the tank cools, fresh air is drawn back through the canister into the fuel tank. This fresh air partially purges the canister and returns hydrocarbons to the fuel tank. This creates open sites in the carbon so the canister can again collect vapor during the next heating event. A passively purged canister is capable of reducing diurnal emissions by more than 60 percent due to the normal airflow across the canister bed during cooling periods.

If a manufacturer uses a canister-based system to comply with the standard applicable to the specific tank, we are also requiring that manufacturers design their systems not to allow liquid gasoline to reach the canister during refueling or from fuel sloshing or volume expansion. Liquid gasoline will significantly degrade the carbon's ability to capture hydrocarbon vapors.

Currently, industry consensus standards in ABYC H-24[4] address, to some extent, spillage during refueling and due to fuel expansion. However, under these guidelines, the refueling "blow back" test is only for a partial fill and does not necessarily prevent fuel from spilling out the vent line (where a canister would likely be installed) during refueling. In addition, although ABYC recommends that a fuel system be designed to contain 5 percent fuel expansion, the actual requirement can be met by the manufacturer by simply lowering the fuel tank capacity rating without designing the fuel system to prevent overfilling. We do not believe that a system that simply meets the current ABYC requirements would necessarily be adequate to demonstrate that liquid fuel would not reach the carbon canister. However, ABYC commented that it intends to revisit its standards to include proper canister installation instructions and an improved fuel spillage performance test. One example of an approach to protect the canister from exposure to liquid gasoline is a design in which the canister is mounted higher than the fuel level and a small orifice or a float valve is installed in the vent line to stop the flow of liquid gasoline to the canister.

There was a range of several years in the commenter's opinions on the proper implementation date for marine diurnal emission standards. The recommended implementation date ranged from the 2009 model year to a three-year phase-in from 2011 through 2013. At this point, many manufacturers are producing their 2009 model boats already; therefore a 2009 model year implementation date is clearly too early. Personal watercraft currently use sealed fuel systems for preventing fuel from exiting, or water from entering, the fuel tank during typical operation. These vessels use pressure-relief valves for preventing excessive positive pressure in the fuel system; the pressure to trigger the valve may range from 0.5 to 4.0 psi. Such a fuel system also uses a low-pressure vacuum relief valve to allow the engine to draw fuel from the tank during operation. Because we do not expect significant engineering changes for these vessels, we are implementing the diurnal emission standards, for PWC, beginning with 2010 model year.

Vessels with installed fuel tanks are typically designed with open vent systems. In their comments, marine vessel manufacturers expressed general support of the feasibility of using carbon canisters on boats. In addition, the marine industry has expressed an interest in developing consensus standards for the installation of carbon canisters in boats. However, they commented that the development of these consensus standards will take time and that a phase-in would be needed for an orderly transition with regard to installing diurnal emission controls across their product lines. We recognize that canister technology has not yet been applied commercially to marine applications and additional lead time may be necessary to work out various technical parameters associated with the large variety of boat models and tanks. Many boat designs have ample space, within hull, to allow for canister installation without significant mold changes. However, we believe that that a one year phase-in approach will give boat builders the flexibility they need to balance their engineering resources and to address any boat designs with limited space for the installation of canisters. Therefore, for fuel tanks installed on vessels, we are finalizing a phase-in beginning on July 31, 2011. In the period from July 31, 2011 through July 31, 2012, 50 percent of the boats produced by each company must meet the

[4] American Boat and Yacht Council, "Standards and Technical Information Reports for Small Craft; H-24 Gasoline Fuel Systems," July, 2007.

diurnal standard described above. Beginning on August 1, 2012, all marine fuel tanks and boats must meet the diurnal emission standard.

We did not propose running loss or diffusion standards for marine vessels. Installed marine fuel tanks are generally not mounted near the engine or other heat sources so running losses should be very low. A possible exception to this is for personal watercraft or other small boats where the fuel tank may be closer to the engine. However, under the new standard for controlling diurnal emissions, we expect that PWC manufacturers will design their fuel tanks to stay pressurized up to 1 psi. This will also help control running loss emissions. The use of a carbon canister will also help control diurnal emissions for other installations where the fuel tank may be near the engine. The same passive purge phenomenon that limits venting emissions caused by diurnal tank heating would limit venting emissions from fuel tanks heated by engine operation. Any increase in fuel temperature resulting from engine operation will cause a potential for fuel tank vapor emissions that are generated in a manner similar to fuel tank diurnal emissions. We are therefore not allowing manufacturers to disable their approaches for controlling diurnal emissions during engine operation. This will ensure that any running loss emissions that will otherwise occur will be controlled to a comparable degree as diurnal emissions. In addition, we believe the diurnal emission standard will lead manufacturers to adopt technologies that automatically limit diffusion losses, so there is no need to set a separate diffusion standard for those systems.

4.3.8 Diurnal – portable fuel tanks

What Commenters Said:

Suzuki expressed support of the proposed concept of a diurnal requirement for portable fuel tanks that requires they be equipped with self-sealing gas caps up to a internal pressure of 5.0 psi, and that the tanks must be self sealing when they are disconnected from the outboard engine. Suzuki commented that the requirement is technically feasible given sufficient lead-time. They argued that compliance with this all-new requirement will require the development of new components, which must also be validated to ensure proper function and durability in all market conditions. Suzuki and NMMA requested that EPA adopt an implementation date of the 2011 model year for the portable fuel tank diurnal requirement to allow for the lead time needed to develop the new components.

Letters:

Commenter	Document #
NMMA	0688
Suzuki	0698

Our Response:

The design standard for portable marine fuel tanks can be met with relatively straight-forward technology. These fuel tanks are already designed to withstand the pressure of being stored in a sealed condition, which may lead to pressures substantially larger than 5.0 psi. The manual valve simply needs to be replaced with an automatic pressure/vacuum-relief valve such

as have been used in other fuel system applications for decades. In addition, the hose connections are typically designed to seal when the tank is disconnected from the engine, even in today's designs. However, we recognize that some additional lead time may be necessary for the development and validation of new components. Therefore we are providing an additional year of lead time beyond the proposed implementation date. Specifically, we are implementing the new diurnal standards for portable marine fuel tanks in 2010. We believe these requirements will not result in a significant change from current practice so this date will provide sufficient lead time for manufacturers to comply with standards.

4.3.9 Diurnal – engine-mounted fuel tanks

What Commenters Said:

NMMA expressed support of the proposed diurnal requirements for engine-mounted fuel tanks. NMMA stated that, in the case of engine-mounted fuel tanks, compliance with the proposed diurnal standard is feasible through the use of pressure-sealing gas caps. However, NMMA noted that components that can meet these specifications must still be developed. Given the state of the technology, NMMA recommended that any diurnal requirements for very small engine-mounted tanks be delayed until model year 2011. Yamaha also expressed support EPA proposal to control diurnal emission loss from engine mounted fuel tanks in 2011.

Letters:

Commenter	Document #
NMMA	0688
Yamaha	0721

Our Response:

We agree that the diurnal requirements can be met for engine-mounted fuel tanks, through the use of sealed systems with pressure relief valves. However, we recognize that some additional lead time may be necessary for the development and validation of new components. Unlike portable fuel tanks, these tanks are not currently designed to be sealed for storage. Therefore we are providing two additional years of lead time beyond the proposed implementation date. Specifically, we are implementing the new diurnal standards for engine mounted fuel beginning on July 31, 2011.

4.4 Averaging, banking, and trading

What Commenters Said:

EMA and OPEI commented that ABT programs provide important flexibility and incentive to regulated parties, and are a major contributing factor to the creation of a balanced and effective regulatory program. ABT programs generate a substantial amount of emissions reduction over and above reductions effected by regulation, at a low cost to regulated parties. EMA and OPEI supported the need for a nonhandheld fuel tank ABT program. They both commented that it is imperative that the evaporative AB&T program included in the final rule is

designed to generate the greatest environmental benefit possible. In order to take full advantage of this mutually beneficial opportunity to achieve greater emissions reductions, EPA must ensure that the AB&T program incorporated into the final rule is both effective and viable.

OPEI supported the proposed ABT program for handheld fuel tanks and fuel lines. OPEI also supported the continuation of the handheld fuel tank ABT program after the implementation of the FEL caps. OPEI did not support the use of an ABT program for service tanks. They noted that no controls exist for the manufacture and sale of replacement tanks and the market could be flooded with unneeded and unnecessary parts for the sake of credit generation.

EMA commented that fuel lines should not be included in the fuel tank permeation AB&T program. As a result, the temperature difference between the fuel line permeation test and the fuel tank permeation test should not be a concern. In addition, the 23ºC test temperature for fuel line is a well established industry standard that provides consistency throughout the fuel line industry regardless of final product application/regulation.

EMA commented on §1054.706 "How do I generate and calculate evaporative emission credits?" They believe the ability to generate credits should be extended to engine manufacturers for engines sold with integrated fuel systems that include fuel tanks.

EMA commented on §1060.130(b)(5) "What installation instructions must I give to equipment manufacturers?" The evaporative ABT program should be limited to OEM and engine manufacturers. Allowing component manufacturers to participate in ABT creates incredible complexity.

EMA noted that the proposed ABT program does not allow the use of presumptively compliant materials, such as steel or multi-layer plastics (that will generate significant environmental benefit), to generate credits. EMA presumed the constraint on the credit generating benefits of these very low emitting materials is based on a concern that existing tanks would generate emission credits even though those benefits already are included in the baseline emission inventory analysis. EMA recommended that EPA allow these very low emitting products to generate emission credits if they are used to replace existing high permeation materials.

Letters:

Commenter	Document #
OPEI	0675
EMA	0691

Our Response:

EPA is retaining an evaporative emission ABT program for nonhandheld fuel tanks in the final regulations. EPA believes such a program will provide flexibility for equipment manufacturers to comply with the new fuel tank permeation requirements for nonhandheld equipment.

EPA is making some changes to the proposed evaporative emission ABT program for handheld equipment. These changes are in response to changes made in the final regulations regarding cold weather fuel lines and structurally integrated fuel tanks for handheld equipment. (See sections 4.2.3 and 4.2.5 for information on those changes.) First, the evaporative emission ABT program for handheld equipment will no longer allow credits to be exchanged between fuel tanks and fuel hose. Instead, there will be one ABT program for fuel tanks used in handheld equipment and a second temporary ABT program for fuel lines used in cold-weather equipment. Without changes to the proposed handheld fuel tank and fuel hose ABT program, EPA is concerned that manufacturers would likely have been able to keep their existing cold-weather fuel lines without making any improvements to those designs. This was not the intent of the proposed program. In response, EPA is adopting a temporary fuel line averaging program for cold-weather equipment. Manufacturers would not be allowed to bank or trade credits under the cold-weather fuel line program. As described in Section 4.2.3, EPA believes that cold-weather fuel lines present unique challenges and limitations with regard to permeation control. Given the declining set of standards EPA is adopting for cold-weather fuel lines, the temporary cold-weather fuel line averaging program will provide manufacturers with the ability to redesign their cold-weather fuel lines to meet lower permeation levels in an efficient and timely manner. The cold-weather averaging program will no longer be available in the 2016 model year when all cold-weather fuel lines will need to demonstrate compliance with a 225 g/m^2/day standard. With regard to other types of handheld equipment, EPA believes that manufacturers should be able to meet the fuel line permeation standard of 15 g/m^2/day without the need for credits and is therefore not including those fuel lines in the temporary fuel line averaging program.

The second change to the ABT program for handheld equipment is in regard to the provisions for structurally integrated fuel tanks. As described in Section 4.2.5, EPA is finalizing a 1.5 g/m^2/day standard for all handheld fuel tanks, instead of the slightly higher proposed level of 2.5 g/m^2/day for structurally integrated fuel tanks. Therefore, handheld equipment manufacturers will generate and use credits for any fuel tank based on the standard of 1.5 g/m^2/day, including structurally integrated fuel tanks. As proposed, the evaporative emission ABT program for handheld equipment will allow manufacturers to use credits across all three classes of handheld engines/equipment.

In response to the comments on allowing engines manufacturers to participate in the evaporative ABT program, EPA agrees that engine manufacturers should be able to participate in the ABT program if they assemble the entire fuel system along with the engine. EPA believes it makes sense because the engine manufacturer is expected to be the entity certifying their engine/fuel system to the evaporative standards in these situations and not the equipment manufacturer (such as with handheld engines or personal watercraft). EPA expects this will generally be the case with the large majority of Class I nonhandheld engines as well as nearly all handheld engines. Therefore, the regulations have been revised to allow engine manufacturers that provide the complete fuel system with the engine to participate in the ABT program. It should be noted that if an engine manufacturer participates in the evaporative ABT program for a given engine/fuel system, then the equipment manufacturer who purchases those engines/fuel systems cannot generate its own credits for those products (or would not have to use its own credits for those products either). That would be double-counting of credits.

With regard to the comments on including component manufacturers (i.e., tank manufacturers) in the ABT program, EPA is retaining the provisions as proposed. Tank manufacturers that certify their fuel tanks with EPA can participate in the ABT program. However, their participation is limited to selecting the appropriate FEL for their tank design. The tank manufacturer cannot generate credits in the ABT program. Only equipment manufacturers (or engine manufacturers that provide a complete fuel system with the engine) may earn/use credits and demonstrate compliance under the evaporative ABT program. EPA believes it is appropriate to allow tank manufacturers to participate in the ABT program in this manner to facilitate the use of the ABT program by equipment manufacturers who generally rely on outside sources for their fuel tanks and are required to demonstrate compliance with the overall evaporative requirements for their equipment.

In regard to the comment on service/replacement tanks, EPA agrees it is not appropriate to include such tanks in the ABT program. Equipment manufacturers will be required to demonstrate that their equipment models meet the evaporative emission standards. If the certified equipment uses a fuel tank included in the ABT program, the credits generated were based on a useful life of five years. Therefore, if the tank being replaced is less than five years old, the replacement tank would result in double counting of some of the credits. While manufacturers could potentially gather information to account for the age of the fuel tank being replaced, EPA does not want to complicate the provisions of the ABT program and is therefore not allowing replacement tanks to be included in the ABT program.

With regard to the comments on steel tanks, EPA is retaining the provisions for metal tanks as proposed. Metal tanks will not be included in the ABT program. While EPA acknowledges that these tanks would have permeation rates well below the standard, there is extensive use of metal tanks today. We believe it would be difficult to allow these emission credits without undercutting the stringency of the standard and the expected emission reductions from the standard. Therefore, we are not allowing metal tanks to be included in the ABT program.

With regard to multi-layer tanks, EPA did propose to allow such tanks to participate in the evaporative emission ABT program under a specified condition. To participate in the ABT program, a manufacturer must establish an FEL for the multi-layer fuel tank based on an actual measurement of permeation emissions. EPA is retaining that provision for the final rule. However, it should be noted that manufacturers that certify their multi-layer tanks by design cannot include those tanks in the ABT program.

4.4.1 Averaging sets

What Commenters Said:

EMA and OPEI commented that cross-class trading restrictions are generally not beneficial. Because the tank permeation standards are in terms of grams per square meter, EMA and OPEI believe the relative tank size between Class I and Class II should not impact competitive market or technology development.

EMA commented that cross category trading between Small SI and marine could create a significant competitive market issue and should not be allowed.

OPEI commented that trading between handheld and non-handheld should be restricted except as proposed in §1054 subpart H.

Honda commented that EPA should clarify in the final rule when and if an engine less than 80cc would be categorized as nonhandheld for ABT purposes if EPA does not allow Phase 3 cross class averaging. Clarification or added guidance in the final rule would be useful where an engine less than 80cc is used in a nonhandheld product would qualify as nonhandheld for purposes of ABT, such as an engine used in a ground-supported mini-tiller. **(Also included in Section 2.3.2)**

Letters:

Commenter	Document #
OPEI	0675
EMA	0691
Honda	0705

Our Response:

EPA is retaining the averaging sets for the evaporative emission ABT programs as proposed, with one change for nonhandheld equipment. As proposed, EPA will not allow averaging of emissions between Marine SI vessels and Small SI equipment. In the Marine SI evaporative emission ABT program, EPA will allow averaging of emissions between OB/PWC vessels and SD/I vessels. (Portable marine fuel tanks are not included in the Marine SI evaporative emission ABT program.) In the Small SI evaporative emission ABT program, EPA will not allow averaging of emissions between handheld equipment and nonhandheld equipment.

For the nonhandheld evaporative emission ABT program, EPA is dropping the restriction on averaging between Class I and Class II equipment. In the proposal, EPA noted concerns that trading across the categories could give an unfair competitive advantage to manufacturers with broad product lines. However, given that the trade organization representing equipment manufacturers does not believe the restriction is necessary due to competitiveness concerns, EPA is less concerned about the need for the restriction. Furthermore, because EPA is adopting FEL caps for the fuel tanks, manufacturers eventually will be required to design all of their tanks to comply with the permeation standards. This also lessens our concerns about manufacturers using the ABT program to their advantage in the marketplace since all fuel tanks will need to employ some level of permeation control. Therefore, we are dropping the restriction on trading of evaporative emission credits across Class I and Class II equipment. (It should be noted that the proposed restriction between Class I and Class II equipment in the early allowance programs will still apply. EPA believes this restriction is still appropriate because there is no adjustment in the early allowance program for the size of the fuel tank, unlike the ABT program in which credits are calculated based on the surface area of the tank.)

In regard to the comments on whether engines certified to the handheld standards can generate nonhandheld credits, EPA proposed to allow manufacturers to generate nonhandheld ABT credits from equipment powered by engines at or below 80cc (which are subject to the handheld standards) if a manufacturer has determined the application is a nonhandheld application. A nonhandheld application is an application that does not meet the handheld definition as defined in §1054.801 of the regulations. EPA is retaining that provision in the final rule. Therefore, a manufacturer can generate nonhandheld emission credits from equipment powered by engines at or below 80cc that are subject to the handheld evaporative standards if the manufacturer determines the equipment is actually a nonhandheld application. These nonhandheld credits could be used within Class I and Class II to demonstrate compliance with the evaporative emission standards.

4.4.2 Early Credits

What Commenters Said:

NMMA noted that EPA proposed an early credit system for companies subject to the evaporative emissions standards in Part 1060. Under the program, manufacturers certifying early to the fuel tank permeation standards would be able to earn allowances that they could use to offset high-emitting fuel tanks at a later date. No cross trading between portable fuel tanks, PWC, and other installed fuel tanks would be permitted. For PWC and portable fuel tanks, allowances could be earned for compliant tanks installed prior to 2011 and could be used through the 2013 model year. For other installed tanks, allowances could be earned for compliant tanks installed prior to 2012 and could be used through the 2014 model year. NMMA commented that it appreciates EPA's efforts to provide flexibility and reward early compliance with the proposed standards. However, NMMA noted that an early credit program should not serve as a substitute for additional time for compliance with the new standards. (As noted in Section 4.3.5, NMMA submitted comments noting that its members have serious reservations about imposing a 2012 compliance deadline for rotational-molded tanks. To address these concerns, NMMA recommended that EPA perform a technical review in 2010 and impose an implementation date based on the findings.)

Letters:

Commenter	Document #
NMMA	0688

Our Response:

EPA is retaining the early compliance program for Marine SI fuel tanks as proposed. EPA believes the early compliance program will encourage the early introduction of low permeation products and will provide vessel manufacturers with additional flexibility as they transition to the new standards. (With regard to the 2012 compliance deadline for rotational-molded tanks, as noted in Section 4.3.5, EPA intends to hold periodic progress reviews with small businesses that manufacture rotation-mold fuel tanks. The purpose of these progress

reviews will be to monitor the progress of individual companies towards compliance with the tank permeation standards and to provide feedback as needed.)

4.4.3 Credit Lifetime

What Commenters Said:

OPEI opposed the proposition that any engine-exhaust or evaporative credits generated by a manufacturer should have an arbitrary life period. Emission credits are either generated through the voluntary early implementation of new emission control technology or introduction of products that are cleaner than required by the applicable emission standard. They noted that such credits are generated at a cost to the manufacturer, and are granted in exchange for the manufacturer's independent decision to produce products that provide additional benefits to the environment. These credits are important assets that should not be arbitrarily lost due to time or actions not under the manufacturer's control.

EMA also commented that banked emission credits should not have a limited life. The credits were generated based on a product that was sold and provided environmental benefit relative to the requirement. Whether or not that piece of equipment is still in use is immaterial, since the benefit was already provided.

Letters:

Commenter	Document #
OPEI	0675
EMA	0691

Our Response:

EPA does not believe a limit on the life of the credits is needed at this time for the evaporative emission ABT programs adopted with this rule. While EPA is adopting an indefinite credit life for the ABT program, manufacturers should not assume that this means those credits will be available without any restrictions on their use if, or when, EPA should consider a new round of evaporative emission standards in the future. As part of any future rulemaking, EPA would expect to consider ways to ensure that the evaporative emission ABT credits existing at that time would not result in a delay of any future standards that would prevent us from requiring the greatest degree of achievable emission reductions.

4.4.4 FEL caps

What Commenters Said:

In response to EPA's proposal to set an FEL cap for fuel tanks after the program has been in effect for three years, OPEI and EMA commented that because there was not previously a control standard from which to determine an FEL cap, it is not appropriate to now assign an arbitrary FEL cap. Implementation of an FEL cap at any time during Phase 3 precludes the option for manufacturers to continue to utilize existing technologies for low volume products

that do not justify the design, development, or capital expense associated with the implementation of prescribed emission controls. If a manufacturer can either generate or trade for sufficient credits to continue the use of relatively high emission level pre-compliance products the ABT program should not preclude them from doing so.

In response to EPA's request for comment on the usefulness of an ABT program after we implement an FEL cap, OPEI and EMA supported the continued need for an ABT program and commented that an FEL cap without an ABT program would not allow the flexibility required by manufacturers. They noted that it is not clear how a product could be certified to any level other than the prescribed standard without an ABT program irrespective of the use of an FEL cap.

EMA and OPEI commented that the proposed alternative FEL cap associated with testing at 40°C is not equivalent to the FEL cap at 28°C. The averaged results for Fuel C and Fuel CE10 predict that the permeation rate will increase by a factor of 2 between 28°C and 40°C. If an FEL cap is required, they commented that the alternative caps prescribed at 40°C should be changed to be 2 times the cap at 28°C in order to provide equivalent stringency. Therefore, the alternative FEL cap at 40°C should be changed to 10.0 g/m^2/day to be equivalent stringency as the 28°C cap (and 6.0 g/m^2/day for structurally integrated nylon tanks and 16.0 g/m^2/day for small-volume manufacturers).

OPEI noted that they agree with the proposed FEL caps for handheld engines/equipment. In addition, OPEI requested that EPA consider an FEL cap of 5.0 g/m^2/day for structurally integrated tanks since the higher cap would not result in any increase in emissions when using the ABT program.

Letters:

Commenter	Document #
OPEI	0675
EMA	0691

Our Response:

With regard to the comments on whether EPA should have an FEL cap for fuel tanks when there is no previous standard, EPA is retaining the FEL caps as proposed (with one change for structurally integrated fuel tanks as described below). EPA believes that equipment and vessel manufacturers eventually should be required to apply low-permeation technology to all of their fuel tank designs. In the short term, we would not have FEL caps for the fuel tanks. However, starting in 2015 for handheld equipment and Class I equipment, 2014 for Class II equipment, 2014 for PWC, and 2015 for installed marine fuel tanks, the FEL cap would apply. Therefore, manufacturers could continue using current uncontrolled fuel tank designs for the first few years, provided they have sufficient credits to offset the higher permeation levels from those fuel tanks. However, starting with the dates noted above, manufacturers would need to employ low-permeation technologies on all of their equipment. Given the FEL cap of 5.0 g/m^2/day (or 8.0 g/m^2/day Small SI small volume families), manufacturers would still need to improve their existing tank designs, but they may be able to employ simpler, less expensive technologies that meet the FEL cap (but not the 1.5 g m^2/day standard) such as thicker walled fuel tanks.

With regard to the comments on the level of the FEL caps for the alternative permeation standard at 40ºC, EPA is retaining the FEL caps for the higher temperature testing as proposed. The higher temperature permeation standards have been included in this rule as an alternative standard because manufacturers that wish to certify with California ARB are required to perform fuel tank testing at 40ºC and EPA wanted to provide a means for manufacturers to use that information for certifying with EPA. Based on permeation results from fuel tanks tested at 28ºC and 40ºC, EPA has seen a range in the effect of temperature on permeation emissions depending on the fuel tank material. Therefore, in selecting the FEL caps for the higher temperature alternative standard, EPA has selected a limit that provides a high level of confidence that the fuel tank would also comply with the FEL cap associated with the testing at the normal testing conditions of 28ºC. For the available data representing a range of materials and control technologies, the selected FEL caps for high-temperature testing represent the value that corresponds to a relatively worst-case condition for taking compliant products tested at 40°C and showing that they would also comply when tested at 28°C.

With regard to the FEL cap for structurally integrated tanks, EPA is revising the FEL cap for structurally integrated fuel tanks. As described in Section 4.2.5, EPA is finalizing the same permeation standard for structurally integrated fuel tanks as for all other tanks. Therefore, EPA believes it is appropriate to apply the same FEL cap of 5.0 g/m^2/day to structurally integrated fuel tanks (or 8.0 g/m^2/day Small SI small volume families) that would apply to all other fuel tanks.

4.4.5 Other ABT Issues

What Commenters Said:

OPEI supported the credit adjustment for the effect of different test temperatures on fuel tank permeation measurements.

OPEI commented that paragraph 1054.706(b) is confusing and EPA's intent is not understood. For example if an FEL of 4.5 g/m^2/day is used for a tank, paragraph (b)(1) says it is not allowed, yet such an emission level is allowed under paragraph 1054.110(b). OPEI suggested that paragraph (b)(1) be deleted. In addition, paragraph (b)(2) should be revised to reflect that if a manufacturer chooses not to test they could use a default level of 10.4 g/m^2/day.

OPEI commented that the calculation of emission credits for structurally integrated tanks in paragraph 1054.706(c) is based on levels established for testing at 28ºC. The last two lines need to be revised to reflect the calculation of positive credits for a standard of 2.5 g/m^2/day at 40ºC and the calculation of negative credits at a level of 4.0 g/m^2/day when tested at 40ºC.

EMA commented on §1054.706(a) "How do I generate and calculate evaporative emission credits?" They believe the final regulations need more detail regarding how the "Total Area" is calculated. EMA recommended that "Total Area" should be calculated by multiplying the projected domestic sales volume with internal surface area of each fuel tank design within a family.

EMA commented on §1054.706(b)(1) "How do I generate and calculate evaporative emission credits?" They believe the requirement to measure emissions from every tank without an FEL is not appropriate. A manufacturer should have the option to measure permeation from the worst case tank, as determined using good engineering judgment.

EMA commented on §1054.715(b) "How do I bank emission credits?" They believe reserve credits cannot be traded. Therefore, EMA recommended that the reference to "trading" should be deleted from this section. **(Also included in 2.3.5)**

EMA commented on §1054.725(b)(2) "What must I include in my application for certification?" They believe engine families that generate or use credits at the time of certification should not be required to designate their credit destination or origin within the averaging set. **(Also included in 2.3.5)**

EMA commented on §1054.730(f)(3) "What ABT reports must I send to EPA?" They believe that if an error mistakenly increases a manufacturer's balance of emission credits, correction of the errors and recalculation of the balance of emission credits should be undertaken at the manufacturer's discretion. Manufacturers should not be required to correct the errors and recalculate the balance of emission credits as currently proposed. **(Also included in 2.3.5)**

EMA commented on §1054.735(d) "What records must I keep?" They believe the requirement to keep additional records for each engine or piece of equipment including the engine identification number, build date and assembly plant is excessive and beyond the current requirements of 40 CFR Part 90.209. These additional record keeping requirements either should be deleted or replaced with engine manufacturer records associated with products produced. **(Also included in 2.3.5)**

EMA commented on §1054.735(e) "What records must I keep?" They believe that this section, as drafted, appears to be arbitrary and capricious. EPA should not be allowed to require manufacturers to keep additional unspecified records or demand additional information not required by the rule without a proper purpose or for cause. EPA should be required to support any imposition of additional record keeping requirements or demand for additional information with specific and appropriate reasons. Further, such decisions should not be made unilaterally by EPA, and the manufacturer must have the ability to question any such request and, if necessary, request a formal hearing process. **(Also included in 2.3.5)**

Letters:

Commenter	Document #
OPEI	0675
EMA	0691

Our Response:

Regarding the comment on the adjustment to credit calculations for the effects of temperature, EPA is adopting the adjustment as proposed. Manufacturers earning credits based on the alternative standard at a higher temperature of 40ºC will apply a factor of 0.6 to determine the number of credits they generate or use.

EPA agrees that additional language should be added to the regulations to clarify that credits are based on the total internal surface area for all fuel tanks in the emission family. This

would be calculated by multiplying the production volume of each fuel tank design by its internal surface area and adding each of the resulting values together.

EPA has revised the language regarding the fuel tank FEL language in §1054.706(b) to clarify the original intent of the proposal. The revised language provides two options to manufacturers for the tanks included in the ABT program. Manufacturers can establish FELs for each of their fuel tank families based on permeation testing of each tank design. Alternatively, manufacturers may establish FELs for all of their "controlled" fuel tanks (i.e., those tanks for which the manufacturer has applied some type of low-permeation technology or material and presumed to have an FEL of less than 5.0 g/m^2/day) and assume an FEL of 10.4 g/m^2/day for all remaining "uncontrolled" fuel tanks. Manufacturers are not allowed to pick and choose which uncontrolled fuel tanks they want to test. They either must test all of the uncontrolled tank designs (and establish an FEL for each tank design based on the results) or they must assume an FEL of 10.4 g/ m^2/day for each uncontrolled tank design. If a manufacturer wants to test their uncontrolled fuel tanks, EPA believes the manufacturers must test all of them and not just a "worst-case" tank design, since it may difficult to justify which design is truly the "worst-case" among the uncontrolled tanks.

EPA has deleted the paragraph regarding the comments on the calculation of credits for structurally integrated fuel tanks in §1054.706(c). As noted in Section 4.2.5, EPA has deleted the separate standards for structurally integrated fuel tanks from the final regulations. Therefore, the information in paragraph (c) of §1054.706 is no longer needed.

For the remaining comments on §1054.715(b), §1054.725(b)(2), §1054.730(f)(3), §1054.735(d), and §1054.735(e), EPA responded to these comments in Section 2.3.5 of this document since the comments also applied to the exhaust ABT program for Small SI engines. The reader is directed to that discussion for a response to these comments.

4.5 Other requirements

4.5.1 Refueling– Marine SI

What Commenters Said:

Enviro-Fill described the extent of the problem related to refueling spillage from marine vessels. While there are no known studies that accurately quantify the problem, there are plenty of articles documenting how extensive the fuel spill problem is. Enviro-Fill referenced letters from fuel dock operators and boat owners supporting changes that would reduce the occurrence of refueling spillage. One operator stated that the majority of the boats refueled at his marina spill through the vent.

Enviro-Fill observed that there are regulations and standards in place for building boats. US Coast Guard regulations are mandatory while ABYC's specifications are followed voluntarily. This system seems to work; however, there are some shortcomings in the standards. ABYC's standard (H-24) allows a manufacturer to rate a fuel tank, for example, at 21 gallons even though the tank can hold 26 gallons. The extra capacity is considered to be for expansion. However, an operator will typically fill the tank to 26 gallons, leaving no room for expansion.

As this fuel warms and expands, five percent of the volume (1.3 gallons) could be expelled from the tank. ABYC or EPA need to adopt standards and procedures that properly test marine refueling systems to require designs that prevent spillage. A proper arrangement would be for automatic refueling shutoff to occur at fill rates between 5 and 20 gallons per minute such that no spitback or spillage occurs and five percent of tank volume is reserved for expansion. Such a solution would comply with section 311 of the Clean Water Act, which states that it is illegal to dump any petroleum product in the waters of this country.

Enviro-Fill stated that they have developed a technology to prevent spitback, spillage, or overfill when refueling boats. The technology senses the fuel level in the tank and activates the nozzle shutoff automatically when the fuel level reaches a predetermined level. An independent laboratory tested the prototype system by filling a tank 25,000 times at 15 gallons per minute, allowing the system to shut off the nozzle each time without spilling any fuel and without filling the tank past the 95 percent fill level. This would require hardware changes to the fuel tank and filler neck (not the hull or deck) for an estimated total cost of $100, though that cost impact may be reduced to the extent that other components may no longer be needed. There would also be cost savings from no longer spilling fuel or cleaning up the spilled fuel.

Enviro-Fill's technology keeps fuel from entering carbon canisters without a check valve. This technology depends on a standardized fuel nozzle, so they recommend that EPA adopt the nozzle specifications described in the proposed rule on the same schedule as the other requirements in the rule. Enviro-Fill recommended a nominal spout diameter of 1.187 inches because that size is commonly found at marinas today.

NMMA suggested that EPA's proposed provision requiring vessel designs that allow an operator to reasonably expect to fill fuel tanks without spitback or spillage completely fails to take into account how different marine refueling is from other industry segments. For example, there are countless combinations of vehicles and trailers, which create numerous different fill angles. In addition, the need for an "open" system as well as specific installation locations for both fill and vent openings make an industry standard difficult to establish. Apart from the fuel system, there are a number of other variables that the boat builder cannot control that have a direct impact on whether the fuel system can perform automatic shutoff and reduce spitback and spillage. These challenges cannot be overcome by the boat builders alone. For example, the nozzles in use at marinas are not standardized nor are they equipped with an automatic shutoff feature. The unique fuel dispensing needs of boat fuel systems are another huge challenge. A gallon-per-minute (gpm) fuel dispensing restriction like that in place at retail gas stations to reduce spitback and spillage would not work for tanks that hold hundreds of gallons of fuel. EPA suggests a fill rate restriction between 5 to 20 gpm. A limit of 10 gpm, which is required at retail gas stations, would mean that a boat with a 300 gallon tank would have to wait 30 minutes to refuel. This is just not practical for refueling at a marina.

NMMA chided EPA for incorrectly citing the ABYC standard for refueling and misstating its requirements (NMMA cited no specific errors and offered no corrections). NMMA also pointed out that EPA failed to mention that there is an ABYC technical committee currently working to address the technological issues associated with the H-24 standard and refueling practices. For all of these reasons, any requirements for refueling in the marine context

requires further analysis and discussion with ABYC to ensure the development of a comprehensive regulatory regime that addresses all the necessary parameters and variables. EPA must defer requirements addressing spitback and spillage until the necessary technological challenges can be resolved. NMMA recommends that ABYC be given three years to develop appropriate refueling standard practices and then provide industry with two model years of lead time for implementation.

ABYC noted that vessel attitudes can vary dramatically during refueling and during operation, which increases that likelihood that liquid fuel will get into vent lines. Fill and vent openings on current boats must be located such that any fuel spilled, either from the filler neck or the vent, will not spill into the boat, which would create a grave fire and explosion hazard. Current recreational boats therefore are designed to route spills and overflows overboard, minimizing the fire and explosion risk (while contributing to water and atmospheric pollution). All these factors combine to make it impossible to simply adopt the automotive model in the marine market. ABYC is encouraging open and frank discussions among Project Technical Committees and comparable ISO Working Groups to develop a solution to spills caused by refueling or venting. This will be a long road and will likely result in substantive re-design of fuel systems to prevent and/or contain spills while still complying with established federal regulations.

Sea Ray chimed in to say that EPA needs to recognize that standardization of fuel filler nozzles and fuel flow rates at marinas must be addressed before boat builders can design for compliance.

Environmental Defense stated that EPA's proposed requirement to produce vessels designed to prevent spills during refueling provide manufacturers with ample flexibility in choosing designs consistent with good engineering practices to reduce refueling and spillage emissions. Such design changes could include fuel inlets that allow consumers to see rising fuel levels during refueling and automatic shutoff devices. They support EPA's proposal to reduce refueling spillage and spitback emissions as an important step in protecting human health and the environment.

Inca Molded Products objected to the proposed regulatory provision related to preventing refueling emissions in §160.101(f)(3). There has not been time to evaluate the impact of this requirement to know what safety or performance issues might arise. Standardized nozzles and automatic shutoff would be necessary to implement for refueling controls can be implemented, and a 10 gallon-per-minute limit is not reasonable for marine vessels. It would also take time to design, test, and produce the components needed to address all the different penetration, attachment, and sealing techniques needed for the various vessel designs. Inca recommends that EPA give the ABYC and Inca at least three years to develop and test these systems, followed by a technical review.

Attwood commented that the combinations of hulls, gunwale, and trailer designs, not to mention engine compartments and tank locations make it a monumental task to understand how each separate component plays into the boats fuel system design. Each item needs to be taken into consideration when designing the system and components to prevent fuel spillage and proper ventilation of the system to provide systems that fill without causing undue fuel spitback.

The chorus of boat builders largely reiterated NMMA's position with respect to refueling controls. They included the following points:

- ABYC has a technical committee established to address the issue of refueling. ABYC should be allowed three years to complete a refueling standard such that the controls could be applied to 2013 model year vessels.
- Refueling control is a complex business. Variables include the refueling pumps, attitude of the vessel, and the vessel fuel system. A vessel's attitude is not under the control of the vessel manufacturer. The levelness of the trailer and the load size and distribution in the boat when it is in the water affects boat attitude. The resulting variation in attitude causes an incalculable number of possible fill angles. Additional factors include single vs. twin engines, two- and four-stroke engines, widely varying vessel sizes, and many option combinations and custom boats. Lowering fuel rates is not a solution because some fuel tanks are very large.
- There are no current requirements for standardized nozzles or automatic shutoff at marinas today. These would need to be in place before ABYC is able to address the technical issues related to refueling and before boat builders can design for compliance.
- Additional labor hours would be required to install the necessary hardware to control refueling and also greatly increase the number of potential fuel leaks at the various additional connections. Any system that depends on automatic shutoff is useless if there are refueling nozzles that do not have automatic shutoff.

OPW and Husky, two prominent manufacturers for fuel nozzles, commented on the detailed specifications for standardizing marine nozzle dimensions. After some interaction regarding the optimal geometries for a standardized nozzle, they agreed that they could meet EPA specifications without changing their current product lineup if we would adopt specifications modeled after those for motor vehicle nozzles. The smaller-diameter nozzle would be capable of handling high flow rates (20 – 25 gallons per minute) that are sometimes seen at marinas. The "marine nozzle" would cost no more than nozzles that are used today.

NMMA responded to the draft regulatory language by commenting that they believed EPA had not provided adequate opportunity to comment on the nozzle requirements, as required by the Administrative Procedures Act. They also noted that many of the marinas are small businesses, so a small business panel may be necessary before implementing these requirements. NMMA nevertheless stated its support for standardizing nozzles and upgrading marina fueling equipment, but preferred to do that in the context of the ABYC effort to adopt refueling standards. In any case, nozzle sizes should be smaller than 1.187 inches in diameter to avoid incompatibility with some vessels that are currently in use. NMMA emphasized that more information from marina owners and marine fuel system designers is needed before taking further action.

Enviro-Fill added that they were working with two boat builders to prove out the technology for preventing refueling losses, and noted that the smaller-diameter nozzle would work well with their technology.

Letters:

Commenter	Document #
NMMA	0688
Sea Ray	0683
Environmental Defense	0648
Attwood	0653
ABYC (hearing)	0642
Enviro-Fill (hearing)	0642
Enviro-Fill	0684
Captain Aaron Kelly	0643
Sea Ray	0683
S2Yachts	0697
Grady-White Boats	0677
North American Sleekcraft	0666
Triton	0656
Lund Boat Co	0655
Brunswick Corporation	0695
Lowe Boats	0660
Godfrey	0645
American Marine Sports	0639
Cigarette Racing	0637
Massachusetts Marine Trade Association	0634
Regulator Marine Inc.	0632
Chaparral/Robalo Boats, Inc.	0630
Ranger Boats	0628
Larson/Glastron Boats	0626
Four Winns Boats	0650
Premier Marine Inc,	0613
Skeeter	0706
Yellowfin	0681
Four Winns	0625
OPW	0804
Husky	0803
NMMA	0805
Enviro-Fill	0806

Our Response:

We appreciate the degree of interest in finding the best approach to reduce spitback and spillage from refueling vessels. This is clearly an issue that everyone understands to be very important. The best approach to ensure that refueling systems are properly designed would involve a standardized test procedure for boat builders to follow with an emission standard in place to determine when a design meets the required level of performance. The process of adopting such a standard would take considerable time, effort, and expense to ensure that the standard and the detailed test specifications are appropriately matched to the range of possible

design configurations and their achievable level of control. We do not have the time or resources to include such a plan in this rulemaking but plan to address this issue in the future. We expect to work with ABYC in this effort as they have initiated a process that would help to address this issue.

However, we note from the comments that there is general agreement to adopt requirements now to standardize fuel nozzle geometries, while NMMA noted a preference to define nozzle geometries in the context of ABYC's effort to establish an industry standard practice for boat builders. We believe it is not necessary to wait for development of standards for boat builders before we adopt a requirement applicable to marine refueling nozzles. Because regulating marine nozzle dimensions will reduce HC emissions during refueling, we are adopting the requirements related to marine refueling nozzle under Clean Air Act section 211(C). These requirements will help to reduce air pollution capable of endangering public health or welfare. These nozzle dimensions include the following:

- Nominal outside diameter of 0.824±0.017 inches.
- Straight with no holes or grooves, other than the aspirator hole, for at least 2.5 inches from the terminal end of the spout
- Spring if used, to terminate at least 3.0 inches from the terminal end of the spout
- Aspirator hole 0.670±0.05" from terminal end of the spout

These specifications are identical to those already in place for motor vehicles, with the exception of the minimum diameter and the location of the aspirator hole. However, these dimensions are based on current practice with motor-vehicle nozzles (which includes specifications that go beyond EPA's requirements), so we would expect most or all current gasoline nozzles to simultaneously meet the specifications for both motor vehicles and marine vessels. We may initiate a future rulemaking to merge these two separate specifications into a single specification that would apply universally for gasoline nozzles. We also believe that adopting these specifications now will better assist future efforts to address refueling emissions from vessels by defining a standard nozzle configuration, which we expect to be a necessary prerequisite for designing boats to prevent spitback and spillage. We also believe that adopting these specifications now will better assist future efforts to address the need for adopting provisions in the future to prevent spitback and spillage from marine vessels, as described above.

Note that the nozzle requirements do not include a limitation on flow rate during refueling. If ABYC's analysis indicates that a limited flow rate is necessary as a reasonable boundary condition for designing fuel systems, we would consider including such a specification for maximum flow rate in a future rulemaking. Given the size of many marine fuel tanks, we agree that a restrictive maximum flow rate (below 20 gallons per minute or so) should be avoided if at all possible.

We believe it is most appropriate to adopt the nozzle requirements "upon replacement." Rather than having all marinas replace their nozzles by some date certain, we believe it will be most effective to adopt the requirement now so that any marina replacing a fuel nozzle must use a replacement nozzle that meets the new requirements. This minimizes the cost and disruption of the new requirement and puts the industry on a conversion plan that will generally align with the timing for implementation of future standards. Once this transition has started and there are

vessels that benefit from the standardized nozzle geometries, we would expect market forces to accelerate the conversion to the new nozzles. We would consider revising the nozzle regulation to require conversion to the new nozzles by some date certain if it becomes clear that this is necessary to facilitate effective controls resulting from the effort to adopt uniform industry practices for boat designs that minimize refueling losses.

Pending development of any further detailed specifications for designing and testing boats, we believe it is appropriate for us to keep the proposed provision requiring boat builders to follow good engineering practice to allow for a reasonable expectation that operators can expect to fill the fuel tank without spitback or spillage. We would expect boat builders to at least take the minimal steps noted in the proposal to avoid designs that virtually ensure that normal refueling procedures would lead to spillage. For example, running a filler neck to the side of a boat with a substantial horizontal segment at the inlet makes it very difficult to execute a clean refueling event. If an industry standard is adopted, "good engineering practice" would include following the industry standard unless EPA believes such a standard is inadequate.

We believe our proposed rule fairly apprised commenters of the issues related to nozzle requirements. We requested comment on detailed specifications on nozzle dimensions in the proposal. We received a very extensive set of comments during the comment period, some supporting the adoption of nozzle requirements and some objecting. We made draft regulatory language available in the rulemaking docket and sent that draft directly to the parties most affected and most able to further communicate that information to additional affected parties. We also received comment on this later request for feedback. The final requirements are consistent with the discussion in the proposed rule and with the concepts already in place for motor vehicles. In addition, nozzle manufacturers commented that they can meet the new requirements with no change in their current product lineup. As a result, the impact on marinas is a limitation on the nozzle choices they have available. We also understand the nozzle manufacturers' statements to be clearly responsive to Inca's concern that there is a need to evaluate the impact of the new requirement to verify that there will be no safety or performance issues. We would not expect boat builders to change their designs to accommodate the compliant nozzles because such nozzles are in common use today. Based on information from nozzle manufacturers, replacement nozzles will not cost more due to this requirement than they would without it; but there will not be an option to choose from the selection of nozzles that have been available previously. Since there is minimal to no impact on small businesses due to these nozzle requirements, we are certifying that the final rule will not have a significant impact on a substantial number of small entities and EPA has complied with requirements for convening a small business advocacy review panel pursuant to section 609(b) of the Regulatory Flexibility Act.

4.5.2 Refueling– Small SI

What Commenters Said:

OPEI and EMA commented the proposed refueling requirement lacks the necessary defined acceptance criteria necessary to be implemented as a regulatory requirement. As such, OPEI and EMA believe the requirement cannot be included in the regulatory requirements and

should be deleted. However, the information provided is valid reference material for future designs and is more appropriately included in the regulatory preamble. If EPA must keep the requirement in this regulation, OPEI commented that EPA should modify the language to ensure there is no conflict with existing applicable ANSI, ISO or EN standards that specify opening sizes.

Environmental Defense noted that gasoline vapors are always present in typical fuel tanks. These vapors automatically are released during refueling as gas inserted into the tank forces out the evaporative vapors from remaining tank space. Fuel spills also occur from Small SI and Marine SI engines during refueling. In the case of marine boats, "relatively large quantities of gasoline are released into the marine environment during marine refueling events." Accordingly, controlling spills during refueling is important for public health and the environment. Environmental Defense noted that EPA is proposing equipment design changes to reduce spills during refueling of both SI small and marine engines and equipment. These design changes provide manufacturers with ample flexibility in choosing designs consistent with good engineering practices to reduce refueling and spillage emissions. Such design changes could include fuel inlets that allow consumers to see rising fuel levels during refueling and automatic shutoff devices. Environmental Defense supported EPA's proposal to reduce refueling spillage and spitback emissions as an important step in protecting human health and the environment.

Letters:

Commenter	Document #
OPEI	0675
Environmental Defense	0648
EMA	0691

Our Response:

EPA and engine and equipment manufacturers have long agreed that refueling emissions are a substantial source of emissions. It has also been clear that it is very difficult to address refueling losses through regulatory requirements since spill-free refueling depends on a combination of several factors related to design of the engine, the design of the equipment, the design of the refueling container, and (not least) the refueling procedures used by millions of owners. Now that exhaust and permeation emissions are on track to reach much lower levels, spillage becomes an ever more important contribution to overall emissions from Small SI engines and equipment.

Our normal approach would be to adopt a test procedure and a corresponding standard so manufacturers would design and produce their products such that they prevent emissions by virtue of their design features, much like we describe above for marine applications. However, Small SI equipment models generally have very simple fuel systems that do not lend themselves to design features for preventing spillage. We recently adopted a requirement for refueling containers (i.e., gas cans) very similar to what we proposed in this rulemaking (72 FR 8428, February 26, 2007)).

We agree with the commenters that the proposed refueling requirements do not include defined criteria for evaluating whether or not the designs are compliant. Nevertheless, we believe it is meaningful and workable to adopt a good-engineering standard for Small SI equipment that corresponds to the provisions that already apply for gas cans. Furthermore, we believe it is reasonable to specify that manufacturers should be able to design their engines and equipment such that operators can reasonably expect to fill a fuel tank without fuel overflow. Many equipment designs today would meet this requirement. For example, riding lawn mowers typically have 2-inch or 3-inch diameter openings for refueling that are located in a place with easy access and good visibility. Smaller equipment with smaller fuel tanks generally have smaller openings for refueling, but we would want to differentiate those designs with a big enough opening to allow for seeing the fuel level and a ready enough access with a refueling spout to avoid spillage in positioning the gas can. Gas cans come with a standard spout diameter of 3/4 inch. This should allow for engine and equipment manufacturers to design their systems to allow for a sufficient margin to prevent an unavoidably awkward procedure to fill the fuel tank. As an example, we would consider a design deficient if it required the operator to use a funnel to properly position the spout from a typical gas can to consistently deliver fuel into the fuel tank.

We agree that any published industry standards addressing equipment designs related to refueling would be sufficient for purposes of implementing the proposed requirement. Specifically, we would not insist that manufacturers go beyond current industry standards to meet our requirements. For example, we are aware of ANSI standards that specify standard dimensions for fuel tanks on chainsaws. We have revised the regulation to take this into account.

Manufacturers also raised a concern in discussions after the proposal that operators may attempt to refuel with a gas can that is too big. For example, filling a string trimmer's fuel tank with a five-gallon container would be awkward and difficult to perform without spilling even if the string trimmer were appropriately designed given the constraint of the size of the fuel tank. We have revised the regulation to specify that the expectation for proper refueling is limited to refueling events with an appropriately sized gas can.

4.5.3 Fittings and connectors

What Commenters Said:

California ARB commented that carburetor and connector emissions could be controlled by available technology.

Letters:

Commenter	Document #
California ARB	0682

Our Response:

We proposed a requirement in §1060.101(f) that manufacturers design fittings and connectors to ensure secure connections that prevent leakage. We did not propose a separate

requirement that fittings and connectors be made of low-permeation materials. We believe the emissions resulting from permeation through these parts of the fuel system with very small surface area exposed to fuel will not be great enough to warrant separate testing and certification. As we learn more about low-permeation technologies and gain experience with overseeing evaporative standards for nonroad equipment, we may consider whether it is necessary or appropriate to include such a requirement in a later rulemaking.

4.5.4 Tethered and self-sealing fuel caps

What Commenters Said:

NMMA and Mercury Marine noted that in §1060.101(f), EPA proposed requirements that would apply to equipment manufacturers whether or not they are subject to and certify to any of the evaporative emissions standards in §§ 1060.102 or 1060.105. If these requirements are met, equipment manufacturers will be "deemed to be certified" as conforming with the requirements without having to submit a certification application. NMMA and Mercury Marine supported the first requirement for fuel caps in §1060.101(f)(1)(i), which includes the requirement that fuel caps for equipment subject to diurnal requirements must include a visual or audible indication of when the cap is properly sealed. The added flexibility of being able to use either a visual or audible indication is helpful and recognizes that either approach will be able to signify that the cap is sealing the tank.

Since caps with automatic vents, tethers, and audible or visual indicators of being sealed do not exist, currently, for marine tanks, Mercury Marine requested that this requirement not be implemented before 2010. Mercury Marine commented that design, development, testing and validation to meet these requirements will take 18 to 24 months.

EMA commented that in order to provide necessary alignment with California ARB requirements, the second sentence of §1060.101(f)(1)(i) should be revised to read as follows: "Fuel caps for equipment subject to diurnal requirements must include physical and/or audible feedback to the user indicating when it is properly sealed."

IMPCO and Protectoseal submitted comments on the sealing requirements for gas caps on Large SI engines and equipment. See Section 1.8.2 for those comments and our response.

Letters:

Commenter	Document #
NMMA	0688
Mercury	0693
EMA	0691

Our Response:

The requirement to include tethered fuel caps with sealing indicators does not take effect for Marine SI vessels until there is a diurnal standard. These standards start to apply in 2010 for portable marine fuel tanks and personal watercraft. The diurnal standards start in July 2011 for

other vessels (and outboard engines) with installed fuel tanks. Vessels that are exempted from the diurnal emission standards for the first one or two years of the new standards are also exempt from the tethering and sealing requirement. Implementation of these requirements therefore fits with the development timeline suggested by Mercury.

We agree that it would be appropriate to specify a "physical" indication of a sealed fuel cap in addition to visual or audible indicators. We have revised the regulations accordingly.

4.5.5 Keeping water out of evaporative canisters

What Commenters Said:

EMA commented on §1060.101(f)(1)(iii) "What evaporative emission requirements apply under this part?" EMA commented that while this section requires carbon canisters to be installed such that they will not be exposed to water or liquid fuel, it fails to establish the criteria for determining what EPA will consider an acceptable design to preclude exposure to water or liquid fuel. EMA commented that such criteria should either be included in the final rule or addressed in subsequent guidance.

Letters:

Commenter	Document #
EMA	0691

Our Response:

Designing systems to prevent flow of liquids into carbon canisters is achievable with simple and well established technologies. This requirement does not relate to exposing canisters to humid air that may be approaching the dewpoint. A straightforward engineering demonstration would be sufficient to show that water or liquid fuel will not reach the canister. Since this requirement applies to companies that will generally not be submitting an application for certification, this requirement does not involve EPA approval.

4.6 Labeling equipment, vessels, and fuel-system components

4.6.1 Labeling fuel lines, fuel tanks, and other fuel-system components

What Commenters Said:

NMMA and Mercury Marine noted that the evaporative emissions provisions require labeling of the fuel lines, fuel tanks, and other emission-related components in §§ 1060.135 through 1060.138. One of the greatest concerns NMMA and Mercury Marine have with the proposed evaporative emissions labeling requirements is the requirement to include EPA's standardized designation for the emission family. This requirement is contained in §1060.136(a)(3), §1060.137(b)(2), and §1060.138(b)(2). NMMA and Mercury Marine commented that to include the standardized designation for the emission family places a large burden on component and vessel manufacturers. These businesses must already comply with a

whole host of labeling/certification requirements. NMMA and Mercury Marine urged EPA to move to a universal label that will simplify the administrative burden placed on the marine industry. They noted that ABYC and NMMA have developed in H-24 and in SAE J1527 uniform language and markings that include all the necessary information and which satisfy the USCG requirements as well as those imposed by California ARB. Both of these standards were recently revised at the request of EPA to reflect low permeation hoses. NMMA and Mercury Marine believe that the uniform language in H-24 and SAE J1527 for fuel lines makes the most sense for this industry. NMMA commented that EPA should also adopt for fuel tank labels the uniform language recommended in ABYC H-24.

NMMA commented that another way for EPA to reduce the regulatory burden associated with the labeling requirements for hoses is to allow for use of hoses certified to other EPA standards. In the past, NMMA has raised with EPA the importance of including in this rule the ability to use hoses that are labeled for purposes of complying with the Recreational Vehicle Rule. This type of flexibility makes sense for manufacturers that produce products for both markets and reduces the compliance burden without impacting emissions reductions.

Sea Ray commented that a universal label would help to minimize the administrative burden for of labeling. Sea Ray encouraged EPA to work with ABYC and NMMA to approve a universal label.

OPEI and EMA commented that the evaporative labeling requirements should be dramatically simplified to respond to both space constraints and common industry practices for identification of manufacturer and construction. Specific requirements to include EPA emission family and FELs are not viable or practical. OPEI noted that California ARB does not require evaporative FELs to be placed on the emission label. EPA's proposal to add individual evaporative FELs on the label would be inconsistent with California ARB, would further confuse consumers, and would be totally impractical for manufacturers. OPEI and EMA commented that EPA should drop completely its proposed evaporative FEL labeling requirement.

OPEI and EMA recommended that the regulatory requirement specify that the evaporative components be labeled such that the Agency, the equipment manufacturer, the engine manufacturer, or any other interested party can logically locate the EPA Certificate of Conformity information. Anything beyond the component manufacturer's designation that can be traced to EPA certification documentation is redundant and should be avoided. For example, fuel tank labeling should include the manufacturer name or trademark and a product identification that allows identification of the applicable Certificate of Conformity. This may include a part number or series number that is identified in the applicable application for certification, and a date of manufacture code.

OPEI commented that handheld engines are integrated equipment and should be allowed to use the California ARB labeling method for harmonization purposes. Fuel tanks and fuel line should be labeled with an ID mark that can be traced back to the emission application for confirmation purposes. OPEI commented that labeling the individual components with statements, FEL, and family names is not always possible.

OPEI commented that language needs to be added to §1060.138 that allows the information required on the fuel cap to be molded in.

EMA commented that the requirements set forth in §90.127(a)(5)(ii) are confusing. EMA noted that the section indicates that the fuel line permeation level must be included on the label in addition to the certificate holder or fuel line manufacturer's corporate name or trademark. However, the example would allow use of SAE classification.

EMA commented that the repeating period of 12 inches on fuel lines is typical in industry and should be maintained. Regardless of the desire to assure the ability to confirm identification there are products that require fuel lines that are extremely short and could not practically include the identification on every piece. EMA commented that if there is a question of compliance, EPA should inspect several units to provide assurance that short lines contain, in aggregate, identification of compliance.

EMA and MIC noted that the proposed regulation incorrectly references §1060.135(e) in several places to identify the provision related to alternate labeling.

Letters:

Commenter	Document #
NMMA	0688
Mercury Marine	0693
Sea Ray	0683
MIC	0701
OPEI	0675
EMA	0691

Our Response:

We agree with the commenters that a streamlined approach for labeling fuel-system components is appropriate. We have developed an alternate protocol with very simple label information that would allow for looking up all the relevant certification information in our database. We believe the label information should do three things: (1) identify that the code relates to emission standards, (2) identify the certifying manufacturer, and (3) identify the certified emission family. This code could be perhaps nine characters in length. For example: "EPA: ABCXYZ" would (1) identify the hose as compliant with EPA regulations, (2) identify the manufacturer as ABC (generally based on the manufacturer abbreviation assigned by EPA), and (3) identify the family as XYZ. Since the manufacturer is identified in the label information, the family identification code can be determined by the manufacturer without the risk that a different manufacturer would use the same code. This shortened labeling protocol applies equally to fuel lines, fuel tanks, and other certified fuel-system components.

This approach should allow manufacturers to label their products consistent with industry standards. The detailed provisions in the final rule may require some additional characters, but it remains very short and allows for the coded approach favored by the industry.

We believe manufacturers should have the option of including the more detailed information on fuel-system components if they would rather not develop the code names for their emission families. For example, we are aware that straight-run fuel lines are commonly labeled with a continuous printing that includes extensive information. Similarly, fuel tanks are already produced with labeling information incorporated into the mold. If manufacturers want to take this approach, we would welcome that.

We agree that harmonized standards and labeling requirements across EPA programs is beneficial. The emission standards and test procedures in this final rule are consistent with those that already apply for recreational vehicles. The labeling regulations for recreational vehicles do not include any specific requirements. We would therefore agree that any fuel tanks or fuel lines that are properly labeled under part 1060 would be suitable for use in recreational vehicles. We intend in the future to broaden the scope of part 1060 to include recreational vehicles, with any appropriate modifications to reflect the unique situation for those applications. We believe this is the best way to maintain a consistent approach across programs.

It is important for equipment manufacturers and EPA inspectors to be able to readily establish the applicable Family Emission Limit for any particular fuel tank. We agree, however, that the FEL can be omitted from the label under the streamlined labeling approach described above, since the label code could be used to look up the family information, including the FEL. This is possible because we require fuel-tank manufacturers to recertify a fuel tank if they change the FEL. Changing the FEL without recertifying the emission family would lead to confusion, since the database would not readily associate a single FEL with each family code. For manufacturers choosing to include the more detailed label information on their fuel tank, we are specifying that the FEL should be part of the included information. Without the code for looking up certification data, equipment manufacturers and EPA inspectors would otherwise not be prompted to know that an FEL applies for any particular fuel tank.

We are including the proposed requirement to label fuel lines with continuous information, repeating at least every 12 inches (except for short segments), with one modification. The shortened labeling approach we are allowing for the final rule does not lend itself as well to continuous repeating. We are therefore revising the regulation to specify that this code must be repeated such that the blank space between repeated label information must be no longer than the code itself. We understand that this approach to labeling for short fuel-line segments may involve individual pieces that do not include a complete set of labeling information. We agree with the commenter that inspection of multiple fuel lines associated with an engine would be an appropriate way of evaluating these products.

We agree that fuel caps and other components besides the fuel tank may be properly labeled by molding the label content with the part. We have revised the regulation to specifically allow this.

We have corrected the references to the alternate labeling provisions in §1060.135.

4.6.2 Labeling equipment and vessels

What Commenters Said:

OPEI commented that to create a practical, efficient program and provide greater harmonization with California ARB, EPA should finalize –as an alternative compliance path – an integrated and holistic evaporative compliance approval process. This process should explicitly provide for a single evaporative and exhaust certification application, an integrated label, and an inclusive warranty statement consistent with California ARB's approach. For example, for engines or equipment using a single label for both exhaust and evaporative compliance, the emission compliance label language should be combined to read "This engine complies with U.S. EPA EXH/EVP STDS." The engine or equipment manufacturer that is responsible for the introduction into commerce of the complete evaporative control system required by this part should label the engine/equipment. The label should simply include the following information: 1) Corporate name or trademark; 2) Date of manufacture [month and year] unless it is stamped or engraved elsewhere on the engine/equipment; and 3) Statement of compliance; i.e., "this equipment complies with U.S. EPA evap. Stds."

OPEI commented that the requirement to add a statement about using credits to certify (see §1060.135(b)(2)(iv)) is not used for exhaust certification labels today. Such a requirement is not justified, serves no purpose to consumers and is an unnecessary burden and therefore should be deleted. When EPA inspectors need this info, they can get it from their own certification website.

EMA commented regarding §1060.135(b)(2) that whether a product generates or uses credits should not be included in labeling. EMA noted that ABT information is available in the certification application documents. Including this information on the label serves no purpose, and would take up unnecessary space on a very small and crowded label.

EMA commented that the proposed labeling requirements in §1060.135(b)(1) are not feasible. The engine or equipment manufacturer that is responsible for introducing into commerce the complete evaporative control system required by this part should be required to provide the emission compliance label for the engine/equipment. The emission compliance label should only be required to include the following information:

(i) Corporate name or trademark

(ii) Date of manufacture [month and year] unless it is stamped or engraved elsewhere on the engine/equipment

(iii) Statement of compliance; i.e., "This equipment complies with U.S. EPA evap. stds." For engines or equipment using a single label for both exhaust and evaporative compliance, the statement of compliance would read "This engine complies with U.S. EPA EXH/EVP STDS."

Briggs and Stratton commented that the labeling requirements for engines and components needs to be simplified and harmonized significantly from what is in the proposal. A lot of unnecessary and impractical requirements are proposed which add no benefit but a lot of cost and effort for manufacturers.

Honda commented that in the case where a single manufacturer is certifying and building the complete assembly, there should be no requirement to label components as specified in §§1060.136 through 1060.138. Honda requested that if an engine manufacturer chooses to certify a complete fuel system, that a single emission label for exhaust and evaporative standards compliance be allowed. Purchasing fuel tanks that are designed, manufactured and certified by a third party is not the only way an equipment manufacturer or engine manufacturer builds a product. In fact, it is uncommon, other than for portable and some larger marine fuel tanks, that a manufacturer will use a generic or third party fuel tank. It is much more common for the equipment or engine manufacturer to outsource the manufacture of the fuel tank based on its own tooling and design. This is also true for fuel lines, especially molded fuel lines that are required for the confined spaces and challenging routing for many engines and equipment. Honda suggested that the final rule should recognize that there can be one certifying entity for a complete fuel system or that the system can be assembled as a combination of certified parts by any combination of certifying entities.

Honda commented on §1060.135(b) with regard to OB/PWC labeling. Honda recommended that a simplified statement be used on the single label stating only that the outboard engine or the PWC complies with the evaporative requirement. Since there is already a compliance statement this could be accomplished by adding the word evaporative or better the abbreviation “evap”. Actually, an even simpler statement is possible. Because the regulation requires both exhaust and evaporative compliance the label could simply state compliance with the requirements for the applicable model year i.e., THIS ENGINE COMPLIES WITH U.S. EPA REGULATION FOR (MY) SPARK IGNITION MARINE ENGINES.

Boat builders belonging to NMMA commented on the labeling requirements. They commented that the proposed labeling regulations are vague and confusing. They commented that EPA needs to simplify the requirements and should work with NMMA and ABYC to create universal compliance label and location, such as on the hull. The boat builders noted that ABYC and NMMA are working on developing a universal label that will include all information and would like to work with EPA.

NMMA included later comments to suggest label language that states: "This boat complies with EPA evaporative emission requirements in place at the time of construction". This label would be located on the helm and would follow the USCG required language that states that the vessel is in compliance with their regulations. They included pictures showing labels required by Coast Guard. In addition, NMMA requires that their members add a certification plate at the vessel’s helm. NMMA recommended that we allow boat builders to combine these various labels and suggested that we require all such labels to be visible from the helm of the vessel.

Letters:

Commenter	Document #
Yellowfin	0681
Honda	0705
OPEI	0675
Briggs and Stratton	0657
EMA	0691
Sea Ray	0683
S2Yachts	0697
Grady-White Boats	0677
North American Sleekcraft	0666
Triton	0656
Brunswick Corporation	0695
Lowe Boats	0660
Godfrey	0645
American Marine Sports	0639
Cigarette Racing	0637
Regal Marine Industry	0635
Massachusetts Marine Trade Association	0634
Regulator Marine Inc.	0632
Ranger Boats	0628
Larson/Glastron Boats	0626
Four Winns Boats	0650
Hallett	0713
Skeeter	0706
NMMA	0790

Our Response:

We agree with the commenters that the evaporative labeling requirements for equipment should be simplified and better aligned with the requirements adopted by California ARB. For equipment that is produced using only certified components (i.e., certified by companies other than the equipment manufacturer), the final rule specifies that the label include only the manufacturer's name and a simple statement that the equipment uses certified components. For certifying equipment manufacturers, we also require the date of manufacture to be on the label (or permanently identified elsewhere on the equipment), and coded information to identify the various certified components. This may take the form of a single code that allows us to look up all the part information in the manufacturer's application for certification, or manufacturers may identify the individual components. For manufacturers that certify with respect to both exhaust and evaporative emissions, this code could be the engine family name used for compliance with exhaust standards. We would expect many equipment models to use only two certified components (fuel tank and fuel line), though other models might have include multiple fuel tanks or fuel lines from different emission families. Being able to access information related to certified components will be very helpful for inspectors to establish whether an individual piece of equipment complies with the regulations.

This approach includes specifications that are nearly identical to those adopted by California ARB. Where we specify additional detail, we believe there will be a minimal burden to make the label more prescriptive or more informative than California ARB requires. We would also expect California ARB to consider revising its requirements to complete the effort to harmonize federal and state requirements.

We agree the manufacturers do not need to separately identify equipment that generates or uses emission credits. Identifying the certified components and the emission family name for the equipment (if applicable) should allow EPA or Customs inspectors to identify whether the equipment complies with regulations or not.

We also agree that manufacturers certifying with respect to both exhaust and evaporative emissions should be able to combine information into a single label. In fact, this would be preferred for EPA's purposes, since all the relevant information would be presented together.

We have included in the final regulation NMMA's suggestion to require vessel labels to be visible from the helm. This labeling content may also be combined with other required labeling information, such as labels required by Coast Guard.

4.7 Certification and compliance issues

4.7.1 Useful Life

What Commenters Said:

OPEI and EMA commented that the proposed lead time is not sufficient to allow confirmation of the EPA proposed useful life period of five years. OPEI and EMA suggested a two-year useful life requirement for all evaporative standards. If necessary, they noted that a longer durability period should be the subject of a subsequent rulemaking. OPEI similarly commented that EPA should restrict the useful life requirements for handheld fuel lines in the first three years of the standard to two years instead of five, because there will be no opportunity to verify longer useful life of the uniquely handheld equipment solutions before the first low-permeation fuel lines go into production.

EMA commented that the default maximum calendar time for required compliance of 5 years for exhaust and 2 years for evaporative must be included in the definition of useful life in §1054.801. Accordingly, EMA suggested the useful life definition should be revised as follows: "…degree of service accumulation can be verified separately or the engine/equipment have exceeded the required compliance calendar period."

EMA noted that useful life for evaporative controls is addressed in §1060.101(g) and §1054.145. EMA commented that EPA should combine all useful life discussion into one section.

Promens commented that under §1045.145(d) and §1054.145(g) an interim provision is being offered for a limited time of two years for Marine SI and Small SI fuel tanks through 2013

to allow manufacturers to gain experience. This provision is greeted with open arms but does not give the fuel tank manufacturers enough in-field use experience as might be expected. Promens noted that a typical marine fuel tank may be manufactured in March, is shipped and stored at the boat manufacturer for up to 3 months then installed into the vessel. The vessel is stored as a finished product at the boat manufacturer for 1 to 2 months, is shipped to a dealership and then sits in storage for as long as 6 months until it is sold at the retail level. A typical scenario may place the tank from date of manufacture to end user in 4 to 11 months. This lowers the in-field experience level down to only a little over one year. Promens noted that many boat owners use their boats only on weekends and only for 3 to 5 months of the year. Therefore, true in field use could be reduced to as little as a 3 to 6 month timeframe in the two years provided by this provision. Promens requested that this provision be extended to three years to provide a true measure of at least two working seasons.

Letters:

Commenter	Document #
EMA	0691
OPEI	0675
Promens (Hearing)	0642

Our Response:

Emission standards are meaningful only to the extent they ensure emission reductions over the period that equipment is properly maintained and used. We believe there are emission control technologies already available to achieve most of the new emission standards and there has been time to establish the necessary durability of the products. In some cases, manufacturers are working toward commercializing technologies that have been under development more recently. In these cases too, we would expect manufacturers to factor durability into the design effort to ensure that products will meet emission standards over five years of normal use. Manufacturers provided no basis for claiming that it was possible to comply over a useful life period of two years but not five years. However, to ensure that manufacturers have some opportunity to take steps to confirm the durability of permeation controls for fuel tanks and cold-weather fuel lines, we are adopting a two-year useful life for model years before 2014. We also note that the permeation standards were first proposed in 2001 for Marine SI vessels and in 2007 for Small SI equipment. These several years of lead time should allow manufacturers ample opportunity to confirm that technologies are durable, including any need to adjust product specifications or production processes to comply.

It is not necessary to include the additional text to the definition of useful life, as recommended by EMA. The definition already references the appropriate cites to illustrate which useful life periods apply.

We intend for §1060.101 to include a general framework for establishing useful life. The interim provisions for a shorter useful life in §1054.145 are limited to Small SI engines and equipment and will have no relevance after 2013. We therefore believe it is unnecessary to add that as clutter to the long-term provisions in §1060.101.

4.7.2 Division of responsibilities for component manufacturers, engine manufacturers, and equipment/vessel manufacturers

What Commenters Said:

EMA noted that the NPRM properly recognized that evaporative emission control of Small SI engines and the equipment these engines power may involve the engine manufacturer, the equipment manufacturer, or the component supplier. Accordingly, EMA supports the overall framework of the NPRM, and urged EPA to finalize a rule that preserves that framework in order to maintain the feasibility of the pending rulemaking.

EMA commented that the complex multi-level, disaggregated nature of the industry's structure makes it impossible to impose the evaporative emission control requirements on either the engine manufacturer or the equipment manufacturer exclusively. For example, EMA noted that the highest volume engine/product category affected by the NPRM is walk-behind lawnmowers. In the case of such lawnmowers, the engine manufacturer generally provides the equipment manufacturer with a complete, compliant product that complies with all regulatory requirements (including both exhaust and evaporative emission controls). In such a scenario, all regulatory compliance, emission warranty, and other requirements typically are the sole responsibility of the engine manufacturer. In addition, California requires such engines to comply with performance-based standards that require testing using a SHED. In contrast, EMA noted that the lowest volume products covered by the NPRM are produced by equipment manufacturers that utilize "standard" engines purchased through a distribution network. In those cases, the engine manufacturer typically has no direct relationship with the equipment manufacturer. Due to the structure of the industry, EMA commented that the flexibility proposed in the NPRM is absolutely necessary in order to allow alternate means for the production of compliant engines and equipment. Accordingly, it is crucial that such flexibility be maintained in the final rule.

EMA commented that it is not appropriate or practical for equipment manufacturers that are using engines certified to the exhaust standard provisions by their engine supplier to include information regarding exhaust standard compliance. Engines certified for use with equipment manufacturer supplied fuel tanks will include the required interface features to allow the equipment manufacturer to install engines into equipment with the running loss controls in place without modification to the engine. EMA commented that equipment manufacturer modifications to engines certified by the engine manufacturer should be considered tampering, unless the modification is contractually agreed to by the engine and equipment manufacturer.

Honda recommended that EPA implement the necessary steps to accept SHED-tested engines and equipment as an option to component certification throughout the Phase 3 regulation. Engines and equipment that have evaporative emission certification granted by California ARB, based on SHED testing and meeting the running loss control requirements, will exceed the EPA emission reduction standards. For this reason, Honda commented that these engines and equipment should be granted an EPA certificate based on the test data upon which the California ARB certification is based. Honda appreciates that EPA has provided the option to use the California ARB certification, regardless of the actual parts used to comply with the

SHED standard, to demonstrate compliance with the early fuel line requirement and the transition period implementation of additional controls. Similarly, Honda noted that EPA acceptance of this testing option will allow them to sell their products in all 50 states. This harmonization is beneficial to the environment and economy of all parties involved, from suppliers in the production cycle to the final user of the product, and would be applicable both near term during the regulatory transition phase and beyond 2013.

The RV Industry Association noted that with respect to towable RVs, there are more than 50 manufacturers producing many hundred different RV models and floor plans. Total industry-wide production of towable RVs in 2006 exceeded 334,600 units. Given the proposal's requirement that certifications be filed for each applicable model, along with the staggering number of potentially affected models produced by RV manufacturers, they believe that the proposed certification requirements will inundate the agency with thousands of certification submissions annually from the RV industry alone. The RV Industry Association commented that this reality suggests changes to the proposed certification requirements need to be considered. If the end goal is to develop a regulation that provides for enhanced control over evaporative emissions from generator fuel systems without unnecessarily burdening government and industry, EPA should consider emulating the approach adopted by California ARB in 2005 for its Small Off Road Engine (SORE) regulation. Under that regulation, if a RV manufacturer utilizes only fuel system components specified by the manufacturer of the generator (who has itself obtained an Executive Order from California ARB), then there is no up-front certification burden on the RV manufacturer. Conversely, if any RV manufacturer elects not to use the components specified by the generator manufacturer, it then becomes the responsibility of that RV manufacturer to certify to California ARB that the generator fuel system complies with the applicable requirements.

Briggs and Stratton commented that when an equipment manufacturer certifies for evaporative emissions it is not clear if the certified components used (fuel tank, fuel cap (if separate), fuel line, and carbon canister) are combined into an application. Briggs and Stratton commented that this issue needs to be clarified so that one manufacturer (the engine or equipment manufacturer as applicable) gets a combined certificate for the product. It appears that the way the NPRM is written each component manufacturer is responsible for labeling, warranty, etc. for each component. Briggs and Stratton commented that this is not a practical way to manage the emissions certification process.

EMA commented that the proposal does not appear to allow a manufacturer responsible for both the exhaust and evaporative emission requirements to submit a single certification application and obtain a single Certificate of Conformity for compliance with both requirements. Engine manufacturers that produce fully integrated engines, such as walk behind mower engines and many handheld products, should be provided the opportunity to submit one application and obtain a single Certificate for their products. In addition, §1054.201(a) states that a manufacturer certifying to both exhaust and evaporative emission requirements must submit separate applications. If finalized, EMA believes this requirement would preclude a manufacturer from combining documentation, labeling, and other features that could result in a significant reduction in paperwork and lower potential for errors. EMA commented that manufacturers should be

given the opportunity to combine exhaust and evaporative certification submissions and obtain a single Certificate of Conformity at their discretion.

EMA commented that §1054.205(o)(2) is inconsistent with the requirement to segregate exhaust and evaporative certification submissions as proposed under §1054.201(a). EMA believes manufacturers should be allowed to submit a combined exhaust and evaporative application. EMA commented that if their recommended revisions to §1054.201(a) were implemented, then §1054.205(o)(2) is acceptable. However, if their recommended revisions are not implemented, EMA commented that §1054.205(o)(2) must be deleted.

EMA noted that the first sentence of §1054.2 refers to manufacturers of engine and fuel-system components as described in §1054.1. However, §1054.1 does not describe engine and fuel system component manufacturers. The last sentence of this section states that equipment manufacturers are generally responsible for evaporative emissions. However, the evaporative emission control requirements described in Part 1054 are generally applicable to engine manufacturers (equipment manufacturer requirements are identified in Part 1060). EMA commented that this section must be revised so that it accurately identifies the industry to which the regulatory sections (1054 or 1060) apply.

EMA commented that the proposed language in §1060.5(e)(2) is confusing and must be clarified. EMA recommended that the first sentence be revised to read as follows: "Engine and equipment manufacturers that produce handheld Small SI engines/equipment must certify their engines and fuel systems under 40 CFR Part 1054. However, they must certify..."

EMA noted that as proposed, §1060.5(e)(1) would require the component manufacturer to certify fuel lines and fuel tanks, except as allowed by §1060.601. However, §1060.601(f) does not require the component manufacturer to certify fuel lines and tanks, but rather gives them the option to do so. EMA commented that this section should be revised to identify this option and specifically refer to §1060.601(f).

Honda suggested that the final regulation state clearly what parts of §1060.5(b)(3) apply to outboard marine engines and avoid implications of requirements associated with completely different products (e.g., vessels). Specifically, Honda noted that §1060.5(b)(3) states that "manufacturers of outboard engines must meet all the requirements that apply to vessels". Honda believes this is lacking important specificity, overly broad and can lead to misinterpretation. Honda commented that the outboard engine manufacturer should be responsible for the permeation emission from the fuel lines integral to the engine (under the cowl) and permeation emissions from the fuel tank for the very small outboard engines that include the tank as part of the engine. All other parts of the fuel system are either part of the boat or, as in the case of a portable marine tank, are certified, manufactured and sold by a third party and not part of the outboard engine manufacturer production, certification or responsibility.

Brunswick commented that boat builders already have an overwhelming number of certification and labeling requirements for the boat itself and that most companies don't have staff for certifying. We need to ensure that we work towards a universal solution regarding these matters to avoid confusion. Brunswick noted that NMMA has a current "type accepted" program for many safety related components that are installed in boats. A similar approach to the

certification requirement would make it a much easier transition for boat manufacturers to follow.

A chorus of boat builders that are NMMA members submitted comments on certification. They noted that companies do not have experience or staff in certifying with EPA. They commented that there will be a need for EPA to provide training for boat builders on certification and penalties. They noted that NMMA has a "type accepted" program, which the industry is familiar with, and commented that such a program would make for a smoother transition for the industry to certification with EPA?

Letters:

Commenter	Document #
Sea Ray	0683
Honda	705
RV Industry Association	0647
Briggs and Stratton	0657
Brunswick (hearing)	0642
EMA	0691
Triton	0656
Lund Boat Co	0655
Brunswick Corporation	0695
Brunswick Commercial and Government Products, Inc.	0652
Lowe Boats	0660
Godfrey	0645
Cigarette Racing	0637
Regal Marine Industry	0635
Massachusetts Marine Trade Association	0634
Regulator Marine Inc	0632
Chaparral/Robalo Boats	0630
Ranger Boats	0628
Larson/Glastron Boats	0626
Four Winns Boats, Inc	0650
Skeeter	0706

Our Response:

We agree that the rule should balance the respective roles of engine, equipment, and component suppliers. We have preserved the proposed framework for assigning certification responsibilities, with various adjustments and clarifications as noted below.

Engine manufacturers must supply equipment manufacturers emission-related installation instructions. We expect these instructions to include any necessary requirements, restrictions, or other information to ensure that the finished products are compliant with exhaust and evaporative emission standards. Equipment manufacturers that do not follow these installation instructions are in violation of the prohibitions in §1068.101.

We agree that the regulations should allow Small SI manufacturers to use the SHED-based measurement procedures from California ARB without expiration, as described in Section 4.7.2.

We believe we have constructed a certification protocol that minimizes the regulatory burden on EPA and industry. By focusing on component certification, we are aiming to place certification responsibilities as far upstream in the assembly sequence as possible. This prevents multiple equipment manufacturers using a common fuel tank or fuel line from needing to submit paperwork to EPA. The regulations allow for equipment manufacturers to assume certification responsibilities for components, but this is only where this arrangement is agreeable to both component and equipment manufacturers. Control of running losses for nonhandheld engines pose a challenge to this approach. Only the manufacturers assembling the complete fuel system for engines and equipment can certify with respect to running losses. We are aware that this will require the involvement of a large number of companies. However, running loss certification is relatively simple, since most companies will use one or at most two approaches. The running loss requirement does not involve emission measurement so the application for certification will consist of little more than a brief description of the method of control. We believe this approach is consistent with the requirements adopted by California ARB.

We expect to prepare certification documents such that manufacturers can include information related to exhaust and evaporative emissions compliance in a single submission. We may issue combined or separate certificates for exhaust and evaporative emission controls, but we intend to make efforts to simplify data submission as much as possible. We have revised §1054.201(a) to specify that separate certifications are required for each engine family; this emphasizes that separate certificates apply for families with respect to exhaust emissions without limiting our approach for certifying with respect to evaporative emissions. Component manufacturers that certify their products are obligated to meet all the requirements associated with certification. However, in the case of Small SI equipment, we also require equipment manufacturers to certify their equipment. This would allow for an approach to warranty that aligns with existing practices. If the equipment manufacturer provides the warranty for components, the certifying component manufacturer would have no further obligation to meet warranty requirements. In cases where equipment manufacturers don't certify (most commonly with marine vessels), the component manufacturers should make contractual arrangements to delegate responsibilities for processing warranty claims.

We have revised the regulation to move the certification requirements for evaporative emissions to part 1060. We have therefore removed the proposed requirement from §1060.205(o)(2) to submit evaporative emission data in the application related to compliance with exhaust emission standards. Engine and equipment manufacturers that certify with respect to evaporative emissions must certify under part 1060. The remaining evaporative-related regulations in part 1054 summarize the applicable standards, describe the provisions related to emission credits, and present various interim provisions that are specific to Small SI engines and equipment. Certifying for compliance with exhaust and evaporative emission standards in separate parts does not prevent us from combining these applications for certification, as described above.

We have revised §1054.2 to clarify who is responsible for meeting evaporative requirements under part 1054. We have eliminated the reference to component manufacturers, since they would be certifying under part 1060 and they have no responsibility for producing or installing engines that meet exhaust emission standards. Also, engine manufacturers are responsible for meeting evaporative emission requirements only to the extent they install fuel-system components. However, engine manufacturers that install complete fuel systems are considered to be the equipment manufacturer with respect to evaporative emission standards.

We drafted §1060.5(e)(2) to address three separate scenarios for assigning certification responsibilities to different types of manufacturers. EMA's suggested wording is not inconsistent with the proposed language, but it does not allow for a clear presentation of the full range of scenarios. We are finalizing these provisions as proposed.

We have revised §1060.5(e)(1) to refer specifically to §1060.601(f).

We agree that the proposal included overly broad assignment of responsibility to outboard engine manufacturers. We have revised §1060.5(b)(3) to specify that engine manufacturers must comply with requirements that apply to vessel manufacturers for those fuel-system components they install on their engines. This is true for all types of marine engines, so we no longer apply this provision only for outboard engine manufacturers.

We are adopting an approach that minimizes the compliance for boat builders. Boat builders that do not build their own fuel tanks will generally be able to buy certified components that meet all applicable emission standards (permeation and diurnal). Boat builders must keep records to document their compliance and apply a simple label to their vessels. We believe this approach is very similar to the type approval described by NMMA. We look forward to working with NMMA to ensure that boat builders and component suppliers are informed of the new requirements and have access to the tools they need to comply.

4.7.3 Relationship to California ARB certification (reciprocity, etc.)

What Commenters Said:

OPEI noted that as proposed, there are still several conflicts that will prevent 50 state products with common certification applications, and common testing, labeling, and warranty standards for the same evaporative families. California ARB's evaporative program allows the certifying engine or equipment manufacturers to: 1) Install all the evaporative components; 2) Apply an integrated engine exhaust and/or evaporative label; and 3) Issue to consumers a single, integrated emission warranty statement – for the complete evaporative system (i.e., tanks and fuel lines) – even when a separate component supplier performs the actual tests to demonstrate compliance. To further facilitate an efficient certification process, California ARB allows manufacturers with the needed flexibility to broadly aggregate families based simply on the use of different materials and technologies.

OPEI noted that in sharp contrast, under the Phase 3 proposal, EPA would have to issue separate and distinct certifications (in all cases) that would require unique labels for each individual evaporative component. Unlike California ARB, EPA's proposal apparently would not practically allow a single integrated exhaust and/or evaporative label or combined warranty statement from the engine manufacturer or the OEM. OPEI believes that EPA's proposal creates unintended problems and is impractical – given the small spaces for labels on most products. EPA's proposed piecemeal approach would be confusing to consumers, who would have to read numerous confusing labels and try to track and apply numerous warranty statements. Moreover under EPA's overly-complicated, piecemeal evaporative program, even manufacturers of integrated products could not certify and label a 50-state product – even though it fully meets the EPA and California ARB programs. In this regard, EPA's proposal imposes substantial administrative burdens without any benefits.

OPEI noted that during the interim or transition period (generally before 2011), EPA proposed to fully accept California ARB evaporative Executive Orders for evaporative systems and components without requiring extensive re-testing and re-certification. OPEI urged EPA to permanently accept California ARB Executive Orders as a demonstration of compliance to allow manufacturers to avoid wasting substantial resources (re-testing and re-certifying) California ARB Tier III-compliant products with no commensurate environmental benefits. For example, under the California ARB Tier III program, the complete connected fuel tank and engines on walk-behind mowers (and other products certified using the California ARB SHED-performance requirements) must be certified under a very stringent SHED-based performance standard that is more robust that EPA's component-based certification program. While OPEI fully supported EPA's assessment that SHED-based testing requirements are not viable or cost-effective for all Small SI products, OPEI commented that it does not make any sense to require these California ARB-compliant lawnmowers and other products to be re-certified on a component-by-component basis. OPEI requested that manufacturers have the option to certify products to EPA's Phase 3 requirements based on previously established performance certification to California ARB's Tier 3 limits.

EMA commented that EPA should accept engines and equipment that are certified to California ARB Tier III standards via compliance with a full diurnal SHED test in addition to running loss control requirements. Even though the manufacturer will not have documented individual component emission performance for such engines or equipment, EPA should accept such engines because they exceed EPA's required emission reduction expectations. Certain products, such as walk-behind lawn mowers certified for California ARB utilizing the SHED-based performance option will not have individual component emission performance documented by the manufacturer; however, such products exceed EPA's required emission reduction expectations. EPA's acceptance of this testing option will provide a significant environmental benefit as well as the much sought after harmonization necessary to enable manufacturers to distribute product on a 50-state basis.

California ARB commented that EPA should specifically consider adopting language giving flexibility to accept the California ARB diurnal test results that measure the same or more restrictive performance standards as satisfying the EPA requirements for tanks and hose assemblies. As part of its evaluation, California ARB is testing the entire tank as one unit, and

the hose and primer bulb as an assembly. In this way, the permeation aspect is included in the test results. California ARB diurnal test procedures for tanks include permeation as well as evaporative emissions from fittings, pickup tubes, and fill caps. Likewise, the hose and primer bulb test method includes all fitting and hose connectors.

OPEI specifically requested that EPA make additional efforts to harmonize all its evaporative test methods with the California ARB Tier 3 requirements. Harmonizing soak temperatures, tolerances, measurement methods, and reporting requirements will substantially reduce regulatory burdens without reducing environmental benefits. OPEI commented that all components that have achieved California ARB compliance and received a California ARB Executive Order should be approved for use on EPA compliant products without additional testing, labeling, or burden on either the engine manufacturer, equipment manufacturer, or fuel line manufacturer.

OPEI also requested that products meeting the California ARB Tier 3 diurnal and running loss requirements automatically be deemed compliant with EPA's Phase 3 running loss regulations.

EMA commented on §1060.105(e)(2) that manufacturers should have the option to comply with the design standard requirements by certification with the diurnal requirements specified for Small SI engines by California ARB. EMA recommended that an option (v) be added that reads as follows: "Have a valid Executive Order from California ARB that includes running loss control."

EMA commented that a California ARB approved fuel line always should be acceptable, not just during the transition period. California ARB compliant fuel lines that have received a California ARB Executive Order should be approved for use on EPA compliant products without additional testing, labeling, or imposition of any other burden on either the engine manufacturer, equipment manufacturer, or fuel line manufacturer.

In general, California ARB recommended that EPA either modify its proposal to match the California program or allow California test results to meet the EPA requirements.

NMMA and Mercury Marine noted that EPA's proposal contains an entirely new Part 1060 which would establish evaporative emissions requirements for all Marine SI engines. They also noted that California ARB also is in the process of developing evaporative emissions rules for Marine SI engines. Two separate requirements for evaporative emissions create needless complexity and impose an additional burden on industry. NMMA and Mercury Marine as well as several NMMA member boat builders strongly urged EPA to develop a national evaporative emissions rule to simplify the regulatory requirements applicable to marine engine and component manufacturers and boat builders.

Sea Ray also recommended a "national approach" to establish evaporative emissions requirements for Marine SI engines. Sea Ray encouraged EPA and California ARB to work as partners and develop a national evaporative emissions rule to simplify the regulatory requirements and eliminate the regulatory burden of complying with two separate sets of

regulatory requirements. Sea Ray commented further that they encourage EPA to look for common alignment with the current California ARB rule considerable amount of effort has been made to meet those guidelines. They also encourage EPA to work closely with industry on the key aspects of this rule.

Letters:

Commenter	Document #
Sea Ray	0683
OPEI	0675
Mercury	0693
California ARB	0682
EMA	0691
Grady-White Boats	0677
Triton	0656
Brunswick Corporation	0695
Brunswick Commercial and Government Products	0652
Lowe Boats	0660

Our Response:

Our proposed requirements were substantially aligned with the requirements adopted by California ARB. We have made several changes in the regulations to eliminate many of the remaining areas where there were inconsistent requirements or specifications between the two programs.

Perhaps the broadest area of concern relates to whether equipment manufacturers or component manufacturers would need to certify their products. We believe it is the most efficient and practical approach to put primary certification responsibilities on component manufacturers. They have the primary responsibility to design and produce compliant products. They are generally also best positioned to generate emission data and submit applications describing how the products meet emission standards. The alternative approach of requiring equipment manufacturers to take primary responsibility for certification would greatly increase the number of certifying manufacturers and involve a tremendous duplication of effort as dozens or perhaps hundreds of equipment manufacturers would certify products from the same component manufacturer.

At the same time, we are aware that there may be legitimate business reasons for equipment manufacturers to prefer to take on the certification responsibility instead of component manufacturers. Where component manufacturers have a written commitment from the equipment manufacturer stating that the equipment manufacturer will certify the product, the component manufacturer may delegate all compliance responsibilities to the equipment manufacturer. In the case of Small SI equipment, we additionally require equipment manufacturers to certify their equipment, largely as a result of the running loss emission standards.

This sets up a different default than that established by California ARB, but it nevertheless allows for a harmonized approach. Manufacturers using any combination of component and equipment certification in California can rely on those certifications with EPA, as long as the documentation makes it clear who is responsible for certifying each item.

We are adopting California ARB's SHED-based procedures on a permanent basis. This decision depends substantially on California ARB making a change to their certification fuel to include the effects of ethanol on permeation rates. If this does not change, we intend to revisit this provision to limit its applicability or to allow it only for testing with EPA's certification fuel.

We have revised the regulation in several areas to align with the testing and certification provisions adopted by California ARB. One area that remains different is the test fuel. As described in Section 4.8, we have determined that it is important to maintain the proposed specification including ethanol in the test fuel. California ARB has communicated that they plan to revise their specified test fuel, so it is not possible at this point to identify a test fuel that will align with California ARB for the long term. The current regulation therefore does not allow for components certified using California test fuels to be valid for demonstrating compliance with EPA standards.

We proposed to include a provision allowing manufacturers to use their California ARB certification as the basis for meeting EPA's running loss standards. This provision will remain in the final rule.

We will continue to communicate with California ARB in their effort to set evaporative standards for Marine SI applications.

4.7.4 Production period for component certification

What Commenters Said:

EMA and OPEI commented that EPA should not require annual re-certification of fuel lines. EPA has sufficient enforcement power to ensure that on-going production remains in compliance without an annual certification process. In addition, EPA must provide sufficient notice, either directly or through the fuel line manufacturer, to customers if a previously certified product will no longer be available as a result of EPA's determination that the Certificate of Conformity is no longer valid.

EMA commented that once EPA has issued a Certificate of Conformity for a component, the Certificate should remain valid until there has been a change in the applicable standard level or it has been voided. Component certifications should not require either annual or periodic renewal. In the event a component manufacturer certificate is voided as the result of a compliance enforcement action, EMA commented that all users of the affected components must be provided a minimum of one full model year after notification to identify alternative compliant components.

Saint Gobain noted that EPA is proposing under §1060.201 that fuel system components such as a fuel line hose or tubing must be certified on an annual basis. For components such as fuel line hose or tubing as part of the low emission fuel-system equipment, they fail to understand the need to recertify this component on an annual basis. Usually when such a product is developed, perfected and sold into the industry, the design could have a significant life span before it would be modified or discontinued. A typical life span could be 5-10 years. So it would seem to be a very redundant and unnecessary requirement to certify this type of component for each year of production. In fact such products are never distinguished by model years.

Saint Gobain noted that many of these types products are sold through a network of distributors and dealers, thus it could create severe inventory problems. They raised a number of questions in their comments. For example would tubing manufactured in 2009 be required to be installed on equipment prior to December 31, 2009? Would they be required to brand or label the tubing with a model year? If such were the case, then many customers would be forced to scrap out any unused tubing or they would want to return it to the manufacturer. This could create unnecessary financial hardships. They also asked about the aftermarket application such as replacement tubing/hose for marine outboard engines and lawn mowers. Would dealers and retailers be required to throw out this unused inventory after December 31st? This would basically require an expiration date on such products.

Saint Gobain suggested that EPA exempt fuel line tubing and hose from the annual certification requirement. They observed that annual certification might make sense if the fuel line is part of fuel system assemblies built for specific model year equipment. In such cases the hose or tubing manufacturer may be subject to annual certification. This would be an example of an OEM application where the inventory is carefully controlled. A fuel hose or tubing within a family of design should only be required to be certified once for its lifetime of production.

Letters:

Commenter	Document #
OPEI	0675
Saint Gobain	0661
EMA	0691

Our Response:

We agree that fuel components are not generally produced based on annual production periods. Thus, neither the proposed regulations nor the regulations being finalized require annual certification for components. However, the regulations do not allow component certificates to cover indefinite production periods. The longest production period that may be covered by a single component certificate is five years. We believe that allowing component certificates to cover up to five years of production appropriately balances the need for periodic EPA review with the desire to minimize the certification burden. Where components remain unchanged for more than five years, the manufacturer can easily obtain a new certificate using carryover data. This provisions contrasts with the approach we have taken in emission control programs related to exhaust emissions; however, this approach is consistent with Clean Air Act

section 213(d), where the Act specifies that EPA may modify the certification protocol where that is appropriate.

On the other hand, since most equipment manufacturers have annual production periods, we are requiring that equipment certificates cover only a single model year, in the same manner as engine certificates.

In response to the comment from Saint Gobain, it is important to note that the provisions related to production periods only affect what can be *produced* under a certificate. In general, anything that is lawfully produced under a valid certificate can be distributed in U.S. commerce later. The exception to this is when new standards take effect. Since these new standards are based on the model year of the equipment, should we tighten the standard for fuel lines in the future, it would not be permissible for an equipment manufacturer to stockpile fuel lines such that the higher-emitting fuel lines are installed after the new standard take effect, even though it may have been produced under a valid certificate meeting the earlier less stringent standard. We allow for normal inventory practices to eliminate product produced under the less stringent standard, much like we have always allowed for equipment manufacturers installing certified engines.

Finally, we disagree strongly with the comments stating that the regulation should allow the continued production and sale of components for which we have voided, revoked, or suspended the certificate. We have no obligation to make noncompliance with the regulations convenient for industry. That would only serve to make such noncompliance more likely. Moreover, we have no similar allowance for equipment manufacturers to use noncomplying engines. To the extent that engine or equipment manufacturers have concerns about potential disruptions to their production, they should address them in their purchase agreements with their suppliers.

See Section 4.7.9 for issues related to replacement components.

4.7.5 Family criteria

What Commenters Said:

Commenter	Response
OPEI and EMA commented that EPA's proposed definition of emission families for fuel tanks to include extraneous factors (such as pigment and UV inhibitors) would create further inefficiencies and inconsistencies with California ARB. This, in turn, would impose additional administrative and product-segregation costs and burdens without any benefits. OPEI and EMA commented that EPA should create a broad evaporative tank family definition similar to California ARB's more stringent approach. There is no reason that a manufacturer can not evaluate the influence, if any, for these additives in the process of determination of a worst case selection for testing. By allowing combinations of these options within a family the certification process	The proposal required that manufacturers differentiate emission families based on additives that "may affect" emissions. We are revising this in the final rule to specify additives that "are expected to affect" emissions. These additives may have a strong effect on emissions, for example, by affecting adhesion of post-processing barrier layers, and in many cases it is not apparent which recipe would represent the worst-case condition. We would expect normal production within a tank model to rely on a consistent formula and manufacturers provided no basis for needing such a variety. As a result, we believe it is necessary and appropriate to require that manufacturers separate their products into different emission families as described above.

burden can be reduced for both the industry and the agency.	
Due to a high number of different tanks (over 70 different versions) in production, OPEI commented that EPA should require a test of best and worst surface to volume ratio of tanks, to reduce the number of tests. The worst emission value would be applicable for certification.	The regulations do not specify additional testing for fuel tanks for different values of surface-to-volume ratio. It is not clear what change is recommended by the comment.
OPEI commented that EPA should provide information on how a manufacturer should establish a family name. (See §1060.230) OPEI requested that EPA reference a guidance document.	To the extent that we establish a naming convention for evaporative emission families, this would occur outside of the rulemaking process.
EMA noted that the evaporative emission family naming convention is not identified in the proposal. EMA recommended that the convention be the minimum required to identify the family. For engine or equipment manufacturers that are also obtaining a Certificate of Conformity to the exhaust emission requirements, the minimum additional information required to indicate the evaporative family should be a two character code established by the manufacturer. For other manufacturers, the evaporative family name should include only a model year designation, manufacturer identification code, and a two character code established by the manufacturer.	We will take these suggestions into account if we pursue a standardized convention for identifying emission families for evaporative emissions.
EMA and OPEI objected to the requirement for manufacturers to submit a new application for a changed FEL with respect to fuel tank permeation (see §1060.225). They noted that this is not required for exhaust emissions.	We agree that equipment manufacturers should be able to change the FEL within an emission family (subject to the same restrictions that apply for exhaust FELS), since they can easily track their own products to know what FEL applies for each tank. This does not apply for tank manufacturers that name an FEL and certify their own tanks. Requiring them to recertify for a changed FEL will help make clear for equipment manufacturers which FEL applies for each tank.
EMA commented on §1060.205 that Small SI engine and equipment manufactures that are required to certify to the running loss requirements specified in §1060.601(c) must have the ability to include in their certification submission component Certificate of Conformity information in place of the specific product selection and testing requirements proposed.	We expect to arrange certification templates to allow for engine manufacturers to include certification information showing that they meet running loss standards. However, as described in §1027.115, we would apply a separate certification fee for evaporative compliance. This fee is considerably lower than the fee for exhaust emission compliance. Also, a single fee would apply for all evaporative compliance in the same emission family as described in §1060.230. This allows manufacturers to group products from the same engine family for exhaust emissions into a bigger combined family for evaporative emissions.
EMA commented on §1060.230(c) that it is inappropriate to include fuel cap design as a criterion in establishing emission families for fuel tanks.	We specify that fuel cap design is relevant for defining emission families only with respect to diurnal emission controls (the proposal also include reference to diffusion emissions, but that is not part of the final rule). Fuel cap design is therefore of interest for Small SI equipment to the extent that they use California's SHED-certified approach and the fuel cap varies in ways that are relevant to diurnal emission control. We believe this is a reasonable approach.

MIC commented that the language of §1060.230(g) says, "Select test components that are most likely to exceed the applicable emission standards. For example, select a fuel tank with the smallest average wall thickness (or barrier thickness, as appropriate) of those fuel tanks you include in the same family." This text appears to be misplaced because 1060.230 addresses how to divide product into engine families, not how to select components for testing.	We agree with this suggestion and have moved the testing-related text to §1060.235

Letters:

Commenter	Document #
MIC	0701
OPEI	0675
EMA	0691

4.7.6 Design-based certification– fuel tank permeation

What Commenters Said:

NMMA expressed strong support for the inclusion of provisions allowing design-based certification for manufacturers of tanks and components. NMMA stated that it will significantly reduce the testing burden placed on manufacturers by providing the option to certify products using a design-based approach. In addition, NMMA commented that such measures are necessary in order to facilitate compliance with the rule across a diverse group of affected businesses. Inca also commented that the design-based certification process should be included in the final rule.

Fluoro-Seal International proposed that undeveloped technology be allowed for future consideration as a compliance option by including an "innovative product" review and qualification procedure in this regulation. Fluoro-Seal commented that allowing for the development of innovative products will enable continuous improvement of materials and systems for lowering emissions from fuel handling systems and recommended the following approach:

(a) EPA would require a manufacturer to demonstrate by clear and convincing evidence that, due to the product's design, delivery system, or other factors, the use of the product will result in lower emissions below the highest level allowed by rule.
(b) A manufacturer (applicant) would apply in writing to EPA for an innovative product exemption claimed under a subsection to be written. The application would include the supporting documentation that quantifies emissions from the innovative product, including the actual physical test methods used to generate the data. In addition, the applicant would provide any information necessary to enable the EPA to establish enforceable conditions for granting the exemption.
(c) Within 30 days of receipt of the exemption application EPA would determine whether an application is complete as required by rule.
(d) Within 90 days after an application has been deemed complete, EPA would determine whether, under what conditions, and to what extent, an exemption from the requirements of said rule will be permitted. An applicant would be allowed to submit additional supporting

documentation before a decision has been reached. The EPA would notify the applicant of the decision in writing and specify such terms and conditions that are necessary to ensure that emissions from use of the product will meet the emissions reductions specified in the rule, and that such emissions reductions can be enforced.
(e) In granting an innovative product an exemption, EPA would specify the test methods for determining conformance to the conditions established. The test methods may include criteria for reproducibility, accuracy, and laboratory sampling procedures.

Letters:

Commenter	Document #
NMMA	0688
Fluoro-Seal	0646
Inca Molded Products	0700

Our Response:

We are finalizing design-based certification provisions for meeting the fuel tank permeation standards. We agree with commenters that design-based certification would reduce the testing burden for manufacturers. However, we believe that this approach should only be used when the technology is well understood and the design constraints can be clearly specified. As proposed, we are allowing design-based certification to the fuel tank permeation standards for metal fuel tanks and for co-extruded fuel tanks with a continuous ethylene vinyl alcohol (EVOH) barrier layer. Metal does not permeate, and the EVOH-barrier tank design specified in the regulations is a well established technology that has long been proven in automotive and other applications as having a permeation rate well below the standards finalized in this rule.

Fluoro-Seal describes an approach in which manufacturers would provide "clear and convincing evidence" that a product will meet the tank permeation standard including test procedures specified by EPA. This approach is very similar to the direct certification procedures for these fuel tanks. To certify a fuel tank family to our standards, manufacturers would perform emission testing on the fuel tank design in the family expected to have the highest permeation rate. The test data are then used to certify a whole family of similar products. In addition, the manufacturer may carry this data over from year to year.

We believe that it is important that the fuel tank manufacturer certify to the standards, rather than a material supplier or a post-process treatment facility. The final permeation performance of the fuel tank depends heavily on the design of the fuel tank and the actual manufacturing process. Specifically for surface treatments, data in the RIA suggests that the performance of these barrier technologies is a function of a wide range of variables, including the material used for the fuel tank, additives to this material, and processing temperatures and pressures that are typically held confidential. For these reasons, we believe that any new treatment process and tank material combination should be tested to ensure proper performance.

We may establish additional design-based certification options where we find that new test data demonstrate that the use of other technology designs will ensure compliance with the applicable emission standards. These designs will need to produce emission levels comfortably

below the new emission standards when variability in the emission control performance is considered. In addition, all aspects of these designs would need to be publicly available and quantifiable. For instance, we would not create an design-based certification for a material or process without full public disclosure of all of the characteristics of that material or process relevant to its emission barrier performance. We would also not include products whose emission performance is highly variable due to tolerances in materials or manufacturing processes.

4.7.7 Design-based certification– diurnal

What Commenters Said:

NMMA expressed strong support for the inclusion of provisions allowing design-based certification for manufacturers of tanks and components. NMMA stated that it will significantly reduce the testing burden placed on manufacturers by providing the option to certify products using a design-based approach. In addition, NMMA commented that such measures are necessary in order to facilitate compliance with the rule across a diverse group of affected businesses.

Delphi commented in favor of the proposed provisions for design-based certification, including the canister design requirements and the minimum carbon butane working capacity of 9 g/dL. All carbon grades utilized for automotive and other canisters produced by Delphi have butane working capacities greater than or equal to 9 g/dL. Delphi expressed support for the canister sizing requirements of a minimum of 0.04 liters per gallon of fuel tank capacity for trailerable boats and 0.016 liters per gallon for non-trailerable boats. Delphi stated that these carbon volumes should provide good efficiency while allowing for canisters that can be packaged in boats. Delphi also expressed support for the minimum length-to-diameter ratio of 3.5, and the use of a volume compensator to reduce carbon abrasion.

MeadWestvaco Corporation stated that it supports the proposed design-based certification provisions for diurnal emissions, but expressed concern that the proposed carbon requirements do not include a specification for mean particle diameter. For any given flow rate of air or vapor through activated carbon, the pressure drop across the carbon bed increases with decreasing particle size. MeadWestvaco stated that without a requirement for carbon particle size, a very finely sized activated carbon could be used within the canister that meets the above requirements but has characteristics of very high flow restriction, making the carbon canister unusable. MeadWestvaco Corporation suggested that a minimum Mean Particle Diameter of 3.1 mm, based on ASTM procedure D2862, be included in the design-based certification carbon requirements outlined in § 1060.240(d) to ensure low pressure drop while continuing to maintain carbon functionality.

Letters:

Commenter	Document #
NMMA	0688
MeadWestvaco Corporation	0723
MeadWestvaco Corporation	0724
Delphi	0638

Our Response:

We are finalizing design-based certification provisions for meeting the diurnal emission standards. We agree with commenters that design-based certification would reduce the testing burden for manufacturers. The final design specification for carbon canisters include MeadWestvaco's recommendation that the carbon granules must have a minimum mean diameter of 3.1 mm based on the procedures in ASTM D2862. We believe that this additional specification is necessary to prevent canister designs with high flow restrictions.

4.7.8 Warranty

What Commenters Said:

California ARB noted that EPA proposed a two-year period for emission-related warranties with respect to evaporative emission controls. This period is not long enough to ensure that quality evaporative control devices will be used and will stay consistent with engine warranty periods. ARB recommended a five year warranty period, consistent with engine warranty.

EMA commented that it is not practical for certifying component suppliers to provide an emission-related warranty. The emission warranty requirement should be placed on the engine or equipment manufacturer that assembles the complete evaporative control system with appropriate contractual agreements between the engine/equipment manufacturer and their component suppliers. The general requirements should be revised such that the engine or equipment manufacturer that provides the commercial warranty for an engine or equipment must provide the emission-related warranty. The component supplier will be accountable to the engine/equipment manufacturer by way of the contractual relationship between the parties. Accordingly, EMA commented that §1060.120(a) should be revised to read as follows: "The engine or equipment manufacturer that provides the commercial warranty for an engine or equipment must warrant to the ultimate purchaser and each subsequent purchaser that the new nonroad equipment conforms with the requirement of this part at the time of sale and is free from defects in materials and workmanship that may keep it from meeting these requirements."

Letters:

Commenter	Document #
California ARB	0682
EMA	0691

Our Response:

California ARB's comment confuses useful life and warranty periods. Current regulations for Small SI in part 90 and Marine SI engines in part 91generally specify warranty periods of two years. EPA's general approach in more recent rulemakings is to set warranty periods to be half of the applicable useful life. This approach for evaporative requirements takes a similar approach. We expect this to have very little impact on the way manufacturers design or produce their products. Evaporative emission controls are generally not susceptible to defects that would cause an owner to bring the product in for repairs.

In the final rule, we require Small SI equipment manufacturers to certify with respect to evaporative emissions. For Marine SI vessel manufacturers, certification is optional. For both cases, we specify that component manufacturers may meet their warranty obligations if a certifying equipment or vessel manufacturer meets warranty requirements. If a vessel manufacturer does not certify, the component manufacturers would be expected to make an agreement with the vessel manufacturer to process warranty claims on their behalf, or otherwise to combine efforts to fulfill the warranty obligation.

4.7.9 Replacement components

What Commenters Said:

NMMA noted that EPA proposed in §1060.601(b)(3) that in cases where a fuel tank is replaced, the replacement tank should have the same or lower FEL as the original fuel tank. If such a tank is not available, EPA proposed to allow equipment owners to request an exemption from the anti-tampering provisions if there is no low-FEL tank available. NMMA commented that this situation is very likely to occur in the future as molded tanks eventually wear out and the older molds are no longer available. NMMA agreed that such situations should be exempt from the tampering provisions. However, customers in these situations should be able to put whatever tank fits in the vessel without having to request an exemption. NMMA commented that an exemption process is administratively burdensome and impractical and the requirement for a formal request should be removed from the final rule.

Arctic Cat requested that specific language be added that would allow more flexibility in supplying replacement fuel tanks. Arctic Cat noted that since the vehicle emission control information (VECI) label specifically states the permeation family name, they have been told by certification staff that replacement tanks that do not match the information on the VECI label would not be allowed. To recreate the precise tank that was made in the past has significant cost impact and adds little value for anyone. In fact, the high cost of these replacement tanks could motivate the customer to find an alternative that may result in much higher permeation. Arctic Cat does not feel that EPA's original intent was to disallow flexibility for providing replacement tanks by adding requirements to include the permeation family name on the VECI label. They requested the addition of a paragraph that allows any fuel tank from a permeation family that has already been certified under the same or other engine family to be used as a replacement tank as long as it meets the same FEL or standard as the tank being replaced.

OPEI commented that they agreed with the provision to allow equipment owners to ask for an exemption from the tampering prohibition if there is no low-FEL tank available. The replacement tank would still need to meet applicable standards, but would not need to meet the more stringent emission levels reflected by the old tank's FEL. OPEI believes there should be special provisions to allow historical fuel tanks (fuel tanks used on products produced before low permeation regulations were enforced) to be supplied as replacement parts for all time for those products.

Letters:

Commenter	Document #
NMMA	0688
Arctic Cat	0709
OPEI	0675

Our Response:

We have revised the regulations to clarify that new fuel tanks need not be certified to the permeation standards if they will be installed as replacement tanks where the original tank was not subject to emission standards. This allows for continued production of replacement fuel tanks that are identical to the original tanks, or otherwise in something other than a low-permeation configuration.

In cases where replacement tanks will be installed in equipment in which the original tanks were certified with an FEL below the applicable standards, we agree with the commenters that it would be inappropriate to require manufacturers to match that same level of emission control with the replacement tank, or to require owners to go through a process to get EPA approval for a waiver from this requirement. As long as these replacement tanks are certified, we will consider them to be compliant with EPA requirements. This avoids imposing the burden of tracking product and prevents a situation where manufacturers are unable to supply low-permeation fuel tanks of a different configuration than the original fuel tank.

Equipment manufacturers may identify multiple valid fuel tank models (or emission families) on their labels or in their applications for certification. If they do this it will be easier to establish that equipment with a replacement fuel tank that differs from the original configuration is still in a certified configuration. This would also accommodate a production scenario in which the equipment manufacturer includes different kinds of fuel tanks for a given equipment model (for example, by sourcing fuel tanks from different component manufacturers).

4.7.10 Other certification issues

Summary of Comment	Response
EMA commented on §1060.225(c) that the requirement to supply additional test data within 30 days of EPA's request is not appropriate. The requirement should specify that manufacturers must supply data within 30 days after completion of the testing associated with EPA's request.	We agree that it may take more than 30 days to respond to certain requests. For example, any testing that requires preconditioning components would take several weeks to be able to run a valid test. As a result, we are modifying the regulation to specify that the manufacturer must either give us the information within

	30 days or give us a plan for providing the information in a timely manner.
EMA commented on §1060.235(f) that the method used to determine the official test results must be identified for cases when more than one unit is tested. EMA suggested that the average of all test results should be considered the official test results.	Section 1060.801 defines the "official emission result" as the measured emission level from a certification test on a given tested component. The "certified emission level" is defined as the highest official emission result from a family. This approach is consistent with the terminology and practice for exhaust emission testing for all nonroad engines.
EMA commented that a demonstration of durability as part of the determination of compliance for a given fuel system technology is appropriate. However, due to the long term stabilization requirement to generate test result for permeation testing it is not practical to utilize deterioration factors as typically applied to exhaust emissions.	We adopted an approach that relied on deterioration factors for recreational vehicles, but have since concluded that deterioration factors are not a sensible approach for testing and certifying fuel tanks for permeation emissions. We did not include this approach in the proposed rule or this final rule. We expect to revise the rule for recreational vehicles to align with this new approach.
EMA noted that §90.127(c)(2) requires the engine manufacturer to provide appropriate instructions to equipment manufacturers adding a fuel line so that they may meet the requirements set forth in §90.128, if they add fuel line. However, EPA does not indicate what the approval process is for such instructions. EMA commented that this section should be revised to read as follows: "It is not a violation to introduce your engines into U.S. commerce if other companies add fuel lines when installing your engines pursuant to §90.128. [Emphasis added.]	We believe it is not necessary to amend the regulation as recommended by EMA. The text simply describes how responsibilities for including compliant fuel lines fall on engine and equipment manufacturers. The installation instructions should make clear that any additional fuel line coming from the equipment manufacturer is their responsibility.
EMA noted that the manner in which installation instructions are provided to engine installers will vary significantly depending on the business relationship between the engine manufacturer and equipment manufacturer. EMA commented on §90.128(c) that instead of requiring the manufacturer to provide an explanation of how the manufacturer will ensure that installers are informed of the installation instructions, the manufacturer should be required to retain records demonstrating how the notification was provided.	EMA is not objecting to the requirement to notify installers regarding the installation instructions. In effect, their request is to avoid committing to a specific plan ahead of time and instead document afterward how this occurred. We believe it is quite appropriate to identify a plan for communicating installation instructions to installers. This might involve a variety of methods and manufacturers would not need to identify the method used for each company. It would be enough to identify the nature of the communications that are intended to ensure proper installation.
OPEI noted that §1060.520 does not define the quantity of fuel tanks required for testing and certification. The quantity of tanks tested during cert should be discussed with industry.	We have indeed had these discussions and concluded that testing a single tank is appropriate, except that three tests are required for certifying based on a Family Emission Limit. There was some interest in testing more than one tank for other families, but we believe this is best left to the manufacturer's discretion. However, we may require manufacturers to test additional fuel tanks if we believe that is necessary to ensure proper certification.

Letters:

Commenter	Document #
EMA	0691
OPEI	0675

4.8 Test procedures

4.8.1 Fuel line permeation– preconditioning

What Commenters Said:

NMMA and Mercury Marine expressed support for the proposed procedures for fuel line permeation testing. NMMA noted that it would defer to its members' comments on whether a longer soak period would be necessary for fuel lines.

In its comments, OPEI noted that the proposed fuel line preconditioning period is for 4 to 8 weeks and 23°C ± 5°C. OPEI expressed concern that this may lead to too much variation in test procedures and results. Therefore, OPEI recommended that a single preconditioning period be set, such as 8 weeks, so that any in-use or compliance checks EPA conducted would agree with manufacturer testing. In addition, OPEI recommended that the temperature tolerance be changed from ± 5°C to ± 2.5°C.

California ARB commented that the proposed preconditioning soak time for fuel lines should be at the higher end of the proposed soak times (8 weeks or more). The commenter noted that the Society of Automotive Engineers (SAE) J1737 recommends 1000 hours (approximately 6 weeks) to sufficiently achieve steady state for 60°C. California ARB stated that if the temperature is lower than 60°C, the overall soak time should be lengthened. Correspondingly, California ARB recommended that, because the proposed preconditioning soak temperature is 23°C, the soak time should be substantially longer to ensure the permeation rate has reached steady-state. California ARB's concern was that a permeation rate calculated before it reaches steady-state may represent a lower rate than the actual permeation rate of the fuel line. California ARB commented that a higher test temperature of 40°C would shorten the preconditioning soak time.

Letters:

Commenter	Document #
NMMA	0688
Mercury	0693
California ARB	0682
OPEI	0675

Our Response:

The purpose of the proposed preconditioning soak period was to ensure that the fuel line had reached a stable permeation rate prior to the permeation test. We believed that a fuel line with a permeation rate at the proposed standard of 15 g/m^2/day would require approximately 4 weeks to reach a steady permeation rate. For more fuel resistant products, we believed that a longer fuel soak period may be necessary to make an accurate measurement of permeation. For this reason, we proposed a soak period of 4 to 8 weeks to allow for longer soak periods, if necessary.

According to SAE recommended practice,[5] a fuel line permeating at 10-20 g/m^2/day at 60°C fuel should have a preconditioning soak period of approximately 6 weeks at 60°C. Based on the relationship between permeation and temperature, it is reasonable to conclude that a 6 week preconditioning soak period at 23°C is appropriate for testing a fuel line with a permeation rate of 10-20 g/m^2-day at 23°C. For fuel lines with a lower permeation rate, a longer soak time is necessary to ensure a stable permeation rate. Considering that fuel lines will likely be certified with a compliance margin below the standard, we believe it is reasonable to conclude that an 8 week preconditioning soak period is appropriate for most fuel lines subject to this standard.

The intent of the proposed wide temperature range for the preconditioning soak was to simplify the preconditioning soak by requiring less sophisticated temperature control. We believe that this tolerance can be allowed without significantly affecting the results of the permeation test.

Manufacturers commented that the preconditioning soak period must be rigid to ensure that in-use compliance testing would match manufacturer testing. In most cases, fuel lines sampled for in-use testing would be exposed to fuel for more than 8 weeks. For this reason, we believe that it is important that certification testing include a minimum soak period that ensures a stable permeation rate. In addition to the 8 week preconditioning soak period, we are finalizing a requirement that the fuel line should be preconditioned for a longer period, based on good engineering judgment, if necessary to achieve a stable permeation rate.

For fuel tank testing, the preconditioning soak period may be shortened if performed at elevated temperature. Consistent with this provision, we are finalizing a provision that the fuel line preconditioning soak period be 4 weeks if performed at 43°C ± 5°C.

4.8.2 Fuel line permeation– test fuel

What Commenters Said:

California ARB commented that the proposed test fuel, CE10, should continue to be the test fuel of choice because it is a known blend and is readily available. California ARB stated that allowing Indolene with 10 percent ethanol (IE10) should not be adopted because IE10 has a lower permeation rate than CE10, and its use would allow less efficient control technology to pass the fuel permeation test procedure. NMMA and Mercury Marine also expressed support of the proposed test fuel for fuel line permeation.

EMA commented that EPA incorporate the California ARB Tier 3 methods as specified in CCR 2754(a)(1)(C) for measurement of fuel line permeation. EMA commented that the alternative should be allowed of using data generated using SAE J30 test method with appropriate adjustments to test temperature and test fuel per Phase 3 requirements.

5 Nonmetallic Fuel System Tubing with One or More Layers," SAE Recommended Practice J2260, November 1996.

OPEI commented that the water limit in the test fuel should be limited to 500 ppm to avoid interaction with nylon materials. OPEI stated that nylon materials have an affinity for water, so this can affect the accuracy of permeation tests. In this regard, OPEI argued that harmonization with California ARB test fuel (E0) would be recommended. OPEI also recommended that manufacturers should be provided the flexibility to conduct permeation emission testing with a variety of fuels to minimize the duplication of testing and also overall testing burden. No standard level adjustment or other means should be included to account for the small differences in permeation rate for relatively similar fuels. OPEI did recognize that testing without ethanol does produce a significantly different permeation rate for some fuel line technologies and recommended that E0 should not be allowed without development of an appropriate adjustment factor to preserve a level competitive playing field.

In later discussions, OPEI commented that their support of a limit of 175 g/m^2/day for cold weather fuel lines is predicated on using IE10 as a test fuel.[6] They stated that the fuel line test data supplied to EPA by OPEI was based on this test fuel and supplied further test data using fuel CE10 which showed higher permeation results. As a result, OPEI recommended a test fuel of IE10 for cold weather fuel lines.

Letters:

Commenter	Document #
NMMA	0688
Mercury	0693
California ARB	0682
OPEI	0675
EMA	0691

Our Response:

We are finalizing a test fuel of CE10 for fuel line permeation testing. Fuel CE10 is widely used by material manufacturers and hose manufacturers for determining fuel resistance from fuel system materials, particularly those used in fuel lines. In addition, the technological feasibility of the fuel line standards was largely based on testing using fuel CE10. Based on data presented in the RIA, permeation testing based on IE10 results in lower measured emissions for most fuel system materials.

The California ARB Tier 3 methods as specified in CCR 2754(a)(1)(C) for measurement of fuel line permeation include a number of test fuels that may be used. Two of these test fuels are fuel CE10 and California certification gasoline which does not include ethanol. We are not incorporating the California ARB method because we believe that the test fuel for fuel lines should include ethanol. Gasoline containing ethanol is widely used in-use and ethanol can have a large effect on the permeation rates of fuel lines. In the case where a manufacturer wishes to use a single test fuel for certification to the California ARB and EPA standards, CE10 may be used in both instances.

[6] "HHPC Evaluation of EPA Proposed Phase 3 Rule for Fuel Line Permeation," Outdoor Power Equipment Institute, Presentation to EPA, February 5, 2008

We believe it would not be appropriate to develop an adjustment factor for the use of fuel with and without ethanol for all fuel lines. As shown in the RIA, the effect of ethanol on permeation varies greatly for different materials used in fuel lines.

We are finalizing specifications for fuel ethanol blended into test gasoline based on standard industry practice. Specifically, we are incorporating by reference ASTM D4806-07[7] which specifies a maximum water content, in the ethanol, of 1 percent by volume. When this ethanol is blended into gasoline at 10 percent, this would result in a maximum water concentration of about 1,000 ppm. Because this is a maximum, manufacturers testing hygroscopic materials would be able to test using fuels with lower water content.

One exception is for fuel lines on cold-weather handheld products. In this case, the standard is based on a test fuel of IE10, which is EPA certification gasoline blended with 10 percent ethanol by volume. Note that the standard is based on test data in which IE10 was used. If we had used CE10 as a test fuel for these products, then the numerical level of the standard would have needed to be raised significantly to achieve equivalent emission reductions.

4.8.3 Fuel line permeation– measurement method

What Commenters Said:

NMMA and Mercury Marine expressed support of basing the fuel line permeation test procedure on a weight-loss method similar to what is specified in the recommended practices in SAE J30 and J1527, with adjustments (discussed above) to the preconditioning soak and test fuel.

OPEI commented that handheld fuel lines are typically shorter than the length required for testing under SAE J30. OPEI stated that, if EPA will perform in-use testing of handheld fuel lines, a different test procedure is required which will need correlation to SAE J30.

California ARB commented that EPA should consider increasing the test temperatures for fuel line permeation testing to 40°C because, as permeation rates lower, accurate measurements become increasingly difficult. Also, a higher test temperature would shorten the preconditioning soak time; newer technology increases a component's resistance to permeation, thus taking longer to reach steady-state conditions.

California ARB also commented that the permeation test procedure and standards for hoses and primer bulbs should require only the entire hose assembly be tested as a unit and not allow for individual components. California ARB test data and field surveys show that many consumers assemble the individual component parts incorrectly. Therefore, California ARB supports testing the hose and primer bulb as an assembly, thus reducing the excess emissions caused by improper assembly.

7 ASTM International, "Standard Specification for Denatured Fuel Ethanol for Blending with Gasoline for Use as Automotive Spark-Ignition Engine Fuel, ASTM D4806-07, 2007.

EMA commented that EPA should work with California ARB to ensure that evaporative emission test procedures are aligned to the greatest extent possible. Therefore, EMA recommended that the final rule include or incorporate by reference California ARB Tier 3 methods as specified in CCR 2754(a)(1)(C). Alternatively EMA commented that we should allow certification using data generated using SAE J30 test method with appropriate adjustments to test temperature and test fuel per Phase 3 requirements. EMA argued that methods based on the SAE J30 test method has been the most widely used method for certifying to California ARB Tier 3 fuel hose permeation requirements.

Harold Haskew & Associates (HH&A) commented that permeation mass measurements using ethanol containing fuels will produce different results if determined by the weight loss method and compared to the current SHED procedure. The issue here is that if one tests for permeation using a SHED, and uses the Federal calculations for mass emissions found in 40 CFR §86.143-96, the ethanol fraction of the permeate is reported as "equivalent gasoline." The equivalent gasoline deletes the oxygen mass and lowers the hydrogen/carbon fraction from 3 to 2.3, both resulting in a lower than real mass calculation. As a result, if the SHED mass emissions measurement is compared to a gravimetric (weight loss) measurement, the SHED value will under-report the true value.

HH&A recommended a revision to the SHED mass calculation where the ethanol contribution to permeation would be measured separately. A Flame Ionization Detector would be used to measures total hydrocarbons. This reading would then be corrected by subtracting the concentration of ethanol measured by the gas chromatograph (GC). This corrected reading would be used to compute non-ethanol hydrocarbon mass emissions. To this value you would add the ethanol concentration converted to mass using the true mass of the ethanol molecule.

Letters:

Commenter	Document #
NMMA	0688
Mercury	0693
California ARB	0682
HH&A	0640
EMA	0691
OPEI	0675

Our Response:

As proposed, the fuel line test procedures will reference the weight loss test procedure in SAE J30 or J1527 with modifications to the fuel line preconditioning procedure and test fuel. Both test procedures are similar in that a reservoir and weight loss method is used. Both SAE J30 and J1527 specify minimum fuel line lengths. Especially for in-use testing, it may not be possible to identify fuel line samples that meet these minimum length requirements. Therefore, we have included a provision to allow fuel line permeation testing to be performed with shorter sample sections. Good engineering judgment would be required in testing shorter fuel line samples. For instance, the reservoir size may need to be scaled down for the smaller fuel line

volumes. Also, additional steps may be necessary to ensure that air is not trapped in narrow diameter fuel lines beyond tapping the hose (as recommended in SAE J30).

We are retaining the proposed nominal test temperature of 23°C for fuel line testing. This is the same temperature recommended in SAE J30 for weight loss testing and is consistent with our test procedures for recreational vehicles. However, because testing at 40°C would result in an increased permeation rate, we would accept data at this temperature as well. Many of the fuel lines certified to the California ARB standards were tested at 40°C on fuel CE10 and were below our permeation standards. As discussed above, we would accept a shorter preconditioning soak at a nominal temperature of 40°C.

We are finalizing fuel line permeation standards that will apply to primer bulbs and fuel hose independently. In many cases, the fuel hose and primer bulbs may be produced by different manufacturers. This approach would allow individual component manufacturers to certify to our standards. As an alternative, we will allow manufacturers who supply a whole primer bulb and fuel line assembly to test the assembly, as a whole, for certification to the fuel line permeation standards.

California ARB's regulations, in CCR 2754(a)(1)(C), reference SAE J1737[8] as the method for measuring permeation from fuel lines. These recommended procedures use a recirculation technique whereby nitrogen is flowed over the test sample to carry the permeate to adsorption canisters. Permeation is determined based on the weight change of the canister. This method was intended to provide a greater level of sensitivity than the weight loss method specified in SAE J30 and J1527 so that lower rates of permeation could be measured. As an alternative, we will accept permeation data collected using the methodology in SAE J1737. If this alternative is used, the same test fuel, test temperature, and preconditioning period must be used as for the primary (weight-loss) test method.

In addition, manufacturers may request the use of other procedures provided that these procedures are equivalent or more accurate than the primary test procedures or if it can be demonstrated that the use of the alternate test procedure would not affect the ability to demonstrate compliance. In the case of SHED testing, the manufacturer would need to demonstrate that it is correctly accounting for the ethanol content in the fuel. One approach may be to use a procedure similar to that described above in the HH&A comments.

4.8.4 Fuel tank permeation– preconditioning

What Commenters Said:

NMMA commented that the shortened tank permeation test procedures for recreational vehicles specified in a guidance letter from EPA be allowed for marine fuel tanks.[9] This

8 SAE Recommended Practice J1737, "Test Procedure to Determine the Hydrocarbon Losses from Fuel Tubes, Hoses, Fittings, and Fuel Line Assemblies by Recirculation,"1997, (Docket EPA-HQ-OAR-2004-0008-0178).
9 Dear Manufacturer Letter from Merrylin Zaw-Mon, Re: Alternative Test Procedures for Measuring Fuel Tank Permeation from Highway Motorcycles, ATVs, Off-highway Motorcycles and Snowmobiles, Document No. CCD-05-14 (MC/ATV/OFMC/ICI/Snowmobiles), Aug. 17, 2005.

guidance included a shortened preconditioning soak period of 10 weeks if performed at an elevated temperature of 43°C ± 5°C.

EMA commented that EPA should work with California ARB to ensure that evaporative emission test procedures are aligned to the greatest extent possible. EMA recommended that the final rule include or incorporate by reference the California ARB's TP-901 procedures including an alternative permeation preconditioning soak temperature of 40°C ± 5°C. OPEI also requested that EPA accept the California ARB preconditioning procedure as an alternate test method. EMA claimed that testing has shown that most materials meeting the proposed permeation limits attain a steady-state permeation rate after soaking for less than 10 weeks. Therefore, EMA recommended a process for alternative procedure approval in which manufacturers would be allowed to obtain agency approval to utilize shorter stabilization periods if they can demonstrate that permeation rates have stabilized in this time period.

EMA also commented that the requirement that the tanks be sealed during their pre-test conditioning soak is not viable. EMA argued that there is no data available to support that sealing the tank during the conditioning soak is critical to accurate characterization of the material's permeability; therefore, the requirement for sealing tanks during the preconditioning soak should be removed.

OPEI expressed support for the option of allowing the durability testing to be considered as part of the preconditioning soak period.

Letters:

Commenter	Document #
NMMA	0688
OPEI	0675
EMA	0691

Our Response:

For fuel tank testing, the preconditioning soak period may be shortened to 10 weeks if performed at an elevated temperature of 43°C ± 5°C. This is consistent with current practices for recreational vehicles. In addition, the preconditioning soak temperature overlaps significantly with the preconditioning soak temperature in TP-901. Therefore, a single tank could be preconditioned, simultaneously, under both the EPA and California ARB procedures by simply holding the temperature to 41.5°C ± 3.5°C. The intent of the wide temperature range for the preconditioning soak is to simplify the preconditioning soak by requiring less sophisticated temperature control. However, as noted above in the manufacturer comments on the fuel line preconditioning soak temperature, much tighter temperature tolerances can be maintained.

EMA did not present data to support its claim that materials reach a steady-state permeation rate in less than 10 weeks. We believe that the final preconditioning soak periods are appropriate as a minimum for fuel tanks meeting the permeation standards. These soak periods

are consistent with recommended practice for permeation testing of polymer-based fuel tubing[10] and provide some assurance that the fuel tanks have reached a stable permeation rate. In the case of a very low permeation tank, we would expect the manufacturer to use a longer soak period, as appropriate.

EMA did not provide any information on why they did not consider sealing tanks during the preconditioning soak to be viable. All of the fuel tanks tested at EPA were sealed during the preconditioning period without incident. The purpose of sealing the fuel tank is to keep fuel and fuel vapor in the fuel tank, to the extent possible, during the preconditioning period. In the case where fuel was dispensed at a temperature below the soak temperature, it would be possible for the fuel tank to pressurize if the tank were sealed prior to the fuel temperature reaching the soak temperature. In this case, it would be acceptable to allow reasonable time for the test fuel to approach the soak temperature, prior to sealing, to prevent over-pressurization of the fuel tank. To prevent gross evaporation of fuel vapors during this period, the venting of the tank should be no greater than needed to prevent over-pressurization of the fuel tank.

Provided that fuel is continuously in the tank during the durability testing, manufacturers may include this as part of the preconditioning soak.

4.8.5 Fuel tank permeation– durability testing

What Commenters Said:

NMMA commented that the fuel tank permeation testing guidance provided for recreational vehicles should apply to marine fuel tanks as well.[11] NMMA stated that this guidance retained the integrity of the permeation tests but greatly reduced the testing burden imposed on recreational vehicle manufacturers by providing optional ways to shorten and minimize the required test procedures. Specifically, NMMA and Inca Molded Products argued that fuel tanks not using surface treatment technologies, e.g., fluorination, to meet the permeation standards should not be subject to the slosh test because sloshing would not negatively impact the permeation of these types of tanks. In addition, NMMA and Inca Molded Products commented that the ultraviolet light exposure test does not make sense for fuel tanks installed inside marine vessels. With these modifications, Inca Molded Products expressed general support of the preconditioning durability procedures.

Grady-White Boats commented that there is no need or benefit in requiring ultraviolet exposure testing of tanks that will not be exposed to sunlight once installed. Grady-White also commented that there is no benefit in slosh testing tanks that are not using surface treatment barriers to meet permeation requirements.

10 Nonmetallic Fuel System Tubing with One or More Layers," SAE Recommended Practice J2260, November 1996.

11 Dear Manufacturer Letter from Merrylin Zaw-Mon, Re: Alternative Test Procedures for Measuring Fuel Tank Permeation from Highway Motorcycles, ATVs, Off-highway Motorcycles and Snowmobiles, Document No. CCD-05-14 (MC/ATV/OFMC/ICI/Snowmobiles), Aug. 17, 2005.

EMA commented that manufacturers should be allowed to request approval on a case by case basis in order to eliminate redundant testing or preconditioning requirements. This would include pressure cycling for tanks that have venting mechanisms that preclude a pressure increase or ultraviolet light exposure for tanks that are enclosed to prevent exposure to the sun. OPEI requested that EPA provide data to show that the durability test requirements properly represent real use simulation and can properly identify failed/compliant products at the end of 5-year useful life.

EMA commented that EPA should work with ARB to ensure that evaporative emission test procedures are aligned to the greatest extent possible. EMA and OPEI reasoned that aligning the EPA and California ARB durability test procedures would significantly reduce testing burden with no detriment to the environmental benefits of this rule. EMA and OPEI commented that EPA should accept testing performed following the California ARB procedures in TP-901. These test procedures include a shaker method for slosh. OPEI comments that a significant amount of the data utilized in the rule making utilized the California ARB TP-901 shaker method for slosh.

EMA commented that tank systems that do not include features for pressure or vacuum retention, e.g. valves, should not require pressure-vacuum cycling as part of their durability demonstration. To allow harmonization with California ARB, EMA stated that the requirements for pressure and vacuum test values must be expanded to within 10 percent of design pressure-vacuum limits and the number of cycles reduced to 1000 through either a change in the proposed requirements or an approved alternate without request by the manufacturer.

OPEI commented that the UV test is not necessary on tanks made of materials containing UV inhibitors or nylon tanks which are resistant to UV rays. Additionally, the UV test should not be required on HDPE tanks that a manufacturer can prove that less than 50 percent of the tank's external surface would be exposed to UV light. OPEI stated that clarity is needed in how the tank should be positioned for such a test. EMA commented that the specified UV criteria, 0.4 W-hr/m^2/min, represents solar load on a clear day in the Southern U.S. EMA stated that the optional natural sunlight exposure does not specify where the exposure is conducted or the quality of the daylight raising concerns regarding equivalence between these options. In addition, the term "daylight hours" is not defined. In order to provide alignment with California ARB requirements, EMA commented that the UV requirements should be deleted. EMA argued that no data has been included in the record of this rulemaking that indicates that UV degradation of fuel tank permeation exists.

With regard to EPA's request whether additional durability tests are necessary, OPEI commented that there is no need to add additional durability tests because other safety standards exist (ISO/ANSI) covering requirements for tanks on Small SI products. In addition they stated that manufacturers are keenly aware of the critical durability testing and validation requirements in order to produce safe products. This can include cold drop testing, impact testing, pressure cycle testing, vibration testing, burst testing, leak testing, etc. New low permeation tank technologies will vary from manufacturer to manufacturer and the new technologies may involve new materials and processing equipment. OPEI commented that equipment manufacturers will be very cautious with these new technologies and continue with existing durability/validation

testing and may expand upon them with additional testing in order to validate the new low permeation fuel tank designs. Because the equipment manufacturers have a better understanding of the way the specific equipment is used, OPEI commented that the equipment manufacturers would be the best judge to determine what durability testing and validation testing is required. Therefore, OPEI commented that additional regulatory compliance could be complex and/or misrepresentative for specific equipment usage, and, therefore, should not be required.

Inca molded products commented that, in some cases, molded parts made from new materials are able to meet all of the proposed durability requirements and pass the permeation test, but fail impact testing. Promens testified that they have worked with barrier layer materials that have increased the brittleness of the fuel tank. Promens presented information on the results of dart impact testing on these tanks showing ductile failures. Promens stated that use of the dart impact test, also known as the Bruceton Staircase Method, has proven to ensure a safe and reliable product and argued that marine fuel tanks must be able to pass this test. Promens argued that crash impacts testing such as described in SAE 5288 Snowmobile fuel tank impact test or SAE 51241 Motorcycle fuel tank lateral impact test do not directly test the integrity of the material. These tests only verify the integrity of the mounting of the tanks within structures because both SAE tests described have the tanks mounted to structures, and the tanks are not directly impacted. Promens commented that the arm impact test should be included as a preconditioning test or included it as part of the ABYC requirements.

Letters:

Commenter	Document #
NMMA	0688
OPEI	0675
Inca Molded Products	0700
OPEI	0691
Promens (hearing)	0642
EMA	0691
Grady-White Boats	0697

Our Response:

We agree with commenters that the durability testing requirements are not necessary for all fuel tank designs. In the proposal, we stated that one or more durability tests could be waived if we determine that omission of these tests would not affect the emissions from the fuel tank. In the guidance letter referenced above for recreational vehicles, we clarified that minimized durability testing may be appropriate for some tank materials and manufacturing processes. In the final rule we are specifically excluding metal tanks and other tanks using direct material solutions in the molding process from the durability test procedures by stating that they only apply to fuel tanks using surface treatments or post-processing barrier coatings as a permeation barrier.

The durability test requirements are not intended to represent real use simulation of fuel tanks on equipment over the five year useful life. Rather these tests are intended to identify potential problems with the permeation barrier on fuel tanks. The slosh testing and pressure

vacuum testing are based on a draft recommended SAE practice and are intended to address surface wear and microcracking concerns. One million slosh cycles does not necessarily represent what each tank will see in-use, but does present a reasonable method for determining if an improperly applied treatment will wear off easily. The pressure-vacuum test provides a method for flexing the fuel tank to ensure that the coating will flex with the tank walls without easily breaking down. The purpose of the UV exposure test is to address concerns that certain treatments or coatings may break down when exposed to sunlight. In the case of surface treatments, UV additives do not protect the treatment, and certain UV additives may even hamper the proper application of the barrier. During testing, the amount of the surface exposed to UV light on the fuel tank should be representative of the largest amount of sunlight that the fuel tank would likely be exposed to. Good engineering judgment should be used, in the case of the direct natural sunlight option, to achieve a UV load comparable to the laboratory specification.

We do not believe it is necessary to modify the durability procedures to achieve harmonization with California ARB. TP-901 already specifically allows the use of the EPA test fuel and slosh testing procedure. Most fuel tanks are not pressurized in use. For non-pressurized fuel tanks, California ARB does not require pressure-vacuum testing, making the EPA test the only one necessary. For pressurized fuel tanks, the EPA test is likely to be the more stringent procedure. Both EPA and California ARB allow manufacturers to request alternative test procedures provided that these procedures are equivalent or more stringent than the primary procedures. California ARB does not currently require UV exposure testing; however, performing this test would not be expected to disqualify a fuel tank from being compliant with the TP-901 procedures. Finally, as discussed above, many fuel tanks will not be subject to the EPA durability testing.

The durability tests are not intended to address the integrity of the fuel tank itself, but rather to provide some assurance of the durability of the permeation barrier. We believe that manufacturers are best positioned to determine the appropriate methodology for determining product durability from a performance perspective. While consumers may not be aware of failures in the permeation resistance of a fuel tank, a fuel leak is quickly apparent. Manufacturers have a significant incentive to produce durable fuel tanks. In the marine industry, Coast Guard safety standards are augmented by consensus standards developed under the American Boat and Yacht Council. Land based equipment manufacturers have developed consensus standards such as ANSI and SAE recommended practices. In addition, several manufacturers have indicated that they have developed their own durability requirements. Given these factors, we are not expanding the durability testing procedures to address fuel tank integrity.

4.8.6 Fuel tank permeation– test fuel

What Commenters Said:

OPEI commented that CE10 can be acceptable if the water content and aldehyde content of the ethanol is defined. They recommended that aldehydes and ketones be specified as being less than 100 ppm and that the water content be limited to 500 ppm. OPEI stated that splash

blending with denatured alcohol should be avoided due to the high water content and the negative effects (including repeatability) this can have on permeation tests with nylon fuel tanks.

OPEI also commented that California ARB and EPA use different test fuels. OPEI requested that EPA and California ARB harmonize on a complete test procedure or that EPA accept California ARB test data (corrected for fuel types) as proof of compliance. In conjunction, OPEI commented that any EPA testing should use the same procedures as that used for certification.

California ARB commented that CE10 should be the test fuel of choice because it is a known blend and is readily available. California ARB recommended that the proposed test fuel of EPA certification fuel with 10 percent ethanol (IE10) should not be adopted because IE10 has a lower permeation rate than CE10 and it is expected that its use would allow less efficient control technology to pass the fuel permeation test procedure.

Letters:

Commenter	Document #
OPEI	0675
California ARB	0682

Our Response:

We are finalizing a test fuel of certification gasoline blended with 10 percent ethanol (IE10) for fuel tank permeation testing. The technological feasibility of the fuel tank permeation standards was largely based on testing using this test fuel. In addition, IE10 is much more representative of ethanol-gasoline fuel blends seen in use than CE10. While we are adopting a CE10 fuel specification for fuel lines to reflect established industry practice and the data available to set emission standards, these factors do not come into play for fuel tank testing.

The California ARB test methods as specified in TP-901 for measurement of fuel tank permeation specify California certification gasoline or EPA certification gasoline, neither of which contain ethanol. We are not incorporating the California ARB method because we believe that the test fuel for fuel tanks should include ethanol. Gasoline containing ethanol is widely used in-use and ethanol can have a large effect on the permeation rates of fuel tanks. In the case where a manufacturer wishes to use a single test fuel for certification to the California ARB and EPA standards, the manufacturer may request approval of an alternative test fuel from California ARB as described in TP-901. Several executive orders have been issued by California ARB in which the test fuel contained ethanol.

We do not believe that it would be appropriate to develop an adjustment factor for the use of fuel with and without ethanol for all fuel tanks. As shown in the RIA, the effect of ethanol on permeation varies greatly for different materials and permeation barriers used in fuel tanks.

We are finalizing specifications for fuel ethanol blended into test gasoline based on standard industry practice. Specifically, we are incorporating by reference ASTM D4806-07 which specifies a maximum water content, in the ethanol, of 1 percent by volume. When this

ethanol is blended into gasoline at 10 percent, this would result in a maximum water concentration of about 1,000 ppm. Because this is a maximum, manufacturers testing hygroscopic materials would be able to test using fuels with lower water content. ASTM D4806-07 states that only gasoline compounds in the gasoline boiling range may be used as denaturants and specifically states that ketones may not be used as denaturants. This recommended practice makes no specific mention to aldehydes; however, commenters did not present information on why they believed that aldehyde content should be limited or if aldehydes are even commonly found in denatured ethanol. In any case, we believe that using the industry standard specification for denatured ethanol will provide for a test fuel that is representative of in-use blends.

4.8.7 Fuel tank permeation– measurement method

What Commenters Said:

California ARB commented that the proposed fuel tank test procedures have no definitive way of determining the stability of the permeation rate for fuel tank testing. California ARB recommended that values be obtained for multiple days and a correlation coefficient be applied. The soak time for low-permeation fuel tanks may not be long enough to reach equilibrium. By not having this method for stability, the actual permeation rate may be higher than calculated.

OPEI commented that the 14-day test period does not agree with California ARB practice and may be questionable engineering judgment. OPEI suggested EPA require that a minimum of 4 weigh points be required in the 14-day period (including the 0-day measurement). If the data is suspicious, OPEI recommended that the test could be extended until some level of confidence is reached which may not necessarily require an additional 14 days.

EMA commented that EPA should work with California ARB to ensure that evaporative emission test procedures are aligned to the greatest extent possible and recommends using the test procedures specified in TP-901. California ARB's procedure requires daily measurements that ensure the permeation rate is at steady state by looking at the slope of the cumulative loss line which EMA argued is significantly more robust than the two data requirement proposed. For low permeation rates that challenge the precision of the balance employed, EMA recommended that it should be left to the discretion of the tester to extend the test in any reasonable increment as long as the result is expressed in the proper units. EMA argued that there is no need to specify that the test be lengthened in two week increments. In addition, EMA commented that a reduced testing burden should be determined using good engineering judgment and approved by the agency on a case by case basis. EMA stated that it is presumptuous to identify technologies in the regulatory context without the ability to allow equally effective technologies to be granted similar relief.

California ARB commented that EPA should consider increasing test temperatures because, as permeation rates lower, accurate measurements become increasingly difficult. In addition, a higher test temperature would also shorten the preconditioning soak time. Newer technology increases a component's resistance to permeation, thus taking longer to reach steady-state conditions. California ARB recommended a permeation test temperature of 40°C.

OPEI commented that California ARB and EPA test procedures use different test temperatures. OPEI requested that EPA and California ARB harmonize on a complete test procedure or that EPA accept California ARB test data (corrected for temperature) as proof of compliance. In conjunction, OPEI commented that any EPA testing should use the same procedures as that used for certification.

EMA commented that the required readability of 0.1 g or better is not feasible for testing larger tanks due to total scale capacity requirements. Promens expressed concern whether the weight change, due to permeation, for very large fuel tanks could be accurately measured. Promens stated that, in the case of the 50 gallon tank, there would only be a 3/100 of a percent change in weight and in the case of the 100 gallon tank, there would only be just over a 25/1000 of a percent change in weight.

HH&A commented that permeation mass measurements using ethanol containing fuels will produce different results if determined by the weight loss method and compared to the current SHED procedure. The issue here is that if one tests for permeation using a SHED, and uses the Federal calculations for mass emissions found in 40 CFR §86.143-96, the ethanol fraction of the permeate is reported as "equivalent gasoline." The equivalent gasoline deletes the oxygen mass and lowers the hydrogen/carbon fraction from 3 to 2.3, both resulting in a lower than real mass calculation. As a result, if the SHED mass emissions measurement is compared to a gravimetric (weight loss) measurement, the SHED value will under-report the true value.

HH&A recommended a revision to the SHED mass calculation where the ethanol contribution to permeation would be measured separately. A Flame Ionization Detector would be used to measures total hydrocarbons. This reading would then be corrected by subtracting the concentration of ethanol measured by the gas chromatograph (GC). This corrected reading would be used to compute non-ethanol hydrocarbon mass emissions. To this value you would add the ethanol concentration converted to mass using the true mass of the ethanol molecule.

EMA stated that the NPRM directs the tester to close the door and "record the time" when the enclosure is closed at the beginning of the weight loss test. However, EMA recommended that both the time and date should be recorded.

Letters:

Commenter	Document #
California ARB	0682
EMA	0691
OPEI	0675
HH&A	0640
Promens (hearing)	0642

Our Response:

We agree with commenters that making daily recordings of the fuel tank weight is consistent with good engineering practices. These daily mass measurements can be used to determine the stability of the permeation rate of the fuel tank and can help identify if anything

unusual is occurring during the test such as a lost seal during testing. The test procedures in TP-901 require that the weight loss test continue until the correlation coefficient (r^2), from a plot of the cumulative daily weight loss versus time for 10 consecutive 24-hour cycles, is 95 percent or greater. We believe this approach gives testing facilities flexibility for basing the length of the test on good engineering judgment rather than a fixed time period. Therefore, we are adopting this general method of using daily measurements to determine the length of the test, with one modification. The California ARB method would require test facilities to make measurements over at least one weekend. We believe that weight loss measurements can be suspended for short periods of time without a negative impact on the test. Therefore, we do not require that the 11 weight loss measurements (including the 0-hour measurement) be on consecutive days provided that measurements are made on at least five different days of any given seven day period of the test. Measurements must be made at roughly the same time on each test day.

We are also adopting the sensitivity requirements for the weight loss measurements specified in TP-901. For mass measurements more than 6200 grams, the sensitivity of the balance remains at 0.1 grams, as proposed. However, for smaller tanks, more sensitive equipment is needed to accurately measure the permeation using the weight loss method. In the data collection for this rulemaking, for instance, a balance with a sensitivity of 0.001 grams was used for fuel tanks less than 1000 grams. Therefore, we are specifying a minimum sensitivity of the balance of 0.01 grams for mass measurements between 1000 and 6200 grams and 0.001 grams for mass measurements less than 1000 grams.

At this time, it appears that required readability of 0.1 grams or better is not feasible for mass measurements larger than roughly 35 kilograms due to total scale capacity requirements. However, a fuel tank within this weight limit may be used to represent a family of larger fuel tanks provided that the smaller fuel tank represents a “worst case” configuration for that family. In addition, manufacturers may request the use of other procedures provided that these procedures are equivalent or more accurate than the primary test procedures or if it can be demonstrated that the use of the alternate test procedure would not affect the ability to demonstrate compliance. In the case of SHED testing, the manufacturer would need to demonstrate that it is correctly accounting for the ethanol content in the fuel. One approach may be to use a procedure similar to that described above in the HH&A comments.

We modified the test procedures to specify that the date should also be recorded when the enclosure is closed or at other steps when the time is recorded.

4.8.8 Fuel tank permeation– other

What Commenters Said:

Honda requested clarification on §1060.520(b)(5)(i) and (ii), asking if this test is necessary, specifically related to when the fill pipe / hose is part of the tank test, tested as a separate part required to meet a 15 gram standard, or simply not covered because it does not contain liquid fuel. In addition, Honda requested clarification as to why the fuel cap would need to meet a permeation standard at the top of a 12 inch or longer fill pipe / hose when, like the fuel fill, it is not exposed to liquid fuel. Promens commented that this provision complicated the fuel

tank testing and recommended that fuel caps should not be tested as part of the fuel tank unless the cap is directly part of the tank either by threads or mechanical attachment.

Yamaha noted that the requirement in §1060.520(b)(5)(i) of the proposal it indicates that filler necks that are under 6 inches above the top of the tank be tested with the filler cap as part of the tank system. Yamaha commented that this 6 inch requirement will unfairly target low gunwale height (small) boats and low profile bass boat designs with small installed fuel tanks. Yamaha argued that EPA has not made any demonstration as to the need of the 6 inch minimum requirement in or prior to this proposal and that this 6 inch criteria will cause all builders of small gunwale height boats a great expense for testing or design changes for no emission reduction gains. Yamaha requested that the 6 inch minimum height be removed from the test requirement for compliance testing of the fuel tank.

EMA commented that the reference to dry sand in the reference tank should be replaced with glass bead because sand is known to adsorb moisture and may not be appropriate. MIC commented that because the intent of this subsection describing the reference tank is to deal with changes in "buoyancy" caused by changes in atmospheric pressure, the same correction could be accomplished mathematically based on the difference in air density measurements between tests. MIC argued that this would avoid the cost and space required to prepare and store reference tanks. MIC recommended the addition of a new subsection stating that, as an alternative, manufacturers may calculate the weight change associated with the permeation test run without the use of the reference tank method by determining the air density (from barometric pressure) during the initial weighing of the sealed test tank under 1060.520(d)(1), using the measured value as $M_{initial}$, and then replacing the procedure described in 1060.520(d)(7) with a determination of M_{final} from the buoyancy-corrected weight for the sealed test tank calculated based on the change in air density between the initial and final measurements and the known volume displaced by the tank.

OPEI noted that 1060.520(b)(5) allows non-fuel cap openings to be sealed with non-permeable coverings or methods. OPEI recommended that an allowance should be made to not have the openings machined into the tank for permeation testing because this would be easier for testing and would only produce insignificantly higher permeation rates when compared to non-permeable sealing methods. OPEI specifically recommended that grommets not be considered to be part of the fuel tank. OPEI stated that this would harmonize with California ARB's TP-901and requested that EPA add California ARB language from TP-901 in this regard.

California ARB commented proposed permeation test procedure and standards for tanks may exclude emissions from fittings, fuel pickup tubes, and fill caps. California ARB recommended that we adopt a diurnal test procedure that measures permeation, evaporation, and liquid leaks. During emissions inventory development testing, California ARB conducted diurnal testing to check the integrity of the tank components in addition to permeation barriers. California ARB reported that the data shows significant sources of evaporative emissions from components in addition to permeation.

OPEI commented that 1060.520(d)(10) has a typo in the last sentence. It currently reads "In this case, repeat the steps in paragraphs (b) (8)…" It should read "In this case, repeat the

steps in paragraphs (d) (8)…" EMA commented that the reference, in §1060.521(c), to §1060.520 is not adequate because several aspects of §1060.520 are not applicable. EMA commented that the specific reference should be to §1060.520(d).

Letters:

Commenter	Document #
MIC	0701
Yamaha	0721
California ARB	0682
EMA	0691
OPEI	0675
Honda	0705
Promens (hearing)	0642

Our Response:

The general purpose of §1060.520(b)(5)(i) and (ii) is to describe how the fill inlet must be sealed for a tank permeation test. We are simplifying this requirement to state that, if the fuel cap is not directly mounted on the fuel tank, then the opening may be sealed with a non-permeable covering. We are concerned that the fuel tank manufacturer may not necessarily be aware of the configuration of the fill neck once it is installed in a marine vessel or piece of equipment. If the fuel cap is mounted directly on the fuel tank, we consider it to be part of the fuel tank and that it should be included in the fuel tank permeation test. We do allow alternatives to installing the cap on the tank during the test, including separate permeation testing of the fuel cap and the use of a default value for fuel cap permeation.

Based on the concern that sand may adsorb moisture, we are changing the regulation to refer to glass bead rather than dry sand for use inside of the reference fuel tank. We believe that an actual weight measurement on the reference fuel tank is the most direct and accurate method for correcting for buoyancy effects that may occur during testing. In addition, the reference tank inherently corrects for changes in humidity that may affect the amount of water absorbed by the fuel tank. Therefore, we are not including a buoyancy correction calculation as an alternative.

To simplify the test procedures, we are specifically excluding grommets from the fuel tank permeation testing. In this case, and for hose connections, the manufacturer has the option of simply not drilling the opening as an alternative to sealing the opening with an impermeable plug. Fuel caps, and other components mounted directly on the fuel tank, are included under the permeation standard. We are concerned that requiring a diurnal test procedure would add significant complexity and cost to the tank permeation testing without a significant environmental benefit. This is especially true for fuel tanks that are not pressurized in-use and have fittings that are not designed to withstand the tank pressures that may occur during the test.

The incorrect reference (in §1060.520(d)(10)) to paragraphs (b)(8) through (9) has been removed. The reference (in §1060.521(c)) to §1060.520 is correct. A reference specifically to §1060.520(d) would unintentionally exclude the preconditioning fuel soak.

4.8.9 Diurnal

What Commenters Said:

Honda noted that §1060.525(a)(5) proposes that the test of a canister should begin with the canister at full working capacity, exposure of the canister to one diurnal cycle and then initiation of the test. Honda commented that this test will not be representative of some canisters that will not reach full saturation under normal diurnal conditions. Honda argued that this is an issue of concern for both small engines and marine engines and suggested that this issue needs further, more in-depth evaluation.

California ARB commented that the proposed diurnal temperature profile may not be stringent enough to replicate the higher temperatures that commonly occur in California and other Southwestern states. Because many marine spark-ignition vessels spend the majority of time exposed to the sun, California ARB expects that fuel temperatures will likely exceed the proposed 25.6ºC to 32.2ºC fuel temperature profile. California ARB commented that a temperature profile of 65 to 105 degrees Fahrenheit (ºF) seems more appropriate for California and is currently evaluating the diurnal temperature profile. California ARB requested that EPA adjust the proposed temperature profile when the data becomes available.

California ARB commented that the proposal to fill the fuel tanks to 40 percent capacity is not consistent with the California established procedure of filling the fuel tanks to 50 percent capacity for diurnal testing. For harmonization, California ARB recommended that EPA should either modify the test procedure to require that fuel tanks be filled to 50 percent capacity or to allow California testing to meet the proposed EPA requirements.

California ARB commented that the proposed three-day diurnal cycle for measuring emissions from marine vessel tanks configured with carbon canisters may not be long enough to determine canister stability. California ARB recommended a seven-day diurnal cycle to ensure canister stability.

EMA commented that the ASTM method cannot be used for measurement of butane working capacity in a carbon canister because the method requires a specific shaped test vessel, a specific amount of carbon, and temperature controlled water bath. EMA argued that the ASTM method should not be referenced except when specifically defining the bulk characteristics of the carbon itself. EMA recommended that the Butane Working Capacity be determined using the procedure defined in ARB TP-902 Appendix A.

Delphi stated that it agrees with the proposed diurnal fuel temperatures for the fuel tanks, but suggested that there may be challenges associated with running the proposed test procedure. Delphi stated that breakthrough amounts may exceed limits of a typical SHED flame-ionization detector. Therefore, a purged slave canister would need to be weighed and connected to the air inlet of the test canister to measure breakthrough amount. By having the slave canister outside the SHED, the permeation of the fuel tank would not contribute to the diurnal emissions. Delphi stated that the slave canister may need to be manually changed to allow back purging of test canister; otherwise, complicated valving and switching is required. Delphi also noted that the

SHED ambient temperature needs to be controlled based on fuel temperature which is different from typical automotive testing where SHED temperature is controlled as a function of ambient temperature in the SHED.

Letters:

Commenter	Document #
Honda	0705
California ARB	0682
EMA	0691
Delphi	0638

Our Response:

It is not clear why Honda believes that a carbon canister on a marine vessel may not reach saturation under normal diurnal conditions. It is common for marine vessels to remain unused for extended periods of time. Therefore, effects such as active purge or fuel draw down in the tank, which require engine operation, cannot be relied on to purge the canister regularly at short intervals. Data in the RIA show that passively-purged carbon canisters subject to a multi-day diurnal cycle eventually reach saturation. A large enough canister to never reach saturation would be cost-prohibitive and too large for most marine applications. Therefore, we believe that the carbon canister must begin loaded and then subjected to a passive purge cycle prior to performing diurnal emission measurements.

The temperature profile for marine fuel tanks is based on the same ambient temperature profile used, in EPA test procedures, for automotive applications. It is reasonable to expect that boats would experience similar summer day temperatures as cars and trucks. As demonstrated by data in the RIA, fuel temperatures profiles in marine fuel tanks typically have less variation than ambient air temperature due to inherent insulation of the fuel tank in the boat, influence of water temperature (for boats stored in the water), and thermal inertial of the fuel (especially in larger fuel tanks). As a result we based the diurnal test temperatures on fuel temperature and adjusted for the above effects.

It should be kept in mind that the test procedure is a combination of different parameters that affect the measured diurnal emission rate. These variables include fuel specifications and fill level as well as the temperature profile. The diurnal emission standards are based on measured emissions using the emission test procedures established in this rule. If the test parameters were to be changed, the numerical level of the standards would need to be adjusted as well to achieve the same stringency. In the event that California ARB develops a diurnal test procedure for marine vessels, we would need to consider all of the above test parameters before determining if data collected on that future test cycle will be acceptable for certification to the EPA standard. To the extent that there are differences in test procedures, we would need to approve those changes under §1060.505(c).

We believe the diurnal test procedures are appropriate for demonstrating the in-use control capability of anticipated emission control technologies. An overly high temperature profile could cause poor test results for a given control technology, such as sealed tanks with

pressure relief, even though this given control technology would be expected to achieve significant emission reductions in use. The fill level and test fuel specifications are based on those used today for automotive testing, and we believe these parameters are also representative of in-use conditions for marine vessels.

We have not seen evidence that a seven-day diurnal cycle would ensure canister stability. In our test procedure, the canister begins in a loaded condition then a single passive purge event is run. Data in the RIA suggests that, once these conditions have been achieved, that a relatively stable emissions profile is achieved. We believe that a seven day test would be overly burdensome without providing significant additional useful information. We do recognize that additional diurnal cycles may be warranted for control strategies that depend on regular engine operation such as designs that are based on active purge, or even running loss conditions. This may be appropriate for equipment types that are used more regularly than marine vessels.

We agree with EMA that ASTM D5228-92 is intended for determining carbon working capacity rather than canister working capacity and is therefore not an appropriate method for loading a canister prior to a diurnal emission test. As a result, the diurnal emission test procedures have been revised to include a canister loading procedure, for marine applications, based on the method in TP-902 for small off-road equipment.

Delphi commented that the diurnal emissions from marine fuel tanks may be too high to be measured by standard equipment in existing SHEDs and suggested an alternative procedure based on the use of a slave canister. It should be noted that the diurnal emission data presented in the RIA for marine fuel tanks was based on SHED testing with a flame-ionization detector. In the event that a manufacturer was not able to perform the test procedure in the regulations, they would be able to request EPA approval of an alternative method provided that this method is equivalent to the primary method.

4.8.10 Running Losses (temperature measurement)

What Commenters Said:

EMA commented that, for running loss testing, the fuel tank temperature must be stabilized prior to running the test such that fuel stabilization is not inadvertently included in the measured result. However, EMA argued that the requirement that the fuel in the tank be within 2°C of (but not exceeding) the ambient temperature is overly prescriptive. EMA recommended that the requirement be revised to indicate the use of good engineering judgment to determine that the fuel temperature in the tank has stabilized, with the caveat that the measured temperature rise cannot be adjusted to account for perceived changes due to stabilization. In addition, EMA commented that fuel temperature in the tank that is not a result of engine operation, such as sun heat loading, should not be included in the temperature rise associated with determination of running loss control. If, using good engineering judgment, EMA stated that a manufacturer can demonstrate the fuel tank temperature variation associated with conditions other than running the engine these variations should be allowed to be deleted from the running loss temperature rise assessment.

EMA argued that the proposed testing conditions are not viable and do not represent the appropriate measure of fuel tank temperature change associated with running the engine. According to EMA, the set of conditions needed to run an outdoor running loss test are unacceptably limiting, large portions of the year will not meet the combinations of conditions, and the number of days that can be used for testing will be severely limited. Specifically, EMA recommended that the maximum acceptable cloud cover specified in §1060.535(a)(3)(iv) should be deleted in its entirety.

EMA requested that the final rule include the option to use a laboratory test procedure, stating that a lab test would be more repeatable and less subject to variation due to ambient conditions. Additionally, EMA commented that these procedures should include an option to record the fuel temperature of an equivalent unit exposed to the same ambient conditions but without the engine running. The reported temperature rise would be the difference between the temperature of the running unit and the non-running unit. EMA commented that the requirement to include solar loading in the determination of an equivalent indoor test is not appropriate, and that temperature rise criteria should not include effects that are not related to engine operation, such as solar loading.

Letters:

Commenter	Document #
EMA	0691

Our Response:

As discussed above, we are not finalizing an option to comply with the running loss standard by demonstrating that only a minimum fuel temperature rise occurs during engine operation. Therefore, the above comments are not relevant because we are not finalizing a test procedure for measuring fuel temperature changes during engine operation.

4.8.11 Diffusion

What Commenters Said:

EMA commented that there is no need for a specific requirement related to diffusion emission controls and therefore no need for a procedure to test diffusion emissions. However, in the case that a diffusion test is required, EMA made the following recommendations:

- Manufacturers also should have the option to test using the gasoline specified for testing in 40 CFR Part 1060.501. The option to test with the gasoline specified in §1060.501 would allow the manufacturer to conduct diffusion testing with the same stabilized fuel tank utilized for permeation testing.
- The requirement to use a fully loaded canister attached to the fuel tank in a way that represents a typical in-use configuration is not appropriate. No testing was performed during the development of the NPRM with a carbon canister, and the implications of the canister loading are not clear. We recommend the test be conducted with a fully purged canister or, at the maximum, a 50% filled canister. In addition, California ARB's TP-902 method should be used to determine canister working capacity.

- The length of the "stabilization period" must be defined. EMA recommends that the stabilization period definition require that both the liquid fuel and enclosure temperature should be maintained at the specified temperature range for 30 minutes. While required for accurate testing, purging the SHED introduces fresh air to the enclosure that is not at the specified temperature. A re-stabilization of the SHED and liquid fuel temperature after purging for at least 15 minutes should be included.
- The requirement to collect emission measurements for 6 hours is overly prescriptive. EMA recommends a change to allow collection of emissions measurements for at least 6 hours but no more than 24 hours.

Letters:

Commenter	Document #
EMA	0691

Our Response:

As discussed above, we are not finalizing a diffusion standard. Therefore, the above comments on the test procedures are not relevant because we are not finalizing a diffusion test procedure.

4.9 Small business issues

What Commenters Said:

Tohatsu commented that it is quite a tough job for a small manufacturer like itself who has total employees of less than 500 people to redevelop and set calibration fuel, ignition timing, etc. and also comply with evaporation requirements. Although Tohatsu understands that these requirements are necessary, they noted that it is a very time consuming, and expensive, process for a small company to meet. Tohatsu commented that the time frame should be extended as much as possible to give small manufacturers a realistic chance to comply with the new regulations. Unlike many of their competitors that have other divisions in cars and motorcycles, Tohatsu produces only outboards. Because of this, Tohatsu commented that it does not have the same resources to be able to comply with new regulations as quickly as other companies.

Premier Marine commented that the diurnal system requires a pressurized fuel system and they would be very cautious regarding the safety of this technology for use in the marine market and could lead to possible hazardous conditions. As a small business, they commented that they do not have the resources to engineer and test the proposed canisters. It will be very costly to implement and they would need more time to implement the change.

NMMA noted that EPA acknowledges the challenges faced by the small boat builders and requested comment on a three-year phase-in (33-66-100 percent) for the diurnal emission standards over model years 2010-2012. NMMA commented that a phase-in approach is not practicable for boat builders. Instead, NMMA supported an additional two years of lead time for compliance, i.e., until model year 2013, for small businesses to allow for sufficient time for these business to gain experience with carbon canisters. NMMA commented that small businesses

with 500 employees or less should be eligible for this relief. NMMA also supported additional lead time so that ABYC could work on standard practices for canisters and address possible pressurization issues.

Grady-White Boats provided comments to EPA after the close of the comment period on a phase-in of the diurnal emission standards for small manufacturers. Grady-White noted that they are convinced that the fairest method to implement the diurnal controls is on a percentage basis. This treats all boat builders on an equal basis and does not create competitive advantages or disadvantages for anyone.

To demonstrate the inequities created by an allowance system, Grady-White suggested EPA consider a comparison of a low volume builder of a larger sized boat to a high volume builder of a small model boat. Both builders have total wholesale dollar sales of $50 million a year. Builder A builds an 18' center console model that wholesales for $19,000. This requires sales of 2,632 units to make the $50 million in sales. Production level would be about 50 boats a week. Under an allowance system discussed by the EPA this builder has to install diurnal controls on 1,832 boats the first year. Builder B builds a 33' boat that wholesales for $259,000. This requires 193 boats to get annual sales of $50 million. Production would be about 3.7 units per week. Under the allowance system discussed by EPA the builder would not have to install controls on any boats until the last year of the phase-in period.

Grady-White noted that the two companies of equal sales figures are treated completely different regarding the impact of the diurnal control phase-in allowance. This is clearly unfair to the one builder. A straight percentage based approach as recommended by NMMA (30/60/100) treats both the above businesses fairly and equally. In the above example, both builders have only one model upon which to engineer the changes. The engineering cost will be 100% in the first year for builder A while builder B can spread the re-engineering cost over a three year period.

Grady-White noted that they have also struggled to understand the EPA's perspective from the compliance/enforcement side. If a builder has to keep records to prove compliance on a percentage basis, or on an allowance basis, there seems to be no difference. The builder will have to maintain these records and be able to produce them upon the request of the EPA. The boats can be clearly labeled as within the percentage required to have controls as easily as they can be labeled as within the allowance. They fail to understand how the percentage proposal requirement places any additional burden upon the EPA.

Grady-White Boats also commented on the impact and challenges the proposed rule creates for small businesses. They commented that the rule creates many demands for re-engineering, paperwork, record keeping and cost increases for our customers. They believe it is vital to keep the new requirements from becoming a paperwork and reporting nightmare for the small businesses that are the backbone of the boat building industry. Grady White highlighted the engineering resource burden to redesign and/or modify existing tooling to accept canisters and estimated that 100 man hours per model will be needed to design, prototype, train production associates, and document the fuel system changes on each model. The builders commented that

small businesses do not have the engineering stuff to handle these extra demands in such a short time.

NMMA noted that it is conducting outreach to the boat building community to ensure that all affected businesses are aware of the new regulation and its implications. NMMA urged EPA to work with the SBA to develop a schedule for workshops across the country to ensure that small businesses understand the requirements of the standards and the implementation dates.

ABYC noted one concern it shares with NMMA is the education of the non-NMMA builders. The US Coast Guard has a database with over 4,000 registered boatbuilders. ABYC is geared toward all builders with the ultimate goal of safer product on the water. With its 15 year track record of educating and certifying personnel to our standards, ABYC commented that it will be a crucial asset for educating the approximately 3,600 builders that remain uncertified by the NMMA. ABYC noted that with the proper funding, it can help educate boatbuilders, on a much broader scale, to the upcoming EPA requirements as well as ways to make a boat safer.

Letters:

Commenter	Document #
Tohatsu (hearing)	0642
Premier Maine Inc.	0613
NMMA	0688
ABYC (hearing)	0642
Grady-White Boats	0677
NMMA	0739
Grady-White	0750

Our Response:

With respect to the comments on additional time for small manufacturers to meet the evaporative standards, it can be noted that EPA is delaying implementation of a number of the evaporative emission standards for all manufacturers. EPA is delaying implementation of certain hose requirements originally scheduled for implementation in 2009. The requirements contained in the final rule for under cowl hose will be phased in between 2010 and 2015, and the primer bulb will have until 2011 to comply. In addition, EPA is delaying the diurnal requirements which were proposed for 2009 for portable tanks and PWCs until 2010. In addition, EPA is delaying implementation until July 31, 2011 for other installed tanks, with a 50 percent phase-in requirement for the first year. As noted below, EPA is also adopting a diurnal allowance program for small-volume boat builders as an alternative to the phase-in. EPA believes these delays will provide sufficient lead time for all manufacturers to comply, whether large or small. (See Section 4.3 of this document for further discussion of the feasibility and lead time for the evaporative emission standards for Marine SI engines and vessels.)

As noted above, manufacturers expressed concern that many small boat builders may need additional time to develop installation procedures and install carbon canisters in their boats. To address this, we are establishing an interim diurnal allowance program that will give additional time for small-volume manufacturers for a certain number of boats during the first two

years of the program. Under this program, each small-volume boat builder will be allowed to sell these boats without the diurnal emission controls that would otherwise be required. This allowance program applies only to boats with installed fuel tanks that are expected to use carbon canisters to meet the diurnal emission standards. Therefore, it does not apply to portable fuel tanks or personal watercraft. If the small-volume boat builder chooses to use this allowance provision, then the 50 percent phase-in for the first year, as noted above, would not apply. Each small-volume boat builder will have a total of 1,200 allowances that may be used, at the manufacturer's discretion, for boats produced from July 31, 2011 through July 31, 2013. For instance, a small manufacturer could produce 800 boats in the first year and 400 in the second year without diurnal emission controls. For most small-volume boat builders, we expect that this allowance program will result in an additional year or two of lead time for them to address potential installation issues related to carbon canisters.

In response to the comments on conducting outreach to boat builders, EPA agrees that such a process is important to ensuring the success of implementing the new requirements. With potentially thousands of boat builders, it will be necessary to use a variety of methods to make sure that all affected manufacturers are aware of the new requirements. EPA expects to explore working with all interested parties, including trade organizations and other government agencies, to educate boat builders on the requirements that will come into effect as a result of the new evaporative emission standards for marine engines and vessels.

With regard to the comments on the amount of paperwork and reporting required under the new standards, EPA has designed the program in a way that allows boat builders that use certified components (i.e., hose, tanks, and diurnal systems) to not have to certify with EPA at all. This would be synonymous with the current program in which boat builders that use certified engines have no requirement to submit any information to EPA. If a boat builder chooses to certify its own fuel line, fuel tank, or diurnal system, they will be required to certify with EPA and submit all of the information required as part of that process. However, EPA expects that most boat builders will purchase certified components, allowing them to avoid submitting any information to EPA. Boat builders participating in the ABT program for fuel tanks would also be required to certify with EPA. Because participation in the ABT program is voluntary, only those boat builders choosing to earn or use credits for their boats would need to certify with EPA.

4.10 Other issues

Comment	Response
OPEI commented on §1060.301 that more detail is required from EPA as to what is acceptable QA data. OPEI noted, for example, thickness checks, FTIR data, iodine checks for coextruded and asked what level of data would be acceptable to EPA. Similarly, EMA commented on §1060.301, saying that the section is vague, and should include examples of expected testing such as the following: "For example, you must conduct production quality testing in order to confirm barrier layer thickness or materials utilized are as specified."	We believe it is most appropriate to rely on broad language requiring manufacturers to perform quality-assurance procedures relative to the evaporative emission standards without requiring specific measurements, sampling rates, or other detailed specifications. We would expect all manufacturers to take steps today to ensure that their products meet certain quality and performance specifications. We simply want manufacturers to use good engineering judgment to factor emissions compliance into their

	ongoing effort to ensure quality production. This might involve emission measurements, but it may alternatively involve a series of measurements and inspections not directly related to the applicable emission standard.
NMMA and Mercury Marine noted that EPA's preamble states that manufacturers will not be required to perform in-use testing or production-line testing for evaporative emission standards. However, EPA then states that "we may pursue testing of certified products to evaluate compliance with evaporative emissions standards" and includes proposed §1060.301. This section requires manufacturers to "test production samples or otherwise verify that equipment or components . . . are as specified in the certificate of conformity." (as proposed in §1060.301(a)). NMMA and Mercury Marine commented that the inclusion of this provision not only contradicts EPA's statement in the preamble but it also seems inconsistent with the design-based certification option. Given that EPA can always use the SEA program, NMMA and Mercury Marine recommended that EPA delete this provision from the rule.	We are not adopting specific requirements for in-use testing or production-line testing for evaporative emission standards. This contrasts with outboard and personal watercraft engines where we have adopted requirements for both of these types of testing. The Clean Air Act allows us to do any amount of testing to confirm that certified products meet applicable standards. Without routine testing after certification from manufacturers, we may find the need to do some of this testing ourselves. As described under the preceding comment, the provision requiring evaluation of production samples is intended to require broadly that the manufacturers take steps to ensure that their products are meeting quality specifications for emission-related compliance at the same time that they are evaluating these components for other purposes.
Honda recommended that we clarify the design-based certification options in §1060.240 to emphasize that any of the listed technologies are acceptable for certification (not all of them).	We agree with the comment and have changed the regulation accordingly.
OPEI supported the provisions as stated by EPA to align exemptions for both exhaust and evaporative requirements for the same product. The exemptions for evaporative requirements must be for products where the exhaust requirements have already been exempted for the reasons stated within the provision. Equipment manufacturers may need to apply for exemptions for equipment that includes new evaporative emission control technology but does not include new exhaust emission technology. As such, a program to allow for exemptions associated with evaporative only provisions independent of the engine manufacturer must be allowed.	We understand this comment as supporting the proposed approach. We are finalizing these provisions as proposed.
EMA noted that equipment manufacturers may need to apply for exemptions for equipment that include new evaporative emission control technology, but does not include new exhaust emission technology. As such, EMA commented that a program to allow for exemptions associated with evaporative only provisions independent of the engine manufacturer must be included in the final regulation.	We specifically proposed that the testing exemption is one of those cases where manufacturers may need an exemption from evaporative requirements even though the engine would not be exempted from exhaust emission standards. We are therefore adopting the regulatory language as proposed.
OPEI commented that EPA should clarify §1060.201. OPEI noted that the certificate of conformity will list an effective date (signature date). The manufacturer may not introduce into commerce before this date but may produce equipment/engines prior to the effective date.	We are adopting provisions in §1068.103 to clarify that manufacturers may produce engines or fuel-system components after submitting an application for certification, subject to certain conditions. This is consistent with longstanding practice.
The Massachusetts Marine Trade Association commented that the recreational marine industry is staggering due to several recent mandates by EPA. They cited damage to boat engines due to the addition of ethanol to gasoline, loss of engine system lubricity due	We have made great efforts to address NMMA's concerns with the regulations, as described throughout this document.

to introduction of ultra low sulfur diesel fuel, permitting of tens of millions of boats due to incidental discharges, and ongoing expenses and regulations imposed on small marinas and boatyards to come into compliance with the Clean Water Act and the Resource Conservation and Recovery Act. The Massachusetts Marine Trade Association requested that EPA work with NMMA to implement the new regulations.	
EMA commented that the combination of engine and equipment requirements as currently set forth in Part 1054 is confusing to the regulated parties. In order to address this issue, EMA commented that §1054.20(a), (c), and (d) should be deleted and §1054.20(b) should be revised to state "All equipment utilizing engines subject to the exhaust standards of this part must meet the evaporative standards of 40 CFR Part 1060.	We believe this section, including the offending paragraphs, provides a useful summary for equipment manufacturers who might be reading part 1054. (This might often occur since these companies in many cases also certify with respect to exhaust emissions.) These paragraphs also allow us to clarify what provisions apply for fuel systems used with marine vessels or motor vehicles.
EMA commented that §1054.110 is confusing and must be clarified. While the introductory paragraph indicates that this section provides standards applicable to handheld engines, §1054.110(c) and (d) specifically state that they are applicable to non-handheld equipment. In order to avoid confusion, EMA commented that the handheld provisions should be segregated from the non-handheld provisions. Accordingly, the references to 40 CFR Part 1060 that apply to each industry could be more clearly identified.	We agree with this suggestion and have revised the final rule accordingly.
EMA commented on "Are there interim provisions that apply only for a limited time?" EMA commented that §1054.145(d) and (e) pertain exclusively to nonhandheld non-integrated equipment manufacturers and therefore appear to be misplaced. EMA commented that these paragraphs should be deleted in their entirety.	Since part 1060 applies broadly to different categories of nonroad equipment, it would also be very confusing to move these provisions to part 1060. Since the provisions related to emission credits are already in part 1054, we believe it is quite appropriate to place these provisions for equipment manufacturers in part 1054. Moreover, in many cases equipment manufacturers also certify with respect to exhaust emissions, so placing these provisions in part 1054 should involve a minimum of confusion.
EMA commented that §1060.202(a) and (b) appear to contain a typographical error. The word "through" should be deleted and replaced with "….standards specified in §1060.105, …" in both paragraphs.	We agree that the text was not correct. The proper wording is "§§1060.102 through §1060.105."
EMA commented that §1060.240 is incomplete. Part 1060 includes requirements for running loss controls and diffusion controls that are not included in the NPRM, but are nonetheless required. EMA recommended that EPA develop a table outlining the requirements for the different regulated industry segments, as defined in §1060.1, and defining the demonstration requirements for each control element required.	We have attempted to lay out the full set of requirements and responsibilities for different manufacturers in §1060.1 and §1060.5. We did not attempt to use §1060.240 to define design-based certification options for every standard and every technology. The list of technologies in §1060.240 is narrowly limited to those things that qualify for consideration under design-based certification.
EMA commented on §1060.250(b) that the requirement to retain data from routine emission tests for one year while retaining all other related test information for eight years is not appropriate. EMA commented that if records are required for eight years, all of the related information should be retained for the same time period. Information that is not related to the prescribed testing requirement should not be required to be retained	If manufacturers are unable to manage recordkeeping according to multiple schedules, they should keep all their records for eight years. We believe this is not sufficient justification to require all manufacturers to keep routine testing records for eight years. We have revised the regulation to clarify the recordkeeping requirements related to routine testing information.

because it is not required to be recorded initially.	
EMA commented on §1060.401 that EPA should clarify for any in-use testing that may be performed that they will use the same test procedure and fuel as that specified by the manufacturer at the time of certification.	This is not correct. EPA will generally use the fuel specified in the regulation for any particular test. If manufacturers use an approved alternate fuel, we may optionally test with the specified test fuel or the alternate fuel.

Letters:

Commenter	Document #
OPEI	0675
Massachusetts Marine Trade Association	0634
EMA	0691
Honda	0705
NMMA	0688
Mercury Marine	0693