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*Advice from the Leaders on*

## **Permanent Fuel Tanks**



(Gasoline or Diesel)

### **Information & Recommendations**

**Permanent Fuel Tanks (Gasoline or Diesel) Information & Recommendations**

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Reformulated (Oxygenated) Gasolines, meeting the 10% limitation above, are acceptable for use in your Moeller Marine fuel tank.

**Gasolines Containing Alcohol**

If the gasoline in your area contains either methanol (methyl alcohol) or ethanol (ethyl alcohol), you should be aware of certain adverse effects that can occur. These adverse effects are more severe with methanol. Increasing the percentage of alcohol in the fuel can also worsen these adverse effects.

- Some of these adverse effects are caused because the alcohol in the gasoline can absorb moisture from the air, resulting in a separation of the water/alcohol from the gasoline in the fuel tank.
- Be aware that gasolines containing alcohol may cause increased corrosion of metal parts, especially aluminum and brass.
- Long periods of storage, common to boats, create unique problems. In cars alcohol-blend fuels are normally consumed before they can absorb enough moisture to cause trouble, but boats often sit idle long enough for phase separation to take place.

**IMPORTANT:** Use of improper gasoline or additives can damage your fuel system. Fuel system damage resulting from the use of improper gasoline or additives is considered misuse of the system, and damage caused thereby will not be covered under the limited warranty.

**WARNING FIRE AND EXPLOSION HAZARD:** Fuel leakage from any part of the fuel system can be a fire and explosion hazard which can cause serious bodily injury or death. Careful periodic inspection of entire fuel system is mandatory, particularly after storage. All fuel components should be inspected for leakage, softening, hardening, swelling or corrosion.

**Diesel**

Moeller Marine fuel tanks will perform satisfactorily when using a major brand of diesel fuel meeting the following specifications:

- **Grade 2-D diesel fuel is required**, meeting ASTM Standards D975 (or fuel rated Diesel DIN 51601), and having a minimum cetane rating of 45.

Diesel Fuel /Applicable Standard	Recommendation
JIS (Japanese Industrial Standard)	<b>No. 2</b>
DIN (Deutsche Industrie Normen)	<b>DIN 51601</b>
SAE (Society Of Automotive Engineers) Based on SAE J-313C	<b>No. 2-D</b>
BS (British Standard) Based on BSEN 590-1197	<b>A-1</b>

Sulphur content of the above fuel is rated at 0.50% by weight, maximum (ASTM). Limits may vary in countries outside of the United States.

**On intermittent-use engines, high sulphur content diesel fuel will greatly increase:**

- Corrosion on metal parts.
- Deterioration of elastomer and plastic parts.

**Diesel Fuel In Cold Weather**

Unaltered diesel fuels thicken and gel in cold temperatures unless treated. Virtually all diesel fuels are climatized to allow their use in the particular region for that time of the year. If it becomes necessary to further treat diesel fuel, it is the owner / operator's responsibility to add a commercial standard brand of anti-gel diesel fuel additive, following that product's directions.

**IMPORTANT:** Use of improper or water contaminated diesel fuel can seriously damage your engine. Use of improper fuel is considered misuse of the engine, and damage caused thereby will not be covered by the warranty.

**WARNING** Under NO circumstances should gasoline, gasohol, or alcohol be mixed with diesel fuel. This mixture of gasoline, gasohol, or alcohol with diesel fuel is highly flammable and produces a significant risk to the user.

**WARNING FIRE AND EXPLOSION HAZARD:** Fuel leakage from any part of the fuel system can be a fire and explosion hazard which can cause serious bodily injury or death. Careful periodic inspection of entire fuel system is mandatory, particularly after storage. All fuel components should be inspected for leakage, softening, hardening, swelling or corrosion. Any sign of leakage or deterioration requires replacement before further engine operation.

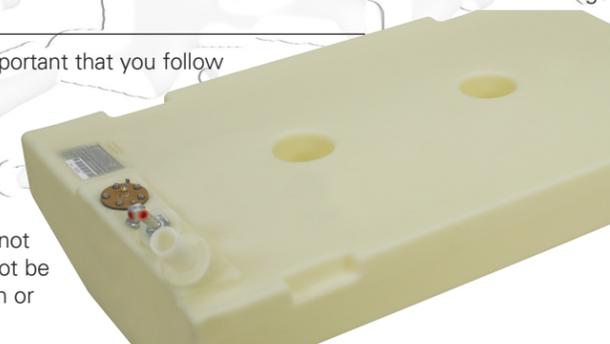
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**PERMANENT INSTALLATION**

To obtain optimal performance from your Moeller Marine fuel tank, it is important that you follow these installation guidelines closely.

1. Follow all applicable ABYC, ISO, NMMA, and USCG regulations and recommendations.
2. The fuel tank must be fully supported in its installed position.
3. The fuel tank should be installed securely. The installed fuel tank shall not bounce, shift, or move as this will cause chaffing. The fuel tank shall not be allowed to be scraped, cut, or punctured because of a loose installation or manufacturing debris.
- IMPORTANT:** Neoprene padding should be added to any area where the surface of the tank makes contact with a surface that may cause chaffing. **DO NOT COMPRESS NEOPRENE PADDING!**
4. Allow 3% expansion of the fuel tank in all directions. Hydrocarbon swell occurs when gasoline or diesel fuel soaks into the fuel tank material. **(Example:** Initial size 40"L x 24"W x 18"H = Expanded size 41.2"L x 24.7"W x 18.5"H) Design the fuel tank compartment to allow growth equally. Hold down brackets / braces must be installed to prevent damage to the fuel tank even after hydrocarbon expansions occur.
5. **DO NOT** remove dust caps until you are ready to install the fuel tank. Dust caps are provided to limit dirt, dust, water or any other foreign substance from getting into the fuel tank.
6. Fuel tank placement should be carefully considered, as certain environmental factors can increase fuel temperature, leading to potential degradation of fuel integrity and related problems.
7. **DO NOT** deform the tank during installation. Methods of deforming the fuel tank also include: walking, standing, or applying excessive weight onto the fuel tank.
8. **DO NOT** solid plumb fuel lines to the fuel tank use only flexible lines.
9. **DO NOT FOAM THE FUEL TANK IN PLACE!**
10. **NEVER** modify the fuel tank. Use only fittings which come with the tank, or fittings approved by Moeller Marine.
11. **DO NOT** attempt to patch or repair holes or punctures in fuel tank.
12. Fuel tank temperatures need to be stabilized to room temperature for 24 hours before testing or installation.



**Improper installation may cause performance problems such as:** Leaks, Loss of Capacity, Sender Inaccuracy, and Fuel Starvation.

**Additional Suggestions:** Mount the tank in an accessible area. Fuel tank fittings should be installed so they are readily accessible. Installations that warrant removal of walls, floors, structure, or other systems may be warranted at a prorated rate.

**IMPORTANT:** Fuel system or propulsion damage resulting from the improper installation of the fuel tank, will not be covered under the limited warranty.

"REMEMBER - THESE ARE GUIDELINES FOR THE PERMANENT INSTALLATION OF FUEL TANKS, AND THAT THE BUILDER IS ULTIMATELY RESPONSIBLE FOR THE PROPER INSTALLATION OF TANKS."

**FUELS**

**Gasoline**

Moeller Marine fuel tanks will perform satisfactorily when using a major brand of unleaded gasoline meeting the following specifications:

- **USA and Canada:** having a posted pump Octane Rating of 87 (R+M)/2 minimum. Premium gasoline [92 (R+M)/2 Octane] is also acceptable. DO NOT use leaded gasoline.
- **Outside USA and Canada:** having a posted pump Octane Rating of 90 RON minimum. Premium gasoline (98 RON) is also acceptable. If unleaded gasoline is not available, use a major brand of leaded gasoline.

The fuel system components on your Moeller Marine fuel tank will withstand up to 10% alcohol content in the gasoline. These are referred to as Reformulated (Oxygenated) Gasolines.

**Using Reformulated (Oxygenated) Gasolines (USA Only)**

This type of gasoline is required in certain areas of the USA. The 2 types of oxygenates used in these fuels is Alcohol (Ethanol) or Ether (MTBE or ETBE). If Ethanol is the oxygenate used in the gasoline in your area, refer to Gasolines Containing Alcohol. These

# Custom Tank

**Every tank must have a Fill, Vent, Withdrawal, Sending Unit & Label.**

## Custom Tank WORKSHEET Checklist

*What Moeller Needs to Know*

- 1 Tank / Compartment Dimensions**
  - 2 Quantity / Location for Fill Vent, Label, Pickup, and Sending Unit**
  - 3 Type / Size for Fill Vent, Pickup, and Sending Unit**
  - 4 Preferred Method for Hold Down**
  - 5 Special Requirements (Gasoline, Diesel, Anti-Syphon, Filtration, etc.)**
- ✓ Fax your complete custom tank needs to your Moeller regional sales manager**

**1/2 NPT Insert with Elbow, Withdrawal Tube, Screen & Barb** (or anti-siphon)  
Used to withdraw fuel from the tank. Be sure to use similar metals to minimize galvanic corrosion. (Diesel tanks do not include screens.)

**1/4 NPT Insert with Elbow, Withdrawal Tube, Screen & Barb** (or anti-siphon) (Patent Pending)  
Used to withdraw fuel from the tank. Be sure to use similar metals to minimize galvanic corrosion. (Diesel tanks do not include screens.)

**Molded Ribs**  
Molded plastic that helps control the amount of warp. They also act as a stiffener when pressure testing the tank to minimize tank deflection. Can be used as the hold down mechanism.

**Fuel Sender "Raised Ridge"** (Patent Pending)  
Provides a superior seal for sending unit.

**Polyethylene Cap**  
Prevents water and debris from entering tank while in storage and transit to the customer.

**Adhesive Label**  
Provides manufacturer info, model no., capacity, date of manufacture per ABYC H-24 standards.

**2-1/4" Molded Threads** (external)  
These are molded threads on a 1-1/4" fill neck, which allows the use of a sealing cap (may include gauge).

**Fuel Pump** (option)  
Mechanical method for pumping fuel to the engines of high performance boats.

**Molded Angled Fill**  
Molded fill which allows fuel to enter the tank. Fill can be molded at the desired angle above the tank surface.

**New Molded in Label**  
Provides manufacture info, model no., capacity, date of manufacture per ABYC H-24 standards.

**Angled Pocket Hold Down**  
A method of securing the tank using an angled aluminum bracket. This is similar to the hook pocket hold down, but is usually located at the top surface of the tank. The opposite end of the bracket is used for securing the tank to a bulkhead.

**Hook Pocket Hold Down**  
A molded plastic component used to catch the radiused end of an aluminum hook bracket. The hook pockets are normally molded in the sidewall of tanks. The opposite end of the bracket is used for securing the tank to a bulkhead.

**Horizontally Molded Vent** (Options offered - Plastic or Aluminum)  
Allows air to flow into and out of the tank. Has a beaded end to meet NMMA, USCG, and ABYC requirements. Must be used in conjunction with a doghouse to be positioned above fuel level at full capacity.

**Horizontally Molded Fill** (Options offered - Plastic or Aluminum)  
Allows fuel to flow into the tank. Has a beaded end to meet NMMA, USCG, and ABYC requirements. Must be used in conjunction with a doghouse to be positioned above fuel level at full capacity.

**Molded Doghouse with Recess**  
Used to provide a means by which components are held above the maximum fuel capacity. The recess provides additional clearance for attaching fuel and vent hoses.

**Sending Unit**  
Sends a signal to the fuel gauge to indicate the level of fuel left in the tank.

**Internal Vent**  
Aluminum assembly that is nearly equal to the length of the tank. Outlet fitting is at one end and connects to an internal aluminum pipe that extends to a raised bubble above the surface of the tank. (This allows for possible trapped air to be evacuated from the tank.)

**Molded in Label**  
Provides manufacturer info, model no., capacity, date of manufacture per ABYC H-24 standards.

**Molded Vertical Vent**  
Allows air to flow into and out of the tank. Has a beaded end to meet NMMA, USCG, and ABYC requirements.

**Molded Vertical Fill**  
Allows fuel to flow into the tank. Has a beaded end to meet NMMA, USCG, and ABYC requirements.

**Bracket Pocket Hold Down** (Plastic bracket)  
A method for securing the tank in the hull. It locks one end in place (usually the aft end) and allows the tank to grow towards the fore end.

**Cluster Plate**

**MOELLER PLUS PRODUCTIONS**

**Grommet Hold Down** (Patent Pending)  
A means for securing the tank in the hull by using a rubber grommet within the cone shaped area and fastening it to the hull.

**Aluminum Inserts** (for L-Bracket hold down)  
A common method to secure the tank in the hull. Uses a slotted aluminum L shaped bracket to secure the tank to the hull.

**Baffle** (Energy diverter)  
A molded structure designed to dissipate the force of sloshing fuel in the tank. Slosh energy is greatest at 1/2 of the tanks' capacity.

**Molded Cone**  
Molded structure that adds support and rigidity to the tank, normally positioned in the center of the tank. They may also be positioned in 1/3 intervals of the length, depending on tank configuration. These cone structures minimize deflection of the tank surface during pressure testing.

**Crosslink Polyethylene**  
Material with excellent chemical resistant properties. Wall thicknesses are designated by gallon capacity and are designed to meet pertinent tests per ABYC H-24 standards. Wall thickness standards are:

- a. 1 to 35 gal: 0.200" wall
- b. 36 to 50 gal: 0.220" wall
- c. 51 to 75 gal: 0.235" wall
- d. 76 to 100 gal: 0.250" wall
- e. 101 to 124 gal: 0.265" wall
- f. 125 to 160 gal: 0.275" wall
- g. 161 to 190 gal: 0.285" wall
- h. 191 to 230 gal: 0.300" wall

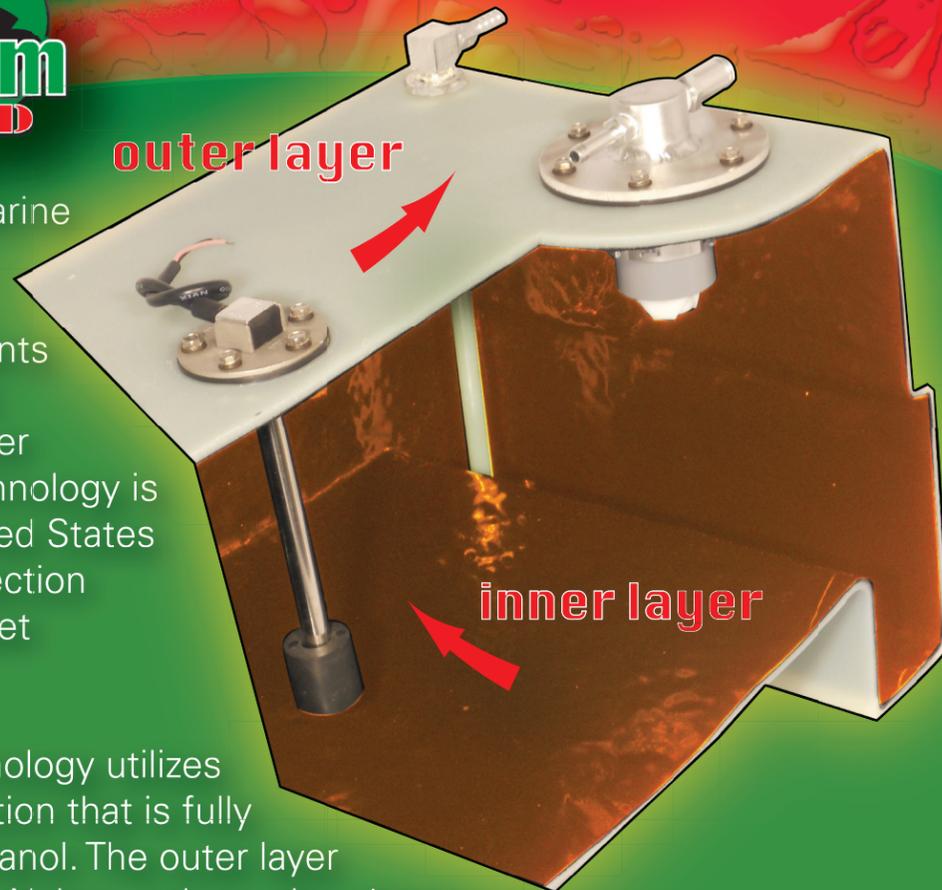
The Recreational Marine Industry is facing new evaporative emission requirements for Model Year 2012. Moeller's new bi-layer plastic fuel tank technology is certified by the United States Environmental Protection Agency (EPA) to meet the regulations.

Moeller's new technology utilizes a proven Nylon solution that is fully compatible with Ethanol. The outer layer is XLPE, the inner is Nylon, and together these materials offer the most repeatable processing in the industry, compared to other solutions.

The benefits of Moeller Marine Products Low Permeation Tank Technology are:

- EPA Approved Certificate of Conformity
- USCG / ABYC H-24 Tested and Passed
- ISO 10088 Tested – Passes
- Mil-STD Thermo Shock Tested and Passed
- UV, Slosh and Abrasion Resistant
- Moeller has offered "Low Odor" Fuel Tank solutions for over two years now.
- There is over 2800 tanks on the market - without any warranty issues.
- Our technology offers a repeatability in processing

For more information about Moeller Marine Products Low Permeation Tank Technology visit us at: [www.moellermarine.com](http://www.moellermarine.com) or call 1-800-432-8344



### OPERATING TEMPERATURES

Moeller Marine fuel tanks are capable of operation within an ambient temperature range from -40°F (-40° C) to 176°F (80°C).

**IMPORTANT:** Fuel tanks temperatures must be limited to 150°F (66° C) when not in operation. Processes that include dry heating of the fuel tank beyond 150°F (66° C) should be discontinued immediately. Fuel tanks subjected to temperatures in excess of 150°F (66° C) when not in operation, could be considered as damaged, and may not be covered under the limited warranty.

### PERMEATION

Permeation is a natural phenomenon of gasoline in a cross-linked polyethylene fuel tank. Permeation is the result of gasoline fumes escaping from the fuel tank, not the loss of liquid fuel.

**Several precautions need to be addressed when using a cross-linked polyethylene fuel tank:**

- Fuel (gasoline) vapors settle to the lowest point in the compartment, therefore, a means for removing the fumes is required. See ABYC Standards Section H-2 for specifics.
- A covered boat will not allow these fumes to escape, so build up of these fumes is inevitable. Caution should be taken when a boat's fuel tank contains fuel and is covered for an extended period of time. A boat cover should never cover the fuel tank's exterior vent fitting(s).
- Fuel vapors will migrate to any compartment open to the fuel tank. The smell of fuel vapors does not necessarily mean that there is a leak in the fuel tank, but a closer inspection should be performed.
- Fuel vapors may be absorbed by other objects located in compartments where fuel vapor may migrate.

**Following the above precautions, a cross-linked polyethylene fuel tank will provide years of service.**

### PRESSURE TESTING

Moeller Marine fuel tanks are tested in accordance to Title 33 CFR, Section 183.510. After installation, fuel tank and fuel system pressure testing must be done in accordance with applicable laws. Fuel tank temperatures need to be stabilized to room temperature for 24 hours before pressure testing.

**IMPORTANT: Unrestrained pressure testing may cause damage or deformation to the fuel tank.**

Fuel tank testing outside of the boat structure or prior to permanent installation requires the use of a fixture(s) to simulate the intended installation or to restrain each tank surface within 1 inch of the print specification. Failure to utilize control fixtures may cause unintended surface deformation, causing leaks and permanent fuel tank damage. **DO NOT** exceed 3 psi for pressure testing.

### STORAGE

Moeller Marine fuel tanks are manufactured from UV stable material. Fuel tanks may be stored outside, as long as steps are taken to prevent damage to the fuel tank, any fittings or components exposed on the fuel tank, and to prevent intrusion of foreign substances. This includes limiting exposure temperatures to -40°F (-40° C) to 150° F (66° C). Fuel tank temperatures need to be stabilized to room temperature for 24 hours before installation or pressure testing. If extended storage of the tanks is needed, Moeller Marine recommends that you cover the fuel tanks. **DO NOT ALLOW ICE OR SNOW BUILDUP.**

First In First Out (FIFO) procedures should be followed as with any inventory.

### TOLERANCES

The Association of Rotational Molders recognizes wall thickness tolerances of plus/minus 20% for rotational molded products. Other wall thickness variations may be present due to design configuration.

Environmental and molding conditions result in variation of size and capacity of the fuel tank. Moeller recognizes size and capacity tolerances of plus or minus 1-1/2 % of specified dimension or capacity. First article parts may exhibit additional shrinkage of the plastic, causing larger than 1-1/2% variation. This is common to break-in of a new or revised mold.