

# BOATOWNERS WARNED: E10 Fuel Presents An Unacceptable Risk

According to the outboard industry, the popularity of ethanol blended fuels could be a disaster for the boating industry - especially if used innocently by boatowners unaware of the potential risks involved. As Gary Fooks\* reports in this special feature on E10, the solution is simple: don't use it in your outboard; leave it to use in your very late model car - and save the planet that way.

**O**wners of old and new boats are going to suffer some serious problems if they start using the cheaper ethanol blended petrol available in several states, and this situation will only get worse as governments around Australia push ethanol mandates on the oil companies.

There are no real savings from E10 (10% ethanol blend) at current pump prices, and the potential damage bill could be high. Boats more than a few years old, and even new boats with fibreglass fuel tanks, are most at risk.

Even one tank of E10 could mean an expensive trip to the workshop.

While ethanol is fine in about 60% of cars, some boat owners are about to experience melted fuel tanks, leaks and damaged engines.

That's why all of the four oil companies we called, recommended that we didn't use ethanol in any boat.

David Heyes, of BRP Evinrude and Chairman of the Outboard Engine Distributors Association (OEDA) recently stated that his members were alarmed. He explained that while most modern outboards will at least tolerate E10, the outboard industry was very concerned with the potential damage to fuel systems, and especially for the safety of boat owners.

The risks for boat owners come from three key characteristics of ethanol. It's a powerful solvent, it doesn't stay mixed with petrol, and it has a very short shelf life. Specifically:

- **The solvent nature of ethanol means that it dissolves some of the components of fibreglass fuel tanks, as well as many elastomer (rubber like) materials found in fuel systems. The inevitable leaks are a fire risk, and if you're lucky enough to avoid a spark there will be a powerful solvent attack to the bilge surfaces.**

- **Ethanol and petrol will separate under normal boating conditions. Feeding two separated fuels into an outboard definitely risks engine damage through misfiring and fuel management issues.**

- **Ethanol has higher volatility than most elements of petrol, meaning it evaporates off first ie a short shelf life.**

While most state governments are pushing ethanol, much of the boat building industry has missed the warning signs.

So far, ethanol fuel is distributed in Queensland, Tasmania, NT and

NSW/ACT and mostly around the capital cities. Serious planning and discussions are taking place in Victoria, SA, and WA, where a major plant is under consideration.

## E10 – A Money Saver? Hardly . .

The E10 attraction to most motorists is the lower price of E10 blended fuel, but it's not that simple – especially for boatowners. For them, it can be argued there are few dollars saved by using E10 at today's prices.

Ethanol has a heating value of 23.5 MJ/L, which is 32% percent less than petrol. Even conservative studies say that a 10% mix (E10) will lose about 3% in the engine's fuel economy.

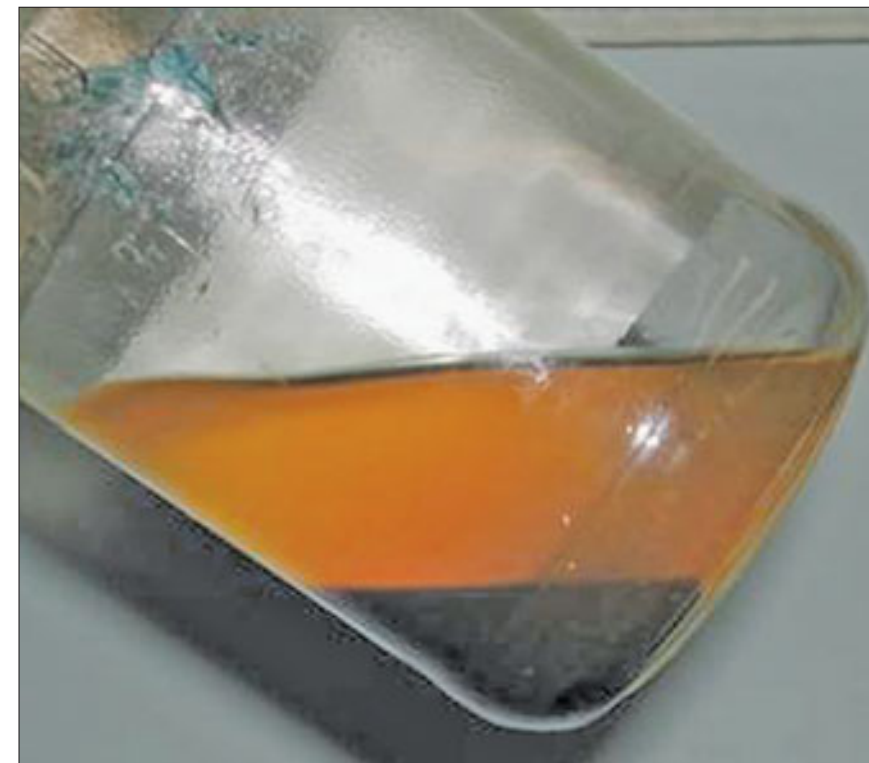
So if unleaded fuel is \$1.70 per litre, E10 has to be under \$1.65 just for the buyer to break even.

At press time (July 2008) the price difference is closer to 3 cents - hardly a bargain.

So if you want to do the right thing, and support a renewable biofuel, then I take my hat off to you. Just realise that you will be paying more - and keep it for your car and not the boat.

## Ethanol – The Super Solvent

As Paul Dawson of Evinrude puts it, ethanol is going to liberate dirt and residue in your fuel system that you



This is what all the fuss is about - an example of "phase separation" in petrol - that 'sludge' on the bottom is not good news for engines.

never knew existed.

In 2007 Shell had to shut down its ethanol sales for a period because the new fuel in old tanks just kept releasing sediments and blocking up filters.

Boat owners are likely to experience the same blocked filters. So if you end up using ethanol, plan for a filter change after the first tank, and carry a spare.

Even the best filters won't block some potential hazards. Some chemicals become completely dissolved and readily pass through the filters before ending up re-deposited inside the engine.

Boats with fibreglass tanks are most at risk from the solvent properties of ethanol. GRP (stands for "glass reinforced plastic") (fibreglass) tanks are soon attacked by ethanol, dissolving the resins, eventually weakening the structure and inviting leaks.

That also means any fuel spills around the filler cap could cause some permanent damage to gel coat or paint finishes. An ethanol spill is one you need to wash off immediately.

Boat USA conducted tests on two older boats that had suffered suspected ethanol damage. The 1967 and 1970 Bertram's both showed signs of engine

and fuel system damage.

They found black material on an intake valve which indicated esters, ketones and polyester. In other words the fibreglass fuel tanks and perhaps fuel lines were dissolving and these chemicals were passing straight through the filters before being deposited inside the engines.

The fuel in the tanks showed styrene, a component of polyester resin. The tanks were also tested and showed to have "aggressive degradation" and had lost 40% of their strength.

There is no easy solution for this. Fibreglass tanks will have to be replaced before they can be used with any ethanol blend.

Some boat builders are on the ball and have been planning for this day. Greg Haines, of Haines Signature, told us that their fibreglass boats sold today all have appropriate roto-moulded, polypropylene tanks.

But not all boat builders are as forward thinking as Haines Signature. A quick survey at last month's Melbourne Boat show revealed that six out of ten boats were not ready for ethanol. Mostly smaller brands.

Aluminium tanks are reported to be at risk of corrosion, too. E10 should be okay, but if there is chloride (from salt water) or copper (e.g. brass

## Who Wants Ethanol?

There is such a tide of groups who want ethanol that we will inevitably be obliged to use more.

Environmentalists want it because it is "green" fuel made from renewable crops. E10 also lowers engine emissions, but there is a cost. Grain used to make fuel pushes up the demand for crops and in turn cattle feed and food prices. That also means less excess food available for donations to famished nations and to support natural disasters.

Growing crops is not pollution free either. Just think of all the tractors, diesel trucks and pesticides.

Some farmers certainly want us to all use ethanol - they get a better base price for their crops. So when the Queensland Labor government announced mandatory 5% ethanol by 2010, the opposition yelled "Not soon enough".

So it's a vote winner for both sides of politics.

The Ethanol 2007 conference was sponsored by six organizations: all of them were farmer associations.

Other farmers aren't so happy. Dougal Gordon of the Australian Feedlotters Association complains that grain diverted to ethanol production is taking away feed grade grain from animals.

And finally there are the oil pundits who say we are running out of oil, and we had better use ethanol and any other means to stretch out our limited world supplies of oil.

fittings) present in the mix then chemical reactions could mean accelerated corrosion.

Ethanol makes petrol more electrically conductive, and this may also be a cause of some cathodic corrosion. Whatever the cause, the NMAA in the USA is clear that aluminium tanks and ethanol are not a good combination.

The bottom line is that only approved plastic and quality stainless