

Scrubbing water from diesel fuel

BY TIM QUEENEY

H2Out canister installs in a vessel's diesel fuel vent line and removes moisture from the air, preventing it from condensing and getting into the fuel.

What causes diesel fuel to go bad? Look at any diesel fuel that has been sitting unused and you will likely see nasty bits of organic growth. Supporting that growth is something very simple: water. Water in fuel causes problems. Remove water from the fuel and many of these problems are reduced or go away altogether. There are a few ways to get the water out. One

new product called H2Out from Pindell Engineering (www.h2out.com) uses a chemical that attracts the water and bonds with it, removing water from the fuel.

Why is water in fuel so bad? Water causes three main problems: a) it absolutely refuses to burn, b) it reduces

the lubricity of diesel fuel, lessening its natural, slippery powers of lubrication and causing wear and tear inside fuel system parts, c) it provides an environment for all types of organic growth.

The bio-bugs that thrive in a diesel fuel tank actually live on the boundary layer between the water and the fuel, which separate into different strata due to their different densities. The bugs feed on the sulfur in the fuel, happily replicating and growing until they get sucked into the fuel supply line and then are removed (we hope!) by fuel filters. So, while we might have excellent filters to stop this bio-ooze from getting into the engine, the filter would do nothing about stopping the bug growth in the fuel tank. We have to remove the water to stop the bug growth.

Many models of fuel filters are equipped with water separator bowls. These use centrifugal energy to make the higher density water separate from the fuel and settle out. Even if these types of water separators could get all the water out of the fuel

tank, there would be a fresh source of water getting into the tank: water vapor from the air that enters via the tank air vent line.

Tanks must be vented to the atmosphere or else when fuel is withdrawn from the tank a partial vacuum would develop inside the tank and eventually the fuel pump would not be able to pull against it and fuel flow would stop. Plus, the air in a nearly empty tank must be able to escape when the tank is refilled with fuel. But the air vent allows moisture-laden air to enter the tank. When that air hits the metal, the water vapor condenses and drips down into the fuel. This process doesn't introduce vast amounts of water during a single day, but over time the water accumulation can become significant if the boat isn't used and fuel is not passed through the filters.

The idea for H2Out comes from an engineer named Richard Pindell who lives in the Pacific Northwest. In the fall of 2005, Pindell, who worked as a diesel engine mechanic,



was attending a seminar on biodiesel at Iowa State University. A major issue with biodiesel is water contamination. Water in biodiesel is worse than in petroleum-based diesel because biodiesel is more hydrophilic (water loving), it will soak up 300 times more water than petroleum-based diesel. Pindell decided to attack the problem of water in the fuel via the air vent line. He devised the H2Out product and in September 2009 filed a provisional patent application on the Fuel Tank Air Vent Dryer.

H2Out is a cylinder containing a type of silica gel (a desiccant, a material that attracts water molecules from the air). According to Pindell, the silica gel compound used in H2Out is the same material NASA uses in spacecraft to control water vapor. Placed in line in the fuel vent tube, all the air moving into the tank passes by the silica gel material which grabs water vapor via the process of adsorption. Unlike absorption, which grabs water vapor without any chemical change — such as a sponge, adsorption results in a chemical bond between the water vapor molecule and the desiccant. Luckily for users of the H2Out product, this chemical change also produces a color change in the silica gel. It changes from blue to pink. A look at the material inside the cylinder via the inspection holes reveals if it has been saturated with water molecules. A great feature of the material is that it can be used many times. The cylinder can be opened and the

silica gel spread out on a baking sheet, put into an oven and baked for one to two hours at 250° F. The heat drives out the water and the silica gel returns to a blue color. The renewed unit is returned to

the vent line and will adsorb water vapor for another few months.

The H2Out AVD 303 will protect a fuel tank up to 200 gallons and has an MSRP of \$189.95. ■



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The advertisement features a background image of a sailboat on the water. In the foreground, four H2Out fuel tank air vent dryers are displayed. Three are cylindrical with a mesh body and a blue handle, and one is a smaller, black and silver unit. The text 'H2Out SYSTEMS' is prominently displayed in a stylized font at the top. A list of benefits is provided in a bulleted format. The website 'WWW.H2OUT.COM' is listed at the bottom of the list.