Simple Stuff
Coolant: Wait there's more!

by Bob Vitrikas

After reading my article on antifreeze, Shenandoah Valley British Car Club's "Founding Father" Wes Maupin asked me if I knew anything about waterless coolant. My reply was short and insightful, "Huh?" Never heard of the stuff. That set me on a quest for information, never stop learning or you're dead! My main source for this information is the Red Line web site. Red Line has been making products for the the racing community (four wheels, not legs) for many years and is highly respected.

Bottom line up front: I do not recommend using waterless coolant. Here's why.

- It's expensive. Evans waterless coolant sells for $51.95 on Amazon. Good ol' Prestone antifreeze sells for $12.58 at your local Walmart.

- Waterless coolants cannot transfer heat as efficiently as water, thus causing an engine to run hotter. The engine will continue to run hot until a critical component fails since the boiling point is so high. Engines can run 45-60°C (113-140F) hotter (at the cylinder heads) with waterless products. Specific heat capacity of waterless products ranges from 0.64 to 0.68, or about half that of water.

- They are slippery when spilled or leaked onto tarmac. In my experience race cars are usually prohibited from using any type of antifreeze in their cooling systems. Just water, thank you very much! The problem is antifreeze, in addition to be very poisonous, is slippery as you know what. Regular antifreeze products are glycol based, which is where the slippery comes in. Waterless coolant products are even more slippery; 100% glycol, some are 100% propylene glycol, and others are a mix of propylene glycol and ethylene glycol. Assuming a baseline friction co-efficient reference of 1.00 for dry pavement, the friction co-efficient of water is 0.65. The friction co-efficient of Waterless products is 0.16, four times less than water. Most race circuits in America prohibit the use of engine coolant that contains ANY glycol due to this fact.

- Waterless products are flammable! Yikes! As a result waterless products are prohibited at most race circuits. With flash points in the range of 110-130°C (230-266F) if the waterless coolant were released at or above the flash point, it could ignite. Coolant temperatures can be observed in this range during real life operating conditions, making this a real risk. Reports have also been made of damage caused by glycol coolant fueled fires, in some instances, destroying whole cars.

- Glycol coolants are now prohibited by the National Hot Rod Association (NHRA), the governing body for the majority of drag racing events in the U.S.. The NHRA rule change regarding glycol coolants was the result of a terrible fire where the competitor was using waterless coolant in his car. The engine blew a head gasket and the coolant caught fire which flowed under the driver's seat resulting in a cockpit fire. For our South African readers, the Motorsport South Africa ASN has prohibited the use of glycol on safety grounds "In the case of both cars and motorcycles, the use of glycol-based coolant additives is prohibited." Wow, that's pretty strong language!

- To counter the higher cylinder head temperatures, the engine octane requirement is increased by 5-7 numbers reducing engine horsepower by 4-5%.
- Waterless product's viscosity is 3-4 times higher than what Original Equipment Manufacturer (OEM) water pumps are rated to tolerate.
- Waterless coolant flow rate through radiator tubes is reduced by 20-25% due to the higher viscosity, thus slowing heat transfer.

Here's a dramatic example of what can happen. A waterless coolant manufacturer provided their product sponsorship to an entrant in the 2012 Classic Le Mans race. The very expensive and historic race car stopped on track with smoke billowing out of the bonnet. On closer inspection, the coolant had plasticized and warped the head, then passed through the head gasket hydraulic locking cylinder one. Hydraulic locking results when the combustion chamber is filled with an incompressible liquid, the valves are closed, and the piston, traveling at an incredible velocity (30-90 ft/sec) smashes against the afore mentioned incompressible liquid resulting in catastrophic destruction of the piston and severe damage to all metal parts it comes in contact with. Goodness gracious what a mess! The damage caused was very costly and ended the team's weekend early. It is not a product they would recommend or use again. Oh dear!

But the question remains, what can I do to make my hot running LBC run cooler? My suggestion is go with Red Line SuperCool Coolant with Water Wetter. Water Wetter is popular with racers and I've used it to good effect on my race cars. Water Wetter reduces the surface tension of water by half, eliminating vapor bubbles to form on hot metal surfaces. These bubbles create an insulating layer that prevents heat transfer.

I'm not getting paid by Red Line for these comments! Here's an article I found regarding the effectiveness of Red Line's SuperCool Coolant on the "motoiq" web site. https://motoiq.com/testing-redliness-new-super-coolant/. Spoiler alert, "under constant load test conditions, the Red Line coolant averaged 19.2 degrees cooler than the OEM coolant." Wow, consider me convinced!