**Potential Issues with Waterless Engine Coolants**

**by** [**Oilem**](http://www.oilem.com/potential-issues-with-waterless-engine-coolants/) **Published on Friday, August 1st, 2014**

Below is an interesting US-based article I received a short while ago.  This is not intended to bash any particular manufacturer of waterless coolants; it is just a challenge on the technology in use.

“Many concerns have been raised to us in recent months regarding the effectiveness of Waterless coolants and the inherent dangers they may possess. We have spent some time researching the product and would like to make all our customers aware of our findings.

Waterless products are 100% glycol, some are 100% propylene glycol, and others are a mix of propylene glycol and ethylene glycol. They are slippery when spilled or leaked onto tarmac. 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. Some race circuits in America are now prohibiting the use of engine coolant that contains ANY glycol due to this fact.

The other and more pressing reason that Waterless products are prohibited at race circuits is that they are flammable. With flash points in the range of 110-130°C if the Waterless coolant were released at or above the flash point, it could ignite. Coolant temperatures can be observed in this range during actual operating conditions, making this a real risk. Reports have also been made of damage caused by glycol coolant fuelled fires, in some instances,  destroying whole cars and resulting in thousands of pounds worth of damage.

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 pushed a head gasket and the coolant caught fire which came under the seat resulting in a cockpit fire. Glycol coolants are now prohibited in the NHRA. In another case the Motorsport South Africa ASN 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.”

In addition, the operational downside is the decreased ability to transfer heat compared to water based coolants. Waterless coolant should never be advised in applications where heat issues are apparent, Waterless coolants will only compound this problem as they lack the necessary heat transfer properties to provide a solution.

Although the product is a very good corrosion inhibitor, it will not adequately protect an engine when overheating. The 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 as the boiling point is so high.

To summarize:

Engines can run 45-60°C hotter (at the cylinder heads) with Waterless products.

Stabilized coolant temps are increased by 15-25°C.

Specific heat capacity of Waterless products ranges from 0.64 to 0.68, or about half that of water.

Engine octane requirement is increased by 5-7 numbers reducing engine horsepower by 4-5%.

Viscosity is 3-4 times higher than what OEM water pumps are rated to accommodate.

Coolant flow rate through radiator tubes is reduced by 20-25% due to the higher viscosity.

Race circuits are starting to prohibit waterless products because they are flammable and cause a slippery surface hazard when leaked.

When speaking to a classic car specialist recently the subject of Waterless coolants was brought up. A Waterless coolant manufacturer had given them product sponsorship ahead of classic Le Mans 2012, in FP1 the car stopped on track with smoke billowing out of bonnet. On closer inspection the coolant had plasticized and warped the head, the coolant then passed through the head gasket hydraulic locking cylinder one. The damaged cause was very costly and ended the team’s weekend early, it is not a product they would recommend or use again.”

*We sold a waterless coolant for a short while but stopped over a year ago.  We never encountered any issues although it sounds like potential issues are more “race” related.  However, I thought we would be remiss if we did not share this information with you as it opens a valuable debate into the safety and efficacy of such technologies versus conventional water based cooling products.*