Two2cool Coolant Technology Engineering

Two2cool's Coolants and Coolant additives stand alone in the world of performance coolants. Two2cool uses real facts and backs it up with real world results. In recent times, the consumer has become much more educated on coolant technology. We will not bore you with generic information, charts or graphs.

First, let us share a brief history of the progression of coolants and some of the problems that affect cooling systems efficiency

In the first combustion engines, water was used as a coolant. Soon after, it was realized that antifreeze was needed. Since that time, many products were used. From alcohol in the early 1900's to 1960 when the first all weather antifreeze was introduced. Since that time, most engine coolants have always consisted of glycol or a glycol water mix. These common blends all have an anticorrosion additive. None of them does anything to reduce engine temperatures from a chemical perspective. They rely on the radiator system to dissipate the heat that is collected.

Originally, the reason glycols were use in coolants was to give a level of anti freeze protection. During the process of blending the glycols and water, they quickly learned that glycol's do not cool as well as water. However, they did not worry about it, since glycols, boil temperature was much higher than water and due to that it helped reduce boil over situations. In short, even though an engine may be running somewhat hotter it did not boil over as easy due to the increased boil temperature of the coolant components mixture. It is a misnomer to use the term "coolant" for glycol based anti freeze. This may or may not include 100% glycol base fluids. We will discuss this later and you can decide.

Some of the things that affect a coolants ability to transfer Temperature from an engine to the radiators include surface tension, cavitations, viscosity, air entrainment (bubbles), coolant speed and the fluid's "Cloud" Temperature index

It is fact that water is a best choice for Heat Transfer. So, why not just use water? Three major reasons!

1. Even with today's very efficient cooling systems, high performance engines can surpass the boiling temperature of water alone.
2. Water provides no anti corrosion protection.
3. Regular obtainable water contains containments (minerals etc)

This is where we step in to bring the right chemical blends to coolants!

Marketing: they can sell you anything!

In today's Market, 95% of the "Performance" anti freeze companies produces a form of a water/glycol mix, so common that it is on the shelf at every store! Even the local convenience store. Then their Marketing Wizards Come up with fancy name such as Ice, Cool, Performance, no boil, no freeze or endurance coolants. They have paid big bucks to come up with and to use these fancy marketing hype style names and fictional claims to sell their coolants. In order to make the consumer believe that their blend of water and glycol cools better than what is available in your local convenience store shelves.

There are a few companies that use single additives to help with heat transfer but the results are non-impressive to say the least. This is because over such a wide range of temperatures and conditions, one single additive does not address the issues affecting cooling systems efficiency.

The Truth! About what coolant needs?

Surface Tension

One of the most common additives used to help with cooling system temp reduction is surfactants. Surfactants are used to reduce the surface tension of a coolant. Most additives available (retail) and coolant companies that have a surfactant in their product use a type of detergent grade surfactant. These inexpensive choices have a limit to their abilities. Some work only in a narrow tempeture range. While others may work in water but have little effect in glycol. Two2cool coolants use multiple surfactants to address this issue.

Two2cool's anionic and non-ionic surfactants work in conjunction and reduce surface tension in water as well as glycol. They cover a wider tempeture range than the inexpensive ingredients used by our competitors.

By reducing surface tension throughout a myriad of temperature ranges, this vastly improves the wetting ability of our coolants as compared to other single surfactant additives, coolants. This helps to reduce localized boiling, during localized boiling it helps to reduce bubble size. The reason why bubble size is important is because vapors do not absorb heat from your engine. The smaller bubbles size allows more coolant to surface metal contact. This allows for more heat removal out of an engine and into the coolant.

Cavitation

Another issue effecting cooling systems is cavitations'. Cavitations' can be set in motion by a number of factors. Coolant speed, sharp corners, casting flaws, sonic vibrations, etc. All can initiate the cavitation scenario. In the Diesel industry, a Borate/Nitrite solution has been used for years to reduce cylinder liner erosion due to excessive cavitation. Nitrite solutions work by producing a thin protective coating on cylinder liners. This provides little help for cavitation in aluminum engines.

Cavitation is a catalyst for air entrainment (bubbles). Two2cool uses a modified OAT additive to reduce cavitation and corrosion. Since ultrasonic cavitation/erosion is not an issue for non-wet sleeve liner engines our coolants and additives is completely nitrite free. As mentioned earlier, reducing cavitation helps to reduce vapor bubbles in a cooling system. By increasing surface contact, this aids in heat transfer.

To understand the importances of boiling/bubble size in a cooling system think of the following comparison. If we entirely line the floor of a 10'x10' room with basketballs. Then line the same room with marbles its easy to understand the marbles would have more surface contact.

Heat Transfer

All two2cool coolants produced utilize our proprietary heat transfer formula. This heat transfer formula is a list of ingredients only used before in the cooling systems in the plastic injection molding industry. This formula helps water and glycol "soak up" heat faster and allows it to release heat faster.

By removing more heat from your engines coolant passages and moving it to its radiators it allows for more heat to be available to dissipate. This would do nothing if a cooling systems radiator was at its maximum efficiency. In testing we feel that most, if not all radiators are not working at their max efficiency.

For those finding the above scenarios hard to understand think of the following: If we have a much less efficient coolant that removes less heat from an engine and on to its radiators. Then the engine will always maintain the heat inside of it and run hotter.

No Boil Coolants

Some coolant companies choose to address these cooling issues by using 100% glycol "no boil" coolant. We at Two2cool also make a NO Boil Coolant. The reason is in some extreme cases this technology is a better choice than a glycol/water or a water base coolant. By removing all water from a system and having a high boiling temperature (365f). It works to reduce localized boiling.

However, there are the negatives that are associated with 100% glycol coolants. They are less effective at heat transfer and they have a much higher viscosity. Bottom line Glycols

remove less heat from an engine and it takes more horsepower to pump it due to the higher viscosity index of the no boil coolants.

This means in normal circumstances an engine using pure glycol will be hotter than one using a 50/50 mix and even hotter than one using water. We do agree that some riders need a higher boiling temperature than water has. A very small percentage of riders need a higher boiling temperature than a 50/50 mix has.

The fact is that some riders either ride hard enough or in the conditions that a boil over will occur. No matter what coolant is being used. In this extreme circumstance, a normal "no boil" coolant would be a better choice. That is if one can stand his engine running hotter. Do not confuse this explanation with our PRO-G no boil over coolant.

Two2cool's three cures for the problem!

We are not a one-coolant fits all company. We offer three different coolants for every situation. All three coolants offered have our proprietary add pack designed to enhance cooling with advanced additives that address the situations above.

Two2cool Racing Coolant: Consists of 82.5% de-ionized water and T2C's enhanced add pack. It has a low boiling tempeture (235f) but due to its increased cooling capability, it helps reduce boil over where even higher boiling temperature glycol/water mixes cannot. It has anti freeze properties to 20f. This is the best choice for summer use and for people wanting the absolute best at reducing temperatures. In some cases with little to no airflow the increased boil temperature of our racing anti freeze may be more suitable. It has the lowest viscosity, which improves HP ratings.

Two2cool Racing Anti freeze: Consists of 52.5% de-ionized water 30% propylene glycol and T2C's enhanced add pack. It offers antifreeze protection to 5 degrees (f). Because of its enhanced add pack it produces much better heat transfer than any other commercially available anti freeze. It has a boil tempeture of 250f.

Two2cool PRO-G: Consists of 82.5% propylene glycol and T2C's enhanced add pack. It offers the no boil properties employed by some other coolants as well as an enhanced heat transfer compound. Testing has proven that Pro-G offers better cooling than other available No Boil coolants or water/glycol coolants. In other terms; one can have the no boil properties and cool better than most other coolants available today.