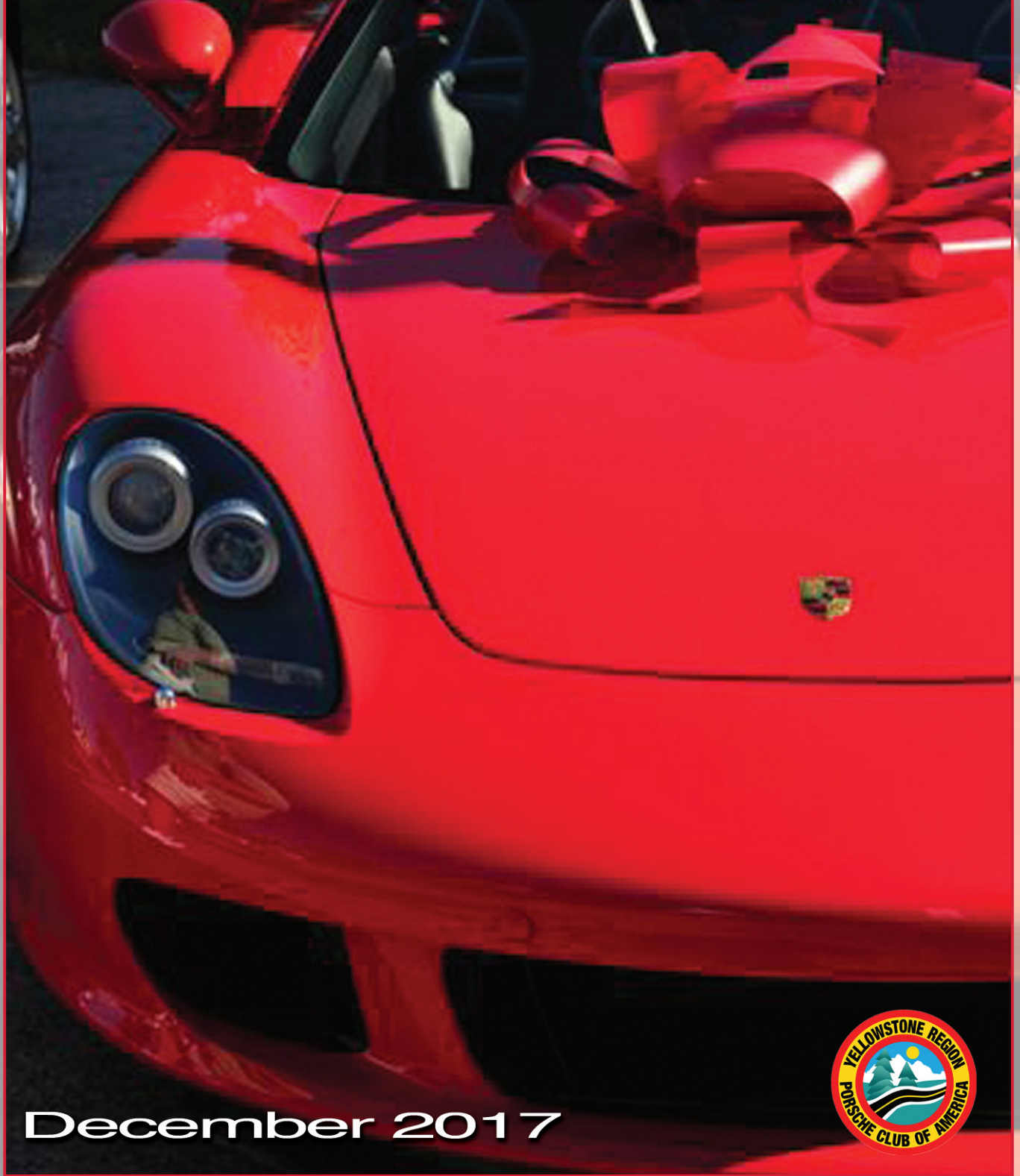


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*Porsche*



December 2017





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### Cover Photo





Another year has passed and our long fall has no doubt allowed many of us to continue to enjoy our cars later into the year than we had ever wished for. It also means that we are gearing up for our Annual Meeting on January 11, 2018.

It is my hope that we get as many folks as possible attending as we need to fill some empty board positions, discuss the newsletter, determine our event calendar for the year and enlist members to head up the individual events. Being that we are a small club, we really need as much participation from our membership as possible.

Please mark January 11, 2018 @ 6:00 PM. 80 W Broadway.

See you then.

## President's Message

---

Jim



### **YELLOWSTONE REGION PCA ANNUAL MEETING**

**JANUARY 11, 2018 ~ 6:00PM–10:00PM**

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CALENDAR, VOTE ON NEW BOARD MEMBERS AND  
VOLUNTEERS TO RUN THE VARIOUS EVENTS.**



## Coolant/Antifreeze

by Pedro P. Bonilla Gold Coast region PCA

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Once upon a time you could only use Porsche coolant in your water-cooled Porsche, but times and products have changed and now you have a choice ... several, actually.

I know you've heard the stories about how your coolant will turn to gel if you put something else in there other than genuine Porsche coolant, but if you have a little patience and read on, I'll give you the skinny. For those of you with "real" air cooled Porsches, thank you for reading this far, but you've read enough. See you next issue ;)

Logically, you'd think that a "wasserboxer" engine (water cooled boxer engine) would be cooled with wasser (water) right? Not exactly. And why does it need to be water cooled, anyway?

A typical, 6 cylinder Porsche cruising at around 70 mph (3,350 RPM) will produce 10,050 controlled explosions per minute inside the engine, as the spark plugs ignite the fuel/air mixture in each cylinder. Obviously, these explosions produce an enormous amount of heat, and if not controlled, will destroy the engine in a matter of minutes. Historically there have been 2 choices for controlling this heat: air and water cooling. The original Porsche engines were all air-cooled, but with the advent of more strict environmental regulations it became more efficient to use water instead of air to cool the engines and now all internal-combustion engines in Porsches are water cooled.

Pure water is probably the best fluid for holding and transferring heat, but it has three problems. It freezes at 32° F which causes it to become solid and expand, thus cracking the engine, it boils at 212° F turning into vapor at too low a temperature considering those generated by the internal combustion engine, and pure water running through the cooling system would promote internal galvanic corrosion.

So, science came to the rescue. By adding a chemical product known as Ethylene Glycol (C<sub>2</sub>H<sub>6</sub>O<sub>2</sub>) to pure water, it changes the freezing and boiling points of the new fluid, now known as antifreeze or coolant.

	Pure water	50/50 C <sub>2</sub> H <sub>6</sub> O <sub>2</sub> / H <sub>2</sub> O	70/30 C <sub>2</sub> H <sub>6</sub> O <sub>2</sub> / H <sub>2</sub> O
Freezing Point	32° F (0 °C)	-35° F (-37 °C)	-55° F (-67 °C)
Boiling Point	212° F (100 °C)	223° F (106 °C)	235° F (113 °C)

Adding Ethylene Glycol obtained the needed anti-freezing qualities, but the coolant still boiled at too low a temperature. So again, science to the rescue. By pressurizing the system to a safe pressure of 14.7 psi the boiling temperature of the

coolant is now raised another 45° F (25° C) so the coolant can withstand the higher temperatures without boiling.

Coolant or antifreeze, has four (4) basic functions it must provide:

- 1.- It must carry heat from the engine to the radiators where it will be dissipated
- 2.- It must not freeze in the winter and must not boil in high temp environments
- 3.- It must lubricate the system's moving parts such as the water pump, and
- 4.- It must protect the cooling system against corrosion

There are 3 basic types of coolants based on the different types of additives used:

Inorganic Additive Technology (IAT), Organic Additive Technology (OAT) and Hybrid Organic Additive Technology (HOAT). Although, technically each one of these would work on any automotive cooling system, each one was developed to meet specific manufacturer's needs.

IAT has been around since the first water cooled engines. It contains silicates and or phosphates that form a protective barrier on everything in the cooling system, even on the hoses. IAT coolant is generally recommended for iron-block and heavy-duty engines.

OAT coolants work differently. Aluminum and ferrous metals form a surface-layer of corrosion in the presence of moisture. OAT coolants anneal (transform by the engine's heating and cooling cycles) this metal-oxide layer into a thin surface coating that protects against further corrosion. OAT coolant is what's in our engines because most of the components are aluminum.

HOAT are hybrid coolants that use both silicate and organic acid corrosion inhibitors, generally recommended for



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engines that have iron-blocks and aluminum heads.

The recommended antifreeze for our Porsche vehicles is the OAT type.

Many of the famous, over-the-counter brands offer OAT coolant with an aluminum-protecting inhibitor package and contain no silicates, borates or phosphates and will be stated as such on their labels. Generally these are called "Extended Life Antifreeze Coolant".



These coolants can be put on top of the existing Porsche coolant, if needed for a top off, even if it's a different color, and although Porsche sells its coolant as a lifetime product, whenever there's a need to service any cooling system component, such as a radiator, a cooling line, the thermostat or the water pump, for which the system must be drained, fresh coolant mix should be used to ensure that the additives are there in the necessary quantities to protect the newly installed surfaces.

As we saw in the table (above) the recommended mix for most of us in the lower 48 is a 50/50 mix of antifreeze and water. Because tap water contains many minerals and chemicals which could reduce or eliminate the wanted effects of the additives, it is highly recommended that distilled water be used for the dilution. You can purchase an already diluted 50/50 mix from most of the antifreeze manufacturers, but it is generally cheaper if you make the mix yourself and you can also adjust the proportion to your specific needs.

Check you coolant level frequently. If you notice a drop in level (from cold to cold) check your coolant cap. Chances are it's an old (even an original) cap which needs to be replaced after 4 or 5 years, since it can lose its pressure-holding ability. If you need to top off, it's fine to do it with just distilled water. You don't need to use mix, not for a small amount.

The Ethylene Glycol used in coolant is poisonous to humans

and pets. Take all necessary precautions.

On a final note, regarding the "mixing of non Porsche coolant with Porsche coolant will turn to gel" issue, here's the scoop.

Porsche was one of the first manufacturers to use an all aluminum engine and they were pioneers in the development of the Organic Additive Technology (OAT) for antifreeze. In those days the concentration of silicates, borates and phosphates (among others) was so high in the commercially available IAT coolants, that when mixed with OAT this would cause the additives to precipitate out of solution and would clog many of the fine cooling vanes in the radiators and engine. This precipitate had the consistency of slush.

Bottom line: Don't mix different types of antifreeze.

For more information about antifreeze / coolant, cooling systems and more, please visit my website at: [www.PedrosGarage.com](http://www.PedrosGarage.com).

Happy Porsche-ing,

Pedro

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## Cracked windshield! ... Repair or Replace?

by Pedro P. Bonilla Gold Coast region PCA

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You're enjoying a drive on an open road.

There are a couple of vehicles in front of you when all of the sudden you hear a loud "WHACK!!!"

You stop the car, inspect it and find that there's a chip in your windshield.

What to do?

Do you have the whole windshield replaced?

Do you have the chip repaired?

Will the repair be good?

If you replace the windshield will you have leaks?

There are many things to consider in this case; all valid, but first let's learn a bit about automotive glass.

It's main function is for the protection of the passengers from the elements and debris.

Glass has been installed in vehicles since the very first cars.

Initially, windshields were made out of ordinary glass, but it didn't take but a few accidents and a couple of lawsuits to make manufacturers search for, and provide safer glass.

The first safety glass was tempered glass. It is produced by heating the pane of glass to over 1,100 °F and then rapidly cooling it (this is known as annealing). The result is that the outer surfaces of the glass become harder than the center and therefore it becomes stronger than regular glass of the same thickness. A good side effect of tempering is that when broken, tempered glass will break into very small, rounded pieces, which are much less dangerous than sharp and pointed glass shards from standard glass.

Tempered glass was installed in Ford automobiles as early as 1917, but it had the tendency to shatter from a simple stone chip. So, in 1919 Henry Ford solved the problem by applying a new French process of glass lamination. Laminated windshields, even today are made from two layers of glass with a bonding substrate in the center. The "sandwich" is subjected to high temperature making the inner substrate become crystal clear which bonds the glass. This inner layer will also hold the pieces of glass together if it fractures, making it much safer for the occupants in case of an accident.

Initially, Ford use a cellulose substrate as a laminating agent, now a days PVB (Polyvinyl Butyrate) is used instead. PVB offers several additional advantages, such as blocking the harmful UV rays from the sun, adding a light tint to the glass, and reducing the amount of sound that comes through the windshield.

Modern cars, including Porsche's still use both types of glass: tempered and laminated.

The side and rear windows are tempered while the windshield is laminated.

Nevertheless Porsche goes a bit further. Their tempered glass (side windows) get a highly efficient water repellent finish. By rapidly dispersing moisture and dirt, it ensures optimum visibility in the wet.



For all of the glass surfaces, including the windshield, Porsche uses a special heat-insulating coating that helps prevent excessively high temperatures inside the vehicle.

Now, back to the chip. Repair or Replace?

In the old days, replacement was the only option and it was costly. So, the insurance companies started promoting windshield repair whenever possible in lieu of replacement.

The origins of windshield repair date back to 1971 when Minnesota Mining and Manufacturing (3M) first introduced a system they called "Scotch Weld".

Prior to that date, the only improvement that could be done was purely cosmetic. Typically, an oil-based fluid was poured into the area to fill the damage and to "hide" the break. It has been said that some used car dealers did this to try to sell a vehicle without installing a new windshield. It should go without saying that this was not a permanent repair.

Today, windshield repair is a thriving business aside from the fact that the new adhesives and resins are excellent. Professional windshield repair companies use very sophisticated equipment to ensure a near-perfect repair. Their system can draw a vacuum to get any moisture out.





Their equipment can also "bend" the glass in order to spread apart the crack, then it will inject a series of special resins which will completely penetrate the cracks making them invisible. The final steps are curing the resin with UV light and shearing off any cured excess from the glass. This whole process will last around 30 minutes and in many cases they will come to your home or place of business.

Most insurance companies will give you the option of repairing your windshield at no cost to you or replacing it, but you're out your deductible.

The most common damages to windshields are: cracks, bulls-eye, star breaks and combinations of them. Cracks that are 6" in length or less are generally repairable and most chips can also be repaired.



The repair process consists of prepping the glass, and then injecting a special resin under pressure which fills in the crack, making it practically invisible. Finally the resin gets cured with a high intensity UV light which makes the glass bond.

Even though you can purchase a DIY glass repair kit, unless you have a minor chip with no cracks, it's generally best to have a professional do the work. It won't cost you any

money, the work will be near perfect and you'll get a guarantee.

If the windshield is in good condition otherwise (no superficial pitting or scratches), it's generally better to have the chip or crack repaired because this way the windshield doesn't have to be removed and re-sealed which in some instances may cause air (sound) and water leaks into the vehicle's cabin. Also, modern cars' windshields are bonded to the frame which offers additional structural rigidity to the vehicle's chassis. According to National Statistics, 8 out of 10 windshield replacements fail to be installed properly. It is recommended to repair instead of replacing the windshield, whenever possible.

A word of caution. If your windshield suffers a crack or a chip, don't wait to get it repaired because the heat and or cold weather as well as any sudden added stress to the glass from driving the car on the road, may make the crack grow longer to the point where it is not repairable any more and the windshield must be replaced.

There are many professional glass repair facilities in your area. Look them up whenever you need one.

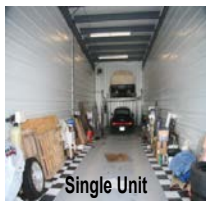
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Happy Porsche-ing,

Pedro

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