



CHAMPION BRANDS

1001 GOLDEN DRIVE

CLINTON, MO 64735

1-800-821-5693

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TECHNICAL BULLETIN: JN3336

DATE: 8-8-14

SUBJECT: UNDERSTANDING ANTI-FREEZE

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Although ethylene glycol has been around since the 1850s, it was not considered for use as an automotive coolant until World War I when it was used in military vehicles to prevent radiators from icing up overnight. Initially it was used as a substitute for glycerol, a component in explosives. American production cars did not begin using any antifreeze until 1923, when an ethylene oxide based coolant was first used. Ethylene Glycol, the green antifreeze we have all been using as long as we can remember, did not replace ethylene oxide as the industry standard until 1937. Life was simple then, just mix one part of the green stuff to one part water and you were good to go for up to three years. Occasionally you would check the potency of your mixture with a bulb-type antifreeze tester and maybe add a little to give you a little more protection, but that was about it.

In recent years, there have been many changes, given the new developments in the area of engine coolant. Several vehicle manufacturers are specifying their own type of antifreeze and it can be confusing to the consumer as to which color or formulation of coolant is acceptable for their car. Some European and Asian coolants are produced to meet manufacturer's requirements and are based on the metallurgy of the components used in their engine manufacture or they can be based on the additives each engine requires to keep it running at its optimum. These European and Asian requirements can be vastly different from those made for American cars, further adding to the consumer's confusion.

All antifreeze falls under one of three basic types.

Inorganic Acid Technology or IAT: This is the common green stuff original equipment manufacturers have used for over 70 years. Ethylene glycol is its base chemical and there are silicate and phosphate additives that make it compatible with copper, brass, cast iron and aluminum cooling system components. Manufacturers recommended that you change the green IAT antifreeze every 36,000 miles or three years. IAT coolant was used in GM vehicles until 1994. Chrysler used green IAT fluid until 2001 as did Ford, (with the exception of some 1999 models that used OAT blue coolant which must be purchased from Ford).

Organic Acid Technology or OAT: Commonly referred in GM vehicles as Dex-Cool or to other manufacturers, propylene glycol. GM introduced Dex-Cool in 1995. Although initially advertised as a long life or permanent antifreeze, most GM car owners and repair shops are finding that Dex-Cool is only good for about three to five years before it needs to be replaced. But because of the additives in the Dex-Cool orange antifreeze, you do not want to substitute the old reliable green coolant. Usually (but not always) dyed orange or yellow so you could tell the difference between OAT and IAT, this coolant has similar corrosion protection as the green stuff, however they are designed to be slower acting, hence the extended-life moniker. It is made from a propylene glycol base, which makes it less poisonous than conventional IAT for children and pets. OAT when spilled or lost due to a boil-over is much less harmful to the environment. OAT antifreeze is now used in 1995 and newer GM cars and trucks newer than 1996. It is also used in 1996 to 2001 in Audi, Land Rover, Nissan, Mazda, Toyota, Honda, Kia, VW, Jaguar, Saab and Porsche. Manufacturers are now recommending your OAT coolant be changed every five years.

Hybrid Organic Acid Technology or HOAT: This coolant is usually dyed yellow but comes in other colors like green, pink, blue, red and orange, which leads to a lot of confusion. One way to know for sure if you are getting HOAT will be by the packaging. Manufacturers often refer to this anti-freeze as "global" and will indicate on the bottle that it meets or exceeds the specification "G-05" for most European cars and G-11 or G-12 for Volkswagen and Audi. Hybrid antifreeze has added silicates for aluminum protection and is advertised as



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having a five-year change interval. Normally HOAT coolants are specified for vehicles newer than 2002, specifically Mercedes, Volvo, Ford, VW, Audi, Chrysler, BMW and Saab.

The use of OAT and HOAT coolants can extend the life of rubber coolant hoses, because they conduct less electrochemical degradation or ECD than the conventional green antifreeze. ECD is the process by which the motion of coolant and water through your engine creates an electrical charge similar to a galvanic battery. This electrical charge degrades both rubber and metal parts in the cooling system from the inside out. ECD can be attributed as the cause of many premature coolant system failures. Volkswagen, Audi and other European vehicles use antifreeze that can be blue, pink or red in color. The pink and red are specifically designed for alloy engines and both meet the required G-12 coolant specification. The blue is also for alloy-based engines and is equivalent to the VW/Audi G-11 rating.

So what should you use? Manufacturers will tell you to stick with what is in there. You can have the cooling system cleaned with a coolant filtration system. This is a very popular tool in repair shops today and will recycle your antifreeze. Component chemicals can be re-added to boost its boiling and freezing point and adjust the Ph of the cooling system back to specifications. The most accurate tool for measuring OAT and HOAT potency is a refractometer which is an expensive piece of equipment, so you should have the coolant checked by a service station before deciding whether to replace or refurbish it.

If you are low on fluid or have a leak, a general rule of thumb is, green IAT is always replaced by green IAT coolant. Dex-Cool or an OAT product with equivalent specifications is always necessary to replace orange or yellow organic-based antifreeze. For the rainbow of colors of HOAT, your only substitute is the yellow or amber global antifreeze. Global coolant will not change the color of the stuff that is already in there. Can you run organic coolant in an earlier vehicle? Yes and no. OAT will work if your radiator is aluminum and you flush your entire cooling system with water and then refill with a 50/50 or 60/40 mixture of OAT, but there are some issues with the interaction between organic coolants and lead solder, so using OAT in a copper radiator is not recommended. In short, antifreeze these days can be confusing. Check your owner's manual for the correct fluid specifications and read the label on your replacement coolant carefully to insure it meets with the required specifications. The proper coolant and mixture ratio is important. Pre-diluted antifreeze is also a good idea because it is already mixed with de-ionized water and will be less likely to produce scale and this will extend the life of your radiator.

There is another answer. Champion Anti-Freeze Products are patented with an advanced organic acid technology that provides guaranteed protection-for 150,000 miles or 5 years. It's patented inhibitors will provide maximum protection against damaging rust and corrosion in all automotive & trucks world-wide, regardless of make, model, year, or original anti-freeze color. Formulated for use in all American, Asian, and European vehicles with a patented formula that is phosphate free, silicate free, borate free, amine free, and nitrite free.

Meets all the following World-Wide Specifications:

ASTM D-3306 (IAT & OAT)

Euro G-05, G-11, and G-12

BS 6580

Ford ESE-M97B44-A & WSS-M97B51-A1

GM 6277M (Dex-Cool)

JIS K2234

MB-7700

ASTM D-4340 (HOAT)

ANFOR R 15-601

Chrysler MS-7170 & MS-9769

FVV HEFT R443

JASO M325

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