

Choosing the right coolant...priceless!

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Special points of interest:

- Maintaining coolant is extremely important!
- Fully-formulated is the newest type of coolant.
- Corrosion in your system causes destruction of component parts.
- Supplemental coolant additives should be one weapon of choice.

Why maintain your coolant?

One of the most important areas of maintaining your engine, is maintaining and using the proper coolant. It is estimated that 40% of all engine failures can be traced back to poor coolant maintenance. Hoses can become soft and brittle if incorrect additives are used. Water pump seals fail and the impellers become corroded. Block heaters short out because of phosphate build-up. Not to mention the devastation to the liners, pistons and radiator core. We're sure by now that you can see some of the problems.

What will the proper coolant do for you and your engine? It will prevent formation and build-up of deposits and scales. It will provide a heat transfer media. It



will help prevent cavitation (pitting) damage. It will aid in providing a corrosion-resistant environment.

In order to provide all of the above, the coolant you use should be of good quality. Not all coolants are created equal. The coolant to use should meet ASTM D-6210 or D-6211 Type A (industry specification) phosphate free requirements.

Use a coolant with 33-60% fully formulated antifreeze. Fully formulated antifreeze should be used without any additional coolant additive.

Fully formulated anti-freeze is one which is the new heavy duty coolant that contains all the necessary chemicals to protect diesel as well as automotive systems. In addition, it meets or exceeds all previous automotive and heavy duty specifications. A true fully formulated anti-freeze can be used in all systems.

Verify that the freeze point and nitrite concentrations are correct using the proper test strip. This will help insure adequate engine protection.

Some antifreezes do not contain all the necessary additives. Before you buy, compare. Read the labels and be sure you are buying a quality product.

Speaking of fully-formulated.....

Fully formulated coolant contains nitrite. Why are nitrites so impor-

tant? The nitrites form a thin protective oxide film on the coolant side of the piston liner wall of

your engine. How is this film formed?

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Speaking of fully-formulated.... (continued)

This oxide film which is formed by a reaction between the liner wall and the nitrites, will act as a protective barrier to prevent pitting (cavitation) and corrosion.

In a properly protected system, the imploding bubbles of combustion attack the protective film on the liner. The film (as described above) quickly heals over the liner by drawing the nitrite out of the

coolant. In a system that is inadequately protected, this healing fails to happen and pitting of the bare metal of the liner begins immediately. As combustion continues so does the pitting.

A good corrosion inhibitor will include nitrite to prevent pitting, pH buffer to prevent corro-

sion of iron and steel, silicate to protect aluminum components and nitrate (this is different from nitrite) to protect aluminum, iron and steel. In addition, there are inhibitors to protect soft metals such as brass, copper and lead.



As everyone knows, corrosion weakens metals and these metals will subsequently fail.

My coolant system is corroded?

Most people don't realize that corrosion is simply a tendency of metals to return to their natural ore state. Iron, for example, will form the common rust that we are all familiar with, otherwise known as iron oxide.

There are a number of conditions that will affect the degree and rate that corrosion will occur within your engine and coolant system. Some of these include: coolant temperature, coolant pH, metal stress, corrosion inhibitors in coolant or lack thereof, and metal surface deposits of minerals.

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So what's a person to do? Since one of the major factors in coolant system corrosion is pH, we need to understand how shifts in pH directly affect the rate of corrosion. The pH scale runs from 0 to 14. The closer a coolant pH is to 0, the more acidic it is. The closer to 14, the more alkaline. What is ideal? Coolant pH should be maintained somewhere between 8.5 and 11. If the pH drops below 8.5,

the coolant becomes aggressive to ferrous metals such as iron, steel, aluminum, copper and brass. If it moves past 11, it becomes aggressive to aluminum and solder in the cooling system. Maintaining pH is one of the most important functions of a coolant additive. It is important to use a coolant additive with a quality pH buffer package to insure the optimum pH range for the coolant.

It's not just fish that have scales.



A diesel engine generates enough heat to warm a seven-room house during the winter. It must shed some of that heat to operate efficiently and prevent severe engine component damage. Two-thirds of that heat is lost through the exhaust and through the engine working. The remaining third must be pulled out of the engine by way of the coolant system. Because of this, it is of the utmost importance for the system to remain clean.

Hard water scale buildup can block a cooling system's ability to transfer that heat and result in overheating. Only 1/16" of scale can reduce heat transfer efficiency by almost 40%!

Most cooling systems contain calcium and magnesium from drinking water sources. That would come from adding regular tap water to your cooling system. While those minerals are wonderful to drink, they are

NOT good for your system. They form scale. As the concentrations of these minerals increases so do your coolant system scale problems. While they initially go undetected, they are part of the cause of your future radiator problems. Cooling system additives contain anti-scale chemicals and can allow the use of some moderately hard water.

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Why are these scales so bad?

Calcium and magnesium have a tendency to combine with the phosphates found in anti-freeze and some additive packages. When they combine they create a type of scale on the heat transfer surfaces, especially on the face of water pump seals. That may not seem like a very big deal until these deposits destroy the flatness of the seal face and prevent the water pump seal from sealing. The result can be the destruction of the water pump bearings.

The combination of the water pump sealing issues, corrosion in the radiator, and inefficient heat transfer can result in several critical and catastrophic engine problems. Some of them are:

1. Cracked heads.
2. Oil temperature running abnormally high.
3. Failure of the cooling system fan to turn on.
4. Scale deposits on block heaters causing them to short out.
5. Damage to thermostats causing them

to stick open or closed and eventually causing an overheat situation.

6. Warped engine blocks.
7. Water circulating pumps, Webasto heating units and MCI door cylinders will also be damaged.

Using distilled water in your coolant system in place of standard "tap" water will help slow down this scaling process.



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A few last words about coolant additives

In the war against premature engine cooling system failure, supplemental coolant additives prove to be a very good weapon. They are absolutely necessary in, and required by, manufacturers such as Detroit Diesel with their Series 50 and 60 engines. Fully-formulated antifreeze does not require a pre-charge of these additives because it is already built-in. The coolant should still be tested every 3 to 6 months and at season changes for pH, nitrite concentration and freeze point. Systems that leak or are run many hours at a time may need closer supervision. Ask a QUALIFIED technician for recommendations for your specific vehicle. Please feel free to e-mail us at busfixx@hotmail.com or at dieselbustech@yahoo.com, if you have any questions regarding this newsletter.

So the value of choosing the right antifreeze is? PRICELESS!!!!

Protect your engine, protect your cooling system and most of all, prevent yourself from having a serious road failure. Check your antifreeze regularly. Evaluate what it might cost you..... The price of a gallon of antifreeze..... \$6.25. The price of that coolant filter.....\$10.00. The price of the radiator.....\$800.00. The price of that engine you just lost.....\$10,000.00. The value of a quality coolant.... Priceless!!!! The money you save on the front end may cost you greatly on the other end.



(Values of the above listed items are not actual. They are used purely for example.)

As always, we diligently work to provide information which can be implemented into a regular service program.

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