

ANTIFREEZE AND FORKLIFTS

Antifreeze/Coolant

Antifreeze is what protects the engine from overheating, the coolant from freezing, and engine and cooling system components from corrosion. To provide these three benefits, the antifreeze must be used in the proper concentration and be in good condition.

Most vehicle manufacturers recommend using a 50/50 mixture of antifreeze and water in the cooling system for year-round driving. At this level of concentration, most antifreezes will provide freezing protection down to -34 degrees Fahrenheit and boilover protection up to 265 degrees depending on the pressure rating of the system (the higher the pressure rating, the greater the boilover protection).

Higher concentrations of antifreeze can be used to extend both the freezing and boilover protection. At a maximum concentration of 70 percent antifreeze and 30 percent water, most antifreeze will provide freezing protection down to -84 degrees and boilover protection to 276 degrees (at maximum pressure rating).

Under no circumstances should a higher concentration of antifreeze be used in the cooling system. Antifreeze does not carry heat quite as efficiently as water, so increasing the concentration of antifreeze beyond a maximum concentration of 70 percent can reduce the cooling capacity of the system and increase the danger of overheating. What's more, straight antifreeze will not provide as much freezing protection as a mixture of antifreeze and water. Straight antifreeze freezes at -8 degrees F!

Nor should straight water ever be used in a cooling system. Straight water freezes at 32 degrees, boils at 212 degrees (which is close to the normal operating temperature of many engines today!), and provides no corrosion protection whatsoever.

Most antifreezes are ethylene glycol, which provides the freezing and boilover protection needed by all cooling systems. But ethylene glycol by itself does nothing to prevent corrosion inside the cooling system. For that job, corrosion inhibiting chemicals are added to antifreeze.

In conventional antifreeze, silicates, phosphates and/or borates are used in

various combinations to form a protective coating on cooling system surfaces. This coating does an excellent job of preventing corrosion as long as it is intact.

But eventually heat and the combined effects of dissolved oxygen and minerals in the coolant deplete the inhibitors. And once the protection is gone, electrolytic corrosion begins to accelerate very quickly.

Aluminum parts such as radiators, cylinder heads, water pump and thermostat housings can be damaged by electrolytic attack, as can the soldered joints and seams in copper/brass radiators and heater cores. Even rubber hoses can come under attack and fail from the inside out because of electrolysis.

To protect the cooling system against this kind of damage, the coolant must be changed periodically. Most vehicle manufacturers recommend changing conventional antifreeze every two years or 24,000 to 30,000 miles for preventative maintenance.

Many new vehicles now come factory-filled with extended life antifreeze to reduce maintenance requirements. If coolant is needed, the same type of extended life product should be added to the system to maintain the same level of protection. Adding ordinary antifreeze will dilute the special corrosion inhibitors in the extended life antifreeze and reduce the coolant's corrosion longevity to that of ordinary antifreeze.

Many mechanics realize they should change their antifreeze periodically, but may not understand why. The main ingredient in antifreeze (ethylene glycol) does not wear out so the amount of freezing and boilover protection remains unchanged regardless of the coolant's age - provided the same concentration of antifreeze is maintained in the coolant. If straight water is added to a system that is low on coolant, it will dilute the concentration of antifreeze and reduce the freezing and boilover protection. For this reason, a 50/50 mixture of antifreeze and water (distilled is preferred because it contains no dissolved minerals) should always be added to the system anytime additional coolant is required.

The reason why the antifreeze needs to be changed is to replenish depleted corrosion inhibitors, and to remove contaminants such as sediment and rust from the system. This can only be accomplished by changing the coolant.