

ACL TECH TALK

Coolants, Ethylene Glycol and Engine Assembly

Modern, high quality coolant is an invaluable necessity in any modern engine. The ethylene glycol in the coolant helps to prevent freezing and boiling, and the inhibitor reduces the potential for engine component corrosion.

There are a number of types of corrosion that can affect both the engine and gasket performance. Two of the most common forms within an engine are *general corrosion* and *galvanic corrosion*. General corrosion will occur wherever there is metal in contact with both water and air. The form of *Galvanic corrosion* is prevalent in modern engines with aluminium cylinder heads. This occurs when there are two or more dissimilar metals in contact with each other or when immersed in a fluid capable of conducting electric charge. This is a faster process than general corrosion.

Inhibitors can work in two ways, either by removing oxygen (oxygen and water are needed for corrosion to take place) or by promoting passivity. Passivity is the slowing down of the rate at which metal oxides are released into the cooling fluid.

Many coolants also contain ethylene glycol to help prevent freezing and boiling. However, due to the nature of ethylene glycol, care must be taken when adding coolant to newly assembled motors. The ethylene glycol molecule is a lot more flexible than the water molecule. It is therefore more likely to track into any available crevice, such as scratch grooves made when cleaning or machining marks on the cylinder head or block faces. The machined surface of the cylinder head and block in any motor is made up of a series of peaks and troughs. When a traditional head gasket is fitted to this relatively rough surface, it does not generally fill all these troughs. If ethylene glycol is introduced in the coolant at this point, the ethylene glycol can track along the fibers of the gasket material and cylinder head machine marks. Once a path of leakage is created it is generally irreversible.

Fortunately, many new generation ACL head gaskets have a special resin coating that creates a cold seal. This cold seal will fill the crevices immediately during gasket assembly. In instances where grooves are too deep for any coating to reach into the very bottom, the coating is designed to flow into any remaining voids the first time the engine gets hot. In this way a complete and effective seal is achieved. The following practice is recommended by ACL:

1. Fill the cooling system with distilled/demineralised water.
2. Start the engine, carry out standard engine adjustments/checks, test run vehicle and allow the engine to reach normal operating temperature.
3. Stop the engine and allow the engine to cool down, remove the radiator cap safely, drain and add a good quality coolant (including inhibitor) according to the manufacture recommendations.