

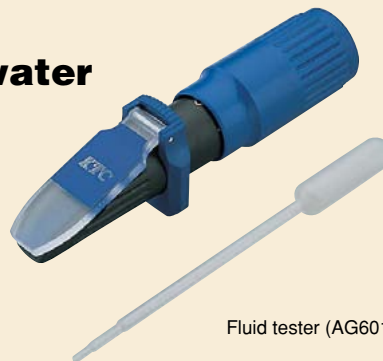
Basic knowledge of tools 4

About the LLC

● The role of the engine radiator and water

The engine is continuously exposed to heating from the combustion of fuel, and will naturally overheat if left in this state. The radiator plays the role of sustaining the optimum temperature by cooling the engine.

Cooling devices are divided into air-cooled and water-cooled types. Most cars commonly use the water-cooling system. The water-cooled type circulates cooled water (coolant) throughout the engine system using a water pump in order to cool the engine. The water that is heated from this process is directed back to the radiator for cooling, and is circulated back to the engine. This process is repeated.



Fluid tester (AG601)

● LLC

Because the liquid used in the radiator is mainly water, freezing will occur in temperatures less than 0°C, and boiling and evaporation will occur in temperatures over 100°C. Both of the above situations will cause engine trouble. LLC is a product that lowers the water freezing point, and raises the boiling point.

Previous coolants were known as anti-freeze, however, improvements have been made to these products giving them a longer useful life. These are now known as LLC (Long Life Coolant). One of the disadvantages of using anti-freeze was that it would have to be replaced after winter whereas the LLC can be used all year around. One of the disadvantages of using LLC is that the radiator can become blocked causing damage to the water pump and cause overheating and then possible engine trouble.

LLC concentration and freezing temperatures standards

| LCC concentration | Freezing temperatures |
|-------------------|-----------------------|
| 30% | -15°C |
| 35% | -20°C |
| 40% | -24°C |
| 45% | -28°C |
| 50% | -36°C |
| 55% | -41°C |
| 60% | -54°C |

● LLC concentration

There is a 30% concentration ratio of LLC in new vehicles. Because the freezing temperature is lowered when the concentration is high, the concentration ratio is increased in cold areas. However, the concentration ratio should not exceed 60%. LLC concentration ratios relating to cold temperatures are shown above. Current temperatures can be tested with the fluid tester (P. 227).

● LLC color

LLC main ingredient, ethylene glycol, is a poisonous product. The coolant is colored to help prevent mistaken use. The coolant is red mainly in Toyotas and green mainly in Nissan vehicles. However, the color does not affect performance. However, avoid using two different colored coolants.

● LLC toxicity

LLC main ingredient is ethylene glycol and is poisonous to humans. Drinking LLC may lead to death. The recently introduced PRTR law is specific to special chemical substances. Care must be taken when handling.

Tool basics

PRTR Law

PRTR (Pollutant Release and Transfer Register): This law deals with waste matter (pollutants) entering the environment and aims to improve the management of the environment. This law has been designed to build a system that carries out strong control of chemical substances and environmental protection. The law was put into practice in 2001, and obligates those who deal in pollutants, which can endanger the health of others, to understand their actions and report to the Government.

● KTC's CO₂ emission cutting proposal

Presently, problems concerning the cutting of CO₂ emissions have been getting much attention. However, KTC believes that CO₂ emissions can be reduced over and above maintenance alone.

This is believed to be the eliminating of idling after LLC is injected when carrying out the air bleeding process. By using the KTC's Coolant Charger (No. AE401), the air bleeding process can be completed without idling after the LLC has been added. This means that if the Coolant Charger was to be utilized in every service center that over 30 million cars (*1) that have their LLC replaced annually when renewing their fitness certificate, would not need to be idling while the process was carried out. In other words, the air bleeding process time for each vehicle is around 30 minutes. This calculates to about 0.4 liters of fuel and in CO₂ emission terms, around 270 g (*2). By this calculation, there is around 8,100t of CO₂ being emitted into the atmosphere every time the renewal process is carried on the vehicles out there today.

*1 The actual figure may be different to what is stated here as the figure of 30 million yearly fitness certificate checks includes light weight, as well as diesel powered vehicles.

*2 This data has been supplied by the Environmental Department