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ACUSTRIP® 5000 Refractometer Specifications & Instructions

Acustrip 5000

Please read all instructions and safety information prior to using product.

Why use a Refractometer?

We all know that competition is fierce in the automotive service field. It seems that everyone has a repair shop, and there are many freelance repair services available, not to mention the large number of DIY'ers.

As a result equipment suppliers must provide equipment that will perform exceptionally well, at a reasonable cost, with widely available distribution.

In the battle for the engine coolant/antifreeze concentration and freeze point level testers today the hydrometer accounts for approximately 75% of all units sold. Refractometers and test strips account for the rest. When service personnel are asked if they feel that their engine coolant tester is performing adequately over 95% feel satisfied. Amazingly 35% feel extremely satisfied! The significance of this is that 75% of the service providers feel that their instruments need to be accurate to within 5% F. Less than one tenth of those surveyed felt that an accuracy of +/- 10% or worse was even acceptable.



The curious fact about this is that even a high precision, expensive laboratory hydrometer used by a trained laboratory technician, in a controlled environment, using a calibrated and clean hydrometer, using fluids mathematically corrected for fluid temperature, can not obtain this level of accuracy. According to ASTM Method D1124, the best accuracy that is achievable with a hydrometer under these precise conditions is +/- 8%. How can we reconcile this fact with the overwhelming feeling of satisfaction that service providers have regarding their hydrometers. Simply stated they do not realize how inaccurate the hydrometers really are.

Facts

Hydrometers measure specific gravity. Specific gravity is extremely temperature dependent. The same sample which is read at 150° F will read as having a 30° F better freeze point protection level than if it is read a temperature of 100° F. Temperature effects can be calculated.

Hydrometers only work for the ethylene glycol based antifreeze coolant. Propylene glycol cannot be read with a hydrometer due to the fact that up to 70% concentration specific gravity increases, but above 70% specific gravity decrease. A 100% solution reads identical to a 40% solution.

Sampling techniques is critical to hydrometer use. Air bubbles in the sample will cause inaccurate readings. The float must be kept free from the wall of the hydrometer.

Test Strips and Refractometers can measure both Ethylene and Propylene based coolant/antifreeze mixtures very accurately. According to ASTM Method 3321 Standard Practice for the Use of Determining the Freezing point of Aqueous Engine coolants, the Duo-Chek refractometer is accurate to a level of +/- 1%.

The accuracy of the test strips, are +/- one color block. Both are determined in field testing to be more accurate and reliable than the typical hydrometer.

The difference between using a refractometer versus using a test strip is the desired result.

A refractometer will measure the freeze point/concentration very accurately, but not the concentration of the additives in the antifreeze/coolant. The test strip will measure the freeze point/concentration within the required accuracy level as well as determine the level of protection provided by the corrosion protection additives.

Why Measure?

Increasing the concentration to roughly 60% improves the freeze point protection level. Above 70% freeze point protection becomes progressively worse.

Cavitation corrosion, water pump failure, scale formation, gelation, inefficient heat transfer, boil over, freezing and cracking of hoses and engine block, solder bloom are all problems defined by the SAE for over concentration and under concentration of engine coolant/antifreeze.

Emissions control is impossible without the proper concentration. Catalytic converters are fickle at best.

Over 26% of all repair costs can be directly attributed to Coolant System Maintenance issues.

The bottom line is the cost of not measuring properly is in the maintenance costs and poorer performance of the vehicles.



SAFETY WARNING: REMOVAL OF RADIATOR CAP IS DANGEROUS

Radiators are under pressure. Hot coolant under pressure can cause severe burns. Do not remove the radiator cap on a hot engine. Wait until the temperature is below 50° Celsius (120° Fahrenheit) before removing the cap. Failure to wait may result in personal injury from hot coolant spray or steam. Remove cap slowly to relieve all pressure.

Dispose of your used antifreeze coolant in accordance with local regulations.