

New Chemical to Prevent Auto Freezing

What to place in auto radiators to keep them from freezing is the problem that auto owners must now consider. Freezing nights will soon be here.

Shall it be alcohol, glycerine, glycol, chlorides or some other suggested chemical? Careful studies of the advantages and disadvantages of the anti-freeze solutions suggested have been made by experts.

The two common alcohols, denatured ethyl alcohol, and poisonous wood alcohol or methanol, are the most easily available and cheapest anti-freeze agents.

Denatured ethyl alcohol is used to the extent of some 40 million gallons a year as an anti-freeze. Its principal disadvantage is that it evaporates and is lost, causing the radiator to need constant refilling. Its cheapness makes up for this waste.

There is one important disadvantage common to both alcohols. When cars are finished with Duco or some other cellulose lacquer, alcohol must be used with great care or not at all as the spilling of even a small amount of alcohol radiator solution will dissolve and ruin the finish.

Denatured alcohol is usually preferable to wood alcohol in spite of the fact that 10 per cent. less wood alcohol is required for protection against freezing at any given temperature. Wood alcohol has poisonous fumes and it sometimes contains free acids which will damage the radiator.

Glycerine is a favorite anti-freeze especially with those who have lacquered cars. Glycerine is more expensive than alcohol but it does not

evaporate very readily and one filling of the radiator should last a whole season if the radiator is free from leaks. Either the colorless chemically pure glycerine or the yellow distilled commercial grade can be used with safety but the crude product is dangerous because it usually contains salts that corrode the radiator.

When placing either alcohol or glycerine in the radiator do not fill it above two inches from the top of the overflow pipe since the solution will expand when the radiator warms up.

Mixtures of alcohol and glycerine are often used as a compromise between the cost of glycerine and the volatility of alcohol.

A relatively new anti-freeze compound that is beginning to be available in sufficient quantity is the chemical, ethylene glycol, made synthetically from petroleum. It has advantages of both alcohol and glycerine and costs about as much as glycerine. It does not affect lacquer finishes, flows easily, does not evaporate and lowers the freezing point of the solution more effectively than alcohol. It is considered by some chemists to be an ideal anti-freeze compound.

Calcium and magnesium chlorides have been widely sold under trade names as anti-freeze compounds. Their serious disadvantage is that they corrode and cause serious damage to the engine jacket and radiator, particularly aluminum and solder. A soluble chromate added to them tends to prevent this corrosive effect except upon aluminum and this chemical is contained in some of the salt mixtures on sale.

Sugar, honey, and glucose are condemned on the grounds that they do not lower the freezing point sufficiently and are too viscous. Lubricating oil is also ineffective as a radiator solution because of its low heat capacity and high viscosity, while kerosene is dangerous due to inflammability, danger of overheating, and its solvent action on rubber.

Science News-Letter, October 29, 1927

PHYSIOLOGY

Yeast Is Vitamin Source

Yeast is the best source of the concentrated vitamin B extract used by Dr. Barnett Sure of the University of Arkansas in his experiments on the prevention and cure of beriberi in young rats, as described in a recent issue of the SCIENCE NEWS-LETTER (October 1). Dr. Sure states that his most marked results have been obtained since he ceased using wheat germs and adopted yeast as his raw material.

A point of much importance in the development of dietetics for the young is stressed by the Arkansas physiologist. "While babies need cod liver oil, orange juice or tomato juice," he says, "they also need something which has heretofore been unappreciated by pediatricians, and that is large amounts of vitamin B."

In the previous item Dr. Sure was referred to as dean of the agricultural college at the University of Arkansas, whereas he occupies the position of professor or agricultural chemistry.

Science News-Letter, October 29, 1927

HOME ECONOMICS

Fingerprints of Muffins

Suppose you had to record the life histories of hundreds of muffins baked in a long series of experiments to find out how the very best muffins are made—how would you contrive to keep the identity of those good muffins, and not-so-good muffins, and extra-good muffins, and really impossible muffins straightened out?

Miss Mary Little, a teacher of Tuscaloosa who has been studying muffins in order to win her Master of Arts degree, solved the problem by fingerprinting a cross section of each muffin in her laboratory. The prints were taken with mimeograph ink, very much as fingerprints of criminals are made at police headquarters. No two muffins have the same fingerprints, Miss Little has found.

Science News-Letter, October 29, 1927

LIST GIVES RIGHT PROPORTIONS

Following table, based on U. S. Bureau of Standards tests, gives proper amounts of various safe anti-freeze chemicals that should be added to radiator water.

Percentage, by volume, in water

Freezing Temperature, Fahrenheit	Denatured Alcohol	Wood Alcohol	Distilled Glycerine	Ethylene Glycol
20°	19%	12%	22%	16%
10°	30%	20%	32%	25%
0°	38%	29%	40%	32%
-10°	45%	34%	47%	39%
-20°	52%	40%	54%	44%

Example: If denatured alcohol is used, minimum temperature is 20 degrees and the radiator holds 3½ gallons, the radiator solution must contain 19% alcohol, that is, about one-fifth of it by volume. Proper solution can be made by adding one-fifth of 3½ gallons, a little more than 5½ pints, of alcohol to 11 quarts of water.