MOTOR VEHICLES

Anti-freeze Mixtures for Radiators

Now that the temperature is likely to drop below the freezing point, automobile radiators must be protected by filling them with some solution that stays liquid when water has changed to ice.

What should be used? is a question that science can more easily answer this year than heretofore.

Denatured alcohol, or its poisonous brother, methanol (wood alcohol), will continue to be the usual and most common anti-freeze agent this year. Alcohol is cheap, effective and easily obtainable, but it has the disadvantage of evaporating and needing frequent replenishing.

Glycerine will also be a favorite. For all who drive cars painted with Duco or other cellulose lacquers, glycerine is practically a necessity for alcohol dissolves this new sort of finish and even a small amount of alcohol radiator solution spilled on the paint is likely to ruin it. Glycerine is more expensive than alcohol but it does not evaporate very readily and one filling of the radiator should last a whole winter 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.

Denatured alcohol is 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 often contains free acids which will damage the radiator and its fumes due to its poisonous character may be harmful.

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

A little-known chemical, ethylene glycol, which like alcohol and glycerine is one of the chemical group of alcohols, is being heralded in chemical circles as an almost ideal radiator anti-freeze material. Except in northern cities, it is not yet available in the open market because the demand is large and the supply is small. This chemical is used in the manufacture of Duco and other lacquer automobile finishes and the available supply is largely utilized in this way. Glycol does not evaporate readily, it lowers the freezing point more effectively than alcohol, and it is non-corrosive. Its cost is about that of glycerine and when it is available in sufficient quantity it should be widely used.

Many other radiator solutions have been widely exploited and tested but all of them are objectionable for some reason.

Salts, like calcium chloride, magnesium chloride, common salt, etc.—All solutions of salts are corrosive and practically sure to cause serious damage to engine jacket or radiator. They are particularly harmful to aluminum and solder. Calcium chloride solutions are often troublesome if they come in contact with spark plugs and electrical connections as they cause short circuits. Both calcium and magnesuim chloride solutions have been widely sold under trade names.

Sugars, such as honey, invert sugar and glucose.—Although honey has been recommended as an anti-freeze agent, tests at the U. S. Bureau of Standards show that low percentage mixtures do not have sufficiently low freezing points and that high percentage mixtures are so viscous that they circulate very slowly, if at all. Invert sugar acts about like honey and glucose is of even less effect than honey.

Oil—Lubricating oil is used in some cooling systems on tractors. It is not suitable for use in ordinary automobiles for oil cooling systems must be especially designed to give more rapid circulation to compensate for the low heat capacity and the high viscosity of oil.

Kerosene—Kerosene can be used in automobile cooling systems provided with mechanical circulation but the odor and inflammability of its vapor, the possibility of overheating due to high boiling point, and its solvent action on rubber are objections to its use.

Right Proportions to Use

The list below, based upon Bureau of Standards tests, gives the proper amounts of the various safe anti-freeze chemicals that should be placed in radiator water to protect at the temperatures indicated.

Freezing Temperature F.	Percentage, by Volume, in Water			
	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 per cent 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.

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MEDICINE

Rheumatism a Disease

Rheumatism is a distinct and well defined disease, though not responsible for all the aches and pains attributed to it, according to Dr. W. G. MacCallum of the department of pathology of the Johns Hopkins University.

By the great mass of people any pain or swelling in the joints or muscles is called rheumatism. Many believe that rheumatism is not a disease at all but merely the common name for certain symptoms which may arise from many different causes.

Arthritis, an infection of the joints causing pains and swelling, sometimes destroying parts of the joints and causing bony deformations, is a symptom of various diseases: scarlet fever, pneumonia, tuberculosis, cerebrospinal meningitis, dysentery, septicemia, etc., and is to be distinguished from rheumatism.

For many years, said Dr. MacCallum, it has been recognized that there is one condition in which painful swelling of the joints is variously combined with tonsilitis chorea, fever, subcutaneous nodules, and especially with profound disease of the heart, than stands apart from all the rest and is most commonly known as acute rheumatic fever or rheumatism.

The most serious danger of rheumatism lies in its attack upon the heart. The whole heart is involved. But certain parts seem to be especially affected. The tissues are altered. The walls thicken and the valves become distorted.

The peculiar thickening of the wall of the left auricle characteristic of many cases of rheumatism was first observed by Dr. MacCallum.

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The horned toad is really a lizard.