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METHOD FOR THE DETECTION OF METHYL CHLORIDE.

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This invention relates to a method for the detection of methyl chloride as applied to refrigeration, particularly to the detection of leaks in a refrigerating system which employs a refrigerant whose essential ingredient is methyl chloride.

An object of this invention is to provide a rapid, sensitive and dependable test.

In order to accomplish the result, according to this invention, many experiments have been made and it has been found that methyl nitrite added to the refrigerant fulfills the following exacting conditions:

1. It is non-corrosive when used in small quantities, especially in a water-free refrigerating system.

2. It is so sensitive to the action of certain reagents that it can be added to the refrigerant in quantities so small that it will not affect the operation of the refrigerant but will be sufficiently large to give a sensitive test.

3. Its liquefying temperature is such that it is evenly distributed throughout all the phases of the refrigerant.

A prime object of this invention is to provide a method for the detection of methyl chloride as applied to refrigeration for the reason that methyl chloride, because of its high efficiency as a refrigerant. is much desired for this purpose, its only disadvantage being its general inactivity which is characteristic of the alkyl halides. Due to this inactivity, locating leaks in a refrigerating system has been a tedious and uncertain process. It is to remedy this condition that the following test has been developed.

In operation, this invention provides a method for detecting leaks in a refrigerating system which employs a refrigerant whose essential ingredient is methyl chloride. The present common method of detecting leaks in such systems is by the application of light oil or a soap solution to the suspected joint or pipe and the observation of bubbles formed by the escaping gas. This method is slow, difficult to apply, and has the greater disadvantage that it is not capable of detecting small quantities of escaping gas.

In the practice of this invention, the process or method is as follows:

Add to the methyl chloride $\frac{1}{10}$ of one per cent of methyl nitrite. However, it is not desired to confine this invention to a definite proportion as herewith set forth since more or less may be used with no effect other than changing the speed and sensitivity of the test. The joint or pipe is then examined by placing a strip of absorbent paper moistened with a freshly prepared solution made by mixing equal parts of the following stock solutions:

A. A solution made by dissolving 8 grams of sulfanilic acid to 1000 c. c. of 5 normal acetic acid.

B. A solution made by dissolving 5 grams of alpha-naphthylamine in 1000 c. c. of 5 normal acetic acid.

Since the methyl chloride and methyl nitrite are at all times completely mixed, the formation of the characteristic pink color on the paper, which is a test for nitrite, must also show the presence of methyl chloride.

In making the experiments leading up to this discovery and invention, a well equipped chemical laboratory was used, and very careful tests made, consisting primarily of the following:

Data.

Methyl chloride CH_3Cl—colorless gas, sp. g. .920 M. P.—91.5° C. b. p.—23.7° C.—generally inactive, non-poisonous.

Methyl nitrite—CH_3NO_2—gas—sp. g. .991 b. p.—13° C.—yields free nitrous acid in the presence of certain reagents, non-poisonous.

Basis for test.

A variable portion of methyl nitrite is injected into the system. The quantity of CH_3NO_2 may vary between wide limits but may be used in quantities as small as .1% of the volume of methyl chloride used.

At any point in the system, the release of CH_3Cl will be accompanied by a proportional release of CH_3NO_2 because there is a homogeneous mixture of the two compounds throughout the cycle. It follows, then, that the escape of CH_3Cl can be detected by detecting CH_3NO_2.

The detection of CH_3NO_2 is made as follows:

A solution of sulphanilic acid and one of alpha-naphthylamine acetate are required for the detection of CH_3NO_2. These solutions should be kept in separate stock bottles and mixed in equal proportions each day on which testing is to be done. Test paper should be

absolutely pure and of chemical filter paper grade, preferably made into rolls about one inch (1") wide. A short piece of the paper is wetted with the mixed solutions and wrapped once around the joint. Wetting the paper does not materially affect its color, but the slightest trace of CH_3NO_2 produces a distinct red.

What we claim is—

1. A method for the detection of methyl chloride in refrigerating systems using a refrigerant, comprising the addition of methyl nitrite to the refrigerant and the detection of the methyl nitrite through the use of one of its characteristic reactions consisting of the reaction with alpha-naphthylamine acetate and sulfanilic acid.

2. A method for the detection of leaks in refrigerating systems which employ a refrigerant whose essential ingredients is methyl chloride comprising the addition of approximately two-tenths of one per cent of methyl nitrite to the refrigerant, then testing the location of the leak by placing a strip of absorbent paper thereon, the paper being moistened with a liquid consisting of equal parts of a solution comprising 8 grams of sulfanilic acid dissolved in 1000 c. c. of 5 normal acetic acid, and a solution comprising 5 grams of alpha-naphthylamine dissolved in 1000 c. c. of 5 normal acetic acid.

3. A method for the detection of leaks in refrigerating systems employing a refrigerant whose essential ingredient is methyl chloride, comprising the injection into the system of a variable portion of methyl nitrite, CH_3NO_2, which may be used in quantities as small as .1% of the volume of methyl chloride used, the system is then examined for leaks by placing a strip of absorbent paper moistened with a suitably prepared solution over the portion of the system being tested.

4. A method for detecting leakage in systems containing methyl chloride comprising adding methyl nitrite to the methyl chloride and detecting the presence of methyl nitrite at the point of leakage from the system by means of its reaction with a mixture of a suitable salt of alpha-naphthylamine and sulphanilic acid.

5. A method for detecting leakage from a system containing methyl chloride to which has been added methyl nitrite which comprises determining the prescene of the methyl nitrite at the point of leakage bv means of a characteristic color reaction.

In testimony whereof we affix our signatures.

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