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FOAMITE CORROSION INHIBITOR

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It is common practice to generate a fire-extinguishing foam by mixing together solutions of aluminum sulfate and sodium hydrogen carbonate and it is also common practice to prepare these two solutions in advance and to store them in large quantities for mixing and the production of foams in case of fire. It often occurs that these solutions remain unused for a long time and as the aluminum sulfate solution is extremely corrosive to iron, it is common practice to line the tanks in which it is stored in sheet lead, at a very heavy expense, and with not entirely satisfactory results. The tanks themselves may be lead lined but the valves may not and consequently require replacement at short intervals, while even if an acid-proof valve be used, it has been found a matter of some difficulty to make a tight joint between the valve and the lead lining.

I have discovered that the corrosive action of aluminum sulfate or alum on iron is cumulative, increasing rapidly as the iron content of the alum solution increases. I have further discovered that if the aluminum salt from which the solution is made is substantially free from iron, a very small amount of certain reducing agents will substantially inhibit the corrosion of iron by these solutions; so that it is entirely feasible and practical to store the acid foam solution in iron tanks without the use of lead linings.

The necessary qualification of the inhibiting agent appears to be a reducing action for iron compounds and I have obtained satisfactory results with ethyl and other alcohols, glycerine, sugars, aldehydes, and ketones. Particularly successful results were obtained by the use of black-strap molasses, of which as little as one per cent produces a marked decrease in the rate of corrosion of iron and steel. Where ten per cent of molasses was used, a test strip placed in a standard "A" foam solution lost only .005 gram per square centimeter in sixty days, at the end of which time the strip was bright and not visibly corroded. In the same length of time a similar strip placed in the standard "A" solution without the molasses was completely disintegrated. A standard "A" solution is the acid component of the commonly used fire foam systems, and is an aqueous solution containing 7.1% aluminum sulfate, $Al_2(SO_4)_3$.

The use of molasses for this purpose is also desirable for another reason. It is well known that the foam produced by mixing alum or aluminum sulfate solutions with sodium-bicarbonate solutions is highly unstable unless a so-called stabilizing agent is added. For this purpose various glues are used, or still commonly, a thick root or bark extract such as licorice root. It is customary to dissolve this stabilizing agent in the sodium-bicarbonate or so-called "B" solution.

I have found that it is possible and desirable to use crude molasses as the stabilizing agent and to add the molasses to the "A" or acid solution instead of to the "B" solution as is the common practice. About ten per cent of the volume of the solution is required and this addition gives a very stable foam and completely prevents corrosion of an unlined iron tank. As there is some tendency for this molasses solution to mold when stored for long periods, it is desirable to add a very small proportion of some anti-ferment material, as, for instance, one-tenth to two-tenths of one per cent of formaldehyde, sodium benzoate or salicylic acid. A solution so prepared is most noncorrosive and permanent.

I claim as my invention:

1. An acid foam solution comprising an aqueous solution of aluminum sulfate or alum, and from 1% to 10% by volume of molasses to prevent the corrosion of an iron container by said aqueous solution.

2. An acid foam solution comprising an aqueous solution of aluminum sulfate or alum, from 1% to 10% by volume of molasses to prevent corrosion and act as a stabilizer, and an anti-ferment to prevent molding of said molasses.

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