



CERAMIC TILE INSTITUTE OF AMERICA, INC.

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CTIOA Field Report 83-3-1 (R-85)

SUBJECT: ACIDS AND ACID CLEANING - FRIEND OR FOE

A. INTRODUCTION

1. "Experience is a wonderful thing. It enables you to recognize a mistake when you make it again." That is meant to be a joke, of course, but with some things, you may make the same mistake and get by with it.. But, when you are going to acid clean tile, you had better be right the first time.
2. Conversations with a number of ceramic tile trade people indicates a need for more comprehensive information than a simple outline of what to do to acid clean. Also needed is information on the various acids available for cleaning ceramic tile. This article, hopefully, will supply some of that information.

B. DISCUSSION

1. TYPES OF ACID:

The sales people working for one large manufacturing firm have one item they recommend for cleaning - vinegar. They may or may not know it contains acid. When they advocate the use of vinegar they give no warning that good acid cleaning techniques, like saturating the tile and grout with clean water prior to acid cleaning, should be followed.

2. ACETIC ACID:

Vinegar may be considered harmless. We use it as a salad dressing, but read the label. The Heinz label I am looking at says "made from select sun-ripened grain, diluted with water to a uniform pickling and table strength of 5% (50 Grains) acid". Clean with vinegar and you are acid cleaning. Wine vinegar also says on the label, "Diluted with water to 5% acidity".

3. MURIATIC ACID:

- a. Why use it? Don't use it! For years muriatic acid was used for acid cleaning unglazed tiles. In those same years, the damage to the construction industry, and injuries to persons using muriatic acid, is unbelievably extensive.
- b. Direct contact to a person's skin or eyes with muriatic acid is, of course, going to result in acid burns, but additional damage is caused by the fumes. The fumes are harmful when inhaled and will carry considerable distances to corrode all kinds of metals and decorative surfaces. With other acids available it is not necessary to use muriatic acid for cleaning unglazed ceramic mosaic and unglazed quarry tile surfaces.

4. SULFAMIC ACID:

Sulfamic acid has become a recommended acid for cleaning unglazed tile. This acid comes in a crystal form and is made into an acid by adding water. Usual proportions are one pound of crystals to five gallons of clean, cool water. An acid pail is needed as it is for all acids. Unlike muriatic acid, which demands exact measurements to obtain a desired concentration, mixing sulfamic acid is much more simple and does not give off noxious fumes. The cool water will only dissolve the crystals to a certain acid concentration level, and excessive undissolved crystals will sink to the bottom of the container. The only way the acid concentration can be increased is by using hot water and this is not recommended.

5. PHOSPHORIC ACID:

Phosphoric acid reacts in somewhat the same manner as sulfamic acid, in that it does not give off noxious and damaging fumes. Phosphoric acid is used in factory manufactured and packaged liquid cleaners as is sulfamic acid.

6. ACIDS AND GLAZED TILE

- a. Tile Industry literature for years, has said no acid cleaning and this is still basically true. But, with the proliferation of the use of glazed tile in recent years, we are forced to hedge a little on the warning about the use of acid on glazed tile. When tile is used on floors and counter tops, where food is prepared and consumed, the tile used must be capable of withstanding citric and acetic acid. This can be done just as acid resistant enamel sinks can be made to withstand fruit and vegetable acids.
- b. With the extensive use of glazed ceramic tile in residential kitchens on the West Coast, this problem has come forcefully to the attention of the West Coast tile trade. About 850 of the kitchen counters installed in residential units on the West Coast are some kind of glazed ceramic tile and many of the kitchen floors have glazed ceramic tile. The glazed tile used on these surfaces, must be able to resist having etching spots from vinegar and citric acid contact. There are more scientific ways used to acid test tile in the testing laboratories, but a simple do-it-yourself test is to squeeze a spot or two of lemon juice, about the size of a silver dollar, on an uninstalled glazed tile, let it set over night, then rinse and observe. If there are lighter spots or stains on the tile which cannot be cleaned off, the tile is not acid resistant.
- c. While glazed tile, promoted for counter top and kitchen floors, are expected to

resist etching by vinegar and citric acids, they are not expected to resist stronger acids. Muriatic acid and bottled acids, containing sulfamic and phosphoric acids, should not be used on glazed tile.

7. ACIDS AND UNGLAZED TILE:

Acid cleaning of unglazed tile is not always necessary and a few years back, some tile industry persons tried to place a limitation into our Technical Literature that acid cleaning should never be allowed. It is agreed, an effort should be made to keep the tile so clean that acid cleaning is not needed. However, under certain conditions there will be a light haze of grout that needs to be cleaned off with acid.

8. PROTECTION PRIOR TO ACID CLEANING OF CERAMIC TILE SURFACES:

Acid will only remove a light film of grout or portland cement and must be protected against other construction materials.

- a. Acid will not remove a heavy film of grout or portland cement.
- b. Acid will not remove thick pieces of the bond coat or grout.

- c. Since oil and grease are used to protect metal against acid burns, oil and grease spots cannot be removed with acid.
- d. Acid will not remove paint
- e. Many stains will adhere more tightly to the tile after being subjected to an acid bath.

9. ACID CLEANING:

After a decision has been made to acid clean, a series of exacting procedures are needed.

- a. It is essential that acid cleaning be done by Tile Finishers, experienced in acid cleaning. It should never be left to clean-up crews to do.
- b. A curing time of 14 days is required after the installation is installed and grouted, prior to acid cleaning. A newly installed floor should never be acid cleaned. When acid comes in contact with uncured portland cement, the acid burns into the green cement. The result of this acid burn is a white film over the grout joint which is virtually impossible to remove.

- c. Acid cleaning requires proper and adequate equipment to mix, apply, brush and rinse the acid off the tile installation. This means acid pails, brooms, mops, brushes, hoses, etc.

- d. Dust and dirt are to be swept off of the floor in advance of wetting the floor.

10. Wetting is one of the first things to be done.

The water can be soaking in while other preparations are being made. Wetting is one of the most important steps in acid cleaning as an unwet joint will absorb the acid solution and be weakened. When acid is put in contact with dry portland cement grout, the same type of acid burn, as described above, occurs. The resulting white film will form and this white film is insoluble and impossible to remove.

Mix small amounts of the acid solution and keep it clean. Replace the acid solution with fresh batches as needed. Do not dip dirty cleaning equipment in the acid solution. Precipitate means to make a slightly soluble substance (the thin film of grout on the tile) to become insoluble. When these precipitated acid salts are allowed to get into the acid cleaning solution, and are then mopped onto the tile surface, they stick tightly to the tile and are now insoluble and very difficult, if not impossible to remove.

The clean acid solution is placed on the surface and scrubbed with a stiff brush until the cement film is softened and removed.

When rinsing, the surface is to be scrubbed with a stiff brush followed by continuous scrubbing and rinsings with clean water. It is important to rinse quickly as soon as the cement scum is dissolved to prevent the acid salts from combining with the remaining scum on the surface of the tile, making it difficult to remove.

Sulfamic acid does not fume as much as muriatic acid. However, acid cleaning should be done prior to the time chrome fixtures are installed. If the chrome is on, it should be protected with a coating of vaseline.

Only one acid cleaning should be made on an installation, repeated cleanings are harmful and usually unsuccessful.

C. CONCLUSIONS

1. Specifications are written with the requirement that the finished tile installation be clean and free from grout and mortar and polished clean.
2. The tile contractor should not consider the tile installation finished until it is in the proper condition to maintain with ordinary cleaning procedures.
3. If the above outlined procedures for acid cleaning are followed, the tile contractor will have clean installations to turn over to the owner.