Ceramic tile, porcelain and concrete surfaces are rendered slipproof by treatment with an etching preparation applied in such a manner as to roughen the surface without changing its outward appearance.

4 Claims, No Drawings
SYSTEM FOR ETCHING CERAMIC SURFACES AND THE LIKE

BACKGROUND OF THE INVENTION

As is well known, many of the accidents occurring in hotels, homes, places of business, hospitals, around swimming pools, and the like, result from slipping on wet surfaces of ceramic tile, glazed porcelain and smooth concrete.

Numerous expedients have heretofore been devised to increase the coefficient of friction on such surfaces, including strips of material having an adhesive on the bottom side and a layer of roughened material on the exposed upper side. Such roughening strips serve moderately well, although they sometimes come loose, particularly if the subjacent surface was not properly prepared at the time of installation of the strips; and, of course, the appearance of the surface covered by the strips is considerably altered.

SUMMARY OF THE INVENTION

The invention relates to an improved system for roughening the surface of ceramic tile, and the like, without altering its appearance to to any significant extent.

It is an object of the invention to provide a system for treating the smooth surface of ceramic tile, porcelain, concrete and the like so that even when the surface is wet, accidental slippage is, for all practical purposes, substantially eliminated.

It is another object of the invention to provide an etching system which is entirely free from objectionable discoloration or any outward appearance that the surface friction has been beneficially altered in any way.

It is a further object of the invention to provide an etching system in which one application will last for a period of several years before a further application is necessary.

It is still a further object of the invention to provide an etching preparation which is not only economical to prepare and apply, but which is also safe to work with if the rules for its proper handling are adhered to.

It is yet another object of the invention to provide a system for applying an etching preparation to the surface of ceramic tile and the like which is both convenient and quick, and which can be applied either at the factory or at any subsequent time, either before or after plumbing fixtures have been installed.

It is an additional object of the invention to provide a system for roughening the supporting smooth surfaces of tubs, showers, kitchen floors, swimming pool decks, walkways, and the like, which affords greater safety to users and eventually reduced insurance rates.

It is another object of the invention to provide a generally improved system for etching ceramic surfaces and the like.

Other objects, together with the foregoing, are attained in the system described in the following description.

DETAILED DESCRIPTION OF A PREFERRED FORM OF THE INVENTION

Application of the etching preparation is preceded by a thorough cleaning and drying of the concrete, ceramic, porcelain or porcelain-like surface to be treated.

It is to be noted, at this juncture, that the etching preparation of the invention is not suitable for vinyls, "plastics" or fiberglass.

Cleaning of the surface to be treated can be effected by any suitable means, such as a detergent.

After thorough cleaning and drying of the surface to be roughened, the etching compound is applied as an aqueous solution, the solution comprising distilled water, hydrofluoric acid, ethylene oxide and nonylphenol.

The concentration of the hydrofluoric acid (as well as the other active ingredients of the treating agent) and the relative proportions of the active ingredients, can be varied. For example, with a 60 percent hydrofluoric acid concentration, the amounts of the combined ethylene oxide and nonylphenol can be varied as follows:

In ten gallons of distilled water containing not less than 26.03 ounces and not more than 64.03 ounces of 60 percent hydrofluoric acid, the amount of ethylene oxide and nonylphenol can be varied between 0.50 ounces and 2.00 ounces, in the proportion of 65 percent 9 mol ethylene oxide and 35 percent nonylphenol.

In other terms, the amounts can be varied within the following approximate ranges:

a. Hydrofluoric acid — 2 to 5 percent of 60 percent hydrofluoric acid
b. Ethylene oxide and nonylphenol in the proportion of 65 percent ethylene oxide and 35 percent nonylphenol in the proportions not to exceed 1/200th of 1 percent to 920th of 1 percent based on a thousand mean.

The foregoing solution is applied to the previously cleaned and dried surface of ceramic tile, or the like, and worked in for at least 4 minutes, as by a rough sponge, or brush. If applied by hand, the hands should be protected, as by rubber or "plastic" gloves. This contact effects a slight etching of the surface but without harming, discoloring or otherwise adversely effecting the external, over-all appearance of the treated surface.

At the conclusion of the etching operation, the surface is flushed thoroughly with clear water, followed by the step of applying a neutralizing agent, such as trisodium phosphate, using 2.00 to 3.40 pounds of trisodium phosphate to ten gallons of water. In other terms, the trisodium phosphate can be in the proportion of 2 1/2 — 4 percent in an aqueous solution. After working in the neutralizing agent and allowing it to stand for about two minutes, thorough rinsing with clear water is effected, followed by drying.

After drying, the treated surface is slip proof and ready for use.

It can therefore be seen that I have devised a system for etching a surface of ceramic tile or the like which is economical, quick and safe, yet is effective to render the surface slip proof without deleteriously affecting the appearance of the surface so treated.

What is claimed is:

1. A system of etching ceramic surfaces and the like including the method characterized by the application to the treated surface of an aqueous solution of hydrofluoric acid, ethylene oxide and nonylphenol, continuing the contact on the treated surface for a period of
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3. A system as in claim 2 in which the neutralizing agent is trisodium phosphate in the proportion of 2 1/2 to 4 percent in an aqueous solution.

4. A system as in claim 1 in which the hydrofluoric acid, ethylene oxide and nonylphenol are present in approximately the following amounts:
   a. Hydrofluoric acid—2 to 5 percent hydrofluoric acid; and,
   b. Ethylene oxide in the proportion of 65 percent ethylene oxide and 35 percent nonylphenol in the proportions not to exceed 1/240 of 1 percent to 920th of 1 percent based on a thousand mean.

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