

COMPREHENSIVE CUSTODIAL TRAINING MANUAL

CHAPTER 2
HARD FLOOR CARE: CERAMIC, PORCELAIN AND
CLAY TILE FLOORS



Lesson 26

Floor Care for Ceramic Flooring

By Wm R. Griffin

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**A Training, Reference
and Certification Manual
for Cleaning Professionals**

Comprehensive Custodial Training Manual

Lesson 26

Floor Care for Ceramic Flooring

An excerpt from 380 page hard floor care manual

By Wm R. Griffin

Editorial Assitance by
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Floor Care for Ceramic Flooring

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THE CERAMIC FLOOR CARE PROGRAM

UNDERSTANDING CERAMIC FLOOR CARE

CERAMIC TILE FLOOR CARE

Most ceramic and clay tiles make great wall and floor coverings because when properly installed and sealed, they are basically impervious to moisture, soil and most stains. Occasionally tiles are improperly specified or poorly installed which makes proper maintenance more difficult and expensive.

Determining the required service level is important to assess and classify. The cleaning categories will fall into one of four processes.

- Initial Floor Care
(deep clean-up of newly installed floors) or the first time cleaning for a new account to get the floor into shape.
- Daily/Routine Floor Care
(normally a dust mop and damp mop)
- Periodic Floor Care
(normally a heavy-duty scrub operation).
- Restorative Floor Care
(deep strip or heavy-duty alkaline or acid treatment).

In most cases, cleaning challenges with clay tile floors relates to the grout between the tiles, which are often rough, porous and below the level of the tile floor itself. The grout becomes a catchall for soil, grease and oils and accumulation of build-up. Add heavy soil loads, dirty equipment and solution, irregular service frequencies, and several coats of topical sealer and finish, and you have a floor that not only looks bad, but is difficult, time consuming and expensive to clean.

As with other floor coverings, prevention is the best approach. Use clean equipment and solution and employ regular daily and scheduled periodic maintenance as they play a key role in organizing an effective and efficient cleaning program.

Recommend that the customer install door mats to reduce tracking and spreading of fine grit. Regular dust mop and damp mopping is also important to reduce scratching of any hard surface floor. Abrasive foot traffic can even begin to wear off the top surface and or color of the tile. There could even be unique conditions where a topical sealer may need to be applied to ceramic tile in a high traffic area to prevent premature wear.

Inspect the floor for damage prior to cleaning. Floors with damaged grout, cracked, loose or missing tiles should be repaired prior to wet cleaning. If this is not possible, limit the use of moisture, cover or tape over damaged areas with plastic and use caution when cleaning to prevent moisture penetration and further damage.

Professional contractors have a saying they go by: Every defect found prior to the job can be an asset (you charge extra to perform repairs). Every defect found after the job is finished becomes a liability (why didn't you notice it before starting). It is better to educate the customer before doing the work instead of offering excuses after the job is finished.

DAILY/ROUTINE FLOOR CARE

Dust mop using an untreated or microfiber head, or sweep or vacuum the tile. A vacuum is especially helpful to remove dust along the edges or between tiles. Make sure the vacuum does not contain a beater bar that could damage the tile. Spot damp mop or wet mop the floor as required with an approved degreaser, disinfectant or neutral detergent. Do not use high acidic cleaners which could attack the tile or grout. When service is to be performed in large areas, consider using an automatic scrubbing machine, rotary floor machine or a cylindrical brush machine.

Use a synthetic detergent that is neutral on the pH scale or other stronger cleaning chemical if soil is heavy or of a specific type that does not respond to cleaning with the neutral detergent. You may want to increase concentration or water temperature, or add more aggressive agitation if needed, prior to trying a harsher product.

Strong acids and harsh alkaline detergents can damage, dull or etch ceramic tile and grout, and should not be used for regular daily maintenance. Do not use steel wool pads to clean tile surfaces as steel fragments left on the floor may rust and stain the tile or grout. Damaged grout can become discolored, chipped and brittle resulting in loose or detached tiles as well as possible damage to the underlayment and sub-flooring.

Note: Providing regular daily maintenance is critical when it comes to avoiding or extending the time between the use of more expensive periodic and restorative procedures.

PERIODIC FLOOR CARE

Dust mop, sweep, or vacuum all areas to be serviced. Move all portable items for access to as much floor surface as possible. Flood mop floor surface with appropriate

degreaser, disinfectant or neutral detergent. Follow the manufacturer's directions regarding dilution and dwell time.

Use a soft to medium stiff bristle nylon or nylon grit brush for scrubbing or stripping. A special grout brush works best to access the grout. Choose a brush that has bristles that are flexible enough to get down into the grout. Standard synthetic floor pads and stiff bristle brushes tend to be less effective as they float on the surface rather than reach down into the grout where soil accumulates. Several companies now offer a special pad that does a better job of cleaning rough, uneven and irregular surfaces such as the grout and anti-slip flooring.

Some commercial settings are now using a daily spray and vacuum process. High-tech machines or the individual hand application method allow the operator to spray out the area, scrub any heavy encrustation and then rinse the area with clear, heated water. The final step includes using a foam rubber floor squeegee or wet vacuum to remove the soiled solution. The soiled water extraction process is the most efficient manner to remove embedded soil from porous grout.

The most effective approach for spent solution removal in open areas is a wet pick up vacuum with a floor-mounted squeegee. Confined areas such as rest room stalls and under kitchen equipment are best cleared by using a foam rubber squeegee to bring the spent solution out from behind and under equipment. Once collected into a puddle, the wet vacuum is efficient in removing the collection points.

Stairs, edges and small or confined areas may be scrubbed with a deck brush or hand held powered edge scrubber. Large areas require the use of an appropriate size floor machine (rotary, counter rotating, cylindrical, etc.), walk behind or riding automatic floor machine. If strong acid or alkaline chemicals must be used for difficult cleaning or , follow manufacturer's directions closely regarding dilution ratio and dwell time, pick up spent solution with a wet vacuum and immediately neutralize the surface and follow with at least two clear water rinses. Consider pre-testing a small area first to avoid chemical damage.

Water spot removal – if the water hardness (high mineral content) leaves the tile spotted after drying, consider adding white vinegar to the clear rinse water. Using two (2) ounces of white vinegar per gallon of water is considered safe (1/2 cup added to a typical commercial mop bucket). This will normally counter the tendency of water spotting and additionally remove any detergent buildup. Another option is to periodically buff the tile with a white floor pad using a standard 175 rpm floor machine after cleaning. The use of deionized water for the cleaning of tile will normally prevent the formation of water spots on the surface of clay tile.

Commercial and residential tile are cleaned in similar fashions with a few differences in procedures. A commercial tile installation can exceed several thousand square feet and is best cleaned with larger equipment including automatic scrubbers. Additionally, residential customers are handled somewhat different than a commercial client.

RESIDENTIAL PERIODIC FLOOR CARE PROCESS

1. Meet and Greet Customer
 - a. Introduce self, assistant, provide promotional literature and business card
 - b. Answer questions
 - c. Ask to see work area
2. Inspect area to be serviced
 - a. Determine condition and identify pre-existing damage or needed repairs
 - b. Test for hollow spots that would prevent using heavy equipment (tap with scraper handle to identify)
 - c. Hazards, risks or exceptions
 - d. Issues, concerns, potential problems
 - e. Measure square footage to be cleaned (length times width)
3. Pretest
 - a. Consider need to pretest the cleaning process to determine any difficult cleaning challenges and project anticipated results
 - b. Identify best removal process and required dilution ratio of cleaning product
 - c. Show cleaned result to customer to obtain approval if available
4. Prepare work order
 - a. Discuss additional services you can provide. Ask if they would like a quote on any additional services or upgrades
 - b. Calculate and enter pricing along with written procedural tasks
 - c. Discuss job and expectations with customer, make written notes on work order
 - d. Point out concerns, limitations, problems, take photos as needed
 - e. Ask if everything looks ok, and then inquire about payment method when job is finished
 - f. Ask for their signature on the work order and initial of any exceptions or limitations
 - g. Thank customer, discuss safety issues (children or pets kept out, allergic reactions to cleaning vapors, etc.), time commitments, drying times and special needs to complete work
5. Prepare work site
 - a. Move items off floor and coordinate proper relocation with customer
 - b. Set up safety perimeter
 - c. Position walk off matting, staging area tarp, etc.
 - d. Apply protective plastic sheeting and water-proof masking tape as needed
6. Organize and bring equipment and chemicals to work area
 - a. Only bring in those items you will need
 - b. A 5-gallon plastic pail is handy to transport all miscellaneous tools and products
7. Begin cleaning process

- a. Dust mop floor to remove all dust and debris
 - b. Mix and apply appropriate cleaning solution (following label and safety instructions) to difficult to reach areas (edges, corners, behind and around fixtures). Pre-agitate difficult stains and then reapply more cleaning solution if necessary.
 - c. Allow recommended dwell time. Reapply solution as needed to keep surfaces wet
 - d. Thoroughly agitate or scrub area and determine if removal is complete. Consider second application and cleaning area again, if required.
 - e. Remove soiled slurry from difficult to reach areas before it dries with squeegee or wet vacuum and then rinse.
 - f. Apply cleaning solution to remaining floor surfaces following steps A-D.
 - g. If baseboards are to be cleaned, they can be vacuumed and damp wiped prior to or along with rinsing of the floor.
 - h. Thoroughly rinse floor a second time and inspect entire floor surface again. Repeat cleaning process as needed
 - i. Position fans and heat if speed drying is desired
8. Clean up equipment and return to vehicle and secure. Double check work area and around vehicle for any remaining tasks or equipment/chemicals that remain in the home.
 9. Apply sealer to grout if desired, allow it to dry 80% and then remove excess with squeegee, flat mop or chamois.
 10. Apply fans to speed drying
 11. Return all items removed for cleaning to proper location
 12. Discuss cleaning with customer and either - obtain signed approval for billing or present invoice for payment.
 13. Thank customer for the opportunity of being of service and encourage customer to call if they need additional service or have any questions. Discuss ongoing maintenance and services.
 14. Ask for referrals (assuming the job turned out good). Leave refrigerator magnet if customer is to be serviced regularly.
 15. Record job time and any bookkeeping/production notations such as gross hourly rate. List any supplies that have been depleted or equipment needing repairs.
 16. Check around vehicle for children, pets, toys, etc. Determine next stop to be made.

ADJUSTMENTS FOR LARGER COMMERCIAL JOBS

If the area has brass metal floor drains, it will be necessary to cover those with water-proof tape if acid cleaner will be used. This will prevent corrosion and damage.

Mix a neutral or heavy-duty cleaner according to the manufacturer's directions listed on the container. It is important at this point to decide if the job requires light or heavy scrubbing. Again, a pre-test will help identify the proper cleaning agent to be use. The

main difference in cleaning heavy buildup, verses light soil, is strength of the cleaning solution and amount of agitation required.

Person #1 should start applying the solution in a corner at the point furthest away from the exit door. Be careful not to splash furniture or baseboards. If this occurs, wipe off immediately with a damp cloth. If using a mop bucket for the cleaner, dip the mop in the bucket, place in the wringer for two seconds without wringing and then place on floor for applying the cleaner. The fastest method is to apply a diluted heavy-duty floor cleaner with a shower feed solution tank mounted on the scrubber handle. Work an area approximately 6 feet by 25 feet and cut in the edges from left to right to minimize splashing.

The machine operator (person #2) begins by scrubbing in a left to right motion while moving backwards. The combined process of the detergent action of the cleaning solution and the abrasive action of the scrubbing pad or brush breaks up the soil that is embedded in the floor.

Next, person #1 scrapes difficult areas of buildup not removed by the machine agitation. This is best accomplished with a 5" razor scraper that has a 12" handle. Apply pressure on one side and then carefully scrape marks with that edge. Stand the scraper at a 45-degree angle pointing toward you, and pull over the mark.

After the scrubber moves on, the second person proceeds over the same area and picks up the soiled solution with a wet vacuum, or large foam squeegee (24"-36"). Once a large section of the floor has been worked with the squeegee and a puddle has formed, this puddle can be wet vacuumed to pick it up. This person should carry a white nylon scrub pad that can be used to remove any marks the scrubber missed. The dirty solution must be picked up quickly before it dries. If it has dried then the floor may need to be re-dampened and scrubbed again. If the wet vacuum leaves any residue behind, it should be mopped up as soon as possible.

The first rinse should now be applied. Fill the rinse bucket with warm water, squeeze the mop out lightly in the wringer and apply a fairly heavy rinse. While rinsing, carefully inspect the floor again and scrape any imperfections.

The final rinse can now be applied. The mop should be wrung out tighter to lessen the amount of water and shorten the drying time. Again, the final rinse mop must include a detailed inspection and touch up of any imperfections. The rinse water must be changed often enough to keep the rinse water fairly clean.

AUTOMATIC SCRUBBING MACHINE ADJUSTMENTS

If using an auto-scrubber, follow the basic instructions previously explained. In addition, you must determine if the floor is lightly soiled, or is experiencing a heavier use. Fill the machine and mix the cleaning solution according to directions. For light soil, make one pass over the area with the solution valve or switch open and the squeegee

down and vacuum on. This is referred to as a single pass cleaning. Additionally, traffic lanes might require a repeat cleaning.

For heavier soil, make an initial pass with the solution feed dispensing cleaner and the squeegee up and vacuum motor off. After scrubbing about 5 minutes ahead, lower the squeegee, apply a slight amount of solution (required if the solution from the first pass is starting to dry) and make a final scrub/rinse/squeegee pass. This process would qualify as a double scrub, where the added contact time and a second pass performs a deep clean on heavy soil conditions.

SCRUB AND RECOAT

Some floors that have been sealed may begin to show wear in the traffic lanes. An ongoing maintenance program might include deep scrubbing the traffic lanes and re-applying seal to replace any amounts that have been worn off by traffic. The procedure would include a thorough cleaning and rinsing, and then one to two light coats of seal to the worn areas.

The goal of a scrub/recoat operation is to only apply as much sealer as necessary to ensure an even appearance. The floor must be thoroughly cleaned to avoid applying sealer to any soiled areas. Since sealer does not wear off from the edges, care must be taken not to recoat those areas.

RESTORATIVE FLOOR CARE

It is always safer to assess the level of restoration that may be required for any given job. Get in the habit of carefully inspecting the tile to determine if the corrective cleaning action would be light, medium or heavy. Warning: Strong chemical applications of water-based strippers or acid cleaners should be limited to restorative cleaning demands because they are time consuming, can be hazardous and may change tile appearance. Especially important is a pre-test of any product or procedure in a small inconspicuous area to ensure no damage or color loss will occur. After the pre-test, a hot air dryer can be used to quickly dry the area and observe the finished process.

Always pre-test restorative procedures and chemicals in a small area (12 inches square or less) prior to widespread use as some tiles may bleed, discolor or change appearance during or after the use of such procedures.

Start with the least aggressive procedures and chemicals and progressively move toward more aggressive processes and chemicals as needed to obtain the desired results. If a less aggressive procedure will obtain the desired result, they should be used (scrub vs. strip). This is especially true with soft clay tiles such as Saltillo tile which have a tendency to bleed. Here are the most common deep cleaning processes

HEAVY-DUTY SCRUB OR STRIP (REQUIRED FOR FINISH REMOVAL)

In many cases it is necessary to strip off floor finish or sealer from clay tile installations. The process is similar to performing a strip operation on VCT, the only

differences may be the use of specialty chemicals, additional dwell time, and repeating the process several times.

The Stripping Procedure

Here are the general steps for stripping most topical finishes:

1. Protect adjacent areas by staging equipment and chemicals on plastic sheeting, walk-off mats or heavy cardboard.
2. Apply masking tape and plastic sheeting to create barriers and zones between the work area and areas that will not be stripped. Properly mask off all chrome and metal fixtures that are adjacent as well as baseboards, doors and walls. Be certain that all masking tape is firmly attached to prevent chemicals from seeping onto painted surfaces or carpet. If the floor requires flooding and there is a concern for water seeping into cracks in the grout or tiles and damaging the subfloor, consider using clear shipping tape to seal the cracks prior to the flooding process.
3. Following all safety precautions, apply stripping solution to an area approximately 100 square feet (if working alone or 200 sq. ft. if working with a helper); which would be about 7 feet wide and 14 feet long. Start applying solution at the edges in the back of the area to be cleaned.
4. Allow proper contact or dwell time as recommended by the chemical manufacturer. Normally, stripper must have 15-20 minutes dwell time prior to agitation. Follow all label directions.
5. Hand-work all edges with a strip pad on a pole, grout brush or scraper to clean where a machine cannot access. Use special precaution to not scratch the tile surface. Consider cleaning all the edges first and then clean the remainder of the open area. For small areas such as elevators or individual restrooms, consider using hand brushes to accomplish all of the cleaning work.
6. For open areas, use a strip pad or build-up removal pad on a 175 rpm floor machine and slowly work the area. The pre-test operation should have also confirmed that the intended strip pad does not scratch the tile. Glazed tile can be permanently scratched by a black pad, so a softer pad such as green or blue may be required. Never let the stripper dry. Re-dampen with more stripper or water, prior to removal.
7. Hand squeegee or pick up solution with a front mounted squeegee wet vacuum.
8. Inspect the floor for complete finish removal. If dark or shiny areas remain, re-strip the area. A stronger concentration of chemical may be necessary.
9. Thoroughly rinse the area twice with clean water.

Deep cleaning of grouting can also be accomplished with a cylindrical brush machine. The high-speed brush is normally adjustable to the required depth setting. This machine gets the “below the surface” grout better than a floor machine mounted with a stripping or scrubbing pad can reach. However, brushes tend to bend and flex and

consequently not apply the same amount of pressure that a standard floor machine with pads applies to the tile surfaces.

CHEMICAL CLEANING

There might be jobs that require a paint type remover. If a permanent solvent based urethane sealer was used, then a water based stripper may not remove this type of sealer. Petroleum based strippers (dichloromethane or methylene chloride) will dissolve urethane and solvent type sealers. However, this is a dangerous operation and would necessitate a respirator, ventilation fans, eye and skin protection and plenty of protective guards and masking to prevent damage.

Extreme caution has to be exercised if using flammable or explosive chemicals. In this case, electric equipment or even a nearby pilot light could ignite the fumes. Lacquer thinner is another approach to stripping permanent urethane sealers. Be sure and consider all the potential liability before using solvent-based strippers.

Both strong alkaline and acid based chemicals and cleaning systems are used for grout. Normally an alkaline stripper/cleaner is used first to remove soil and any finish (allow 10 to 15 minutes dwell time and repeat second time if needed).

A second step to the process, if needed, requires an acid based cleaner to remove deeply imbedded soil and to brighten the grout. This process will actually etch a thin layer of grout, revealing new grout. It is extremely important to limit dwell time (3 to 5 minutes) and to neutralize and then flood rinse the floor after the use of these chemicals (again you may have to repeat a second time). You can expect to see some fizzing or bubbling of the grout as the acid reacts with the lime in the cement based grout. Brush agitation is especially useful with this process because it aids in the etching of the grout surface.

Warning: These are harsh, hazardous chemicals with the potential to damage grout and surfaces and injure workers. It is important to neutralize acid-based grout cleaners to prevent the degradation of the grout. Follow chemical manufacturer's instructions carefully. Personal protective equipment is required, with additional safety and technical training advised.

Procedure to Neutralize the Acid Treatment

When strong acids are used in cleaning of grout or tile, it is recommended that they be neutralized. To do so; prepare an acid neutralizer solution in a mop bucket according to label directions. Press out the mop and mop the floor similar to any cleaning procedures. **DO NOT SCRUB THE AREA.** This solution will neutralize the acid and will help remove some of the residue that formed because of the chemical reaction that has taken place (lime content reacting with the acid).

Keep in mind the neutralizing solution may not remove 100% of the residue. Next, mop the area twice with clear water, making sure the second rinse has thoroughly

cleaned the area. Some technicians prefer to use a formulated alkaline tile cleaner by diluting it according to label and then spraying it on the tile.

Once the tile and grout is clean and completely dry (allow 24 hour dry time prior to application) then one or two coats of a penetrating sealer is applied to the grout (not epoxy) and tile, if unglazed.

ABRASIVE CLEANING

A mild abrasive rubberized grout cleaning block is available that abrades and removes a small amount of the grout along with surface soil and discoloration. Grout must be scrubbed by hand, which is labor intensive and a slow process.

Do not use a block, sandpaper, pumice stone, or coarse abrasives on the surface of the tile as this will cause scratches and dulling.

PRESSURE WASHING

In areas where the floor is in good shape and water over-spray and run off are not a problem, the use of a pressure washer might be considered. Care must be taken to not use excessive water pressure or to get too close to the tile with the tip of the spray wand. Normally, pressures below 500 PSI are safe, although some technicians use pressures above that.

The wand spray-tip should be kept 6 to 10 inches away from the grout to prevent damage. Extreme caution must be taken on any loose grout or tile that could come loose under high pressure. Saltillo tile and weak, damaged or defective grout is extremely susceptible to pitting when using high-pressure cleaning equipment.

Pressure washing is not recommended for residential settings, as substantial amounts of water will flood the area. In commercial settings, adjoining areas may need to be masked off and protected with plastic sheeting. It would be necessary in restaurant kitchen setting to protect all electrical outlets, equipment and any other surface or items that could be damaged by water.

The wet vacuum process should follow immediately, to prevent seepage into non-water-tight surfaces. For large areas, the tile and grout can be sprayed with a heavy-duty cleaner using a pump-up sprayer. After the recommend chemical dwell time, the area is cleaned with the high pressure unit, and then vacuumed and rinsed.

ROTARY SPRAY EXTRACTION

Several companies now manufacturer hand tools and rotary floor machine wands that have a spinning head below a vacuum shroud that can be attached to a high-pressure, heated portable extractor, or truck mounted carpet equipment for hard surface cleaning. These tools are quite effective, especially in larger areas or where floor mounted equipment, chairs, tables and legs make access difficult or where water control is needed. The vacuum shroud on the tool catches and removes spent solution and excess water, so there is little or no mess. To avoid scratching the surface of stone and tile, the shroud should have a brush at it's base, rubber or plastic at the base of the shroud should not be used where sanded grout is present. Proper adjustment of a vacuum release valve will lessen the chance of scratching and result in less operator fatigue.

The addition of a brush head to a high-pressure extraction tool prevents scratching on softer tiles. Depending on access to power, water and the location, some set up and

breakdown time is required. Basically it's much like setting up a portable or truck mounted carpet extractor. Most operators keep the psi under 800 to avoid grout damage. Saltillo tile and weak, damaged or defective grout is extremely susceptible to pitting when using high-pressure cleaning equipment.

The rotating head has a definite advantage over a high-pressure wash wand, as it eliminates the labor to squeegee and vacuum all the waste water. The shroud tends to keep the spray water hotter as it is not exposed to the room atmosphere.

In most applications the tile will be pre-conditioned with the appropriate cleaning solution. In some cases, the grout may be pre-scrubbed with a grout brush. After the recommended chemical dwell time, the area is cleaned with the rotary extractor and then damp mopped if desired.

Self-spinning heads usually have jets angled at 45° to produce the rotating action. Other units may have a rotating motor to spin the jets and in this case the spray tips may be angled at 90° to the surface. If the same machine is to be used on rough texture tile such as limestone or travertine, the 90° produces a superior flushing action as the spray directly reaches and penetrates small pin holes. A stronger chemical application, higher heat and the 90° flushing angle may be required to remove black dots from the recessed pores of grout. Before purchasing equipment, it is advisable to test it out first in different applications.

DRY VAPOR STEAM CLEANING

Cleaning with this type of machine is effective in removing soil from grout and other surfaces. Because grout must be scrubbed individually, and you maybe on your hands and knees, this is slow and tedious work that is time consuming and labor intensive, even though it is quite an effective cleaning process.

The dry vapor steam process can penetrate areas more quickly than regular steam, as it is comprised of droplets hotter and smaller than ordinary steam. This allows the heated vapor to penetrate cracks and crevices and reach areas that ordinary steam cleaners cannot. As steam vapor is approximately 94% dry, steam vapor leaves less moisture after the cleaning process for faster soiled solution recovery rates.

Dry vapor steam cleaning can be offered as “chemical free”. The high temperature disinfects surfaces by killing bacteria and mold and the process is considered Eco friendly. Various size units are available with different holding tank sizes. On commercial jobs, the run time between refills is a consideration. This type of unit is handy for cleaning walls, baseboards and door tracks. Dry steam/vapor is also effective to remove tar, graffiti and chewing gum.

Using heavy-duty units that allow the work to be done while standing are far more productive when cleaning large areas. Many units operate at 80 psi and a temperature range of 260-290 or more degrees F. The cleaning results are excellent, but the cleaning

productivity rate is slower than other methods. One caution is to reduce repeated cleaning and scraping with a wire brush, as the continual temperature/agitation can loosen the grout. And, as with all grout cleaning procedures, use caution not to loosen grout or cause additional damage. Some technicians are able to clean grout at about 200-300 square feet per hour depending upon the soil load and efficiency of the unit.

Unsealed tile such as limestone, travertine, and slate as well as concrete, brick, etc. is often too porous to respond well to dry vapor steam cleaning. With these types of stone surfaces, a high-pressure, deep flushing action may be required. A rental or test-drive of a particular machine is advisable prior to purchase.

Caution is advised when using a vapor unit for grout cleaning as excessive heat, pressure, agitation or overly aggressive/stiff brushes may damage or remove grout.

Deep Steam Cleaning Process

(Check with the manufacturer for specific cleaning procedures)

The cleaning attachment best suited for floor grout cleaning is the detail brush. Most manufacturers offer nylon, brass or stainless steel brushes with a 1" diameter or less. Nylon is used for regular cleaning and does not scratch the grout or tile surface. For restorative work, brass or stainless steel is often used for heavy buildup. A pre-test with the nylon brush in an inconspicuous area will determine if you need a coarser metal brush and if scratching of the surface is possible.

Once the unit is producing a steam vapor, place the brush over the grout and begin working the brush back and forth. Continue agitation until the soil is removed. If the grout is heavily soiled, it may need a second treatment. Keep in mind that when grout is wet, it gets darker in color. To assess the cleaning efficiency, consider drying the grout with a heat or hair drier and observe if 100% color has been achieved.

NOTES

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FLOOR CARE FOR CERAMIC GROUT

PROCEDURES FOR GROUT CLEANING AND SPOT AND STAIN REMOVAL

CERAMIC TILE STAIN REMOVAL PROCESSES

If stains persist after using any of the cleaning procedures mentioned, consider an oxygen bleach treatment. Oxygen bleach is nontoxic, does not produce harsh fumes and is color safe on most all grout and even on carpet, if tracked onto adjoining areas. The commercial grade is an organic type of hydrogen peroxide and breaks down stains at the molecular level.

In some cases it may be necessary to remove any existing sealer before a chemical stain remover can access to stain or actual surface. If the stain has been sealed into the surface, a stripping operation will be necessary before individual stain removal treatment will be effective. Some technicians use a soy stripper and allow up to one hour dwell time.

Here is a cleaning process that can be used if any of the oxygen bleach processes fail to remove 100% of the stains:

- Before starting, protect adjacent areas from splashing and follow all safety precautions.
- Pre-test the diluted solution of the oxygen bleach in a small area to ensure its safety and then dilute the oxygen bleach with desired amount of warm water to cover the area.
- Apply solution to the dry grout, brush in with a grout brush and allow 20 minutes dwell time. Keep the grout covered with plenty of solution so it does not dry out. After the initial contact time, brush the grout one more time if required. This should remove even difficult red stains.
- If any permanent stains remain, use a carbide tip grout scraper and carefully scrap the stain. Don't be too aggressive or damage may occur. This process also removes a slight amount of the actual grout.
- Wet vacuum the residue to remove all soil from the grout and tile surfaces.

- Apply a clear water rinse followed by a wet vacuum.
- Final damp mop the area and dry the tile if desired.

Caution regarding Grout Cleaning: Heavily stained grout often occurs due to long-term neglect. If the grout had been properly sealed and maintained, the appearance may not have been so unsightly. Many times, damage occurs which is beyond the scope of normal cleaning. In other words, it is a replacement or repair issue, not a cleaning issue. Always identify and deal with repair/replacement issues before starting the job.

The customer should also be informed that total replacement of an area is the permanent method to correct a problem. Cleaning and restoration may help, but only be temporary. Testing to integrity of the grout with a scribe or pick prior to cleaning will give you an idea as to how resistant to damage the grout will be. If the grout easily breaks up or powders under minimal pressure of the tip of a pick or scribe tool, chances are very good that it will be seriously damaged by harsh chemical or water pressure cleaning. Test a small area and stop before you damage a large area of flooring. Not all floors and grout can be safely cleaned without damage. This is what testing and inspection is all about. Don't overlook this important step or sooner or later you will pay the price for failing to follow proper procedures.

SPOT AND STAIN REMOVAL TECHNIQUES

It's important to quickly clean up spills, to avoid staining of the grout or tile. Do not use bleach or ammonia full strength and never mix the two. If you choose to use a bleach product, pretest in an inconspicuous area first. Here are two other tips to prevent possible damage. The use of soft nylon or felt chair leg protectors can prevent scratching of the tile. Do not use steel wool pads or harsh scouring powders that could scratch and mark the surface of the tile.

As a general rule, a carpet spot removal kit will be safe for ceramic tile except for rust removers containing strong acids, which could etch the tile. So always pre-test first and do not allow cleaning products to dry on the tile or remain more than 5-10 minutes. Some stone cleaning specialty companies also have a spot removal kit for spot and stain removal.

Remember to follow all label instructions and safety precautions of each product used. Consult the MSDS safety sheets, wear rubber gloves and goggles as recommended, do not mix chemicals, follow product directions or precautions, protect from spillage or tracking onto carpet or other areas, and rinse thoroughly. The common process is: Test, apply, agitate, dwell, agitate, remove slurry, rinse, inspect, neutralize and allow the floor to dry before applying a sealer.

SPOT REMOVAL PROCEDURES

Glazed ceramic tile is very resistant to staining. Unglazed and unsealed tile and grout is more susceptible to staining. Sealed unglazed tile and sealed grout is fairly resistant to most staining. The longer a spill is on tile or grout, the greater the chance of

a stain. A wide variety of stain removal agents can be used on clay tiles. Always pre-test, remove the excess and rinse thoroughly.

Normally the first attempt at cleaning a spot would be with a typical neutral cleaner. If it doesn't remove the stain properties, at least it will remove some of the bulk of the spill. Next, progress to a stronger detergent and then possibly a solvent or specialty product. Limit dwell time with harsh chemicals and test in an obscure spot before widespread use. Solvents can remove the colorant from grout. Some harsh acids will etch, discolor or burn ceramic tile and cause damage or discoloration to grout. Rust stains may be able to be removed with acid or non-acid poultices.

GROUT ETCHING AND STAINING

Ceramic and porcelain tile normally resists staining. However, unsealed cementitious grout is absorbent. Many food and drink spills such as orange juice, coffee, vinegar, wine, tomato-based products, mustard and many soft drinks can "etch" or partially dissolve the grouting. That is why sealing of the grout is recommended. Avoid colored cleaning agents such as dark blue window cleaner to remove spots on unsealed grout.

COMMON SPILL AND STAIN REMOVAL TIPS

Clean the spot as you normally would and then if the spot remains, use one of the following procedures. A safer substitute for bleach is to use powdered oxygen bleach (containing sodium perborate) such as Clorox 2TM, Oxiclean® or better yet an industrial grade of a commercial accelerator/booster available from a carpet cleaning supplier.

Blood

Use household hydrogen peroxide (normally 3%). Dab on, let it sit 5-10 minutes and towel off. If stain persists, dilute bleach 1 part to 5 parts water and apply. Let it dwell 5-10 minutes and then rinse and towel dry. Be careful with full-strength bleach as it could discolor tile or grout. TEST first to make sure it is safe. If no discoloration occurs at 1:5 dilution ratios, consider using the bleach stronger.

Burn Marks

Apply a citrus solvent gel product used for paint and gum removal on carpet. Allow to dwell 5 minutes and agitate with a white nylon scouring pad. Rinse and dry.

Coffee, Tea, Food and Juices

Use a common household cleaner or neutral commercial cleaner. Rinse and then apply hydrogen peroxide or bleach if stain persists.

Fingernail Polish

Daub on fingernail polish remover. If stain persists, apply bleach, rinse and dry.

Grease and Oil

Apply heavy-duty cleaner or degreaser, agitate and rinse.

Ink and Colored Dyes

Apply bleach, let stand until the stain disappears and then rinse and dry.

Iodine

Apply ammonia, agitate, rinse and dry.

Mildew

Apply bleach or mildew stain remover (never mix chemicals). Allow to dwell a few minutes and then rinse and dry. Bleach is usually not recommended for slate tile. Use diluted ammonia or hydrogen peroxide to remove mold from this type of tile and grout, as it will not discolor the tile or grout. Remove, rinse and dry.

Paint

If hard drops of paint are visible, spray with a clear glass cleaner and carefully scrape with a razor blade. Be careful not to scratch the tile. If the paint has been smeared, apply mineral spirits, agitate and wipe dry. Clean with neutral cleaner, rinse and dry.

Permanent Marker

Apply denatured alcohol or acetone, allow it to dwell, agitate, rinse and dry. Or apply graffiti remover and agitate. Wipe off residue, clean with neutral cleaner, rinse and dry.

Rust

Apply white vinegar to the rust and allow it to sit for several minutes. Rinse and dry. If stain persists apply laundry rust remover or carpet rust remover, allow to dwell and then rinse and dry. Finally, if a trace of the stain persists, apply bleach; allow it to dwell, rinse and dry. Powdered oxygen bleach diluted in water according to instructions is usually safer than sodium hypochlorite (liquid bleach).

Urine Stains and Odors

Typically, bleach or oxygen bleach will remove or lighten urine stains. For heavy-duty stain removal, strong hydrogen peroxide type products are available from carpet cleaning supply stores and safe on most grout. Other options might include dry steam vapor, bioenzymatic cleaners, disinfectants, odor counteractants, and use of a poultice.

Wax or Glue

Apply a mild detergent cleaner and use a razor scraper to carefully remove wax or glue often applied to protect tile during shipping. Remove, rinse and dry. A steam iron and white towel or dry vapor process may also be effective.

Note: use proper Personal Protective Equipment (PPE), good ventilation and prevent from tracking any cleaning chemicals onto other surfaces that could be damaged.

USE OF A POULTICE

Poultices are powdered treatments that can be mixed with a stain removal ingredient and placed on top of the stain. Diatomaceous earth (a chalk-like sedimentary rock) is the most common type of poultice. It normally contains a high amount of silica and traces of sodium, magnesium and iron. The poultice is designed to pull the stain out from deep within the grout or tile - to the top and into the poultice material.

It is extremely helpful to know what caused the stain, so the proper removal agent can be added to the poultice. Mix the following chemicals for a given stain with one cup of poultice material. If normal spot cleaning fails to remove a particular spot, the applying a poultice, may be required.

A proper chemical that removes each individual stain should be added to the poultice powder and mixed into the preparation. The consistency should be that of yogurt or peanut butter.

Mixture Additives

Here are some suggested additives that can be added to a cup of the poultice powder:

- Coffee, tea and drink spills – mix 20% (commercial) hydrogen peroxide with the powder until a soft consistency is achieved.
- Cooking oils, salad dressing, etc. – mix one table spoon of dish detergent and then add necessary water to obtain the desired consistency.
- Food stains such as tomato paste, mustard, etc. – mix 3 tablespoons of ammonia.
- Rust: mix two or three tablespoons oxalic acid or laundry stain remover with one cup of flour or poultice material.

Poultice Process

Apply the paste directly to the stain, approximately $\frac{1}{4}$ inch to $\frac{1}{2}$ inch thick, overlapping the stain $\frac{1}{4}$ inch beyond the soiled area. Cover the paste with plastic wrap and poke a few small holes in the plastic and let stand for 12 hours. If after 12 hours the paste has not hardened, cover it over and check in another 12 hours (24 hours total). In some cases it will be necessary for the paste to set 48 hours if too thick of a covering was applied.

Once the paste has hardened, remove the plastic and remove the dried paste with a plastic scraper. If the stain remains, but is somewhat lighter, re-poultice until it is gone. If the stain refuses to disappear completely, then replacement may be necessary.

REMOVAL OF EFFLORESCENCE

Efflorescence appears as a white powder on the grout and on porous tile. It occurs from excess moisture seeping through the floor and dissolving minerals in the concrete or grout. It then wicks to the top surface where it evaporates, leaving a white salt type

deposit. Eventually foot traffic or brushing the deposits with a stiff brush may remove light accumulations of the white mineral residue.

To counter efflorescence haze, attempt to reduce the amount of water used when cleaning the tile and then consider using an air handler/blow dryer fan to speed up the drying time after cleaning. Sealing the grout with an impregnating sealer is another helpful procedure.

Heavy deposits of efflorescence can be removed with an acid treatment. Prior to acid cleaning, it is recommended the installation cure for at least 14 days. Never acid clean a newly installed floor. Acid can burn Portland cement and leave a white film that is difficult to remove later. Acid cleaning requires proper equipment to apply, brush, extract, and rinse.

Select an approved treatment that is safe for man-made ceramic, porcelain and quarry tiles. Pretest to ensure the acid is not too strong and consequently dull the surface of the tile. Protect items or areas that are not to be cleaned, follow all safety precautions, label instructions and be careful the acid does not contact metal surfaces.

Caution: acids can etch stones that contain calcium; marble, limestone and travertine. Acids may also heavily damage stainless steel partitions and fixtures commonly found in commercial restrooms. Be sure and protect all metal surfaces with proper masking and plastic sheeting prior to cleaning.

Apply the acid according to label and provide adequate ventilation. Allow the recommended dwell time, brush or machine scrub the area and extract or remove with wet vacuum and finally rinse the area thoroughly. When using strong acids, many manufacturers recommend applying an alkaline rinse or high pH alkaline cleaner to suspend later penetration or damage caused by an acid residue. Special pH measurement tape can be used to test the final pH if desired.

TYPES OF ACID

Always use acids with a high degree of caution.

Muriatic Acid

Muriatic acid is often diluted at a 1 to 1 dilution ratio. It has been a standby for years, but the fumes are dangerous and create a hazardous environment and will damage metal and other surfaces. Muriatic acid (30% hydrochloric) available from home improvement stores has a pH of below 1. Extreme caution is advised.

Sulfamic Acid

Sulfamic acid is usually a powder that is mixed at 1 pound powder to 5 gallons water. Generally the use dilution pH of Sulfamic is around 2 or less, and safe on unglazed tile and Cementitious grout.

Phosphoric Acid

Phosphoric acid is another safe type acid is usually purchased ready to use such as a lime scale remover. Many formulated products carry a pH of around 2.

Acetic Acid (Vinegar)

Acetic acid is perhaps the safest chemical to use, but is effective only on light buildup. The pH of vinegar may run 2-3 depending upon the percent of acid and dilution ratio. Even though vinegar is a milder acid, it has the ability to etch unglazed tile or erode grout. So a pre-test is important.

With cleaning products, keep in mind that a chemical with a pH of 1 is ten times stronger than a chemical of a pH of 2. Do not allow acids to dry on the tile or grout. As soon as the build-up has been softened, remove the acid and thoroughly rinse. Remember that acids will etch softer stones such as marble and can produce damage. Always know the type of stone and product that you are working with.

Several manufacturers produce formulated acid products that are safe for most ceramic tile installations, however extended or repeated use may damage, discolor or degrade cement based grout. Occasionally, it may be necessary clean the tile and grout first with a heavy-duty degreaser to remove set in oils before acid cleaning is attempted. When using strong acid on cementitious grout, most manufacturers recommend applying a light mist of water to the grout prior to an acid wash.

It is important to note that using acid each time the tile is cleaned can cause eventual damage. Some acids can etch, dull, soften and even dissolve tile and grout. Only use an acid clean process when it is necessary. There may be times when only specific spots need an acid treatment. Dark grout can be susceptible to fading with some acid cleaners. Instead of increasing the acid concentration on a difficult area, consider increasing the dwell time or agitation. Acid cleaning of grout should not be routine part of the cleaning process. Neutralize and rinse well after the use of any acid based cleaning product.

REMOVAL OF GROUT HAZE

Newly laid tiles are often stained with grout haze and cement spots. Cement grout left over on the tile surface can be removed by using a commercially prepared acid solution (usually sulfamic or phosphoric acid). Read and follow the grout removal manufacturer's instructions closely.

It is safer to use a progressive cleaning process. If the haze is light, perhaps a white nylon scrub pad with mild vinegar will be strong enough to remove the haze. A heavy haze can normally be felt with the hand and may show a buildup of 1/32 of an inch.

The basic process involves application with a mop, brush or sprayer, allow dwell time (5 minutes) then scrub with a nylon brush (hand or machine), use a putty knife or razor scraper to remove thick deposits, wet vacuum to remove, rinse at least twice, test pH of floor, neutralize if needed to get to a pH of 7.

Strong acid solutions should not be used on glazed tiles as they may dull the surface if left on for over 20 minutes (depending on the strength of the acid and hardness of the glaze). Strong acids will dissolve cement based grout, limit dwell time to 10 or 15 minutes and repeat as necessary.

It will be necessary to identify the type of grout material in order to select the proper chemical for removal. Some types of grout may respond to a solvent cleaner.

As discussed later, epoxy grout residue can be removed with a heat gun and scraper.

REMOVAL OF SEALER HAZE OR FILM

Grout sealer that has been overlapped onto the tile may display an uneven gloss appearance. Too much sealer may display a milky haze. Applying too much sealer to an unglazed tile or cementitious grout that has not completely dried following cleaning, may also leave a haze or uneven gloss appearance. A grout removal product may be required to soften and clean sealant residue.

If the haze has not set up and hardened, often a light coat of the original seal can be applied to the tile surface to penetrate and dissolve the haze. Next, brush or agitate the area with a chamois or microfiber towel and polish until it has been absorbed.

The water test previously explained will help identify if the grout is especially absorptive. The speed at which water is absorbed can help foretell if a light, medium or heavier coat of grout seal is required. Remember: too much seal can display a buildup later and grout seal not wiped or removed from the tile surface can be a cause of complaints and rework.

When applying grout seal, most manufacturers recommend using a white buff pad or nylon bonnet under a floor machine to remove any excess grout sealer. Another option is to use an application wheel to apply the sealer and then wipe any spilled-over sealer from the tile surface using a flat mop or microfiber towel.

REMOVAL OF EPOXY GROUT RESIDUE

If the installer left grout residue on the tile surface, it can be extremely difficult to remove especially if the grouting material is epoxy. Special epoxy grout haze removers are available, but should be used with extreme caution. The remover must be kept off the grout and be limited to cleaning of the tile surface only. Directions and warnings must be followed explicitly.

Another approach to remove epoxy type grout residue from the tile surface is to heat it with a heat gun. Once the epoxy has heated up, it can be scrapped off with a razor scraper.