FLOOR AND WALL TILE

The following paragraphs include information pertaining to the various types of tile and their installation procedures.

The number of tiles needed is calculated by performing the following procedures:

First, calculate the square feet of the area to be tiled. If you are using 12-inch-square tiles, the total floor area (in square feet) equals the total number of tiles needed, plus an additional 10 percent waste factor. If another size of tiles is being used, multiply the area by 144 to convert to square inches. Then divide that number by the area (square inches) of the tiles to find the required amount (include a 10 percent waste factor).

Example: You are using tiles 9 x 9 inches. To tile a floor 12 feet long and 9 feet wide—

Multiply the room dimensions to find the area: *12 feet x 9 feet = 108 square feet*

Multiply the area by 144: *108 x 144 = 15,552 square inches*

Calculate the area of the tile: 9 *inches x 9 inches = 81 square inches*

Divide the room area (square inches) by the tile area (square inches): *15,552 divided by 81 = 192 tiles*

Add 10 percent waste factor: *192 + 19 = 211 tiles required*

RESILIENT FLOOR TILE

Resilient floor tile is durable, easily maintained, comfortable and attractive, and low cost. It is made of rubber, vinyl, linoleum, and asphalt. Common sizes of this tile are either 9 x 9 inches or 12 x 12 inches.

A notched trowel (used for spreading adhesive) and a tile cutter are required for installation. To lay out and install resilient floor tile, perform the following procedures:

Locate the center of the end walls of the room. Establish a main centerline by snapping a chalk line between these two points. Lay out another centerline at right angles to the main centerline. This line may be established using a framing square or the triangulation method. With the centerline established, make a trial layout of the tiles along the centerlines. Measure the distance between the wall and the last tile. If this measurement is less than 1/2 tile, move the centerline half the width of the tile closer to the wall. This adjustment will eliminate the need to install border tiles that are too narrow. Since the original centerline is moved exactly half the tile size, the border tile will remain uniform on opposite sides of the room. Check the layout along the other centerline in the same way.

Spread adhesive over one quarter of the total area, starting with the quarter farthest from the door and working toward the door. Ensure that the floor surface is clean before you spread the adhesive. Spread up to the chalk lines but do not cover them. Be sure to use a notched trowel with the notch depth recommended by the manufacturer of the adhesive. Allow the adhesive to take an initial set before setting the first tile. The time required will vary, depending on the type of adhesive used.

Start laying the tiles at the center of the room. Make sure the edges of the tiles are aligned with the chalk line. Lay rows by width, stair-stepping additional rows and ensuring that the tiles are tight against one another in a cross-grained pattern unless otherwise specified. After all of the full tiles have been laid, install the border or edge tiles around the room. To lay out a border tile, place a loose tile over the last tile in the outside row with the grains running in opposite directions (if using a cross-grained pattern). Then, take another tile and place it in position against the wall and mark a pencil line on the first tile. Cut the tile along the marked line.

After all the tiles have been installed, remove any excess adhesive using a cleaner or solvent and procedures approved by the manufacturer.

CERAMIC AND OTHER SPECIALTY TILES

This tile is used extensively where sanitation, stain resistance, easy cleaning, and low maintenance are desired. Types of tile include ceramic, mosaic, paver, quarry, brick-veneer, cement-bodied, marble, and other stone tiles. These can be used for both interior and exterior flooring. Tile is used on both walls and floors. Field tile is regular tile placed on all courses in the main field of an installation. Trim tile is a specially shaped tile used to border and complete the main field of tile; it is available in a wide variety of shapes, sizes, and colors to match field tile.

Tiles come with two types of finishes—glazed and unglazed. Glazed tiles are coated with a glaze before firing to give the tile color and to preserve its surface. They may be fired to a smooth or textured finish. Glazed tiles are most commonly used for walls but may also be applied to floors and countertops. They are used mainly for interiors. Unglazed tiles are fired without a glaze coating. They derive their color from the clay from which they are made. Adhesives used are Thinset or Organic Mastic. Thinset is a powdered cement-based product that is mixed with either water, a latex or acrylic additive, or epoxy. It is very versatile. Organic Mastic is premixed in a solvent or latex base. It may deteriorate if exposed to heat or water.

Grout is a powder made from sand and cement and is used to seal the cracks between the tiles. It is mixed with either water or, to increase durability, an additive. It is available in a variety of colors.

The following tools and equipment are required for installing ceramic and specialty tiles:

A striking tool is used to compact the grout into the joints.

- *A beating block* is a board used to even the tile surface after it has been set.
- A square-notched trowel is used to spread adhesive.
- *A pointing trowel is* used to spread adhesive in tight spots.
- *A tile cutter is* used to score the tile surface so that it can be snapped by applying pressure to the score.
- *A fine file or tile stone is* used to smooth rough edges after cutting tile.
- *A time nipper is* used to clip tile and cut irregular openings.
- *A squeegee or sponge is* used to remove excess grout from the tile surface.
- A sponge float or rubber-faced trowel is used to spread grout over the surface.
- *An electric tile saw is* similar to a mason saw. It is used to make clean, accurate cuts.

To lay out and install ceramic and specialty tiles, perform the following procedures:

Check the area to be tiled to determine if it is square. If the area is slightly out of square, minor changes in the layout can accommodate

these conditions. If the area is seriously out of square, the process stops for any required structural repairs or surface preparation. If the framing problems are serious, it may not be possible to tile the area.

Draw the layout on paper. Layout depends greatly on the pattern desired and the type, size, and shape of the tile being used. Use as many full tiles and as few cut tiles as possible. Place cut tile away from visual focal points (doorways, thresholds, and so forth); tiles should be set symmetrically for a more attractive finish and appearance.

Place reference lines on the floor or wall. Once the layout has been established on paper, transfer it to the floor or wall. A reference line should be snapped to mark the rows of cut tiles around the perimeter. A grid of reference lines should be snapped to enclose all full tiles in sections no larger than 3 square feet.

To install tiles, first spread adhesive over a small area or section (3 x 3 feet), making sure to spread it just up to the lines so that the lines will still be visible. Align the first tile against a 90° intersection in the grid and press it gently into the adhesive. After each course of tile is applied, use a beating block to level the surface. After all the tiles are set, allow the adhesive to set the required time, according to manufacturer's instructions. Prepare the grout and spread it over the tile surface, ensuring that the joints are filled. When the grout begins to dry, clean the tile with a damp sponge. After the grout has dried, wipe off the haze with a clean rag or towel. After the grout has completely dried and hardened (approximately 72 hours), a grout sealer may be applied.

SUSPENDED CEILINGS

Suspended ceilings are primarily designed for acoustical control; however, ceilings are also lowered to save on heating and air conditioning expenses; finish off exposed joints; and cover damaged plaster.

ACOUSTICAL TILE

Acoustical tile absorbs sound, reduces noise, reflects light, and resists flame. Its thickness ranges from 3/16 to 3/4 inch; its width from 12 to 30 inches; and its length from 12 to 60 inches. The most common size panels used are 2 x 2 feet and 2 x 4 feet.

GRID-SYSTEM COMPONENTS

The grid-system components used in suspended ceilings include the following: the *main tee* (12-foot lengths), the *cross tee* (2- and 4-foot lengths), the *wall angle* (10-foot lengths), the *splice plate* (available in aluminum only), *suspending devices,* and *suspending wire.*

Suspending devices include screw eyelets; suspending hooks and nails; 8d common nails or larger, driven into wood joists and bent into a U-shape; and an approved Hilti fastener for concrete or steel.

Suspending wire includes 16-gauge anneal wire placed at 4-foot intervals and attached to suspending devices at the ceiling and to the main tees in the grid system.

INSTALLATION

First, lay out the grid pattern. This is based on the ceiling's length and width at the new ceiling height. If the ceiling's length or width is not divisible by 2 feet, increase to the next higher dimension divisible by 2 feet. For example, if a ceiling measures 12 feet 7 inches x 10 feet 4 inches, the dimensions should be increased to 14 feet x 12 feet for layout purposes. Draw the layout on paper. Make sure that the main tees run perpendicular to the joists. Position the main tees so that the border panels at the room's edges are equal and as large as possible. Draw in cross tees so that the border panels at the room's ends are equal and as large as possible.- Determine the number of pieces of wall angle by dividing the perimeter by 10 and adding 1 additional piece for any

fraction. Determine the number of main tees and cross tees by counting them on the grid pattern layout.

Next, establish the ceiling height. Mark a line around the entire room at the desired height to serve as a reference line. There must be a minimum of 2 inches between the new ceiling and the existing ceiling. Ensure that this line is level and marked continuously so that it meets at intersecting corners. Next, install the wall angle. Secure the wall angle along the reference line, ensuring that it is level.

Install the suspension wire. Suspension wires are required every 4 feet along the main tees and on each side of all splices. Attach the wires to the suspending devices. The wires should be cut at least 2 feet longer than the distance between the old and new ceiling. Now, install the main tees. Main tees need to be laid out from the center to ensure that the slots line up with the cross-tee locations. Cut them where appropriate. Tees 12 feet long or less are installed by resting the ends on opposite wall angles and inserting the suspension wire. Tees over 12 feet long must be cut to ensure that the cross tees will not intersect the main tee at a splice joint. Rest the cut end on the wall angle and attach suspension wires along the tee. Make necessary splices and continue attaching suspension wires along the tee until the tee rests on the opposite wall angle. Ensure that the main tees are level and secured before continuing.

Install the cross tees. Cut and install border tees on one side of the room. Install the remaining cross tees according to the grid-pattern layout. At opposite wall angles, install the remaining border tiles. Finally, install the acoustical panels. Install the full-size panels first. Handle panels with care and ensure that the surfaces are kept clean from hand prints and smudges. If you are working on a large project, work from several cartons to avoid a noticeable change of uniformity. Cut and install the border panels.

PAINTING CEILINGS AND WALLS

The following tools and equipment are required for painting:

- Paint brushes, wall, 2 to 4 inches wide.
- Paint roller with cover.
- Paint pan.
- Stepladder.
- Paddle (stir stick).
- Rags.
- Paint, latex, flat.
- Bucket of water.

Prepare the paint for application. Remove the cover from the paint container. Remove any film layer from the top of the paint. Using the paddle (stir stick), mix the paint thoroughly, in a figure-8 motion. Scrape off and break up any unsettled matter on the bottom or lower sides of the container. Pour the paint into the paint pan until it is 2/3 full.

CEILING

Brush a narrow strip of paint around the perimeter of the ceiling along the inside edges where the wall and the ceiling meet. Using a roller, paint the remaining portion of the ceiling. Cross roll to ensure complete paint coverage without voids.

WALLS

Brush a narrow strip of paint along the inside corners of the wall and corner post. Cut in around all trim and baseboards with a trim brush. Using a roller, paint the remaining portion of the wall and corner post. The corner post may be painted with a brush. When the first coat has completely dried, apply a second coat in the same way. Ensure that the entire surface is covered and without voids.

CLEANUP

Clean paint spots from painted surfaces. Use the appropriate solvent and a clean rag. Repaint spots if necessary. Pour excess paint back into the container. Thoroughly clean brushes and rollers.