



# SAFE-T-TILE TECHNICAL MANUAL

## Installation · Maintenance

Manufactured in the U.S.A. by:



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Supersedes all previous versions.  
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## Base Preparation

### I. GENERAL INFORMATION

Safe-T-Tile playground safety surface tiles and accessories by Amarco Products can be installed on concrete, asphalt, wood or compacted gravel base surfaces, except for limitations noted herein.

**NOTE:** Dimensional tolerance is +/- 1/8" for thickness and +/- 1/8" for width. It may be necessary to hand select some tiles to make sure the course lines remain straight during the installation. Color tone and shading may vary to the extent that some hand selection is required to maintain uniformity throughout the site.

**NOTE:** Slight variance in shade and color chip dispersion is normal. It is the installer’s responsibility to inspect all products to ensure the correct style, thickness, and color. Any moderate to severe discrepancies should be reported immediately before beginning installation. No labor claim will be honored on material installed with visual defects.

	Interior		Exterior	
Surface	24" x 24" x 2-1/2"		24" x 24" x 2-1/2"	
	Quad Lock <sup>1</sup>	Full Glue <sup>1,2</sup>	Quad Lock <sup>1,4</sup>	Full Glue <sup>1,2</sup>
Concrete Surface	Approved	Approved	Approved	Approved
Asphalt Surface	Approved	Approved	Approved	Approved
Plywood	Approved	Approved	Approved	No
Compacted Gravel <sup>3</sup>	Approved	No	Approved	No
Wood or Tile	Approved	No	Approved	No
Resilient Flooring	Approved	No	Approved	No
Rubber Roofing <sup>4</sup>	N/A	N/A	Approved	No
Please note: 1. Tile must always be glued to top of Quad Lock 2. "Full Glue" requires full spread adhesive using Safe-T-Tile Adhesive with 1/8" square notch trowel. Bond test is recommended; installer responsible to determine suitability. 3. Compacted Gravel sub-base may experience movement and subsidence; sub-base out-of-flatness, movement, subsidence, etc. are warranty exclusions. 4. Only adhere tile to Quad Lock connector; do not glue Quad Locks or Tiles to the roof.				

## II. TOOLS/MATERIALS REQUIRED

1. Two tape measures - one 25', one 50'
2. Safety glasses
3. Chalk line
4. 1-1/2" flexible putty knife
5. Saber saw
6. Coveralls
7. Blades for saber saw (7-10 teeth per inch)
8. Kneepads
9. Solvent safe rubber gloves, long cuff style
10. Dustpan
11. Utility knife with heavy-duty blades
12. Rags
13. Framing square
14. Trash bags
15. Silver or gold color paint pencils
16. Push broom or high velocity blower
17. Standard size caulk gun
18. Mineral spirits
19. 4" slot blade screwdriver
20. Installation instructions
21. Silicone Spray Lubricant
22. String line
23. Notched trowels (1/8" square notch)
24. Cutting table (shipping pallet)

## III. SITE WORK

### A. Site Elevation

1. On grade installation - The finished installed height of the Safe-T-Tile surface will be equal to or slightly higher than the perimeter grade but not more than 1" higher unless approved by the project engineer.
2. Above grade installation - The installation of Safe-T-Tile over existing decks or slabs is referred to as an "above grade installation" and will usually require the use of reducers around the perimeters of the area to transition smoothly back to the floor elevation, unless the site terminates at a wall or other vertical surface.

### B. Site Slope / Drainage

1. When preparing a new hard base, a minimum slope equal to 1" per 8 feet of run shall be applied to the finished surface with slope toward the down-grade side of the site, as appropriate.
2. Provide for drainage system to eliminate standing water.

## IV. BASE OPTIONS

### A. Hard Base Construction

1. Concrete Base
  - a. Minimum compressive strength of 3000 psi, cured for a minimum of 28 days.
  - b. Provide base flat to the equivalent of 3/16" (4.8 mm) in 10' (3.0 m). A light broom finish is best if fully adhering the tiles.
  - c. If outside, provide a minimum slope equal to 1" per 8 feet of run toward the drain or down-grade side of the site or as specified.
2. Paved Asphalt Base
  - a. Coarse aggregate mixtures will provide a stable base. The aggregate size best suited for the adhered system is 3/8" to 1/2". Do not use asphalt mixtures that contain a high percentage of fines, as they are not stable in hot weather and may become soft enough to allow the tiles to slide in high use areas.
  - b. The soil subgrade must be compacted with a minimum of two passes of a 10-ton vibratory roller with no soft or moving areas upon completion. The crushed stone base must also be compacted with a minimum of two passes of a 10-ton vibratory roller. The binder and wear courses of the asphalt must both meet 95% of the theoretical maximum density of the JMF (Job Mix Formula).

**Analysis of Asphalt Wear Course**

Total Passing Sieve	Percent by Weight
½"	100
¾"	80-100
#4	45-90
#8	30-65
#50	5-25
#200	2-8
Asphalt Cement	6-8

c. New asphalt surfaces should cure for 28 days before adhering Safe-T-Tiles.

**B. Compacted Loose Base Construction**

1. In outdoor areas or areas with no walls or confines, a perimeter footer will need to be constructed to contain the compacted base and stone dust.
2. Excavate approx. 9 inches of soil below the required finished tile level. Prepare approx. 6 inches of compacted, crushed stone followed by one inch of stone dust on top. Allow for a 1" in 10 LF slope for moisture movement to drainage pit as applicable. Some bases may require a perforated drainpipe to remove moisture build-up.
3. By adding additional stone and compacting to the top of the concrete footer, the Safe-T-Tile can be laid over the top of the footer concealing it, if so desired.
4. The crushed stone must be compacted to 95% standard proctor compaction and should be a homogeneous mix suitable for and available in your geographic area. One example mix might be:

Total Passing Sieve	Percent by Weight
¾"	100
#4	85-100
#100	10-30

5. Cover the entire stone dust area with geo-textile fabric, including the top of the footer if the Safe-T-Tile extends over the footer. Overlap successive geo-textile sections a minimum of 4". The geo-textile should be permanently adhered to the top of the entire footer on all sides.

**NOTE:** Compacted Gravel sub-base may experience movement and subsidence. Subbase out-of-flatness, movement, subsidence, etc. are warranty exclusions.

## Installation

### I. SITE LAYOUT

- A. Sweep area clear of all dust and loose debris.
- B. Determine a starting point for the first course of tile to best suit the site area. Because most walls / borders are not straight or corners square, tile installation generally starts in the middle of the area. Measure the width and length of the space, divide the room into 4 equal quadrants and snap chalk lines that are perpendicular (90 degrees) to each other.
- C. Adjust the starting point to balance the tiles in the space and not end up with small cuts of tile against the perimeter. Begin installation where the two (adjusted) perpendicular chalk lines meet.

**NOTE:** Trimmed / partial tiles may require additional underneath support; this will need to be site engineered.

### II. GENERAL INFORMATION

**NOTE:** For rooftop and specialty applications, we recommend the use of Quad Locks; the tiles are adhered to the Quad Lock connector and not to the roof.

### III. FULLY ADHERED INSTALLATION

- A. **NOTE:** Fully adhered installation method is NOT permitted over Poly Foam or rubber roofing
- B. If fully adhering tiles on an interior installation, moisture must be measured using the RH Relative Humidity test method per the ASTM F2170 test standard. Moisture content should not exceed the allowable limit of the selected Safe-T-Tile Adhesive.
  - a. Safe-T-Tile Adhesive – RH limit of 85% – normally selected

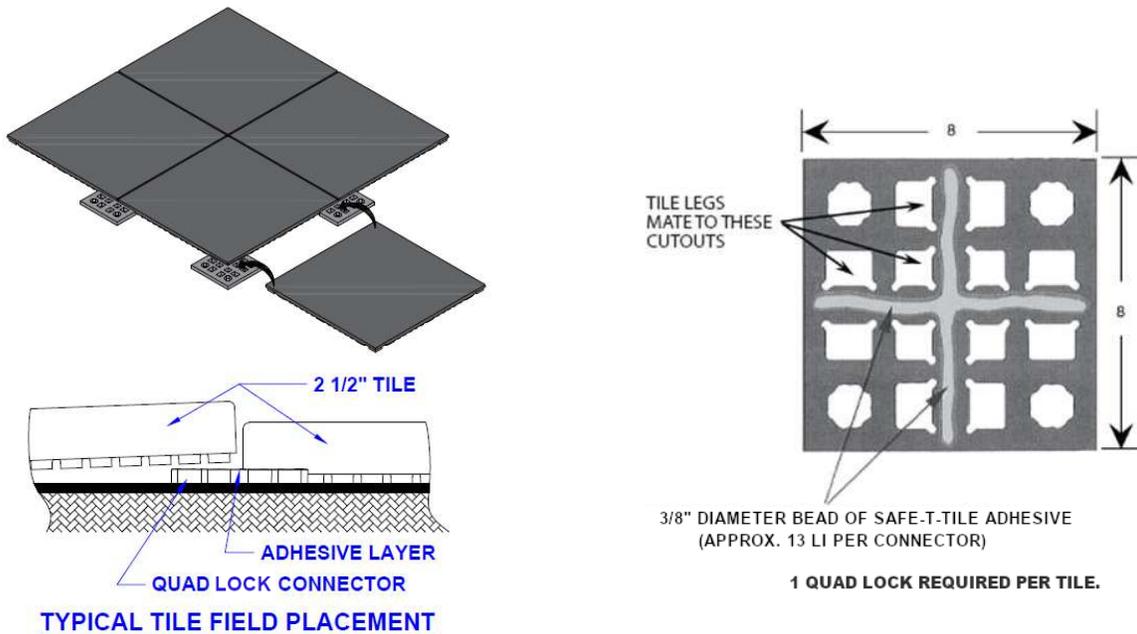
If RH levels exceed the selected Safe-T-Tile Adhesive's RH limit, stop and correct the situation. If outside, simply use Safe-T-Tile Adhesive
- C. In the event that a moisture mitigation system is required, it must conform to the ASTM F3010 Standard Practice for Two-Component Resin Based Membrane Forming Moisture Mitigation Systems for use Under Resilient Floor Coverings.
- D. Perform pH tests on all interior concrete floors. If greater than the allowable limit of the selected Safe-T-Tile Adhesive, neutralize prior to installation.
- E. The tiles, accessories, and substrates must be dry before, during, and 24 hours after the application of adhesive. Higher temperatures and humidity levels will cause the adhesive to set faster and colder temperatures and low humidity will slow down the curing process. The installer should monitor on site conditions and adjust open times accordingly.
- F. Using a 1/8" square-notched trowel, apply the Safe-T-Tile Adhesive slightly wider than the tile being placed. Coverage rates for the Safe-T-Tile Adhesive using a 1/8" square-notched trowel are approx. 60 sq/ft gal on concrete and approx. 50 sq/ft gal on asphalt.
- G. Place tile into the fresh adhesive bed following pre-established lines. If applicable, place ramps into the fresh adhesive in a similar manner.
- H. Allow 24 hours for adhesive to cure before opening the area for use.

**IV. QUAD LOCK INSTALLATION**

- A. NOTE: Quad Locks are required over Poly Foam
- B. Follow the Site Layout instructions.
- C. Once chalk lines are established, place the first tile at the intersection of two chalk lines, aligning adjacent edges of the tile with the chalk lines.
- D. Apply a continuous 3/8" diameter bead of Safe-T-Tile Adhesive along the center axis of all Quad Lock connectors. Insert tile into Quad Lock WHILE ADHESIVE IS STILL WET. Adhesive open / working time is dependent upon environmental conditions.
- E. Fit the first tile with four prepared Quad Lock connectors by lifting each tile corner slightly, sliding the connectors under each corner and engaging the four corner legs of each tile with the respective apertures in the Quad Lock. Continue to sequentially lay the tile and to set the Quad Lock connectors along one chalk line until the first course of tile is complete.

**NOTE:** Cut Quad Lock connectors in half to secure tile at the perimeter edge of surface area.

- F. Complete the other three quadrants of the roof deck in a similar fashion.
- G. Depending on manpower availability, one or more quadrants can be worked on simultaneously using the above method.
- H. Allow 24 hours for adhesive to cure before opening the area for use.
- I. One 10.1-ounce tube of Safe-T-Tile Adhesive is required for approx. 10 of the 8" x 8" Quad Locks.



**V. POLY FOAM PAD INSTALLATION (UNDER SAFE-T-TILE AND QUAD LOCK)**

**CAUTION! Please note:**

- 1. Quad Locks **must** be used when installing over Poly Foam
- 2. The **top** of the Safe-T-Tile Poly Foam Pad is covered with fabric.
- 3. **Plan ahead!** Position the Poly Foam (cut if necessary) so the edges of the Safe-T-Tile **do not line up with an edge of a Poly Foam pad section.**
- 4. The Poly Foam Pads are **only** to be used with both the **2-1/2"** Safe-T-Tile and **Quad Locks**

- A. Sweep area clear of all dust and loose debris.
- B. Determine starting point for the first course of the 39-1/16" x 90-9/16" x 2-1/4" thick Safe-T-Tile Poly Foam Pad. For irregular configurations, the best starting point is often in the center to ensure a symmetrical finish for tiles that require trimming along the perimeter. Some installations are best started in the corner or along the edge that represents the length or width dimension of the site.
- C. Once the layout is determined, apply Safe-T-Tile Adhesive with a 1/8" square notched trowel to a 6" x 6" area at each of the 4 bottom corners of every 39-1/16" x 90-9/16" Safe-T-Tile Poly Foam Pad and adhere to concrete. Extra adhesive may be necessary over rough substrate surfaces. Place the Safe-T-Tile Poly Foam pads tightly against each other. Rough substrates or windy conditions may require weighing down the Poly Foam pads until the adhesive develops a firm set.

**NOTE:** The top of the Safe-T-Tile Poly Foam Pad is covered with fabric.

- D. The most accurate cuts are made using a heavy-duty high carbon steel linoleum knife and a straight edge. A saber saw utilizing a 7-10 TPI wood cutting blade also does an acceptable job, especially for free-form cuts. Blade must be long enough to penetrate the 2-1/4" pad.
- E. When installing pad around equipment posts, a minimum 6" perimeter area of adhesive should be utilized. Standard hole saws work well for making cutouts, but a lead in cut is required to place the pad in place around the posts.
- F. To install tile and Quad Lock over the Safe-T-Tile Poly Foam Pad, begin by following the Site Layout Installation Instructions to prepare the site for the installation of 2-1/2" Safe-T-Tile.
- G. Follow the Quad Lock Installation Instructions to prepare the site to install tile and Quad Lock connectors.

## VI. CUTTING TILES & ACCESSORIES

- A. Avoid leaving a cut edge of a tile exposed to eyesight. To ensure a finished appearance, any tile that has its factory molded edge removed or cut for any reason should be positioned against a transition ramp, masonry, or timber edging unless the edge is to be placed against a wall or other vertical member. Use either a silicone sealant or a permanently elastic urethane sealant/adhesive for filling gaps, if any, between cut edges and walls.
- B. Use a heavy-duty utility knife and a straight edge for a clean, neat surface cut followed by a saber saw using a 7-10 TPI wood cutting blade to finish cutting. Silicone spray lubricant can make cutting easier. Consider using a band saw on larger jobs.
- C. It may be necessary to cut tiles to fit around the play equipment supporting posts. Make the cutout approximately 1/4" larger in all dimensions than the support to prevent binding of the tile around the support. Voids between the equipment supports and tile cuts should be filled in with silicone urethane sealant or adhesive.
- D. Lay out tile cuts out by referencing dimensions from the edges of tiles already in position, and then transfer these dimensions to the tile to be cut.
- E. A lead-in cut is made from the tile edge to the portion to be cut and is usually the shortest distance from the cutout area to a tile edge or one that is less noticeable.
- F. Reducers should be miter cut for the correct fit at the corner

## Maintenance

### I. INDOOR MAINTENANCE

1. Initial Cleaning
  - a. Remove all surface soil, debris, sand, and grit by sweeping, dust mopping, or vacuuming with a high CFM vacuum.
  - b. Scrub floor with Safe-T-Tile Cleaner (10 oz. /gal. of water), using buffer or auto scrubber with a soft nylon brush or pad per table above. Avoid flooding the floor.
  - c. Pick up the solution with a wet vacuum. Rinse with clean water, picking up the rinse water with a wet vacuum and allowing it to dry thoroughly (6-8 hours).
  
2. Daily/Regular Cleaning
  - a. Remove surface soil, debris, sand, and grit by sweeping, dust mopping, or vacuuming. b. Hose or power wash with Safe-T-Tile Cleaner diluted (2-4 oz. /gal. of water)
  
3. Heavy Soil
  - a. Remove surface soil, debris, sand, and grit by sweeping, dust mopping, or vacuuming.
  - b. Scrub floor with Safe-T-Tile Cleaner using a low speed scrubber or auto scrubber with pad per table above.
  - c. Pick up solution with a wet vacuum, rinse with clean water, and allow to dry thoroughly (6-8 hours).
  
4. Restorative Maintenance
  - a. Remove surface soil, debris, sand, and grit by sweeping, dust mopping, or vacuuming.
  - b. Heavily scrub floor with Safe-T-Tile Strip diluted per table. This cleaning may be performed with an auto scrubber or low speed scrubber with pad per table above.
  - c. Vacuum soiled solution with a wet/dry vacuum.
  - d. Pick up the solution with a wet vacuum. Rinse with clean water and allow the floor to dry thoroughly (6- 8 hours).

Indoor Maintenance	Cleaning Product	Mixture	Diluted Coverage	Equipment
Initial Cleaning	Safe-T-Tile Cleaner	10 oz./gallon water	2,000 sq. ft./gallon	Vacuum. Scrub with soft Nylon Brush or 3M 4100 White or 4200 Beige Pad on low speed scrubber. Vacuum up water. Rinse and Dry
Maintenance Cleaning	Safe-T-Tile Cleaner	2-4 oz./gallon water	6,000 sq. ft./gallon	Vacuum. Scrub with soft Nylon Brush or 3M 4100 White or 4200 Beige Pad on low speed scrubber. Vacuum up water. Rinse and dry
Heavy Soil and Restorative Cleaning	Safe-T-Tile Cleaner	10 oz./gallon water	2,000 sq. ft./gallon	Vacuum. Scrub with 3M 5300 Blue pad, Brown 7100 or Black 7200 pad on low speed scrubber. <b>Do NOT</b> use High Productivity Pad. Vacuum up water. Rinse and dry.
	Safe-T-Tile Strip	16 oz./gallon water	1000 sq. ft./gallon	

II. OUTDOOR MAINTENANCE

Outdoor Maintenance	Cleaning Product	Mixture	Diluted Coverage	Equipment
Initial Cleaning	Safe-T-Tile Cleaner	10 oz./gallon water	2,000 sq.ft. /gallon	Vacuum or leaf blower, hose or power wash, or scrub with soft Nylon Brush or 4200 Beige Pad.
Maintenance Cleaning	Safe-T-Tile Cleaner	2-4 oz./gallon water	4,000 – 6,000 sq. ft. /gallon	Blow, vacuum or sweep loose debris and power wash or hose.
Periodic Cleaning	Safe-T-Tile Cleaner	2-4 oz./gallon water	4,000 – 6,000 sq. ft. /gallon	Vacuum or leaf blower, hose or power wash, or scrub with soft Nylon Brush or 4200 Beige Pad. Vacuum or squeegee dry.
Heavy Soil and Restorative Cleaning	Safe-T-Tile Cleaner	10 oz./gallon water	2,000 sq.ft. /gallon	Power wash or scrub using 3M Brown 7100 or Black 7200 pad on low speed scrubber. <b>Do NOT</b> use High Productivity Pad.
	Safe-T-Tile Strip	16 oz./gallon water	1,000 sq.ft. /gallon	

Power Scrubber	<ul style="list-style-type: none"> <li>Low speed (175-300 rpm) 17" rotary floor scrubber with brush / pad attachment</li> </ul>
Auto Scrubber	<ul style="list-style-type: none"> <li>Unit with clear rinse feature and wet vacuum with wand pickup nozzle</li> </ul>
Cold Water Pressure Washer	<ul style="list-style-type: none"> <li>Extensions for trigger gun and quick disconnect fittings</li> </ul> <p><b>CAUTION: Use all applicable PPE when using power washers. Use power washer least 18" from tile surface with the appropriate pressure and recommended 40° wash nozzle. Power washers can cause significant and permanent damage. Hire a professional if unsure regarding power washing safety or use.</b></p>