



avente llc.

Hand Painted Tiles

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PART 2 – HOW TO INSTALL RUSTIC CEMENT PAVERS

GENERAL INSTALLATION TIPS FOR ALL AVENTE PRODUCTS

1. Substrate Preparation – all substrates (bonding surfaces) must be clean and free of contaminants that may interfere with bonding. Substrates must be properly prepared and appropriate for the product.
2. Product Storage – store all material in original packaging and protect from weather, traffic, debris and overspray. Store tiles on their ends; do not stack on top of one another. Do not double stack pallets under any circumstances.
3. Cleaning – all products are porous unless sealed; protect from staining and clean mortar and grout from surface after set up but before hardening. Do not clean with acid or harsh chemicals that may affect the color and surface of the product. Test all products before wholesale application.
4. Work from Multiple Boxes/Pallets – AVENTE handmade products will have natural color variation; blend from multiple boxes or pallets for best results.
5. Associated Products – mortar and other adhesives, grouts, sealers and all other products used in installation must be appropriate for use with concrete products. If in doubt, contact product manufacturer or AVENTE.
6. Building Code Compliance – Users must ensure that installation design and products selected meet local building code requirements. AVENTE is not responsible for any failure

TILE & BRICK VENEER

The AVENTE Handbook details all steps necessary for a trouble free tile installation. Tile can be installed using a variety of setting materials including thin-set mortar, medium bed mortar, or a traditional mortar bed. To ensure a long lasting bond, concrete slabs and other substrates must be properly prepared and free of jobsite debris and other contamination and movement joints must be included per industry guidelines. Tile should be covered or otherwise protected prior to sealing to prevent staining and scratching from jobsite debris.

AVENTE tile is extremely durable but will be affected by forces acting upon the overall tile assembly. AVENTE tile will not crack or debond from the substrate on its own volition but may do so if improperly installed or subjected to excessive movement or moisture from the substrate. The same forces that crack a concrete slab or mortar bed below can similarly crack the AVENTE tile installed above.

Mortar, grout, sealer, membranes, concrete slabs, backer boards, and all other products used in the tile assembly should meet industry standards and be installed in accordance with the manufacturer's recommendations. Contact AVENTE

if there is any discrepancy between our installation instructions and those of any other products specified in the tile assembly.

LAYOUT AND DESIGN

For best results design, layout, transitions, and other details are agreed by all parties before commencing installation. Tiles can be laid in a range of patterns, installed with varying grout widths, and sealed with different finishes. A small mockup should be created, using the same materials to be used in the final installation, for approval by both the owner and installer. The mockup can be incorporated in the final installation if approved by all parties.

SUBSTRATE PREPARATION

AVENTE tile can be installed over a variety of properly prepared substrates:

1. Concrete slab or precast panel
2. Concrete backer board
3. Wood subfloor or framed wall

Make sure to protect all substrates from jobsite debris and other contaminants that can prevent tile from bonding securely.

CONCRETE SLAB

The most important consideration when installing on a new or existing concrete slab is to ensure that the surface is bondable. The surface of the slab must be clean and free of any foreign substances. If you suspect such

“bondbreakers” might be present, test by pouring water on the slab. If the water beads up then a foreign substance has contaminated the surface. Another method is to apply a phenol solution to the slab; if it does not change color the surface may have contamination.

New concrete slabs must be cured for 28-days and a light broom finished surface is preferable. Troweled, smooth finished surfaces should be mechanically abraded (grinding or shot-blasting) prior to installing tiles to avoid potential bonding problems. The surface of the slab should be roughened, not polished.

NOTE: AVENTE products cure much quicker than 28 days due to our controlled factory conditions and use of advanced admixtures. Some concrete slabs may be ready to accept material sooner than 28 days but it is the responsibility of the architect or engineer to determine if this is appropriate.

Existing concrete slabs sometimes show exposed aggregate due to carbonation, a common form of environmental weathering. Carbonation weakens the surface of the concrete by eroding the concrete paste surrounding the aggregate and affected areas must be removed prior to installing tile or other floor coverings.

Excessive vapor transmission from concrete slabs can lead to bond failures. Moisture emission tests range from the simple, qualitative polyethylene sheet test (ASTM D4263) to moisture meters to complex and expensive nuclear density testing. Calcium chloride testing (ASTM F1869) is most commonly used but can only detect moisture close to the slab surface and is sensitive to temperature and humidity variations. Relative humidity probes (ASTM F2170) are becoming more popular because they can detect moisture throughout the slab and can predict future moisture conditions.

Moisture emission problems must be remedied or controlled prior to installation or a failure of the tile assembly is almost certain.

PLYWOOD FLOORS

Bonding tile directly to wood substrates is not recommended. There are three different methods for tiling over a wood substrate, detailed in the Tile Council of America (TCA) Handbook for Tile Installation:

1. Cement backer board
2. Uncoupling membrane
3. Pre floated 1¼” to 2” mortar bed on a cleavage membrane

Wood subfloors must be capable of handling the weight of the tile assembly, including the tile, grout, mortar, and any backing material or membranes. Excessive deflection can occur if the combined load of the tile and setting material exceeds the design limit of the floor joist system. The vertical movement of the subfloor and tile assembly above can lead to problems like cracked and debonded tiles and grout. If in doubt, consult a qualified engineer to ensure the subfloor is adequate for the expected loads.

WALLS

AVENTE tiles, brick veneer, and wall panels can be adhered directly to concrete masonry unit (CMU) walls, concrete panels, cementitious backer units, masonry, or stucco. These substrates should be clean, free of contaminants, and provide a roughened surface for bonding. If in doubt, prepare the surface with metal lath and a mortar scratch coat to provide a suitable bonding surface.

Direct installation on plywood, OSB, gypsum backer board, or other moisture sensitive surfaces is not recommended, especially in exterior installations. Metal lath and a mortar scratch coat should be used to prepare these substrates.

MOVEMENT JOINTS

Expansion, construction, isolation, contraction, and perimeter joints must be allowed for when installing all floor tiles. Consult the TCA Handbook, EJ171 'Movement Joints' for detailed guidelines. Perimeter movement joints are mandatory for interior installations.

Movement joint requirements may vary per project but generally will conform to the TCA recommendations listed below. Perimeter joints should be included any where tilework abuts restraining surfaces such as walls, dissimilar floors, curbs, columns, ceilings, or where backing surfaces differ. All cold, expansion, and other joints in the structure should continue through the tilework (including vertical surfaces) and must never be narrower than the structural joints.

Interior	20' to 25' in each direction
Exterior	8' to 12' in each direction
Interior (exposed to sun or moisture)	8' to 12' in each direction

DRAIN SLOPES

Any required slopes to drainage should be included in the specification of the concrete slab or wood subfloor. Do not build up mortar to create drain slopes as this may compromise the integrity of the mortar bed.

ANTIFRACTURE AND WATERPROOFING MEMBRANES

Antifracture and waterproofing membrane materials should meet applicable ASTM International and ANSI standards and be installed per the manufacturer's instructions. AVENTE recommends waterproofing membranes for exterior installations but these also may be appropriate for some interior installations. Check that any membrane used is appropriate for the type of installation.

Crack isolation membranes can be bonded to the floor to cover existing shrinkage cracks in the substrate. Anti fracture membranes cover the entire substrate and provide protection against thermal and moisture expansion in addition to current and future shrinkage cracks. Uncoupling membranes are similar to anti fracture membranes but use thicker material with air cavities to allow lateral movement

Cleavage membranes can be used to isolate from the substrate a tile assembly installed on a wire-reinforced mortar bed but should not be used with other installation methods.

EXTREME ENVIRONMENTAL CONDITIONS

Installing AVENTE tile in extremely hot or cold weather conditions is not recommended unless precautions are taken. When the environmental conditions are below 40°F or exceed 90°F (32.2°C), comply with the cold or hot weather construction requirements of the local building code and hot weather construction provisions of TMS 602/ACI 530.1/

INSTALLATION METHODS

AVENTE tiles can be set using any of the three methods listed below:

1. Thin-Set Mortar (most common method for tile installers)
2. Medium Bed Mortar (highly recommended, especially for large format tiles)
3. Mortar Set (traditional mortar bed installation by masons)

AVENTE recommends the use of latex and acrylic additives to enhance mortar and grout performance. Do not apply thin-set or medium bed mortar thicker than recommended by the mortar manufacturer in order to repair uneven substrates, make adjacent tiles level, create transitions, or for any other purpose.

INSTALLATION BASICS FOR ALL METHODS

1. Both tile and concrete slab should be cool and moist, not saturated, when mortar is applied. Avoid installation in extreme hot or cold weather conditions if possible.
2. Store uninstalled tiles in their original packaging and protect from weather and jobsite debris. Protect the installation against damage from weather, jobsite debris, and by other trades
3. Installation materials should meet applicable standards (ASTM, ANSI, ISO). Read and follow directions for all products used in the installation process.
4. AVENTE tiles are unsealed and feature a porous surface
 - a. Handle tiles with care to prevent staining and scratching.
 - b. Cut tiles using a wet saw for best results. Wash all cut pieces in clean water to avoid staining by grit and debris.
 - c. Clean excess mortar and grout promptly to avoid permanent staining of the tile surface. **DO NOT USE ACID** or other strong chemicals to clean the tiles during or after installation.
 - d. The use of a grout bag is strongly recommended to prevent staining and avoid the introduction of excess water in the substrate
 - e. Tiles can be presealed to ease cleaning of mortar and grout.
5. Do not retemper (add water to) mixed mortar or grout.
6. Do not apply thinset or medium bed mortar thicker than recommended by the mortar manufacturer. Do not use mortar to build transitions, make uneven surfaces level or create drainage slopes
7. Back buttering is recommended for all interior and exterior applications.
 - a. 100% tile bonding coverage is desirable, with a minimum of 95% on exterior and interior installations.
 - b. It is extremely important all corners and tile edges have 100% bonding coverage to prevent debonding and grout joint cracking.
8. A newly installed floor should cure for 72 hours, free of traffic. Cover the installation to protect against damage from weather, jobsite debris, or by other trades.

THIN-SET MORTAR

1. Review and follow the instructions printed on each bag of thin-set mortar.
2. Mix thin-set mortar and clean cool water together by hand or with variable speed electric drill at a slow speed (150 to 200 rpm [16 to 21 rad/s]) to a smooth, paste consistency. Use a birdcage rather than a paddle mixing attachment to avoid entraining air in the mix.
3. Stir occasionally with the trowel to keep fluffy but do not retemper (add water to) mixed thin set mortar. When properly mixed, the troweled ridges on the slab will stand with little or no slump.
4. Spread the thin-set mortar with the flat side of the trowel to the skin substrate and break the surface tension.
5. Hold the ½-in. (1.27-cm) square notched trowel or ¾ in. (1.91 cm) rounded notched trowel in near-vertical position to form grooves in one direction under each tile; do not allow the thin-set mortar to “skin over.”
6. Spread thin-set mortar uniformly on the back of each tile using the flat side of a trowel so that a minimum of

95 % of the back surface is covered.

7. Place tiles by moving them 1/8 to 1/4 in. (0.3 to 0.6 cm) across the mortar ridges back and forth perpendicular to the ridges until the ridges collapse and all the voids are filled.

MEDIUM-BED MORTAR

1. Review and follow the instructions printed on each bag of medium-bed mortar.
2. Mix medium-bed mortar and clean cool water together by hand or with variable speed electric drill at a slow speed (150 to 200 rpm [16 to 21 rad/s]) to a smooth, paste consistency. Use a birdcage rather than a paddle mixing attachment to avoid entraining air in the mix.
3. Stir occasionally with the trowel to keep fluffy but do not retemper (add water to) mixed medium bed mortar. When properly mixed, the troweled ridges on the slab will stand with little or no slump.
4. Use the 1/2-in. (1.27-cm) square notched trowel or 3/4-in. (2-cm) rounded notched trowel to spread the medium-bed mortar onto the substrate using the flat edge of the trowel. Form grooves with the notched side of the trowel in one direction under each tile.
5. Spread medium-bed mortar uniformly on the back of each tile using the flat side of a trowel so that a minimum of 95 % of the back surface is covered.
6. Place tiles by moving them 1/8 to 1/4 in. (0.3 to 0.6 cm) across the mortar ridges back and forth perpendicular to the ridges until the ridges collapse and all the voids are filled.

MORTAR-SET

1. Use premixed dry mortar or mix in accordance with Specification C 270. The use of latex and acrylic concrete additives is strongly recommended.
2. The mortar bed thickness shall range from minimum 1/2 in. (1.3 cm) thick to maximum 1-in. (2.5-cm) thickness. Do not allow the mortar to lose plasticity and become stiff before the tiles are placed and do not retemper (add water to) mixed mortar.
3. Extreme air and slab temperatures may affect the mortar's setting time. Do not spread too much mortar at one time.
4. Spread mortar uniformly on the back of each tile using the flat side of a trowel so that a minimum of 95 % of the back surface is covered.
5. Place tiles by moving them 1/8 to 1/4 in. (0.3 to 0.6 cm) across the mortar ridges back and forth perpendicular to the ridges until the ridges collapse and all the voids are filled.

GROUTING

AVENTE recommends the use of a grout bag to fill grout joints rather than “floating” or “smearing” grout. Using a grout bag helps to minimize staining and prevent the introduction of excessive water into the grout joints and setting bed.

Remove excess grout before its initial set or preseal the tiles to facilitate cleaning and avoid grout haze and staining.

AVENTE installations should be grouted with Type S mortar or sanded grout appropriate for the grout joint width specified. In either case minimize water use and ensure that grout proportions are correct in order to prevent cracking due to shrinkage.

1. Use sanded grout with grout joints 1/8” to 1/2” wide or use as grout Type S mortar mixed in accordance with ASTM C 270.
2. To minimize grout shrinkage, do not mix with excessive water.
3. Ensure that grout selected is appropriate for specified grout joint width. Mix according to the manufacturer's recommendation and do not retemper (add water to) mixed grout.
4. A grout bag is recommended to fill all joints. Grout shall flow smoothly with a creamy consistency. Twist the grout bag until all the slack is taken up and then continue to roll the bag tighter to maintain constant & consistent pressure.
5. Use one hand to keep the bag twisted at the top; with the other hand, squeeze bottom of bag while pressing

- your knuckles into the bag at the top.
6. Completely fill each grout joint slightly higher than the tile surface. When grout starts to set up, tool the joint to compact the grout.
 7. Clean excess grout before it hardens on the tile surface. Do not use too much water on the tile's surface during cleanup as it will weaken the grout and lead to cracking.
 8. Do not use acid to clean grout from tile surface
 9. Damp curing by misting the grout joints two or three times daily is highly recommended to slow the hydration process and minimize grout cracking or shrinking.

SEALING

AVENTE tiles should be sealed to protect them from staining and preserve their color and original appearance. Unsealed tiles will more quickly patina due to their higher absorbency and erosion of the cement paste on the surface but are otherwise structurally sound.

TYPES OF SEALER

There are two basic types of sealer:

1. Penetrating sealer – also known as “invisible” sealer, penetrating sealers work below the surface for a minimal change of appearance.
2. Topical sealer – sometime referred to as “film-forming” coat the surface of the tile to create a barrier against stains and water intrusion

In general, penetrating sealers will provide a more natural look than topical sealers but will provide less protection against staining and wear.

INSTALLATION TYPE & LOCATION

The location of the installation is an important consideration when selecting a sealer. For exterior installations a penetrating sealer is strongly recommended because topical sealer does not generally hold up well to weathering. Also, surfaces sealed with topical sealer can be extremely slippery when wet. Because topical sealer coats the surface of the tile moisture, efflorescence, or stains may become trapped underneath.

For interior installations either a penetrating sealer or a topical sealer can be employed. In these areas, the key considerations are the desired appearance and stain protection. As previously noted, topical sealer will generally provide the most protection against stains and will usually have a glossy appearance. In general, penetrating sealer will provide a more natural, matte finish but will provide less stain protection than a topical sealer.

Other considerations to take into account include whether the installation is subject to light residential or heavy commercial traffic and if there are dogs, cats, or other pets scampering about. For areas like kitchens and driveways make sure to select a sealer designed to resist oil and grease penetration. A penetrating sealer that “breathes” must be used for concrete slabs poured on grade that are subject to excessive moisture

AVENTE products are porous and over time will develop a unique patina that records the life around them. The patina effect will develop sooner and be more pronounced in material sealed with a penetrating sealer. With either type of sealer, however, the extent of the patina effect will vary depending on the quality of the initial seal and maintenance in addition to the amount of traffic and weathering experienced

SEALER APPLICATION

Carefully follow the sealer manufacturer's directions regarding application. Sealer is usually applied with a pad or sponge and excess sealer removed with towels. Make sure to take note of the recommended cure time before applying additional coats.

The surface of the tile must be clean and dry prior to sealing. Any discoloration, residue or grout haze on the tile's surface must be removed or will be locked in the sealed surface.

HOW TO EVALUATE IF MATERIAL IS FULLY SEALED

Pour a small amount of water on the surface. Water will bead up and not darken the surface if the surface is sealed. If the water is absorbed and darkens the surface additional coat(s) of sealer are required to properly seal a new installation or reseal an existing installation.

COMPLETING THE INSTALLATION

1. Test sealed surface with water to ensure installation is fully sealed. Apply additional sealer if necessary.

REFERENCES

1. ANSI (American National Standards Institute) A108/118 Standards for the Installation of Ceramic Tile
2. CTIOA (Ceramic Tile Institute of America) Report 2006-5-23 Concrete Tiles
3. CTIOA (Ceramic Tile Institute of America) Report 2007-6-24 Floor Crack Isolation Membranes
4. CTMA (Concrete Tile Manufacturers Association) Handbook for the Installation of Concrete Tile
5. MSJC (Masonry Standards Joint Committee) Standard: TMS 602/ACI 530.1/ASCE 6 Specification for Masonry Structures
6. NRMCA (National Ready Mix Concrete Association) Concrete in Practice 2004 CIP 28 Concrete Slab Moisture
7. TCA (Tile Council of North America) 2009 Handbook for Ceramic Tile Installation

BALUSTRADE SYSTEM

The balustrade system consists of three components – baluster, base, and handrail. Balusters can be attached to the base or directly to an appropriate substrate. Drill holes in base to accommodate rebar centers and install balusters using Type S mortar or comparable construction adhesive. Repeat process to install handrail. Grout joints using Type S mortar or sanded grout appropriate for joint width. Make sure to consult local building codes to determine acceptable baluster spacing and weight limits.

WALL CAPS / POOL COPING

Install with Type S mortar or comparable construction adhesive. Grout joints using Type S mortar or sanded grout appropriate for joint width. Use corners or miter cut straight pieces for corner applications. Radius pieces are available in many popular sizes and can be cut and staggered to fit irregular radius sizes. AVENTE is not responsible for errors in measurement, estimation, or application. Consult AVENTE for correct measurement procedures for each style.

SANDESET PAVERS

Pavers can be sandset over a compacted aggregate base or a concrete slab. For sandset driveway applications AVENTE recommends pavers 12x12 or smaller in face dimensions. Larger pavers can be sandset for pedestrian applications but should be installed with mortar in vehicular applications. Detailed installed instruction can be found in CSI 3-part specifications.