

FLEXFORM (5.0mm) VINYL PLANK & TILE INSTALLATION GUIDE

All instructions and recommendations in this guide are based on the most recent information and installation techniques available, please follow this guide to ensure a trouble free and warranty supported installation.

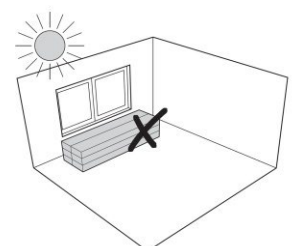
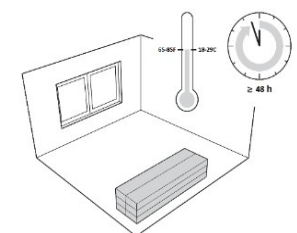
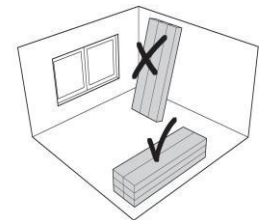
Always check millikenfloors.com for latest installation, warranty and maintenance guides. It is the responsibility of the installer to ensure that the most current documents are used during installation.

Installation contractor is responsible for reasonable inspection of the products prior to installation and for maintenance of dye lot integrity during installation. Milliken will not be responsible for visible defects after LVT has been installed.

Contact Milliken Technical support if there are any specific concerns or questions prior to installation.

Product Handling and Site Conditions

1. Check batch and product details and quantity are correct and match purchase order.
2. Store cartons of tile and/or plank with cartons stacked one on top of the other. Do not store on end or sides or allow cartons to bend during storage or transportation.
3. Acclimate product to job site conditions by delivering all materials, including adhesives and maintenance products, to the job site at least 48 hours prior to installation. Store all products at 65° to 85° Fahrenheit (18° to 29° Celsius) for 48 hours prior to installation. Unpalletized boxes laid on flat surface will acclimate more evenly. Floorcoverings left stacked may take longer to acclimate.
4. The space where flooring is to be installed shall be fully enclosed and the permanent HVAC system shall be operational prior to installing flooring. The temperature shall be 65° to 85° Fahrenheit (18° to 29° Celsius) for 48 hours before installation, during installation and for 48 hours after installation. The temperature of the space shall be kept at a minimum of 50° Fahrenheit (10° Celsius) continually after installation.
5. FlexForm vinyl floors should be protected from direct sunlight and not exposed to intense direct sunlight for extended periods of time. Milliken recommends suitable window coverings be in use in areas of large amounts of direct sunlight exposure. Milliken also recommends use of a full-pattern of adhesive in these areas of installation.
6. To prevent damage to the newly installed flooring the installation of flooring products should be installed after all other trades have completed their work.



To further prevent damage after install until space is occupied, use of a reinforced fiber-based temporary floor protector product is strongly recommended.

7. To prevent problems and general movement of FlexForm 5.0mm LVT, areas to receive flooring shall be permanently dry, clean, smooth, level and structurally sound. They shall be free of all contaminants, including but not limited to: dust, solvents, paint, wax, oil, grease, residual adhesive, adhesive removers, curing, sealing, hardening or parting compounds, alkaline salts, excessive carbonation or laitance, mold, mildew; any foreign material that might prevent a proper adhesive bond.
8. Install flooring perpendicular to direct light sources, including large windows, etc. Use of suitable window coverings during the times of most direct sunlight is recommended.
9. **Never** install LVT outdoors.
10. During installation, mix and install planks from several different cartons to minimize shade variation.
11. Inspect your shipment of LVT to ensure that all cartons are of the same lot/manufacturing run.
12. To minimize shade variation during installation of Milliken Flexform 5.0mm LVT, mix and install planks from several different cartons.
13. All subfloor/underlayment patching must be done with a non-shrinking, water resistant Portland cement patching compound.
14. Doorways and archways must have a suitable "T" molding installed to protect the exposed edges of the flooring, and cover 1/8" installation gap. Use of a 9" band of adhesive in all entryways is recommended to keep flooring from movement.
15. Adhesives used with this product must be approved by Milliken.
16. Milliken Flexform 5.0mm LVT is to be installed in a perimeter fashion or full spread with Milliken LVT Standard, Milliken LVT Moisture XT Adhesive, Mosaic Moisture XT Spray, or Mosaic 98 Spray adhesives. For perimeter installation, a band of adhesive approximately 9" wide should be placed around the perimeter of the room.
17. **Heavy Commercial applications** or areas subjected to heavy traffic, rolling loads, etc. should be installed as a full-spread permanent adhesive application.
18. In areas of high foot traffic, more volatile temperature variations, excessive rolling loads or if there are concerns with the subfloor conditions, it is recommended to use full spread permanent adhesive in those areas.
19. For larger areas or runs greater than 20 feet (6 meters) it is recommended to section the area into equal 10'x12' sections and utilize the perimeter-X pattern for the adhesive.
20. All adhesive installed planks or tiles must be rolled with a 3 section 100-pound roller.

APPROVED SUBSTRATES

The following are approved substrates for installation of Milliken Flexform 5.0mm Luxury Vinyl Tile. See the next section for proper testing and substrate preparation prior to installing your Milliken floorcovering.

All substrates regardless of composition must be smooth and flat to within 1/8" (3.75mm) in 10 feet or achieve an "F50" rating by use of mechanical grinding/sanding or suitable Portland cement-based patching and leveling compounds.

- Above, on or below-grade concrete without hydrostatic pressure, excess moisture or alkalinity. Must be fully cured and dry, free from curing compounds, sealers etc.

- Above or on grade lightweight concrete, properly prepared and without hydrostatic pressure, excess moisture or alkalinity
- Above or on grade Gypsum concrete surfaces, properly prepared, sealed and without hydrostatic pressure, excess moisture or alkalinity
- Properly prepared and well bonded existing resilient floor covering
- Cement Terrazzo, ceramic tile, marble - see adhesive for proper preparation.
- Certain metal floors - see adhesive for proper types and preparation. May require use of a 2-part epoxy; contact Milliken Technical Support for assistance
- Radiant heated floors where heat does not exceed 85°F (29°C)
- APA registered underlayment, sanded face exterior grade with minimum rating of B-C plugged face
- APA registered exterior grade plywood sanded and plugged face with ratings as follows: B-C, or better
- Milliken premium underlayment
- Raised Access flooring

The following are not approved substrates for installing Milliken Flexform 5.0mm Luxury Vinyl Tile:

- Epoxy terrazzo
- Rubber, cork or asphalt tiles
- Textured or cushion backed resilient flooring
- “Sleeper” floor systems and other uneven or unstable substrates
- Plywood floors that have been installed directly over a concrete slab
- Luan, OSB, particle or chip boards, CCA (pressure treated), oil treated or other coated plywood
- Advantech OSB if LVT is to be glued down (must be covered with plywood).
- CDX or other plywood with knots or open defects
- Underlayment made of pine or other soft woods
- Masonite™ or other hardboard underlayment
- Hardwood flooring
- Uneven or unstable substrates
- Paint, wax, oil, grease, residual adhesive, mold, mildew, and other foreign materials that might prevent adhesive bond

SUBSTRATE PREPARATION

All substrates must be properly prepared and tested according to the following guidelines.

1. Concrete Subfloors

- a. Shall be in accordance with the most current version of ASTM F710 - Standard Practice for Preparing Concrete to receive Resilient Flooring
- b. All patching and leveling is to be in accordance with the most current version of ASTM F2678 - Standard Practice for Preparing Underlayment's, Thick Poured Gypsum Concrete Underlayment's, Thick Poured Lightweight Cellular Concrete Underlayment's and Concrete Subfloors with Underlayment Patching Compounds to receive Resilient Flooring
- c. Concrete slab construction shall be in accordance to industry standards for specification related to concrete mix design, curing methods and drying times to prevent moisture problems.
- d. On-grade and below-grade slabs should be installed with a suitable vapor retarder directly underneath the concrete slab.
- e. New concrete shall be properly cured and dried prior to the installation of floor covering. Curing agents, surface hardeners and other membranes or compounds shall be mechanically removed immediately after initial cure to allow the slab to properly dry before installation. Approximately 30 days per 1" of slab thickness.
- f. All concrete substrates, regardless of grade or age of slab, must be properly tested using one of the methods outlined below for warranty to apply. Acceptable test method is the ASTM F 2170 In Situ Relative Humidity. Testing shall be conducted according to the instructions of the manufacturer of the testing equipment.

Please note, Milliken provides adhesive options that do not require moisture testing. Specific requirements are outlined in the Adhesive Recommendations.

ASTM F 2170 In-Situ Relative Humidity Test

- i. Prior to conducting ASTM F 2170 insitu testing, a preliminary evaluation of comparative moisture conditions of concrete, gypsum cement, and other flooring should be conducted using a non-destructive Electronic Moisture Meter. This will assist in determining areas that must then be tested per ASTM F 21070.
- ii. Relative humidity of the slab shall not exceed 95% & 98% when using Milliken LVT Adhesives as outlined in Recommended adhesives. Floor covering should not be installed until concrete is sufficiently dry or until corrective measures are taken by the contractor.
- iii. Testing should only be done when the test site is at the same temperature and humidity expected during normal use; or at a temperature of 65° - 80° F (18° - 26° C) and 45% - 50% humidity for minimum 48 hours prior to testing.
- iv. A minimum of 3 test holes for the first 1,000ft² (100 M²) and one additional test hole for each 1,000ft² (100 M²) thereafter.
- v. Test holes are to be drilled at a depth of 40% of slab thickness (one-side drying) or 20% of slab thickness (two sides drying).
- vi. Test holes should be allowed to acclimate for 72 hours prior to insertion of the test probe. Reusable probes should equilibrate at least 1 hour prior to use in the next test area.

Concrete Alkalinity / pH Test

- i. Testing should only be done when the test site is at the same temperature and humidity expected during normal use; or at a temperature of 65° - 80° F (18° - 26° C) and 45% - 50% humidity for minimum 48 hours prior to testing.
- ii. Using distilled water, place drops of water to form a small puddle approximately 1" in diameter.
- iii. Wait 60 seconds, then dip a portion of the pH paper into the water.

- iv. Acceptable pH levels of the concrete are between 5 and 10 when compared to the color chart provided in the test kit.

Please note, Milliken provides adhesive options that do not require moisture testing. Specific requirements are outlined in the Adhesive Recommendations.

Concrete Slab Preparation

- i Concrete slabs shall be clean and smooth prior to installing floor coverings. Remove all sealers, curing agents and compounds, grease, oil, adhesive removers, old adhesive residue, dirt, paint, etc. to ensure a clean bond surface for the adhesives.
- ii Concrete floors shall be smooth and level to prevent irregularities, roughness or other defects from telegraphing through the new resilient flooring. The surface of the slab shall be flat to within $\leq 1/8"$ over 6-foot and $\leq 3/32"$ over 1-foot in all directions.
- iii Uneven areas should be mechanically ground to smoothness.
- iv Cracks, depressions or other similar irregularities should be leveled using a suitable high moisture resistant Portland cement-based patching compound. Follow the patch manufacturer's instructions regarding mixing and applications.
- v Overly porous, dusty, flaky or soft concrete surfaces are not suitable for resilient floor coverings. It may be necessary to mechanically remove the top layer concrete in such cases and/or these surfaces may need to be primed and covered with a high moisture resistant cement-based underlayment compound. Follow the patching or leveling compound manufacturer's instructions regarding preparation of the concrete surface, priming, mixing of the product, thickness of application and drying time for resilient floor covering installation.
- vi Expansion joints, isolation joints, control joints or other moving joints in the concrete slab shall not be filled with patching compound or covered with resilient flooring.

Applicable requirements for each adhesive option outlined below.

RECOMMENDED ADHESIVES:

- **Milliken Mosaic 95 (trowel & roll on adhesive for full spread and perimeter looselay install methods)**, packaged in 4-gallon (15.1 liter) pails is recommended for the installation of Milliken 5.0 Flexform when:
 - New Pour:
 - 1. It is a new pour > 60 days.
 - 2. Slab is on or above grade.
 - 3. No visible water on the surface.
 - 5. RH does not exceed 95% as measured by the in situ Relative Humidity Probe Test (per latest version of ASTM F2170).
 - 6. pH does not exceed 11
 - 6. Acclimatized to service conditions.
 - 7. Bond test required with archived photo documentation.
 - Renovation - On grade and above grade:
 - 1. RH does not exceed 95% as measured by the in situ Relative Humidity Probe Test (per latest version of ASTM F2170).
 - 2. pH does not exceed 11
 - 3. No visible water on the surface.
 - 4. Existing adhesive must be removed to a stain
 - 5. Acclimatized to service conditions.
 - 6. Bond test required with archived photo documentation.
- **Milliken LVT Standard (trowel & roll on adhesive for full spread and perimeter looselay install methods)**, packaged in 4-gallon (15.1 liter) pails is recommended for the installation of Milliken 5.0 FlexForm LVT when:
 - New Pour:
 - 1. It is a new pour > 60 days.
 - 2. Slab is on or above grade.
 - 3. No visible water on the surface.

- 4. ASTM E-1745 Class B minimum vapor barrier in place in accordance with ACI 302-2001 and directly in contact with the concrete placement.
 - 5. RH does not exceed 98% as measured by the in situ Relative Humidity Probe Test (per latest version of ASTM F2170).
 - 6. pH does not exceed 12
 - 6. Acclimatized to service conditions.
 - 7. Bond test required with archived photo documentation.
 - Renovation - On grade and above grade:
 - 1. Slab is on or above grade.
 - 2. No visible water on the surface.
 - 3. ASTM E-1745 Class B minimum vapor barrier in place in accordance with ACI 302-2001 and directly in contact with the concrete placement.
 - 4. RH does not exceed 98% as measured by the in situ Relative Humidity Probe Test (per latest version of ASTM F2170).
 - 5. pH does not exceed 11
 - 6. Acclimatized to service conditions.
 - 7. Existing adhesive must be removed to a stain
 - 8. Bond test required with archived photo documentation.
- **Milliken Mosaic 98 - Spray adhesive (for full spread and perimeter loose lay install methods)**, packaged in 22oz aerosol cans is recommended for the installation of all Milliken 5.0 FlexForm LVT when:
 - New Pour - pH and RH testing required
 - 1. It is a new pour > 45 days
 - 2. Slab is on or above grade
 - 3. RH does not exceed 98% as measured by the in situ Relative Humidity Probe Test (per latest version of ASTM F2170).
 - 4. pH does not exceed 11
 - 5. No Visible water on the surface
 - 7. Acclimatized to service conditions.
 - 8. Bond test required with archived photo documentation.
 - Renovation - On Grade: Ph and Rh testing required.
 - 1. RH does not exceed 98%
 - 2. pH does not exceed 11
 - 3. There is no visible moisture on the surface.
 - 4. Existing adhesive must be removed to a stain.
 - 5. Acclimatized to service conditions.
 - 6. Bond test is required with archived photo documentation.
- **Milliken LVT Moisture XT (for full spread install method)**: Packaged in 2 gal pails is recommended for the installation of all Milliken 5.00mm Flexform LVT products.
 - New Pour: NO pH or RH Testing required if the following requirements are met.
 - 1. It is a new pour > 45 days
 - 2. Slab is on or above grade.
 - 3. No visible water on the surface.
 - 4. Acclimatized to service conditions.
 - 5. Bond test required with archived photo documentation.
 - Renovation - On Grade: NO Ph or Rh Testing required if the following requirements are met.
 - 1. There is no visible moisture on the surface.
 - 2. Existing adhesive **must** be removed to open porous surface.
 - Must pass ASTM F3191 Porosity Test
 - 3. Acclimatized to service conditions.
 - 4. Bond test is required with archived photo documentation.

2. Gypsum and Lightweight Cellular Concrete Substrates

Gypsum and lightweight concrete subfloors and substrates should in accordance with the listed standard.

Unprimed gypsum surfaces may have a dusty surface and a very open, porous surface, which will lead to an

adhesion bond failure if not properly sealed and treated. It is the responsibility of the installation contractor to obtain verification from the GC, architect, owner or party responsible for the site that the gypsum was properly sealed with the gypsum manufacturer's recommended sealer. If this data is not available, conduct testing according to the appropriate ASTM Test Method for Gypsum Surfaces.

- a. Gypsum surfaces shall be in accordance with and properly prepared to the appropriate ASTM specifications as listed in the above Reference Section
- b. All patching and levelling is to be in accordance with ASTM F2678 (latest version), Standard Practice for Preparing Panel Underlayment's, Thick Poured Gypsum Concrete Underlayment's and Concrete Subfloors with Underlayment Patching Co to Receive Resilient Flooring Compounds

Conduct a surface porosity test to ensure that the surface is properly sealed. If the water is quickly absorbed, stop the installation and Milliken Technical Services.

3. Wood Subfloors

- a. A combination of wood subfloor and panel underlayment construction shall be a minimum of 1" in total thickness.
- b. There shall be at least 18" of well-ventilated air space beneath all wood subfloors. Crawl spaces shall be insulated and protected by a suitable vapor barrier.
- c. Wood subfloors installed directly on concrete or over "sleeper" joist systems are not acceptable for use under Milliken Luxury Vinyl Tile.
- d. Panels designed as suitable underlayment shall be at a minimum:
 - i. Minimum ¼" in thickness
 - ii. Dimensionally stable
 - iii. Fully sanded face to eliminate grain texture or show through.
 - iv. Have a written manufacturer's warranty and installation instructions
 - v. Be free of substances such as ink, fillers and resins which may lead to staining of the resilient flooring
 - vi. Have all knots, voids and defects properly plugged and sanded
- e. Panels shall be installed according to manufacturer's instructions regarding stapling pattern, sanding and filling of joints, and acclimation to installed environment.
- f. Milliken will not cover or accept responsibility for the following:
 - i. Joint telegraphing, either as a "ridge" or "valley"
 - ii. Grain or texture telegraphing
 - iii. Discoloration of finished flooring due to materials used for filling of voids and defects in the face of the underlayment
 - iv. Use of Luan Plywood underlayment
- g. Unacceptable substrates shall be covered using a ¼" or thicker panel underlayment recommended for commercial use. Consult underlayment manufacturer for:
 - i. Recommended uses of product
 - ii. Warranty coverage
 - iii. Joint spacing
 - iv. Nailing or stapling pattern
 - v. Seam treatment
- h. Suitable underlayment panels include Artic (Baltic) Birch, A/C grade plywood with sanded face, or other underlayment grade exterior plywood.

4. Existing Resilient Flooring

When installing Milliken LVT over existing resilient floors, the existing flooring

must be:

- i. Single Layer only.
- ii. Thoroughly stripped of all wax, floor finish, dirt and other contaminants that may affect adhesive bond
- iii. Be firmly bonded to the substrate
- iv. Flat and smooth with no curling edges or loose seams
- v. Dry and free from excessive moisture. All concrete floors shall be tested for moisture regardless of age or grade level. Do not assume that an existing floor is free of moisture related issues. Conduct testing per Section 1.d above.
- vi. Must not be of a cushion back, floating, or perimeter bonded floor
- vii. Embossed surfaces may require use of appropriate embossing leveler in order to not telegraph.

Milliken is not responsible for problems leading to or from indentations, telegraphing of old floor or adhesion release of old floor after the Milliken LVT is installed.

5. Raised Access Flooring

When installing 5.0 FlexForm LVT over raised access flooring. Just ensure the following:

- i. Panels are firm, level, smooth, dry and clean
- ii. Lipping of panels must not exceed 0.030" ($1/32$ ")
- iii. Height difference between panels must not exceed 0.030" ($1/32$ ")
- iv. Gaps between panels must not exceed 0.039" ($3/64$ ")
- v. Overall floor to be level within +/- 0.059" ($1/16$ ")
- vi. Raised Access Floor, requires a trowel notch of $1/16$ " x $1/16$ " x $1/16$ " square notch to be used as a perimeter locking mechanism, and, Full Spread with a $3/8$ " nap roller. Both utilizing Milliken Mosaic 95 adhesive.
- vii. Perimeter area requiring constant access should be rolled on with Milliken Mosaic 95 adhesive.
- viii. Milliken LVT Spray adhesives are acceptable for full spread or perimeter glue installation.
- ix. Milliken LVT Moisture XT Adhesive is not recommended for raised access flooring.

Milliken will not cover or accept responsibility for the following:

- Joint telegraphing, either as a "ridge" or "valley"

6. Old Adhesives

- a. Adhesive residue shall be properly prepared prior to the installation of Milliken LVT. It is recommended that mechanical scraping or grinding be used as a primary means of completely removing old adhesive residue.
 - i. Surface must be porous - Pass ASTM F3191 Porosity test
- b. Residues include, but are not limited to carpet, vinyl, VCT, and or wood flooring adhesives.
- c. Black cutback/asphalt adhesives shall be scraped by hand to remove any loose patches, trowel ridges and puddles so that only a thin residue layer remains. This layer shall then be properly covered using a Portland based patching compound properly mixed with the manufacturer's recommended latex/acrylic additive.
- d. If chemical/liquid adhesive removers are utilized, the manufacturer's recommended instructions for cleaning after use of the remover shall be followed fully. Milliken is not

responsible for any adhesive failures, indentation, bubbling, or delamination of new flooring due to improper cleaning of residue left from liquid adhesive removers. Milliken highly recommends mechanical removal of adhesives.

7. Radiant Heated Substrates

- a. Must not be in direct contact with LVT, must be $\geq 1/2$ " separation between LVT and heating coils.
- b. Temperature of subfloor and floor does not exceed 85° F (29C).
- c. System must be off 48 hrs prior to and post installation.
- d. When ready to start the radiant heat for the first time after installation, limit the temperature increase to 5° F every 6 hours until desired operating temperature is obtained. (The final floor temperature must be less than 85°F (29C) as said in 6.b).
 - a. This will minimize thermal shock and potential bond failure.
- e. Full spread coverage of transitional hard setting adhesive is required
 - a. Milliken LVT Standard Adhesive or Milliken LVT Moisture XT adhesive.
- f. Use of an in-floor temperature sensor is recommended to avoid overheating.

8. Other substrates

- a. Cement terrazzo and metal floors may be suitable for installation and need to be properly prepared for adhesion. Most will need to be prepared with a suitable Portland-based cement patching compound, see manufacturer's recommendations for use and preparation of subfloor.
- b. Ceramic, porcelain, marble and granite tiles are suitable as substrates when the following conditions are met:
 - i. Tiles must be properly bonded with intact grout joints and free of cracks.
 - ii. Surface of tile and grout joints should be free from sealers, coatings, dirt and contaminants.
 - iii. Properly prepare the surface of tiles by grinding any high areas and using a suitable Portland based leveling compound and primer to fill in all low areas. Follow leveling compound manufacturer's recommendations for surface preparation and application of product.

The following are **not suitable substrates** for installation of Milliken Flexform 5.0mm LVT:

Rubber, cork, or asphalt tiles; epoxy terrazzo flooring; stained or painted concrete and any other material covered in the sections above and listed as unsuitable.

Unsuitable substrates should be covered with an approved 1/4" wood underlayment or suitable Portland-based cement leveler or patching compound. Always follow the manufacturer's recommended practices when covering an existing substrate.

WARNING!

DO NOT SAND, DRY SWEEP, BEAD BLAST, SHOT BLAST OR USE ANY OTHER MECHANICAL MEANS TO PULVERIZE

EXISTING TILE FLOORING, BACKING, LINING FELT, ASPHALTIC "CUT - BACK" OR ANY OTHER ADHESIVES. THESE

PRODUCTS MAY CONTAIN ASBESTOS FIBERS AND /OR CRYSTALLINE SILICA. AVOID CREATING DUST. INHALATION

OF SUCH DUST IS A CANCER AND RESPIRATORY TRACT HAZARD. SMOKING BY INDIVIDUALS EXPOSED TO ASBESTOS

FIBERS GREATLY INCREASES THE RISK OF SERIOUS BODILY HARM. UNLESS POSITIVELY CERTAIN THAT THE PRODUCT

IS A NON - ASBESTOS CONTAINING MATERIAL, YOU MUST PRESUME IT CONTAINS ASBESTOS. REGULATIONS

MAY REQUIRE THAT THE MATERIAL BE TESTED TO DETERMINE ASBESTOS CONTENT.

INSTALLING MILLIKEN FLEXFORM 5.0mm LUXURY VINYL PLANK

1. General

- a. When using more than one carton, ensure that the cartons are all the same run / lot number. Different lots may have a variation in color, texture or gloss so they should not be mixed in the same room. **Contact your Milliken representative before installing product from differing runs or lots.**
- b. Milliken plank simulates wood planks and can be installed in the same pattern as a wood plank floor in a random pattern, staggered design, diagonally or other design.
- c. Planks are best in appearance when lying parallel to the longest walls in the room.
- d. Milliken Flexform 5.0mm flooring can be cut using a tile cutter or a utility knife. Keep knife blades sharp for easy, accurate and safe cuts. Fit planks to walls, columns, door jambs, etc. using the same methods as with other floor tiles; overlap, pattern scribe, wall scribe and free hand.
- e. When working on top of Flexform 5.0mm LVT during the installation, be sure to not disturb tiles and planks that have already been laid. If a piece does become dislodged simply peel it up and reinstall; use of a scrap piece as a tapping block can help readjust disturbed tiles and planks.
- f. If it is necessary to heat the planks to achieve a cut, heat slightly from the back only with minimal heat setting (a standard hair dryer will produce enough heat). Carefully make cuts with a sharp utility knife on the heated plank.

2. Adhesive selection

- a. Milliken approved adhesives are designed to be used on most interior installations over most concrete and wood substrates, and other approved substrates that are properly prepared and leveled.
 - i. Milliken Mosaic 95 (trowel or roll on adhesive) 1/16" x 1/16" x 1/32" U notch trowel
 1. Spread rate 165 - 200 sq. ft per gallon (trowel)
 2. Spread rate 200 - 260 sq ft. per gallon (3/8" roller)
 - ii. Milliken LVT Standard (trowel or roll on adhesive)
 1. Non-Porous 1/16" x 1/32" x 1/32" U notch
 - a. Spread rate 200 - 260 sq. ft per gallon (trowel)
 2. Porous - 1/16" x 1/16" x 1/16" SQ notch (trowel)
 3. Spread rate up to 350 sq ft. per gallon (3/4" roller)
 - iii. Milliken Mosaic 98 - Spray - follow spray pattern as shown on can
 1. Spread rate 170 - 200 sq. ft per 22oz can
 - iv. Milliken LVT Moisture XT (for full spread install method)
 1. 1/16" x 1/32" x 1/32" U Notch trowel.
 2. Spread rate up to 150 - 180 sq ft / gal
- b. The adhesive should be allowed to dry to the touch sufficient to prevent slippage. Loss of adhesion can result if the flooring is not installed within the working time of the adhesive.
- c. For some commercial applications and special substrates, a two-part epoxy or urethane adhesive is recommended. Typical applications for these types of adhesives are wet areas, floors subjected to heavy point loads and/or rolling loads, and floors that will be exposed to extreme temperature changes or extreme temperatures. **Milliken LVT Moisture XT Adhesive can be used in these applications.**

- d. Application of Milliken LVT Moisture XT adhesive requires an open porous slab (No residual adhesive).
 - i. LVT Moisture XT is a wet-set adhesive. **Do not** walk, kneel, or work directly on top of flooring without the proper use of knee-boards for at least 60 minutes after flooring is installed.
 - ii. Spread adhesive using a 1/16" x 1/32" x 1/32" (1.6mm x .8mm x .8mm) U Notch trowel.
 - iii. Wait 10 minutes after adhesive is spread to build surface tack and reduce movement. Adhesive ridges will dissipate and level-out during that time.
 - iv. Working time is approximately 45 min.
 - v. Use a hand roller and apply normal pressure to ensure a good bond.
 - vi. Periodically lift flooring material to verify proper transfer of adhesive to tile.
 - vii. Wait a minimum of 1 hour, but no more than 2 hours, after the installation to roll and cross roll floor with a 75-100 lbs. (34-45 kg) roller to ensure proper transfer of adhesive.
- e. If it is determined that a non-Milliken approved adhesive is to be used on an installation, Milliken recommends a written warranty be obtained by the adhesive manufacturer warranting this specific installation with their products.
- f. Raised Access Floor, requires a trowel notch of 1/16" x 1/16" x 1/16" square notch to be used as a perimeter locking mechanism. And, Full Spread with a 3/8" nap roller. Both utilizing Milliken Mosaic 95 adhesive.
 - i. Perimeter area requiring constant access should be rolled on with Milliken Mosaic 95 adhesive.

Use of non-Milliken adhesives or non-Milliken recommended adhesive does not affect Loose-Lay LVT product warranties, however, any claim related to adhesive performance or workmanship and any damage caused by this would be the total responsibility of the party responsible for using the non-recommended product.

3. Layout

- a. Determine the center of the room and dry lay a section of tile/plank from the center line to one wall to determine that the pattern is centered and fit. Measure the border cuts along the wall and compare to the following criteria. If necessary, adjust the first row at the centerline to meet either the plank or tile
- b. Planks should never be less than 9 inches long or less than half of the width of the plank. Avoid small pieces in border areas and adjust the center lines to achieve the proper pattern.
- c. Tiles should not be less than 6" in length or width. Avoid small pieces in border areas and adjust the center to achieve the proper pattern
- d. Tiles are designed to be laid in any fashion with the most popular being point-to-point and ashlar patterns. All tile sizes and patterns look best when the layout is balanced in the installed room.

4. Installation of flooring

- a. Spread adhesives using the proper trowel notch; more adhesive is not a good thing with LVT products.
- b. Before spreading adhesive, strike a parallel chalk line to the centerline of the length of the room approximately 2' to 3' from the wall. Actual position is to be determined by the layout of the planks, ensure that the pattern is followed from your initial starting point determined in the dry layout performed earlier. If necessary, re-lay part of the pattern from centerline starting point to determine the exact measurement of the parallel line.
- c. After determining the starting point, apply 9" band of adhesive along the starter wall and down the side walls, keeping in mind the open time for the adhesive on the side walls. Allow to tack up. Some slippage

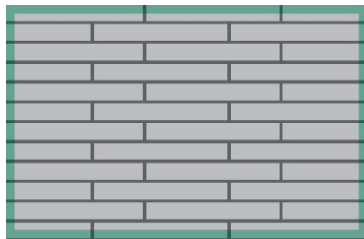
of the plank/tile may occur with a “wet” method. Be careful to follow layout lines and allow adhesive to set before rolling.

- d. Begin installing the first row of flooring into the adhesive, keeping an 1/4” gap along all vertical surfaces. Flexform 5.0mm LVT must be installed ‘tight’; check that room edges are solid, and all thresholds or openings are edged with a 9” strip of adhesive and applicable transition. The tile/planks must be installed ‘tightly’ to themselves. Once your starter rows are secure and the flooring planks/tiles are tightly butted together, continue applying adhesive along the perimeter of the adjacent walls so that enough flooring can be placed within the working time of the adhesive.
- e. Milliken recommends an additional “X” pattern be placed corner-to-corner if the space is greater than 20 feet (6 meters).
- f. Start installing the next rows by continuing the pattern and tightly butting all joints together. A scrap piece of flooring can be used to lightly tap the pieces into the previous row.
- g. Continue in this manner spreading only enough adhesive along the perimeter that can be safely installed within the working time of the adhesive.
- h. Be sure to stagger all end joints by at least 6” or the width of one plank. Vary the length of your planks during installation to ensure that end joints are not bunched, and a randomness is achieved in the pattern.
- i. During installation, roll the areas of the floor that are utilizing adhesive with a 3-section 100 lb. roller to ensure proper transference of adhesive to the plank backing.

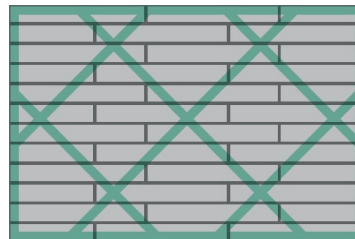
Flexform 5.0mm LVT Installation over Milliken LVT underlayment

- Install gloss side down.
- For commercial and high traffic areas, underlayment must first be bonded to the subfloor with adhesive, preventing any movement on the floor. Use Milliken LVT Standard adhesive, following instructions on pail.
- Roll out underlayment next to wall. Roll out next row in same manner butting underlayment close to first row (do not overlap). Roll with a 75–100 lb. roller to smooth out any air pockets and to secure a good bond to the adhesive. Then apply adhesive to the top side of the underlayment per installation instructions on adhesive pail.
- If residential or low traffic, there is no need to adhere the underlayment to the subfloor, only requirement is to seal the seams with a moisture resistant tape.
- Install Loose-Lay LVT per Milliken installation instructions.
- Always install flooring according to the Milliken LVT installation instructions.

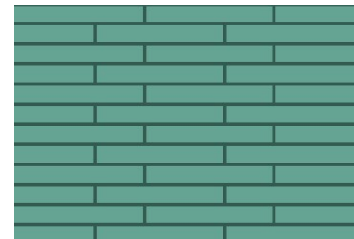
Please refer to adhesive pail for adhesive application details



9” band of adhesive around perimeter



Over 20’ in any direction use “x” band of adhesive



Heavy traffic, full spread adhesive recommended

After Installation

1. Be sure planks are set, flat and have tight edges. Re-roll the entire installation, along the length and width of the planks with a 3-section 100 lb. roller to ensure all tiles are properly set into the

adhesive. If necessary, weigh down any loose planks overnight to ensure bond. Adhesive can be carefully reactivated using a heat gun after drying to reinstall planks.

2. Clean adhesive residue from the face of the flooring following these directions:
 - a. Wet adhesive residue on the surface of the planks can be cleaned with a clean, white cloth dampened with warm, soapy water. Do not use excess water as this can seep between the seams of planks and lead to an adhesion failure!
 - b. Dry adhesive residue can be cleaned with mineral spirits or denatured alcohol and a clean cloth in a sparingly manner. Carefully follow the directions on the mineral spirits container. Please note:
improper use of any chemical can harm the finish of the LVT.
 - c. Do not pour soapy water, mineral spirits or denatured alcohol directly on the LVT.
 - d. If working with epoxy or urethane adhesives you must clean these up while wet according to the adhesive manufacturer's instructions, which can be generally found on the container label.
 - e. Proper rolling of floors during and after installation is a must on Luxury Vinyl products. Use a 3section, 100-pound roller to set flooring into the adhesives.
 - f. In the event that Milliken Flexform 5.0mm is not the last portion of the construction project, the floor must be protected from construction traffic and damage. Wait 24 hours and utilize a reinforced fiber protective board or a heavy Kraft paper (min. 60 lbs.) and cover the floor. Failure to wait 24 hours before covering can impact adhesive curing.

MILLIKEN ADHESIVES

Milliken adhesives are engineered to be used on a variety of interior installations including most concrete, wood and other approved substrates that are properly prepared.

Use of non-Milliken adhesives or non-Milliken recommended adhesive does not affect Milliken LVT product warranties, however, any claim related to adhesive performance or workmanship and any damage caused by this would be the total responsibility of the party responsible for using the non-recommended product.

Milliken LVT adhesives are specially formulated to give superior performance with Milliken LVT products. Adhesives should be purchased with the LVT for maximum convenience and lowest total cost.

NOTE: THE ABOVE INSTALLATION INSTRUCTIONS ARE GENERAL IN NATURE AND ARE NOT COMPLETE FOR EVERY MILLIKEN LVT PATTERN. SOME MILLIKEN PATTERNS REQUIRE SPECIFIC INSTALLATION METHODS TO ACHIEVE THE DESIRED APPEARANCE. ALWAYS CONSULT YOUR MILLIKEN REPRESENTATIVE OR TECHNICAL SERVICES IF THERE ARE QUESTIONS ABOUT THE CORRECT INSTALLATION METHOD. PLEASE SEE WWW.MILLIKENCARPET.COM FOR THE LATEST INSTALLATION INFORMATION.

This information is supplied by Milliken & Company

300 Lukken Industrial Drive West, LaGrange, Georgia 30240

BACKED BY THE LARGEST, MOST PRODUCTIVE RESEARCH AND DEVELOPMENT FACILITY IN THE CARPET INDUSTRY.

Call Technical Services Team Toll Free 1-800-528-8453 - Select Option #2

The above instructions represent the best available data and are deemed to be correct and complete; however, Milliken assumes no liability for installation-related problems.

01/2023