

KNIGHT

QUARTZ FLOORING

KNIGHT QUARTZ FLOORING TILE INSTALLATION GUIDE

As changes occur in our installation systems, Knight Quartz Flooring will publish a new edition.
To ensure the most up-to-date information, please visit our website at

www.knightquartzflooring.com

TABLE OF CONTENTS

Section

1. *Before Starting the Job* – Moisture Testing
2. Material Handling & Storage
3. Jobsite Conditions
4. Substrate Preparation
5. Adhesives
6. Knight Quartz Flooring Tile Installation
7. After Installation

1. BEFORE STARTING THE JOB - MOISTURE TESTING

CONCRETE MOISTURE AND pH TESTING

Before beginning the installation: Test all concrete slabs for moisture and alkali regardless of the slab's age or grade level. New concrete slabs must be properly cured and dried before installation of Knight Quartz Flooring. *Drying time before slabs are ready for moisture testing will vary depending on atmospheric conditions and mix design.*

Conduct all concrete moisture tests following procedures outlined in **ASTM F 2170** (Relative Humidity *in situ* Probe Test Method). For additional information about these two procedures, contact the American Society of Testing and Materials (ASTM) at (610) 832-9585.

Knight Quartz Flooring requires that the concrete substrate must pass the internal Relative Humidity Test before a successful installation can be accomplished.

Note: It is the floor covering installer's responsibility to ensure that these tests have been conducted and that the test results are acceptable before starting the installation.

CONCRETE MOISTURE & pH REQUIREMENTS

<u>Type of Test</u>	<u>Maximum Result</u>
F 2170 Relative Humidity <i>in situ</i> Probe Test	RH must not exceed 80%
pH readings	Must not exceed 9.0



Wagner Rapid RH Test Kit

Photo courtesy of Wagner



pH Testing Kit

Photo courtesy of Vaprecision

ASTM F 2170 RELATIVE HUMIDITY CONCRETE MOISTURE TESTING USING *IN SITU* PROBES

- Do the required concrete moisture testing only after the building is fully enclosed and the HVAC system is fully operational for at least one week.
- Perform three tests for the first 1,000 feet and at least one additional test for each additional 1,000 square feet.
- Select your test probe locations to provide information about moisture in areas of potential high moisture. For slabs on grade and below grade, include a test location within 3 feet of each exterior wall.

- Follow the procedures as described in **Test Method F 2170**. Failure to follow the detailed procedures in F2170 can lead to a moisture related installation failure.
- Field testing has found that the **Wagner Rapid RH System** provides consistent RH results. For more information, visit the Wagner website at www.rapidrh.com.

pH Testing – Concrete floors must be tested for alkalinity prior to the installation of Knight Quartz Flooring. To test for pH at the surface of a concrete slab, use wide range pH paper, its associated pH chart, and distilled or de-ionized water. Place several drops of water on a clean concrete surface, forming a puddle 1 inch in diameter. Allow the puddle to set for 1 minute, and then dip the pH paper in the water. Remove immediately and compare to the chart to determine the pH reading.

Readings in excess of **9.0** will cause acrylic adhesive bond failure.

Document All Test Results – Moisture and pH test results need to be documented by the person conducting the testing and submitted to the general contractor/architect/building owner at the time of the testing. This is important, as moisture and/or excess pH conditions that occur after the floor covering installation is completed are not the responsibility of the installer or Knight Quartz Flooring.

2. MATERIAL HANDLING AND STORAGE – Knight Quartz Flooring Tiles are composed of more than 70% natural quartz. Knight Flooring Reinforced vinyl floor tiles are extremely tough, durable and easy to maintain. The high quartz content provides exceptional durability and superior wear resistance.

- Store all cartons of tile flat and squarely on top of one another. Do not lie on edge.
- Store all flooring products, adhesives, seam sealer and maintenance products in a dry, temperature-controlled interior area at **65 – 80° F**. Avoid temperature extremes.
- Acclimate all materials to job site conditions. Deliver the material to the job site **at least 48 hours** prior to installation.

3. JOB SITE CONDITIONS

- Visit the jobsite to confirm site conditions & floor measurements.
- The jobsite needs to be well-lighted so that the installers can properly prepare the substrate and install the floor.
- Allow other finishing trades, especially the overhead trades, to complete their work before beginning the flooring installation. During spackling and painting, cover the substrate to prevent contamination or staining. Such stains can cause adhesion failures and product discoloration.
- Close working spaces to traffic for 12 hours before installation and at least 12 hours after installation. This will minimize the chance of damaging the new floor.
- The building's heating and air conditioning system needs to be in full operation for at least one week prior to moisture testing and floor installation.
- Portable heaters are not acceptable.
- Kerosene heaters should never be used where floor covering products will be installed. They leave a residue on the substrate. They heat the air, not the substrate.
- **Ambient Jobsite Conditions** - For 48 hours before installation, during the installation, and for 48 hours after installation, keep the temperature of the flooring material, the adhesive, the space to receive flooring, and the subfloor between **65°-80°F or the conditions expected during normal occupancy**. Thereafter, the minimum temperature needs to be

55°F. Be sure the adhesive and the flooring acclimate to the job site conditions by delivering all materials to the job at least two days prior to installation.

4. SUBSTRATE PREPARATION

Knight Quartz Flooring can be installed on wood substrates and on concrete substrates that are -

- On grade
- Above grade
- Below grade

Wood substrates – Use **APA** underlayment type plywood such as APA Underlayment EXT. Wood subfloors should be -

- Double layer construction
- Minimum one-inch total thickness
- Minimum 18 inches of well-ventilated air space beneath the wood substrate
- All crawl spaces must be insulated with a vapor retarder
- The top layer of the wood substrate must be completely free of knots or other voids in its surface
- **Caution** - Do not install over 'sleeper' floors or plywood floors that have been installed directly over a concrete slab.
- **Unacceptable wood surfaces include**, but are not limited to, *Luan, plywood with knots, underlayments made of pine or other soft woods, particle board, chipboard, flake board, oriented strand board, Masonite™ or other hardboard underlayment, hardwood flooring, textured or cushioned flooring, or other uneven or unstable substrates.*
- Cover unacceptable surfaces using a 1/4-inch or thicker wood panel underlayment system such as TECPLY™. Follow the panel underlayment manufacturer's written instructions for spacing, nailing, and seam treatment for underlayment panels.

Concrete Substrates –

Responsibility for the concrete warranty - Regardless of the type of concrete or cement-like material that is used as a substrate, in the event of any underlayment failure, the responsibility for warranty guarantees rests with the concrete or cement-like manufacturer and not with the manufacturer of the resilient flooring.

Concrete Slab Construction - New and existing concrete substrates must meet the requirements of the latest edition of **ASTM F 710 *Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.***

The appendix of **F 710** contains guidelines regarding concrete slab construction, and specific information regarding lightweight concrete, water-cement ratio, curing procedures, alkalinity, moisture retarders, flatness and levelness, and additional reference documents.

Minimum Concrete Substrate Requirements - To ensure a successful Knight Quartz Flooring installation, concrete substrates must be structurally sound to receive resilient flooring material and must meet these minimum requirements:

- A minimum compressive strength of 3000 psi
- A concrete mix water/cement ratio of less than 0.45
- A minimum density of 115 lb/cubic foot

Lightweight concrete (concrete with a density of less than 115 lb/cubic foot) may not be a suitable substrate for Knight Sheet Flooring. Lightweight concrete suffers from fundamental problems that include, but are not limited to:

- Low compressive strength
- Surface porosity and breakdown
- High moisture content
- Excessively long drying times
- Surface indentation due to its low compressive strength

ASTM F 710 clearly states: *Lightweight concrete, less than 115 lb/cubic foot, may have such low strength that it is unsuitable for covering with resilient flooring...* In addition, *floors containing lightweight aggregate or excess water and those that are allowed to dry from only one side, such as concrete on metal deck construction, may need a much longer drying time.*¹

Contact Knight Technical Support @ **(800) 356-0740** before installing Knight Quartz Tile on lightweight concrete.

Flatness and Levelness – Concrete substrates need to be smooth to prevent irregularities and roughness from telegraphing through the new Knight Sheet Flooring. The surface of the concrete needs to be *flat within the equivalent of 3/16 inch in 10 feet and within the equivalent of 1/32 inch in 12 inches*. For more information on flatness and levelness, consult **ASTM F710** Section X 1.7.

Concrete Surface Preparation - ASTM F 710 *Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring* states: *All substrates to receive resilient flooring shall be permanently dry, clean, smooth, and structurally sound. They shall be free of dust, solvent, paint, wax, oil, grease, residual adhesive, adhesive removers, curing, sealing, hardening, or parting compounds, alkaline salts, excessive carbonation or latency, mold, mildew, and other foreign materials that might prevent adhesive bond.*¹

Concrete floors must be structurally sound and -

- Permanently dry
- Clean
- Smooth
- Free of dust, sealers, paint, wax, oil, grease, residual adhesives, adhesive removers, coatings, finishes, dirt, film-forming curing compounds, silicate penetrating curing compounds, sealing, hardening, or parting compounds and any other substances that will interfere with the adhesion of the new Knight Quartz Flooring or with the rate of moisture dissipation through the top surface of the slab.
- Use only non-chemical methods, such as bead blasting or abrasive cleaning, to remove all bond breakers from the surface of the concrete. Removal procedures need to be completed at least 48 hours before any concrete testing is begun
- Do a **bond test** on any floor where foreign substances have been removed. Install several tiles in random areas according to Knight installation instructions described in this guide. Allow the adhesive to set for 24 hours. If the tile and adhesive are easily removed from the substrate, the slab is still contaminated. Additional preparation will need to be done. A 2nd bond test will be needed.

WARNING: *Exceptionally porous, soft, or dusty concrete surfaces may have such low strength that they are not suitable for installation of resilient floor coverings. It may be necessary to*

mechanically remove the top layer of concrete in such cases. Such surfaces may need to be primed and covered with a latex patching or underlayment compound. Consult with a manufacturer of patching or underlayment compounds or someone with expertise in concrete problems.²

Knight does not recommend installation of its Quartz Flooring over gypsum concrete.

Moisture Vapor Retarder – For all Knight installations on grade or below grade, there must be a permanent, effective moisture vapor retarder installed directly below the slab. The retarder must be at least 0.010 inches thick with a permeance of 0.1 y (perms). This retarder is typically incorrectly called a moisture vapor barrier. Provided it has not been ripped or torn, this vapor retarder will reduce the potential severity of water vapor penetration into the concrete slab from groundwater sources.

Alternate approved substrate – Knight Quartz Flooring Tile can be successfully installed over well bonded Knight Quartz Tile, VCT, VAT, or solid vinyl tile. To ensure a successful installation, the tile must be -

- Single-layer of Knight Tile, VCT, VAT, or solid vinyl tile only
- Free of all waxes and floor finishes
- Free of all dirt and debris
- Fully dry
- Securely bonded to the substrate
- Flat with no raised areas

The performance of the finished floor is directly dependent upon the condition and continued bond of the existing floor tile. Any irregularities in the existing flooring (such as bumps, depressions or tile joints) will telegraph through the new floor. If the tile's surface is not sufficiently smooth, it may be preferable to remove the tile before beginning the installation.

Other Substrates - Cement terrazzo or metal may be suitable for Knight Sheet Flooring. Check with your patching/leveling compound manufacturer for guidelines on preparing these substrates. For metal substrates, remove all dirt, rust, oil or other contaminants. Clean the metal with mineral spirits to remove all impurities. Use a 2-part epoxy adhesive such as **WW Henry 452**.

Unacceptable Substrates - Epoxy terrazzo, rubber, cork, and asphalt tiles are not acceptable substrates on which to install Knight Quartz Flooring. To successfully install Knight Flooring, remove these using mechanical means.

Patching or Underlayment Compounds - Use a **Portland-based** patching or underlayment compound to fill all surface cracks, grooves, depressions, control joints or other non-moving joints, and other surface irregularities. Choose a product that is moisture-, mildew-, and alkali resistant with a minimum of 3000 PSI compressive strength after 28 days.

Knight does not recommend gypsum based products.

Expansion joints - *Joints such as expansion joints, isolation joints, or other moving joints in concrete shall not be filled with patching compound or covered with resilient flooring.¹* Use an expansion joint covering system. Such joint covering systems are made by Gradus – www.gradusworld.content.accessories.

Removal of Existing Resilient Floor Coverings - If you decide to remove an existing floor please be aware that existing floors and adhesives may contain asbestos fibers that cannot be easily identified except by laboratory testing. Improper removal of asbestos containing materials (including, but not limited to, vinyl asbestos tile, asphalt tile, felt backed sheet goods, asphalt 'cutback' adhesives and other flooring materials) can create asbestos dust, a known health hazard.

ASBESTOS WARNING! *Do not sand, dry sweep, dry scrape, drill, saw, bead blast, or mechanically chip or pulverize existing resilient flooring, backing, lining felt, asphaltic 'cutback' adhesive, or other adhesive. 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. The pamphlet from the **Resilient Floor Covering Institute** entitled **Recommended Work Practices for Removal of Resilient Floor Coverings** provides a defined set of instructions for removing all resilient floor-covering structures.*

NOTICE: *Various federal, state and local government agencies have regulations governing the removal of in-place asbestos-containing material. If you contemplate the removal of a resilient floor covering structure that contains, or is presumed to contain asbestos, you must review and comply with all applicable regulations.*

Note: **KNIGHT QUARTZ FLOORING PRODUCTS CONTAIN NO ASBESTOS!**

Installing on Substrates Contaminated with Adhesive Residue

Black Adhesive Residue - Do not install resilient flooring directly over residual adhesive or paint. Do not skim coat over old adhesive with patching compound. Where existing asphalt (black) adhesive is present, scrape all adhesive residues off the subfloor. The scraping should remove at least 95% of all residues. No adhesive trowel ridges should remain. SEE THE WARNING ABOVE.

Water-based (other than black) Adhesive Residue - This adhesive residue must be thoroughly removed prior to applying a patching or underlayment compound. This includes old carpet and VCT adhesive. Do not skim coat over adhesive residue with patching compound. No trowel ridges from the old adhesive should remain on the substrate.

Chemical Adhesive Removers – Knight Quartz Flooring does not recommend the use of chemical adhesive removers. There are chemical adhesive removal products that contain solvents effective in removing cutback or emulsion adhesives that comply with OSHA requirements. However, these products leave a solvent residue within the subfloor that interferes with the bonding of the new floor's adhesive.

Concrete subfloors contaminated by chemical adhesive removal products must be mechanically abraded to remove all such residues.

Radiant heated floors – Knight Quartz Flooring may be installed over a radiant heated floor as long as the slab temperature does not exceed 85° F under any condition of use.

5. ADHESIVES

Knight Quartz Flooring has invested much time and research in developing the best adhesives for use with Knight Floors.

Use of Alternate Adhesives - Should Knight Quartz Flooring be installed with adhesives other than Knight's, all adhesive related performance problems are the responsibility of the manufacturer of the alternate adhesive used. Potential problems include, but are not limited to: *indentation, shrinkage, shifting, bubbling, seams peaking, adhesive oozing, moisture related failures, etc.*

Knight Quartz Flooring Adhesive is a solvent free, low odor, acrylic-based, pressure sensitive adhesive for interior installations of Knight Quartz Tile and Quartz Sheet Flooring.

- 4 gallon container - coverage is approximately **550 to 650 square feet** per container
- Use the Gundlach FFA Trowel (1/16" x 1/32" x 1/32" notch)
- Minimum set up time 20 – 35 minutes; dependent on temperature, humidity & airflow
- Adhesive open (working) time for Knight Tile - **8 hours**
- Shelf life: One (1) year if not opened.



The Gundlach FFA Trowel

***Spreading adhesive with the wrong trowel is the cause of many installation failures!
If you don't have the FFA Trowel, don't start the installation!***

The Gundlach FFA Trowel is the correct trowel for applying Knight Quartz Flooring Adhesive. The trowel acts as a measuring device. The FFA Blade is a fine notch (1/16"x 1/32"x 1/32") professional trowel that is available either with a wooden handle or as part of the Versablade System.

- Periodically check your trowel for wear.
- Do not re-notch the Gundlach trowel blade by hand.
- Replace the trowel every 1,000-2,000 s/f.
- Clean old adhesive from your tools using warm water and detergent or mineral spirits.

Instructions for spreading Knight Quartz Flooring Adhesive

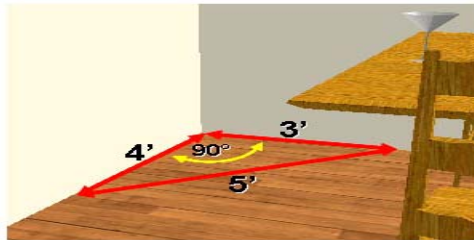
- Spread the adhesive using the Gundlach FFA trowel blade
- Spread evenly. Avoid leaving any puddles of adhesive.
- After spreading, allow the adhesive to set up before laying flooring into the adhesive bed. Minimum set up time is 20-35 minutes.
- The adhesive will turn translucent when ready for flooring installation.
- Knight Quartz Adhesive *is ready for flooring installation when a fingertip touched to the adhesive bed shows only the ridges from the trowel notching.*
- If you are installing Knight Quartz Flooring over an existing tile floor, the adhesive will need more set up time than the 20-35 minutes mentioned above.
- Roll the flooring within an hour after placing the flooring into the adhesive bed.
- Roll the floor in both directions, with a 100 lb three-section roller overlapping the previous rolled area by 1/2 of the width of the roller.
- Cover the floor with construction paper and protective boards to protect it from damage from other trades.
- Permit light foot traffic 12 hours after installation.
- Keep all heavy traffic and rolling loads off the floor for 48 hours.

- While the adhesive is still wet: Clean all tools and adhesive spills with a white cloth dampened with water and mild detergent.
- When the adhesive is set: clean all tools and adhesive spills with a white cloth dampened with mineral spirits. Follow with a water rinse.

6. KNIGHT QUARTZ FLOORING TILE INSTALLATION

Knight Quartz Flooring Tile features a unique visual directional shading effect created by its manufacturing process. *Knight tile must be installed with the directional markings on the tile back aligned in the same direction.* Check the diagram on the tile cartons for correct orientation.

- Sweep and/or vacuum the substrate before spreading adhesive.
- Use one wall as a guide. Place the tiles with the lines on the tile back running parallel toward the wall.
- Drop two chalk lines to square the room. Use the 3-4-5 squaring method.
- **3-4-5 squaring rule** - At the intersection of the two chalk lines, measure along one line and place a mark at 3 feet. On the opposite side of the intersection, measure and place a mark at 4 feet. Measure the distance from the two marks. If the intersection is square, the distance will be 5 feet. Adjust the chalk lines as needed so that the border tiles are the same size on each side of the area. Be sure to also consider the tiles in the doorways or additional design criteria when adjusting the lines. Dry lay several tiles to determine the best layout.



3-4-5 right angle

Diagram courtesy of Wiki-How

- Spread the Knight adhesive in one quadrant at a time to control runoff.
- Once the adhesive is fully set, lay tiles following the standard point-to-point installation method. Use a pyramid layout beginning at the intersection of the two chalk lines.
- Allow ¼ inch expansion space at the perimeter and around all stationary objects.
- Do not mix tiles from different boxes or pallets. Start by laying all tiles from one box. Then start a new box. Install tiles from the last produced tiles sequentially to the first produced tiles to insure proper shade distribution.
- Roll the tile into the adhesive bed within 1 hour. Roll in both directions using a 3-section, 100 lb roller, overlapping each pass by ½ of the width of the roller.
- Clean excess wet adhesive with a white cloth dampened with water and mild detergent.

7. AFTER INSTALLATION

- Clean dried adhesive residue using a white cloth dampened with mineral spirits.
- Cover the newly installed floor with construction paper and protective boards to protect it from damage from other trades.
- Inspect the floor for any damaged or misaligned tiles and replace them.
- Permit light foot traffic 12 hours after installation.
- Do not slide or drag pallets or heavy equipment across the new floor.

- Keep all heavy traffic and rolling loads off the floor for 48 hours.
- While the adhesive is still wet: Clean all tools and adhesive spills with a white cloth dampened with water and mild detergent.
- When the adhesive is set: Clean all tools and adhesive spills with a white cloth dampened with mineral spirits. Follow with a water rinse.

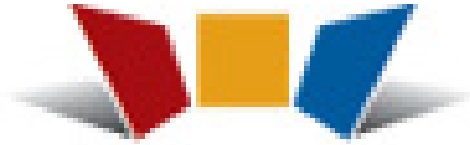
Initial Maintenance

The new floor may be swept and lightly damp mopped. **Do not heavy wash for 72 hours.** After 72 hours follow the maintenance procedures found at www.knightquartzfloors.com or call Knight Technical Support at **(800) 356-0740**.

Referenced Documents

This publication includes direct copyrighted quotes from accepted industry practices as follows:

1. Adapted, with permission, from **ASTM F 710, Standard Practice for Preparing Concrete Floors To Receive Resilient Flooring**, copyright American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428. Complete copies of these standards may be purchased from ASTM, phone (610) 832-9585, fax: 610-832-9555, e-mail service@astm.org, website www.astm.org
2. From *Recommended Work Practices for Removal of Resilient Floor Coverings* by the Resilient Floor Covering Institute (RFCI) 401 East Jefferson Street, Suite 102, Rockville, MD 20850. phone: (301) 340-8580
3. Adapted, with permission, from **ASTM F 2170, Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using *in situ* Probes**, copyright American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428. Complete copies of these standards may be purchased from ASTM, phone (610) 832-9585, fax: 610-832-9555, e-mail service@astm.org, website www.astm.org.



KNIGHT

QUARTZ FLOORING

**Knight Quartz Flooring, LLC
PO Box 8058
Northfield IL 60093**

**Technical Support - Sales - Sample Service
Email – customerservice@kqflooring.net**

**1-800-356-0740 phone
1-866-798-0211 fax**

www.knightquartzflooring.com