

MANNINGTON COMMERCIAL GENERAL INSTALLATION GUIDE

Welcome

This Guide has been created for installers and specifiers of Mannington floor covering products. It will prove especially helpful to those who require a basic knowledge of products, and how to install those products properly.

Our commitment is to provide comprehensive information to assist you in performing the best installation possible. By helping you perform at your best, a long performance life and optimum results for our floor covering products can be obtained.

Mannington strongly recommends following all the directions and advice we have carefully researched and provided for you in this guide. We have based all of our instructions on industry-accepted recommendations. Also, regular field testing of our products and their installation systems produces important, real world experience.

Important Notice to Floor Covering Installers

If it becomes necessary to remove any resilient floor covering materials containing asbestos, it is important to recognize that governmental regulations apply. Please be aware that governmental regulations involving the removal of existing materials containing asbestos vary from state to state. Always exercise safeguards to protect yourself and others on the job site.

Mannington recommends that whenever possible, new wood panel underlayment should be installed over existing resilient floor covering. Removal of existing floor covering should only be done as a last resort.

DANGER: Do not sand, dry sweep, dry scrape drill, saw, bead blast, or mechanically chip or pulverize existing resilient flooring, backing, lining felt, or asphaltic "cutback" adhesives. These products may contain either asbestos fibers or crystalline silica. Avoid creating dust. Inhalation of such dust containing respirable fibers or crystalline silica may cause cancer and respiratory tract diseases. 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.

For instructions on how to remove existing resilient floor covering, refer to the Resilient Floor Covering Institute's brochure, *Recommended Work Practices for Removal of Resilient Floor Coverings*.

These guidelines are based on industry accepted recommendations established by various trade organizations, as well as thorough field testing of various products and their installation systems. This information is also based on the most up-to-date technical information available. We are constantly striving to improve, standardize, and simplify all aspects of flooring installation as new products and procedures are developed. As the professional installer or specifier, it is your responsibility to remain current regarding recommendations for suitability of intended use of our floor covering products and their required installation systems. One last advisory note: Always use Mannington recommended adhesives, primers, and seam sealers.

Introduction

No floor covering material is functional until it is installed into a location. The skill, with which this material is installed, as well as the overall condition of the location, greatly influences the appearance and the performance of the floor covering material. Additionally, the type of floor covering material selected must be appropriate for the intended use. Therefore, it is absolutely critical that sufficient consideration is given to these factors. This guideline cannot cover every possible situation or floor covering question, but it provides general instruction that enable installers, sales representatives, and product specifiers to make solid decisions regarding the installation process. This Guideline should be used in conjunction with each of our published, individual flooring type installation instructions.

The professional installer should ultimately be the last inspector of the quality of any finished flooring products and should never install a product with a visible defect. Additionally, professional flooring installers should abide by the following guidelines:

- Conduct their business as professionals and secure all required licenses, permits, insurances and applicable tax identification numbers.
- Present themselves professionally, in both appearance and deed, to all business associates.
- Follow all Mannington and industry established recommendations regarding installation requirements and work practices.
- Install products and perform installation techniques with which they are knowledgeable, trained, and truly competent.

Basic Guidelines

Regardless of the type of flooring product being installed, the following basic guidelines should be considered to insure a successful installation. In the event that there is a flooring complaint, more often than not, one or more of these six essential guidelines were ignored or not properly completed.

1. Proper storage, handling, and transporting of materials
 - Interior storage location – protected from the weather
 - Do not over-stack – protect from forklift traffic
 - Fully support product during transportation
2. Job site conditions
 - Interior locations only
 - Permanent HVAC, operational and regulated
 - Dry, secure; all windows and doors installed and operable
3. Subfloor selection and preparation
 - Clean, dry, and structurally sound
 - Concrete subfloors tested for moisture (MVT)
 - Wood subfloors covered with appropriate underlayment
4. Product cutting and fitting
 - Material layout is aligned in correct position and balanced
 - Appropriate tools and equipment are available and maintained
 - Craftsmanship is exhibited and evident in fit and function
5. Securing the flooring
 - Correct adhesives are selected and applied in correct amounts
 - Fasteners are of sufficient length and specifically designed for this purpose
 - Proper moldings and transitions are used (even in “floating” installations)
6. Seam alignment and treatment
 - By definition – a seam is a line of junction
 - All flooring products have the probability of seams. Tile products are tight, square, and true. Wood products are tight, straight, and properly positioned. Resilient are strategically placed and properly sealed.
 - Minimize complexity of design and layout

General Installation Guidelines

These guidelines are relevant for all types of floor coverings. Although there may be some specific requirements detailed for certain product categories, the information provided in this section should be considered before beginning any flooring installation. **This Guideline should be used in conjunction with each of our published, individual flooring product type installation instructions.**

Storage

All floor covering products require care during storage and handling. It is important to store flooring products in a dry, temperature controlled interior area. The temperature range should be between 65° F and 100° F, and the relative humidity should be controlled and maintained between 30% to 70%. If it is not possible to provide these storage conditions, you must make arrangements to have the material conditioned for at least 48 hours before beginning the installation.

Roll sheet goods must be tightly rolled, face out on a sturdy cardboard core for storage. Resilient products 12' wide must be stored horizontally, fully supported across their entire width. Six-foot wide rolls may be stored standing on edge in a protected area. It is important to comply with these storage recommendations to prevent compression or distortion of the rolls.

Flooring materials that are shipped in cartons must also be stored properly. These cartons must be kept squarely positioned on the pallet to prevent distortion of the contents, and to be fully supported. Stored cartons are to be protected from forklifts and other traffic that can damage carton corners. **Never** double stack pallets of flooring products. Check specific product instructions to determine maximum carton stacking height on pallets.

Handling

Flooring products can be heavy and bulky. Always use proper material handling equipment when moving these products. Always use proper lifting techniques and never lift more than you can safely handle. Fully support products during transportation. Distribute the load as evenly as possible in the truck.

Flooring products can be damaged by rough handling before installation. Exercise care when handling and transporting these products.

Pre-Installation Checklist

Before starting the job, always check the flooring materials to ensure they are the correct pattern, style, and color. Also, make certain that the correct amount of product is available to complete the job.

Remember to thoroughly inspect all materials for visible defects. **Mannington Mills, Inc will not pay labor charges on claims filed for materials installed with obvious visible defects.** If you discover visible defects, do not proceed with the installation; contact your material provider for assistance.

Be certain to thoroughly understand the requirements of the installation with regard to seam placement, product layout, plank direction, etc. before starting the job.

Be certain to have all necessary and correct adhesives, seam treatments, moldings, and trims available before beginning the job.

Be certain to have a thorough understanding of the scope of the project, and the expectations of the completion schedule before starting the job.

Job Site Conditions

The environment and condition play a very important role in assuring a successful flooring product installation. If the job site is not climate controlled or structurally sound, the chances for a successful flooring installation are dramatically reduced. All Mannington products are designed to be installed in climate controlled locations.

Temperature and Humidity Requirements

Do not install floor covering products until the work area is climate controlled. The recommended temperature range for starting the installation is no cooler than 65° F, and no warmer than 100° F. This acceptable climatic condition must be maintained for at least 48 hours before, during, and after the installation.

Once the floor covering is installed, the temperature of the location should not be allowed to fall below 55° F, or exceed 85° F for the life of the floor covering. Failing to maintain a climate controlled interior environment will adversely affect the performance of the flooring products and/or the adhesives.

Structural Requirements

The structural integrity of the job site is a critical component to the performance of the floor covering. The type and method of construction, the grade level, the subflooring system, and composition all impact the installation of flooring products. Many times, local building codes establish only minimum requirements. These construction practices may not result in sufficient rigidity, flatness, or smoothness.

Structural subflooring systems are constructed of either concrete, (cement like materials) or wood. The description of each subfloor construction is provided to give professional flooring installers enough information to make intelligent decisions regarding the suitability of the differing subfloor systems. For comprehensive information, contact The American Concrete Institute or The American Plywood Association about their respective products.

Subfloor Recommendations and Preparation:

Concrete Subfloors

New and existing concrete subfloors should meet the requirements prescribed in the latest edition of ASTM F 710, "Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring." Though this practice specifically addresses preparing the concrete substrate to receive resilient flooring, the requirements are appropriate for all Mannington floors.

Concrete subfloors must be permanently dry, clean, smooth, flat, and structurally sound. Concrete subfloors on, or below grade must have an acceptable vapor retarding membrane to isolate the concrete from the soil. Newly poured concrete, regardless of grade level, must be given ample time to cure and fully dry. Drying times for concrete slabs vary depending on mix, atmospheric conditions, construction practices, and slab location.

Randomly check concrete subfloor for porosity using the drop water test. Place a 1 inch diameter drop of water directly onto the concrete subfloor. If the water droplet does not dissipate within 60 to 90 seconds, the subfloor is considered non-porous.

Concrete subfloors must have a minimum compressive strength of 3500 PSI, and a dry density of at least 105 pounds per cubic foot. The concrete surface must be free of surface defects and surface contaminants. Surface defects include cracks, holes, and flaking or dusting of the concrete surface. Surface contaminants should be considered as any substance that will interfere with the bond of the

floor covering to the subfloor, such as curing or parting compounds, paints, oils, solvents, or existing adhesives.

Surface defects must be corrected before installing any finished flooring product. Low spots, cracks, holes, and other irregularities can be patched smooth using a latex Portland cement compound designed for this purpose. If the surface of the concrete is found to be flaking or dusting, these conditions must be mechanically removed, followed by resurfacing the concrete with an appropriate compound. All surface contaminants that may interfere with bonding must also be mechanically removed and resurfaced before installing any flooring product requiring a direct glue-down procedure. Mannington does not recommend using any chemicals or solvents to remove concrete surface contaminants.

Many concrete slabs will have joints designed within them. Expansion and isolation joints are designed to allow the concrete slab to expand and contract. These expansion joints must never be filled with patching or leveling compound, nor covered with hard surface flooring products. Expansion joint covers are available and designed to be used with specific types of floor covering products. Other types of concrete joints such as construction, control, and/or saw cuts can be smoothed and leveled using an appropriate Portland cement patching compound designed for this purpose.

Moisture Testing

Regardless of the time in place or the grade level, all concrete subfloors must be tested for moisture and alkalinity before covering with flooring products. Although nearly each product type in each product category has a different tolerance for permissible moisture vapor emissions, it is important to have a quantitative reading in order to resolve any potential problems before, rather than after the fact. The most common quantitative moisture test is the Anhydrous Calcium Chloride test. This test must be performed in accordance with ASTM F 186904, "Standard Test Method for Measuring Moisture Vapor Emissions Rate of Concrete Subfloor Using Anhydrous Calcium Chloride." According to the ASTM, the moisture emissions from the concrete floor shall not exceed 3 lbs/1000 sq. ft./24 hours. At least one test kit should be used in areas up to 1000 sq. ft. Additional kits should be used in larger areas.

Another quantitative moisture test method is the In Situ Relative Humidity test. This test measures the relative humidity level within the concrete slab. This test must be performed in accordance with ASTM F 2170 guidelines. The relative humidity of the slab must not exceed 75%. If the relative humidity in the slab exceeds 75%, **do not install any Mannington Floor Coverings**, (unless an approved moisture resistant adhesive is used). Recent advancements in adhesive properties have permitted Mannington Commercial to warrant higher acceptable moisture values for both % RH and MVE readings when the newly designed adhesives are utilized. Refer to Mannington's moisture bulletin and adhesive charts for moisture limits on each individual adhesive.

Moisture Meters

There are many manufacturers of quality moisture reading devices. However, there is no standard correlation between the meter reading and the calcium chloride or relative humidity test methods. Each meter is calibrated to its own scale and must be interpreted as directed by the manufacturer.

Concrete Curing, Hardening, Sealing, and Parting Compounds

Often, various compounds will be added in the concrete mix or applied to the surface of the freshly laid concrete to assist in the curing process. These compounds may interfere with the bond of any fully-adhered flooring product. If any of these surface compounds are suspected to remain on the surface, they must be removed by grinding, scarifying, or bead blasting.

Alkali Testing - pH

A pH test should be conducted on all concrete floors, regardless of the age or the grade level. The test is performed using a wide range pH paper and distilled water. Puddle the water on the surface of the concrete for a minimum of 60 seconds then, dip the pH paper into the water. The acceptable pH range is between 5 to 10 on the pH scale. If the pH is greater than 10, it must be reduced before proceeding with any fully-adhered flooring product installation.

Bond Testing

If the surface of the concrete shows any evidence of contamination, or if the history of the concrete is unknown, a bond test should be performed before beginning the flooring installation. To conduct a bond test, select an approximate 3' X 3' piece of the exact flooring product specified for the job and adhere it to the subfloor with the exact adhesive that will be used during installation. On large installations, conduct several bond tests; after 72 hours, attempt to remove the test sample. If sufficient force must be used to remove the sample, you may consider the concrete suitable for installation.

Residual Adhesive

Completely remove all residual adhesives on a previously covered concrete subfloor or cover them with a cementitious underlayment intended for this purpose. Never use solvent-based adhesive removers. Complete removal of all residual solvents can be difficult; however, any remaining on the surface of the concrete will prohibit satisfactory bond of the new adhesives. Complete removal of asphalt cutback or asphalt emulsion adhesive from a concrete under floor is nearly impossible. You will need to wet-scrape these adhesives from the concrete. After scraping, cover the concrete with a trowel with a minimum of 1/8" or self-leveling cement underlayment intended for this purpose.

DANGER: Older asphalt adhesives may contain asbestos fibers. Do not use power devices that create asbestos dust when removing these adhesives. The inhalation of asbestos dust may cause bodily harm. Smoking by individuals exposed to asbestos fibers greatly increases this risk.

Wood Under floors

All wood subfloor systems should be suspended at least 18" above the ground, with adequate cross ventilation. Cover the ground surface of crawl spaces with a suitable vapor barrier. All wood subfloors must be structurally sound, dry, and in compliance with local building codes. Wood subfloors should be of double layer construction, at least 1" in total thickness, and solidly fastened to appropriately spaced floor joists.

CAUTION: Wood subfloors directly fastened to concrete, built using sleeper construction with on or below-grade concrete subfloors are not satisfactory for the installation of fully-adhered floor covering products. This non ventilated construction practice will result in deterioration of the wood subfloor system.

Double Plywood Subfloors

Double-layered plywood subfloors should have a first layer at least 5/8" thick, and a second layer at least 3/8" thick, with staggered panels and overlapping joints. Install the long dimension of these panels perpendicular to the floor joists. Panels that carry the American Plywood Association (APA) performance rating of Sturdifloor were designed as combination subfloor/underlayment panels. Field experience, however, has determined these panels are rarely satisfactory for direct installation of Fully Adhered resilient products. Construction traffic and weather exposure can damage the Sturdifloor surface before the flooring installation. Mannington recommends installing 1/4" underlayment panels.

Panels intended for use as underlayment should be specifically designed for this purpose. Furthermore, any panel selected as an underlayment must:

- Be dimensionally stable
- Have a smooth, fully sanded face
- Be resistant to both static and impact indentation
- Be of uniform density porosity and thickness
- Be free of any and all surface contaminants that may cause staining
- Have a written warranty for suitability and performance from the panel manufacturer, or have a history of proven performance.

Underlayment Reference examples include, but are not limited to, the following list below:

- Accuply
- Halex
- Multi-ply
- UltraPly

NOTE: This information is provided for reference only. It must not be interpreted as an endorsement or warranty for any listed panel.

Existing Floor Coverings

In some cases, you may install specific Mannington products over a single layer of existing floor coverings. **Installing Mannington Commercial Resilient products over existing resilient can compromise their performance properties.** The performance of the new flooring is directly dependent on the condition, and continued bond of the existing floor covering.

In any case, the existing resilient flooring should meet the following conditions:

- Be fully adhered (full-spread) and well bonded to a suitable substrate
- Consist of a single layer only
- Be free of all evidence of alkaline salts, hydrostatic pressure, or moisture from the substrate
- Not be a foam-backed or thickly cushioned product
- Not be a perimeter-fastened or loose-laid product
- Not be asphalt tile, self-stick tile, rubber tile, or surface containing residual asphalt-based adhesives

It is the flooring retailer or installer's responsibility to determine if the existing floor covering is a suitable subfloor for the installation of any Mannington product. If there is any doubt about the suitability of the existing floor, remove it or cover it with an appropriate underlayment.

Removal of Existing Floor Coverings

DANGER: Do not sand, dry sweep, dry scrape, drill, saw, bead blast, or mechanically chip or pulverize existing resilient flooring, backing, lining felt, or asphaltic "cutback" adhesives. These products may contain either asbestos fibers or crystalline silica. Avoid creating dust. Inhalation of such dust containing respirable fibers or crystalline silica may cause cancer and respiratory tract diseases. 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 assume it contains asbestos. Regulations may require that the material be tested to determine asbestos content.

Molds and Moisture

If there are visible indications of mold and mildew, the source of the problem must be located and corrected. This includes making any structural repairs that may be necessary. The resilient flooring must not be installed until both problems have been addressed.

Different Types of Subfloors:

Metal Subfloors

You may encounter metal subfloors made of steel, stainless steel, lead, or aluminum. These types of subfloors are typically found in specialized commercial applications. You must thoroughly clean them of all surface contaminants before installing new floor covering. While these subfloors are usually compatible with Mannington flooring products, our recommendation is to always conduct a bond test with the appropriate adhesive and the specified floor covering.

Poured Floors

When working with a poured floor, (polyurethane or epoxy based), make sure it is fully cured and securely bonded to a concrete substrate. Be careful to remove all waxes and finishes, ensuring that the surface is completely smooth. Always conduct a bond test using the appropriate adhesive and the specified floor covering before starting the installation.

Terrazzo is a poured cement floor with a hard sealer on the surface. Be sure the floor is smooth and free of waxes and dressings. A terrazzo floor can be smoothed out with a terrazzo grinder.

There are several brands of poured polyurethane floor covering products. Mannington Flooring products may be installed directly over these surfaces as long as they are fully, and firmly adhered to the substrate. Be sure that all waxes and dressings are stripped off, and then sand the surface smooth.

NOTE: The responsibility for warranties and/or performance of the concrete or poured subfloors as a suitable base for Mannington flooring products, regardless of their type and grade level, rests with the concrete manufacturer or the poured floor manufacturer. Mannington will not be responsible in the event of inherent deficiencies that affect the bond and performance of Mannington flooring and adhesive due to the subfloor performance.

NOTE: Mannington Commercial will not pay labor charges on claims filed on materials installed with obvious visible defects.