



SUBSTRATE PREPARATION

For COMMERCIAL Resilient Floor Coverings (Vinyl Sheet & Tile)

This Bulletin has been prepared to help insure satisfactory product performance and prevent product failures.

All data is a compilation of Industry Standards and Floor Covering Manufacturer's specifications and installation instructions. (See references, p. 11)

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SUBSTRATE Preparation for Commercial Resilient Floor Coverings
(Vinyl, Linoleum, and Rubber Materials)

Substrate preparation is becoming more and more important because the volume of renovation and remodeling work has drastically increased. All floor covering manufacturers require that their floor adhesive bond directly to the substrate or the Portland cement based underlayment and patching materials. In order to accomplish this, the substrate must be thoroughly cleaned of all contaminants and then properly surfaced and repaired to provide a satisfactory foundation for the floor covering. Also, many years of experience have proven that substrate contamination can cause discoloration and staining of all floor coverings and adhesive bond failure.

Most resilient flooring can be installed over the substrates discussed in this bulletin. However, some manufacturers may have specific products that they will not recommend over certain substrate conditions. It is imperative that the manufacturer's recommendation be carefully followed to protect their Warranty.

It is also equally important that the resilient floor covering be installed in strict accordance with the manufacturer's application recommendations and installation instructions under proper job conditions.

Wherever trade names, trademarks, product names, or company names are mentioned; they are used only as a reference to establish a comparative standard of quality. It should not be assumed that these products are recommended or approved for the use suggested or intended. Also, it does not mean that other products of similar and equal quality may not be suitable.

This information has been prepared as a "general guide" for persons and/or companies involved in the commercial construction industry. However, it is impossible for any guide to address every conceivable jobsite condition or variation. The primary purpose for this guide is to help insure satisfactory product performance and prevent product failures and problems.

CONCRETE FLOOR SLAB CONSTRUCTION (Structural New)

(For on-grade, below grade, or suspended interior slabs placed in weather tight buildings)

The following guideline specifications are for the purpose of establishing minimum requirements. Final design of concrete and required reinforcement should be in accordance with the requirements of the specific building involved and as recommended by a qualified structural engineer.

1. CONCRETE

1. Minimum Compressive Strength - 3,500 psi.
2. Finish - steel trowel smooth and flat. (Recommended tolerance 1/4" in a 10'-0" radius.)
3. Steel reinforcement - minimum 4 X 4 - 10/10 Welded Wire Fabric (W.W.F.). For large slabs requiring multiple pours, #5 rebar, 12" length; spaced 12" on center should join adjacent pours to maintain flush surface of all slab pours and to restrict lateral and vertical movement. Do not tool the joint.
4. Slump - 3" to 5"; Water - Cement Ratio 0.30 - 0.50 maximum.
5. Joints - All floor slabs to receive resilient floor covering shall not be jointed in accordance with ACI Committee #302 Bulletin (American Concrete Institute) Paragraph 7.2.9 "Jointing" and PCA Bulletin "Concrete Floors on Ground," Second Edition, Pages 23 and 24. All types of construction joints, control joints, or sawcuts, and expansion joints should be confined to the perimeter of the floor areas receiving resilient floor covering or such jointing should be placed immediately adjacent to partition and/or load bearing walls.
6. Curing - Concrete should be cured for a minimum of 28 days. Curing shall be accomplished by wet cure methods employing burlap and/or six mil polyethylene sheets. Do not apply any type of "sprayed- on" curing membrane.
7. Dampproofing - (Below grade slabs and/or slabs subject to hydrostatic pressure) - Concrete slabs shall be dampproofed directly from beneath with Pre-moulded Membrane as manufactured by W.R. Meadows, Inc., Elgin, IL - 800/342-5976. Pre-moulded membranes shall be installed in strict accordance with manufacturer's recommendations as detailed in their Bulletin #711 (See DETAIL "B").
8. Dampproofing (Concrete slabs on-grade in contact with the earth) - install dampproofing membrane directly beneath concrete slab. Install "Underslab Vapor Barrier - Moistop" as manufactured by Fortifiber Corporation, Los Angeles, CA; Phone 800/773-4777 (See DETAIL "A").

Please note, all dampproofing membranes must be placed over all tamped fill directly beneath concrete slabs. Do not place sand, gravel, or other types of fill over

the membrane. Please follow membrane manufacturer’s application instructions carefully.

Clear polyethylene type membranes are not acceptable.

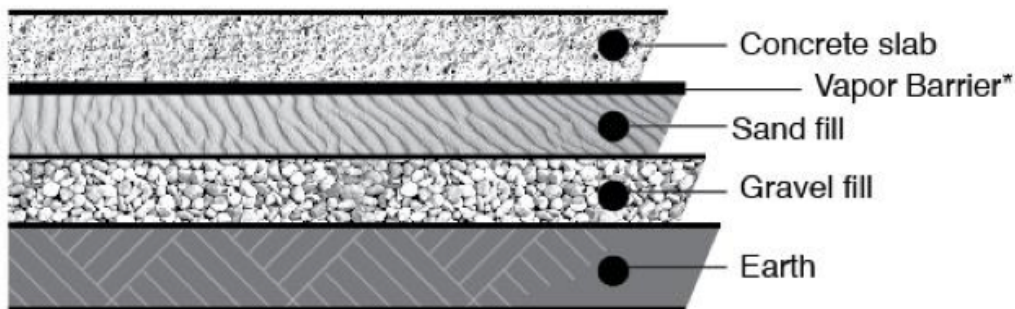
II. RESILIENT FLOOR COVERING - All resilient floor covering must be installed in strict accordance with floor covering manufacturer’s installation instructions under proper job conditions using only manufacturer’s recommended adhesives. Prior to installation, floor subcontractor shall test concrete for water vapor transmission rate (WVTR). The WVTR shall not exceed 3.0 lbs. per thousand square feet for a 24 hour period.

Surface of concrete shall be sanded, scarified, and/or scraped to remove all surface contaminants. Chips, spalls, cracks, and/or corrective leveling shall be performed with Portland cement based patching and/or underlayment materials as manufactured by Ardex or Mapei. Final cleaning shall be performed with heavy duty commercial vacuum to remove all surface dust, dirt, and contaminants. Building area shall be fully enclosed and weather tight with permanent heat available to maintain a minimum of 70° F. Installation of resilient floor covering should not proceed until the work of other building trades has been completed, especially overhead trades. Adequate lighting should be available, minimum 70 candle power to allow for proper installation and seaming of flooring materials.

Detail “A”

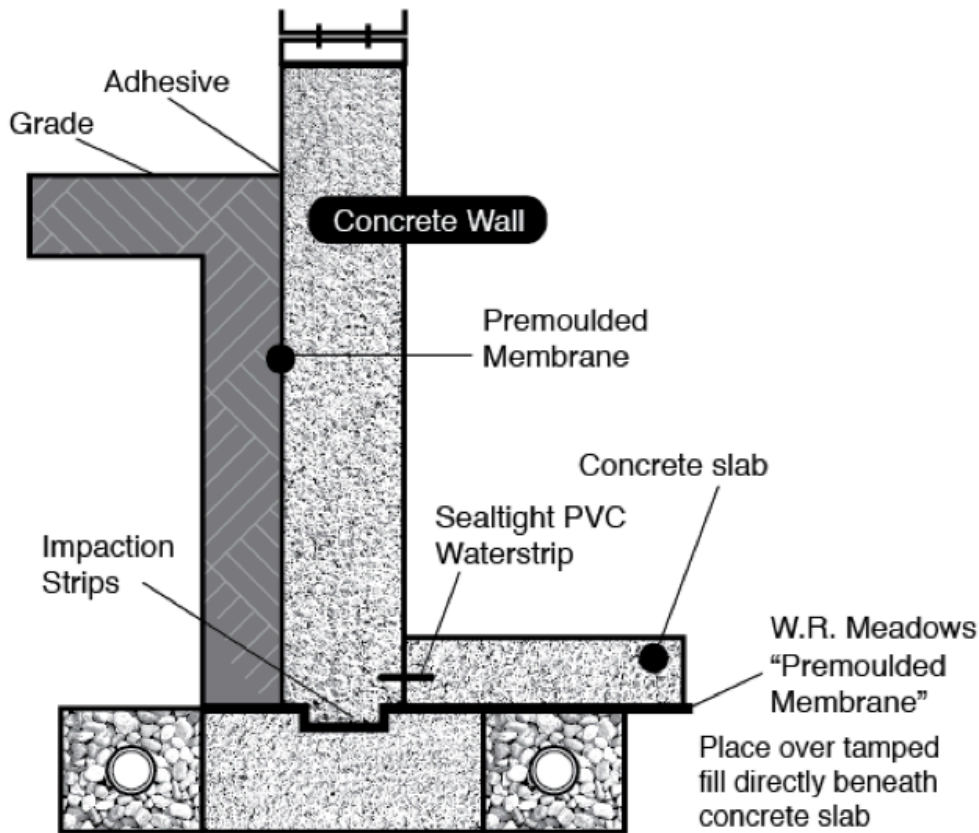
(for on-grade slabs in contact with the earth)

(wet cure slab – do not apply sprayed-on curing membrane) #5 rebar – 12” long – 12” o.c. Do not tool joint



*Fortifiber “Moistop” vapor barrier placed over tamped fill directly beneath concrete slab (800/773-4777) On 1 layer of 10 mil black polyurethane or black vinyl membrane or 2 layers of 6mil

Detail "B" - For "below grade" concrete slab or slabs subject to hydrostatic pressure)



CONCRETE (Structural - Existing)

Structural concrete must provide a minimum compressive strength of 3500 psi (150 lbs. per cubic foot).

Concrete must be dry (moisture emission shall not exceed 3.0 lbs. per one thousand square feet in 24 hours as tested with a calcium chloride test kit).

The surface of the concrete must be clean and free of all contaminants such as paint, oil, grease, curing membranes, etc. Surface of concrete should always be sanded prior to installation of floor covering to remove such contaminants. If contaminants include existing or previous floor covering adhesives, these materials should be removed by scarifying or bead blasting procedure - Blastrac." Surface of concrete should be flat, smooth, and dense.

Any surface imperfections in concrete should be smoothed and leveled using only Portland cement based underlayment equal to Ardex or Mapei. Apply primer as required by manufacturer's instructions. Minor chips, spalls, construction joints, and/or control joints must be filled with a Portland cement based patching material equal to Ardex or Mapei.

Test pH of concrete and underlayment. pH should not exceed 10.

Do not chemically clean surface of concrete as these chemicals will create residues that will interfere with the bond of the floor covering adhesive.

Do not install any type of resilient floor covering over expansion joints. The movement of expansion joints will cause adhesive bond failure and bubbling or looseness of the floor covering. Terminate the floor covering at both sides of the expansion joint.

After all preparation work has been completed, the floor surface should be thoroughly swept and then vacuumed with a heavy-duty commercial vacuum to remove all surface dust and contaminants prior to installation of the floor covering.

NOTE: Proper filling of sawcuts and/or control joints will allow the resilient flooring to function properly. However, these joints will always have a tendency to telegraph through the surface of the floor covering, especially if the flooring material is maintained with high gloss finishes. This is not to be considered a defect in the installation of the floor covering material.

LIGHTWEIGHT CONCRETE:

Lightweight concrete is not a suitable substrate for commercial resilient floor covering because it does not meet floor covering manufacturer's compressive strength requirements of 3500 psi. Also, the floor covering adhesive cannot accomplish adequate bond when applied to lightweight concrete. "Structural" lightweight concrete (minimum 110 lbs. per cubic ft.) has been successfully used in light commercial traffic areas (foot traffic only). The surface of the concrete should be non-dusty and have minor porosity. Most manufacturers will also require that the surface of this "structural" lightweight concrete be primed prior to adhering the floor covering. If heavy loads, including furniture, equipment, etc. must be moved across "structural" lightweight concrete, it is recommended that placement of plywood or planks be utilized to prevent compression damage to the floor covering.

EXISTING RESILIENT FLOOR COVERING (Over Structural Concrete)

1. New resilient floor covering often cannot be installed over existing resilient floor coverings. The best recommendation is to remove the existing floor covering and all existing adhesive residues. The most economical and effective procedure to remove adhesive residues is by scarifying or bead blasting with "Blastrac" equipment.
2. After scarifying operations are completed, the surface should be smooth, leveled and patched as required with Portland cement based underlayment and patching material - Ardex or Mapei.

3. The existing substrate and underlayment must be dry (moisture emission shall not exceed 3.0 lbs. per 1000 square feet in 24 hours as tested with a calcium chloride test kit). Test the pH of the concrete. The pH should not exceed 10.

4. Do not chemically clean the surface of existing concrete as these chemicals leave residues that will interfere with the adhesive bond of the floor covering adhesive

5. Occasionally a client will make a decision not to remove the existing resilient floor covering because of the high costs involved. The client should understand that manufacturers of resilient floor covering will not warranty any of their products where failure occurs that is caused by the existing resilient floor covering. It is not possible for anyone including the manufacturer, contractor, architect, or floor covering supplier to inspect an existing floor and to be able to visually guarantee that that floor won't fail. All floor coverings have a life span and all will eventually fail after a certain period of time depending on the quality of maintenance, type of use, and the quality of the original installation. It is important that the client carefully consider the cost of removal as compared to the possible cost of floor failure. The cost to replace a new floor that has been installed over existing flooring materials can be four to five times the original cost. The other limitation of existing resilient floors is that any type of joints will eventually telegraph through the new resilient floor covering which may be objectionable. Also, the existing floor covering will always reduce the static load capacity and the performance characteristics of the new resilient floor covering. If the commercial area involved is a heavy traffic area and also may involve rolling loads, this could cause serious limitations that will not be acceptable to the client.

6. Whenever existing resilient sheet flooring or floor tile is to remain, the surface of the material should always be cleaned of any contaminants. If the material is non-asbestos, sanding the surface is the most efficient using a 150 to 350 rpm buffing machine with #1 or 1 1/2 sandpaper to thoroughly sand the surface of the existing floor covering. After sanding the surface should be swept clean and then a final cleaning should be done with a heavy duty commercial vac. It is further recommended that an adhesive bond test be done for a minimum of 72 hours to determine if proper adhesive bond can be accomplished.

If the existing floor covering contains asbestos, do not sand the surface. The surface should be cleaned with a strong stripping solution in accordance with manufacturer's instructions. The stripping process may have to be repeated one or two times to thoroughly remove all contaminants. After stripping is completed, rinse the surface thoroughly with clean water and allow to dry. It is also recommended that an adhesive bond test, minimum 72 hours, be performed to verify that the proper adhesion can be accomplished. After cleaning the surface of existing flooring, be sure to remove and replace any damaged, cracked, or loose tiles.

CARPET

(and Other Types of Soft Floor Coverings Over Structural Concrete)

1. There is no type of resilient floor covering that can be successfully installed over carpet or soft floor covering materials. The carpet and/or soft floor coverings should be completely removed including all adhesives and anchoring strips, etc. The surface of the existing substrate should be scarified or bead blasted with "Blastrac" equipment in order to effectively remove all adhesive and other contaminants.

2. The surface of the substrate should be properly primed, smooth, leveled, and patched with Portland cement based underlayment and patching material - Ardex or Mapei. Be sure to test the substrate to be certain it is dry. Perform tests with a calcium chloride test kit (to make certain moisture emission does not exceed 3.0 lbs. per 1000 square feet in 24 hours). Also test concrete for pH. pH reading should not exceed 10.

3. After all preparation work has been completed, the floor surface should be thoroughly swept and then vacuumed with a heavy-duty commercial vacuum to remove all surface dust and contaminants prior to installation of the floor covering.

TERRAZZO (Cement Based)

Resilient floor coverings can be installed over existing terrazzo provided certain preparation work is performed as follows:

1. Terrazzo is normally sealed and finished with either wax, oil, silicone, and sometimes water based floor sealers and finishing materials. All of these materials can prevent proper adhesive bond of the floor covering adhesive. It is therefore imperative that these materials be completely removed. Do not use chemicals or strippers to accomplish this. This method will only clean the surface of the terrazzo and will not remove the deeply penetrative materials. Also chemical cleaning can leave residues which will not be compatible with the floor covering adhesive. The proper way to clean the terrazzo is to scarify it or bead blast the surface with "Blastrac" equipment.

2. After contaminants have been removed, the surface should be smoothed where required so as to provide a smooth hard dense surface to receive the floor covering. Smoothing and leveling of the terrazzo should be accomplished only with Portland cement based underlayment - Ardex or Mapei. Deep holes, chips, or cracks should be attached with a Portland cement based patching material - Ardex or Mapei.

3. The terrazzo must be dry (moisture emissions shall not exceed 3.0 lbs. per 1000 feet in 24 hours as tested with a calcium chloride test kit). Make at least one test for every 1,000 to 2,000 square feet of floor area.
4. Also test the terrazzo for pH using a pH test kit. pH of the terrazzo and/or patching material and underlayment should not exceed 10.
5. After all preparation work has been completed, the floor surface should be thoroughly swept and then vacuumed with a heavy-duty commercial vacuum to remove all surface dust and contaminants prior to installation of the floor covering.

Some terrazzos are designed with polyurethane, polyester, or epoxy compounds. Please refer to the substrate information titled "SEAMLESS FLOOR SURFACINGS."

CERAMIC and QUARRY TILE
 (Installed in Cement Mortar)

Resilient floor covering can be successfully installed over ceramic or quarry tile surfaces provided certain preparation work is correctly done as follows. However, if the existing quarry tile or ceramic tile shows evidence cracking, surface damage, or looseness, then the best procedure is to remove all those tiles to prevent floor covering failure.

1. The surface of the tiles should be scarified or sanded thoroughly to remove all contaminants.
2. The surface of all the tiles should be primed and leveled with a portland cement based underlayment - Ardex or Mapei. Thickness of underlayment should be a minimum of 1/8" to thoroughly cover all grout joints. Allow underlayment to thoroughly dry, minimum 24 hours. Test underlayment with a calcium chloride test kit (moisture emission shall not exceed 3.0 lbs. per 1000 square feet in 24 hours). Also, check the pH of the underlayment to make certain that it does not exceed a reading of 10.

**** NOTE:** It's recommended that ceramic or quarry tile that has been installed in adhesive be completely removed including the adhesive. Remove adhesive by bead blasting - "Blastrac" procedure. Do not use chemicals to remove adhesive as this can cause contamination of the new resilient floor covering adhesive. Inspect surface of existing substrate after adhesive removal and patch and underlay as required with a cement based underlayment and patching material - Ardex or Mapei. After completion of cleaning and preparation work, the surface should be thoroughly vacuumed to remove all surface dust and contamination. Also, moisture emission shall not exceed 3.0 lbs., and pH shall not exceed 10.

SEAMLESS FLOOR SURFACINGS
(Also Referred to as Synthetic Resin Surfaces)

These types of surfaces are placed over structural concrete and often referred to as polyesters, polyurethanes, or epoxies. Oftentimes, the client wants to cover up a seamless floor that has been damaged through use and normal wear and tear. If this damage involves chipping, spalling, and delamination from the concrete substrate, then the seamless floor material should be completely removed. The most efficient and least costly method would be to bead blast (Blastrac).

If the seamless floor surfacing is in good sound condition and shows no evidence of damage or hollowness, then the resilient floor covering can be installed provided the surface of the seamless floor material is thoroughly cleaned of all surface dirt and contaminants. Sanding the surface with coarse grit sandpaper is the most effective.

After sanding, the surface should be vacuumed thoroughly to lift all surface dust. Calcium chloride moisture tests should be taken to make certain moisture does not exceed 3.0 lbs. Also, a pH test should be done and should not exceed 10.

It is then strongly recommended that an adhesive bond test be made with the exact resilient floor covering and adhesive, which the client has selected. This bond test should be conducted for a minimum of one week. If satisfactory bond is accomplished, it usually indicates the acceptability of the substrate. If there's any doubts concerning the bond test, this sometimes is helpful to install a small test area of 100 or 200 square feet and then evaluate that test area over a period of at least one month.

MISCELLANEOUS SUBSTRATES

PLYWOOD

A plywood substrate manufactured in accordance with American Plywood Association rules can provide a suitable substrate for resilient floor covering. It is imperative that the plywood be exterior grade material. Please contact us for specific recommendations as they apply to the job conditions involved.

Note: Plywood joints will have a tendency to telegraph through the floor covering. This will not prevent the proper functional performance of the floor, but it can be visible and if this is objectionable, then plywood should not be considered. Also, plywood is a soft material as compared to structural concrete and will reduce the static load capacity of the resilient floor covering. It will provide a suitable underlayment where the floor covering is exposed to heavy foot traffic but not to heavy rolling loads. If heavy equipment or furniture must be moved across the floor covering, it should be protected with a layer of plywood during the moving operations.



WOOD FLOOR CONSTRUCTION (STRIP, PLANK, ETC.)

Please contact us for specific recommendations as they may apply to the job conditions involved.

UNSUITABLE SUBSTRATES

Materials such as tempered hard board, flake board, chipboard, particleboard, etc. are not suitable for the installation of commercial resilient floor coverings. These materials are more specifically designed for the manufacture of furniture and cabinets. Oftentimes the chemicals contained in these materials are not compatible with floor covering adhesives. In addition, these materials do not hold fasteners securely. Fasteners such as nails and staples have a tendency to back out of the material and puncture the floor covering.

Also, these types of boards do not provide adequate structural support.

The preceding information concerning "Substrate Preparation" is based upon 48 years of experience involving the installation of resilient floor coverings and the following reference information:

Portland Cement Association - Publication "Concrete Floors On-Ground," Second Edition (Page 23, "Reinforcement for Floors On-Ground;" and Page 24, "Unjointed Floors.")

American Concrete Institute "Guide for Concrete Floor and Slab Construction" Committee 302 (Paragraph "7.2.9 Jointing").

Resilient Flooring Covering Institute
W.R. Meadows, Inc.
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