

SECTION 09 65 16.13 -RESILIENT LINOLEUM SHEET FLOORING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Resilient Linoleum Sheet Flooring
 - 1. Marmoleum® Real
 - 2. Resilient Base.
 - 3. Resilient Transition Accessories.
- B. Related Sections: Section(s) related to this section include:
 - 1. Concrete: Refer to Division 3 Concrete Sections for cast-in-place concrete, concrete toppings, and cementitious underlayments.
 - 2. Wood Subflooring: Refer to Division 6 Carpentry Section for wood subflooring and wood underlayment.
 - 3. Resilient Flooring Accessories: Refer to Division 9 Finishes Sections for resilient wall bases, reducer strips, metal edge strips and other resilient flooring accessories.
 - 4. Expansion Joint Covers: Refer to Division 10 Specialties Section for expansion joint covers to be used with resilient flooring.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM F 2034 Standard Specification for Linoleum Sheet Floor Covering.
 - 2. ASTM F 1869 Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
 - 3. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
 - 4. ASTM F 1861 Standard Specification for Resilient Wall Base.
 - 5. ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 - 6. ASTM F 1482 Standard Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring.
 - 7. ASTM E 648 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
 - 8. ASTM E 662 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
 - 9. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 10. ASTM E 492 Standard Test Method for Laboratory Measurement of Impact Sound Transmission through Floor-Ceiling Assemblies Using the Tapping Machine.
 - 11. ASTM E 989 Standard Classification for Determination of Impact Insulation Class (IIC).
- B. National Fire Protection Association (NFPA):
 - 1. NFPA 253 Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
 - 2. NFPA 258 Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
- C. International Standards and Training Alliance (INSTALL):
 - 1. INSTALL Resilient Certification

1.03 SYSTEM DESCRIPTION

- A. Performance Requirements: Provide flooring which has been manufactured, fabricated and installed to performance criteria certified by manufacturer without defects, damage, or failure.

1.04 SUBMITTALS

- A. General: Submit listed submittals in accordance with "Conditions of the Contract" and Division 1 Submittal Procedures Section.
- B. Product Data: Submit product data, including manufacturer's SPEC-DATA product sheet, for specified products.

- C. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including anchorage, accessories, finish colors, patterns and textures.
- D. Samples: Submit selection and verification samples for finishes, colors, and textures.
- E. Quality Assurance Submittals: Submit the following:
 - 1. Certification of compliance: Letter of compliance signed by manufacturer certifying materials comply with specified performance characteristics and criteria, and physical requirements.
 - 2. Manufacturer's Instructions: Manufacturer's installation instructions.
- F. Closeout Submittals: Submit the following:
 - 1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.
 - 2. Warranty: Warranty documents specified herein.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
 - 1. Engage installer certified as a Forbo "Associate Mechanic" or INSTALL certified Resilient Installer (standard installations).
 - 2. Certificate: Submit certificate indicating installer qualification.
- B. Regulatory Requirements:
 - 1. Fire Performance Characteristics: Provide resilient linoleum sheet flooring with the following fire performance characteristics as determined by testing products in accordance with ASTM method indicated below by a certified testing laboratory or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - a. Critical Radiant Flux: Class 1 Rating per NFPA 253 (ASTM E 648) (0.45 watts/cm² or greater).
 - b. Smoke Density: Less than 450 per NFPA 258 (ASTM E 662).

Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements. Comply with Division 1 Project Management and Coordination (Project Meetings) Section.

- C. Pre-Installation Testing: Conduct pre-installation testing as follows: [Specify testing (i.e. moisture tests, bond test, pH test, etc).]

1.06 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with Division 1 Product Requirements Sections.
- B. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.
 - 1. Material should be stored in areas that are fully enclosed and weathertight. The permanent HVAC should be fully operational, controlled and set at a minimum of 68° F (20° C) for at least 48 hours prior to the installation.

1.07 PROJECT CONDITIONS

- A. Environmental Requirements/Conditions: In accordance with manufacturer's recommendations, areas to receive flooring should be clean, fully enclosed and weathertight. The permanent HVAC must be fully operational, controlled and set at a minimum of 68° F (20° C) for a minimum of

seven days prior to, during, and seven days after the installation. The flooring material should be conditioned in the same manner for at least 48 hours prior to the installation. Areas to receive flooring shall be adequately lighted to allow for proper inspection of the substrate, installation and seaming of the flooring, and for final inspection.

- B. Temperature Requirements: Maintain air temperature in spaces where products will be installed for time period before, during, and after installation as recommended by manufacturer.
 - 1. Temperature Conditions: 68° F (20° C) for a minimum of seven days prior to, during, and seven days after the installation.
- C. Existing Conditions: [Specify existing conditions affecting product use and installation.]
- D. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1.08 SEQUENCING AND SCHEDULING

- A. Finishing Operations: Install flooring after finishing operations, including painting and ceiling operations, have been completed.
- B. Concrete Curing: Do not install flooring over concrete substrates until substrates have cured and are dry to bond with adhesive as determined by resilient flooring manufacturer's recommended bond, moisture test, and pH test.
 - 1. Flooring Contractor assigned to report responsibility back to owner/architect.

1.09 WARRANTY

- A. Project Warranty: Refer to "Conditions of the Contract" for project warranty provisions.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.
 - 1. Warranty Period: Five (5) year limited warranty commencing on Date of Substantial Completion.

1.10 MAINTENANCE

- A. Extra Materials: Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 Closeout Submittals (Maintenance Materials) Section.
 - 1. Quantity: Furnish quantity of flooring units equal to 5% of amount installed.
 - 2. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra materials.

PART 2 PRODUCTS

2.01 RESILIENT LINOLEUM SHEET FLOORING

- A. Manufacturer: Forbo Flooring, Inc.
 - 1. Contact: 8 Maplewood Dr., Humboldt Industrial Park, P.O. Box 667, Hazleton, PA 18202; Telephone +800 842 7839 or +570 459 0771; Fax + 570 450 0258

- B. Proprietary Product(s): Marmoleum® Real Linoleum Sheet and Linoleum Adhesive.
 - 1. Description: Homogeneous sheet linoleum of primarily natural materials consisting of linseed oil, wood flour, and rosin binders, mixed and calendered onto natural jute backing. Pattern and color shall extend throughout total thickness of material.
 - 2. Width: 2 Meters (79")
 - 3. Length: 32 Meters (105 Linear Feet)
 - 4. Gauge: 2.5mm (1/10")
 - 5. Pattern and Color: Forbo Marmoleum Dual Tile T31210 Rosato.
 - 6. Adhesive: Forbo Flooring, Inc., L 885 Adhesive
 - 7. Topshield™ finish

2.02 PRODUCT SUBSTITUTIONS

- A. Substitutions: No substitutions permitted.

2.03 RELATED MATERIALS

- A. Related Materials: Refer to other sections for related materials as follows:
 - 1. Underlayment and Patching Compound: Refer to Division 3 Concrete Sections for portland cement based underlayments and patching compounds.
 - 2. Resilient Flooring Accessories: Refer to Division 9 Finishes Sections for resilient flooring accessories.
 - 3. Expansion Joint Covers: Refer to other specification section for expansion joint covers to be used with resilient flooring.

2.04 SOURCE QUALITY

- A. Source Quality: Obtain flooring product materials from a single manufacturer.

PART 3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions, and product carton instructions for installation.

3.02 EXAMINATION

- A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions (i.e. moisture tests, bond test, pH test, etc.).
- B. Material Inspection: In accordance with manufacturer's installation requirements, visually inspect materials prior to installation. Material with visual defects shall not be installed and shall not be considered as a legitimate claim.

3.03 PREPARATION

- A. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.
- B. Surface Preparation:
 - 1. General: Prepare floor substrate in accordance with manufacturer's instructions.
 - 2. Floor Substrate: Floors shall be sound, smooth, flat, permanently dry, clean, and free of all foreign materials including, but not limited to, dust, paint, grease, oils, solvents, curing and hardening compounds, sealers, asphalt and old adhesive residue.
 - 3. Concrete Floor Substrate: Concrete floor substrate shall have a minimum compressive strength of 3,000 psi. Refer to Division 3 Concrete sections for patching and repairing crack materials, and leveling compounds with portland cement based compounds.
 - a. Reference Standard: Comply with ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

- C. Concrete Moisture Testing: Conduct moisture tests on all concrete floors regardless of the age, grade level or the presence of existing flooring. Conduct calcium chloride tests in accordance with ASTM F 1869. Measure the internal relative humidity of the concrete slab in accordance with ASTM F 2170. One test of each type should be conducted for every 1,000 square feet of flooring (minimum of 3). The tests should be conducted around the perimeter of the room, at columns, and anywhere moisture may be evident. Concrete moisture vapor emissions must not exceed 8.0 lbs. per 1,000 square feet in 24 hours when using Forbo L 885 adhesive. Concrete internal relative humidity must not exceed 85% when using Forbo L 885 adhesive. A diagram of the area showing the location and results of each test should be submitted to the Architect, General Contractor or End User. If the test results exceed these limitations, the installation must not proceed until the problem has been corrected.
- D. Concrete pH Test: Perform pH tests on concrete floors regardless of the age or grade level. If the pH is greater than 11, it must be neutralized prior to beginning the installation.
- E. Wood Subfloors: Wood floors should be double construction with a minimum total thickness of 1 inch. Wood floors must be rigid, free from movement and have at least 18" of well-ventilated air space below. Forbo floor coverings should not be installed over wooden subfloors built on sleepers over on or below grade concrete floors without first making sure that adequate precautions have been taken to ensure the structural integrity of the system, and to prevent moisture migration from the concrete slab.
 - 1. Refer to Division 6 Carpentry sections for wood subfloor construction.
 - 2. Reference Standard: Comply with ASTM F 1482 Standard Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring

3.04 INSTALLATION

- A. Adhesive Flooring Installation: Cut required length of linoleum flooring from roll, allowing enough material to extend up the wall 4 to 6 inches at either end. Layout and position sheet flooring so that any seams will fall at least 6 inches from underlayment joints or saw cuts in concrete substrate. Scribe and cut flooring material to shape of vertical surfaces, including walls and partitions. Apply adhesive and lay sheet flooring into wet adhesive and roll with a 100 pound roller. Install sheet flooring square with room axis.
 - 1. [Adhesive, Seamless Flooring Installation: Rout out seams and heat weld together with complementary colored heat welding rod of complimentary composition in accordance with resilient flooring manufacturer's recommendations.]
 - 2. Adhesive Flooring and Flash Coved Base Installation: Extend flooring up the wall in a flash-coved method to a height of 6 inches as indicated.
 - 3. Adhesive Material Installation: Use trowel as recommended by flooring manufacturer for specific adhesive. Spread at a rate of approximately 150 ft²/gallon, as recommended by flooring manufacturer.
- B. Installation Techniques:
 - 1. Where demountable partitions and other items are indicated for installation on top of finished flooring, install flooring before these items are installed.
 - 2. Scribe, cut, fit flooring to butt tightly to vertical surfaces, permanent fixtures and built-in furniture, including pipes, outlets, edgings, thresholds, nosings, and cabinets.
 - 3. Extend flooring into toe spaces, door reveals, closets, and similar openings.
 - 4. Install flooring on covers for telephone and electrical ducts, and similar items occurring within finish floor areas. Maintain overall continuity of color and pattern with pieces of flooring installed on these covers.
 - 5. Do not install resilient flooring over expansion joints. Use expansion joint covers manufactured for use with resilient flooring. Refer to other specification sections for expansion joint covers.
 - 6. Adhere resilient flooring to substrate without producing open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections in completed installation.

- a. Use adhesive applied to substrate in compliance with flooring manufacturer's recommendations, including those for trowel notching, adhesive mixing, and adhesive open and working times.
- 7. Roll resilient flooring as required by resilient flooring manufacturer.
- C. Finish Flooring Patterns: As selected by Architect.

3.05 CLEANING

- A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.
 - 1. Remove visible adhesive and other surface blemishes using cleaning methods recommended by floor manufacturer.
 - 2. Sweep and vacuum floor after installation.
 - 3. Do not wash floor until after time period recommended by flooring manufacturer.
 - 4. Damp mop flooring to remove black marks and soil.

3.06 PROTECTION

- A. Protection: Protect installed product and finish surfaces from damage during construction. Remove and legally dispose of protective covering at time of Substantial Completion.

3.07 INITIAL MAINTENANCE PROCEDURES

- A. Initial maintenance "Starter Kit" supplied by manufacturer. Initial maintenance to be conducted by flooring contractor.
- B. Drying Room Yellowing: Expose installed linoleum to either natural or artificial light to allow "drying room yellowing" (the film is a natural occurrence of the oxidation of the linseed oil in linoleum products) on installed linoleum flooring to disappear prior to initiating temporary protection procedures.

END OF SECTION

Manufacturer's Obligatory Disclaimer Statement (For Electronic Media; Not Print Media)