SECTION 09 6516.16
COMMERCIAL RESILIENT SHEET FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. TEKNOFLOR® FORESTSCAPES HPD™ Commercial Resilient Sheet Flooring.
   2. Accessories.

B. Related Requirements:
   1. Section 03 3000, Cast-in-Place Concrete: For underslab vapor barrier.
   2. Section 09 6513, Resilient Base and Accessories: For wall base, and expansion joint trim between resilient tile flooring and other finish flooring.

1.2 SUBMITTALS

A. Submit in accordance with Section 01 3300.

B. Manufacturer's technical data for each type of resilient flooring and accessory.

C. Manufacturer's standard color chart in the form of actual selections of resilient sheet flooring, including accessories, showing full range of colors and patterns available.

D. Two copies of manufacturer's recommended maintenance practices for resilient sheet flooring and accessories required.

E. Shop Drawings: Jointing, Termination Details; Includes 8½" x 11" details indicating joint method, termination details including reducers and/or caps required.

F. Document and Archive project documentation to include Moisture and pH Test Results.

G. LEED Submittals: Submit required information or documentation for each LEED Credit being pursued applicable to materials, products, and assemblies specified under this section; Refer to Section 01 8115, LEED Design Requirements.
   1. LEED 2009 (v3) Credits being pursued:
      a. MRc2 - Construction Waste Management: Divert 50% or 75% from disposal calculated by weight or by volume.
      b. IEQc4 - Low-Emitting Materials; IEQc4.1 - Adhesives and Sealants: Submit manufacturers' product data for construction adhesives and sealants, including printed statement of VOC content and Safety Data Sheets.
      c. IEQc4.3 - Flooring Systems: Submit documentation that resilient flooring is RFCI FloorScore® certified; or meets testing requirements of CA Dept. of Health Services Standard Practice for the Testing of Organic Emission from Various Sources Using Small Scale Environmental Chambers, including 2004 Addenda.
   2. LEED v4 Credits being pursued:
      a. MR Credit 2 (MRc2): Building Product Disclosure and Optimization - Environmental Product Declarations (EPD): Option 1: Submit a third-party certified Industry-wide (generic) EPD (counts 50%) or Product Specific Type III EPD (counts 100%)
      b. MR Credit 3 (MRc3): Building Product Disclosure and Optimization - Sourcing of Raw Materials: Option 1: Submit documentation that products meet responsible extraction criteria of incorporating reused materials, or recycled content.
      c. MR Credit 4 (MRc4): Building Product Disclosure and Optimization - Material Ingredients: Option 2: Submit a certified report benchmarking chemical ingredients inventoried to 100 ppm using either GreenScreen v1.2, Cradle to Cradle, REACH Optimization, or another USGBC approved program meeting the material ingredient reporting criteria.
      d. EQ Credit 2 (EQc2): Low-Emitting Materials: Option 1: Submit a General Emissions Evaluation using CDPH Standard Method v1.1. Option 2: Submit certification

documentation that product is FloorScore® or NSF/ANSI 332 certified to meet CDPH Standard Method v1.1.

H. Submit manufacturer's certification that products meet the requirements of SCAQMD Rule 1168 in areas where exposure to freeze/thaw conditions and direct exposure to moisture will not occur.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. ASTM E648 (NFPA 253): Critical Radiant Flux — Class I
   2. ASTM E662 (NFPA 258): Smoke Density — ≤ 450 DM Corrected

B. Installer Qualifications: Minimum five (5) years of successful in-service performance and experience with installations of similar size and scope. Provide 3 recent project references, state license documentation (where applicable), insurance certificate and workman's comp documentation.

C. ISO 9001 and ISO 14001 Certified Manufacturer

D. Source Limitations: Provide each type of resilient sheet flooring and accessories from a single manufacturer, including recommended primers, adhesives, sealants, and leveling compounds.

E. Field Samples: Provide field samples, dry laid, to demonstrate aesthetic effects of materials in-situ, to assist the Architect and Owner in making final selections.

1.4 DELIVERY, STORAGE AND HANDLING

A. Comply with manufacturer's instructions and recommendations, Section 01 60 00 requirements.

B. Deliver materials to project site in manufacturer's original, unopened containers with labels indicating brand names, colors and patterns, and quality designations legible and intact.

C. Upon receiving, confirm materials receive are the correct color, style and quantity for each dye lot.

D. Store all roll goods vertically and stage materials to install rolls in consecutive roll numbers.

E. Store and protect all materials in a dry interior area maintained between 55°F and 85°F (13ºC and 29ºC). DO NOT use outside temporary, shipping containers or uncontrolled storage. Improper storage can result in unintended installation issues including bond failure, gapping or buckling, and it is not covered under the product warranty.

F. ACCLIMATION: Store resilient flooring materials in spaces where they will be installed for at least 72 hours prior to installation.

1.5 SITE CONDITIONS

A. Ambient Conditions:
   1. The building envelope must be completely enclosed.
   2. Areas to receive resilient flooring shall be maintained at temperatures and relative humidity (RH) in accordance with ANSI/ASHRAE 55 and Resilient Flooring and Adhesive Manufacturer requirements.
   3. Set and operate permanent or temporary (with data logging of Temp and ambient RH) HVAC at a consistent temperature between 65°F to 85°F (18ºC and 29ºC) for a minimum of 1 week and preferably 2-3 weeks or longer before, during and continuously after installation.
   4. Install resilient flooring and accessories after other trades, including painting and overhead trades have been completed.
   5. Maintain HVAC at a minimum temperature of 55°F (13°C) thereafter as per the manufacturer's recommendations. Space heaters are NOT acceptable.
   6. Do NOT install Resilient Tile Flooring if substrate temperatures fail to meet requirements.
   7. Do NOT install resilient flooring over new concrete slabs until they are cured and sufficiently dry to achieve bond with adhesive as determined by resilient flooring manufacturer's bond, moisture and pH tests.

1.6 EXTRA MATERIALS

A. Furnish a minimum one percent (1%) extra resilient tile flooring and accessory materials in full and unopened cartons for each color and pattern installed.

1.7 WARRANTY

A. Twelve (12) year limited non-prorated warranty including labor commencing on date of substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Shannon Specialty Floors, Inc. 1005 S. 60TH Street, Milwaukee, WI 53214, 800-522-9166
   1. TEKNOFLOR® FORESTSCAPES HPD™ Commercial Heterogeneous Resilient Sheet Flooring

B. Product Description and Physical Characteristics:
   1. Width x Length: 6 feet x 75 feet.
   2. Weight: 5.9 lbs. per SQ. YD.
   3. Nominal Thickness: 2.3 mm non-cushioned.
   4. Standard Specification - ASTM F1303: Meets or Exceeds Requirements
   5. Classification: Type I, Grade 1 Wear Layer: Embossed clear wear layer of 20 mils. for Commercial Use
   6. Backing Class A, Fused Non-cushioned textured backing system.
   6. Top Coat: HP Urethane Coating with Ceramic Bead.
   7. Antimicrobial: TekDefend™ Anti-Microbial incorporated into the wear layer which effectively inhibits bacterial growth on the flooring surface.

C. Test Data:
   1. ASTM E648 (NFPA 253 and FTM Standard 372) Critical Radiant Flux/Flammability: 0.99 W/cm^2 - Meets Requirements Class 1 (≥0.45 W/cm^2)
   2. ASTM E662 Smoke Density: <450 DM Corrected - Meets Requirements
   3. ASTM E84 Surface Burning Characteristics: Class B (Walls)
   4. ASTM F925 Resistance to Chemicals: No or slight staining - Meets or exceeds requirements (Refer to Chemical resistance chart)
   5. ASTM F970 Residual Indentation: 1,000 PSI at or below maximum residual indentation (Standard Specification is 175 PSI @ ≤0.005 Inch Residual Indentation) - Exceeds Requirements
   6. ASTM F1914 Short Term Indentation: 0.003 Inch Residual Indentation (≤ 0.012 Inch Residual Indentation)
   7. ASTM F1514 Heat Stability: Avg. Delta E 0.18 – Exceeds Requirements (<8.0 Delta E)
   8. ASTM F1515 Light Stability: 300 AFU Exposure Delta E 0.80 – Exceeds Requirements (<8.0 Delta
   9. ASTM D2047 Slip Resistance: Static Coefficient of Friction, SCOF Dry: 0.79, SCOF
   10. ANSI B101.3 Dynamic Coefficient of Friction: High Traction Surface Wet DCOF
   11. ASTM F963 Heavy Metals Content Analysis: <0.1 ppm None detected
   12. Phillips Castor Chair Test: 20,000 cycles 5 - No Change in appearance (150 lbs. load, 20,000 cycles Rating Scale 5 - No Change / 1 - Severe Change)
   13. ASTM D-4060 32,000 Cycles to see effect on design layer (H-18 wheel & 1 kg mass)
   14. ASTM F-510 Wear Resistance by Taber Abrasion: 0.05 grams lost (S-39 Wheel & 1 kg mass)
   15. REACH – Substances of Very High Concern (SVHC): SVHC's tested must be less than 0.1% by product weight. Meets Requirements.

2.2 ACCESSORIES

A. Adhesives: As recommended by flooring manufacturer to suit material and substrate conditions.
   1. TUF STIK 9000
      a. Standard acrylic adhesive suitable for most situations. Strong green grab when wet and sets hard when cured.
      b. Provides a 10 year under bed bond warranty.
      c. Moisture & pH Limits: 90% RH and 8 Lbs. MVER & 8-10 pH
   2. TUF STIK 150 Spray Adhesive
      a. High Shear spray adhesive suitable for most situations. Ideal for occupied renovations or where fast turnaround is important. Allows immediate use of the floor after installation.
      b. Moisture & pH Limits: 93% RH and 6 Lbs MVER & 8-10 pH
   3. TUF STIK SPX Multi-Function Adhesive

a. One-part reactive modified polymer adhesive used in place of Epoxy or Urethane adhesives. Reduces footfall sound by Delta IIC 19, provides underfoot comfort as adhesive remains permanently flexible and provides a topical Waterproof bond when cured. TUF STIK SPX is suitable for use under Bariatric beds and can be used over clean scraped cutback adhesive.
b. Moisture & pH Limits: - 10 Lbs MVER No pH limit

4. TEK 4000 Epoxy
a. Two-part reactive Epoxy adhesive for extreme conditions. Use under Bariatric beds and areas with topical water, direct sun exposure or heavy point loads.
b. Moisture & pH Limits: 85% RH - 6 Lbs. MVER No pH limit

B. Concrete Slab Primer: Non-staining, low or no VOC acrylic or latex based primer suitable for use with acrylic adhesives.

C. Patching, Leveling, Underlayment:
a. Trowalable or Self-Leveling Portland cement and/or calcium aluminate patching and leveling compound.
b. Recommended by its manufacturer for intended use conditions.
c. The underlayment shall be mold, mildew and alkali resistant, non-shrinking and water-resistant with a minimum 3,500 psi cured compressive strength.

CAUTION: Gypsum patching compounds shall not be used unless recommended and warranted by product manufacturer as project compliant.

D. Welding Rods: Manufacturer's standard or equal; color as selected.

E. Chemical Weld: Manufacturer's standard or equal.

F. Terminating Reducers: Manufacturer's standard; color as selected.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Ensure subfloor is properly prepared Concrete Slab (ACI 302.1 and ACI 302.2), Thick Pour Gypsum (ASTM F2419), Suspended Wood or Metal deck. Determining jobsite suitability rests solely with the General Contractor and Flooring Contractor.

B. Examine subfloor surfaces to ensure they are suitable for intended use. The subfloor shall be rigid, smooth and flat, permanently dry, clean & free of all foreign materials, including, but not limited to, dust, paint, marker, grease, oils, solvents, cutting/parting/curing compounds, sealers and residue from old adhesive or any other deleterious contaminants that may act as a bond breaker or staining agent (ASTM F710).

C. Concrete surface must be free of curing compounds or adhesives and have a compressive strength of 3500 psi or greater.

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 non-asbestos containing material, you must presume it contains asbestos.

Regulations may require that the material be tested to determine asbestos content. RFCI's Recommended Workplace Practices for Removal of Resilient Floor Coverings are a defined set of instructions addressed to the task of removing all resilient floor covering structures.

CAUTION: All ink, markers and paint on substrate must be removed by sanding to prevent bleed through and staining of the sheet flooring. Sealing and/or skim coating is not a substitution for sanding.

D. Inspect substrate for any contamination, such as oil drippings, cutback adhesives, etc. Remove or encapsulate contamination prior to installation of floor covering.

E. Determine surface porosity. Place dime to quarter size drops of water on the surface of the concrete and time how long they take to fully absorb into the concrete surface. It the water drops take longer than 2 minutes to be fully absorbed, the surface in considered non-porous. Slab absorbency testing should be

performed in at least 3 areas on each installation. For large projects, test every 50 feet in both directions and document on floor plan along with moisture and pH test results.

F. Allow other finishing trades, especially plumbing and electrical, ceiling and walls and painting to complete their work before beginning the floor installation.

G. During spackling, painting, pipe cutting and other operations that can contaminate the subfloor are ongoing, cover the substrate to prevent contamination. Spackling, permanent marker, paint, paint thinner or machine oil and other construction trade items that contaminate the substrate and cause bond failure or discoloration.

H. Do not allow resilient flooring work to proceed until subfloor surfaces are satisfactory. Indicate adverse conditions of any type by letter to Architect and Flooring Distributor.

I. Close working spaces to all non-essential traffic before installation and as specified after installation.

NOTE: After installation, the GC shall protect flooring surface from damage from other trades until the space is turned over. If traffic must be permitted on the flooring, protect with construction paper for foot traffic and plywood for heavy items or rolling loads. Failure to properly protect flooring from construction and trade damage may result in permanent damage to the flooring.

J. Provide good overhead lighting for proper subfloor preparation and installation. Poor lighting is no excuse for improper workmanship or installation of visible defects.

K. Expansion, Isolation and other moving joints are designed and incorporated in concrete slabs to permit movement without causing random cracks. Moving joints shall not be filled or covered with any floor covering. Moving joints must be honored through the flooring and should be treated with an expansion joint covering system as determined though consultation with the system manufacturer.

CAUTION: Self-leveling underlayments can have very high moisture contents and require longer curing times, some up to 10 days. Therefore, check moisture level with a Calcium Chloride test prior to installation.

3.2 PREPARATION

A. Perform a bond test before starting installation to confirm compatibility of adhesive and prepared substrate. Perform at least one bond test for each section of the concrete pour. Perform bond tests on the prepared surface with a 3' x 3' section of flooring. Allow a minimum of 48 hours and preferably 72 hours or longer before determining compatibility and bond strength. Pull up bond test areas by hand to confirm that the adhesive has a strong bond between the flooring and subfloor. If flooring is not strongly bonded to the subfloor additional testing is needed to determine why there is not a strong bond.
When performing a bond test, always check for complete adhesive transfer on the back of the flooring in case more adhesive is needed for porous or rough concrete surface, or if too much adhesive is being used over a nonporous or burnished smooth surface. Adjust trowel size used to increase or decrease the amount of adhesive applied to suit substrate and environmental conditions.

B. Moisture and pH testing shall be properly performed in accordance with current test standard and documented to confirm subfloor suitability. Do not install when the moisture vapor emission rate (MVER) or in-situ Relative Humidity (RH) exceeds adhesive limits or when surface pH is not within specification.
1. Concrete:
ASTM F2170 In-situ Relative Humidity
ASTM F1869 Calcium Chloride;
ASTM F710 pH Testing
2. Wood: Calibrated Wood Pin Meter

C. Remove debris, grit, and other foreign materials or substances from the surface of the subfloor before patching and smoothing. Sand or grind surface to remove mortar, drywall compound and curing compounds, paint, permanent marker and other contaminants or surface irregularities which may result in lack of adhesion, telegraphing or bleed through.

WARNING: Shannon Specialty Floors does not recommend the use of solvent adhesive removers (inorganic or bio-based) or chemically abating an existing floor covering or adhesive. Adhesive removers can remain in the slab, under walls and within cracks and cause failure of the new floor covering and or adhesive after installation. For removal of all flooring and

adhesives, follow the resilient flooring removal procedure as detailed in the RFCI's Recommended Workplace Practices for Removal of Resilient Floor Coverings.

D. The subfloor surface shall be smooth and flat to 3/16" in 10 ft. (3.9 mm in 3 m) and 1/32" in 1 ft. (1 mm in 300 cm) per ASTM F710.

E. Where leveling or smoothing is required, apply trowelable or self-leveling Portland cement and or calcium aluminate patching and leveling compound recommended by its manufacturer for intended use conditions. Apply compound in accordance with manufacturer's current printed instructions. The underlayment shall be mold, mildew and alkali resistant, non-shrinking and water-resistant with a minimum 3,500 psi cured compressive strength. Ensure proper mix water ratio, working time and drying time.

CAUTION: Gypsum patching compounds shall not be used unless recommended and warranted by product manufacturer as project compliant.

F. Porous and/or dusty structurally sound substrates shall be primed by applying one or more coats of acrylic based primer-sealer with a short nap paint roller and allowed to dry before proceeding.

G. After patching, sand the surface to remove all ridges and rework any remaining low spots or surface defects. Vacuum the entire surface paying close attention to the perimeter to remove all dust and debris.

H. Floor covering should not be installed over expansion joints. Expansion joint covers compatible with floor covering should be used.

I. Do not install floor covering over existing VCT or VAT without using an approved underlayment to hide tile seams.

3.3 INSTALLATION

A. Install resilient sheet flooring and accessories using method indicated in strict compliance with manufacturer's printed instructions. Extend resilient sheet flooring into toe spaces, door reveals, and into closets and similar openings.

B. Roll out resilient sheet flooring material with top surface up. Cut materials 2-3 inches longer than needed and allow material to relax for twenty-four (24) hours before installation. This will help to reduce end curl and difficulty getting the flooring to lay flat. For materials that are not laying flay, carefully back roll.

C. Trim selvage edges and ends to remove all edge compression, distortion and damage.

D. Prepare flooring installation. Underscribe, cut and fit resilient sheet flooring to permanent fixtures, built-in furniture and cabinets, pipes, outlets and permanent columns, walls and partitions. Floor shall be tight to door bucks and all abutments.

F. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk, pencil or another non-staining marking device.

G. Apply adhesive in accordance with label instructions. Pay careful attention to using proper trowel to achieve correct adhesive coverage, open and working times based on surface absorbency and environmental conditions. Do not apply excess adhesive or leave lumps in adhesive or allow adhesive to over-dry. Adhesive must fully cover the back of the flooring for proper coverage.

H. Tightly bond resilient sheet to subfloor without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections. Roll flooring with 100 lbs. 3-section roller. Hand roll resilient sheet flooring at seams and perimeter. Frequently check adhesive application of back of flooring to ensure full adhesive coverage and that trowel ridges are flattened. If adhesive has been down too long before installation, scrape clean and apply fresh adhesive.

I. Once the room is installed, re-roll the floor using a 100 lbs. 3-section roller in both directions. Reroll the seams and perimeter with a hand roller making sure the adhesive is flattened to a thin uniform film and continuous coverage on the back of the sheet flooring.

J. Seams: Heat welding is the manufacturers preferred seaming method as this provides the strongest seam.
   1. Heat weld seams.
      a. Groove seam to accept weld rod.
      b. Melt specified weld rod into grooves using heat weld gun.

c. Once the heat weld is cool, use a guide plate on spatula or other trim knife to skive the weld rod for the first pass. Trim the second pass without the guide plate to provide a smooth flush seam. Glaze the seam to seal the weld rod surface.

2. Chemical weld seams using manufacturers approved low gloss chemical weld.

3.4 CLEANING AND PROTECTION

A. ROUTINE MAINTENANCE: TEKNOFLOR® FORESTSCAPES HPD™ is a NO-WAX, NO BUFF product. Reference www.ShannonSpecialtyFloors.com for complete Care and Maintenance Instructions.

1. Before beginning any wet maintenance procedure, read all equipment and cleaning product instructions and safety warnings, wear appropriate protective gear and put out caution signs in the area to be cleaned.
2. Sweep, dust mop or vacuum the floor to remove all loose dirt and grit. Do not use treated dust mops.
3. When available, clean the floor with an auto scrubber using a properly diluted Neutral pH cleaner and a 3M 5100 Red pad or equivalent pad or brush. Rotary or cylindrical brush cleaning is recommended for textured floors.
   DO NOT USE A MORE AGGRESSIVE PAD OR BRUSH.
4. When an auto scrubber is not available, mop on a properly diluted Neutral pH floor cleaner. Apply the solution liberally, but do not flood the floor. Clean the floor using a mop, flat mop or machine scrub with a low speed (175-350 RPM) swing arm floor machine using a 3M 5100 Red pad or equivalent pad or brush.
   DO NOT USE A MORE AGGRESSIVE PAD OR BRUSH.
5. Completely remove the cleaning solution using an auto scrubber, shop vacuum or mop and let the surface dry.
6. Fans or air movers can speed up the drying process. Once the floor surface is clean and dry, remove caution signs.

B. FURNITURE RESTS & PROTECTORS:

Use appropriate furniture rests and floor protectors under all chairs, furniture, rolling equipment and beds. Proper selection and care of furniture rests, wheels and floor protectors is an important part of effective floor care.

KEY ELEMENTS INCLUDE:

1. NON-STAINING: Be made of non-staining materials.
2. RADIUSED EDGE: Provide slightly radius or rounded edges.
3. SUFFICIENT CONTACT AREA: Have a surface contact area that is large enough to evenly distribute the load without causing damage to the floor. Generally, a 1” or larger diameter flat smooth contact area is appropriate for most applications.
4. COMPOSITION OF FLOOR GLIDES: Commercial grade felt glides are preferred for resilient flooring. Stainless steel, nylon and non-staining rubber glides can be used. Do not use metal glides that may rust or plastic glides as they become abrasive with use and can scratch the floor.
5. COMPOSITION OF WHEELS: Wheels for resilient & hard surface flooring should have a soft tread compound of urethane or non-staining rubber. Do not use hard plastic or metal wheels or rollers on resilient flooring. Hard wheels can cause surface damage to the flooring and break the adhesive bond causing bubbling.

C. FLOOR PROTECTION:

1. After installation protect installation from foot traffic for 24 hours and protect flooring from rolling and heavy point loads for 48-72 hours. For spray adhesive allow immediate use of flooring.
2. The Owner and General Contractor are responsible to protect completed flooring after installation is released by the Flooring Contractor. Cover with protective material appropriate to prevent any damage from other construction trades until final acceptance by owner.

END OF SECTION