

SECTION 32 18 16.13

EPDM/TPV PLAYGROUND PROTECTIVE SURFACING

PART 1 - GENERAL

1.01 WORK SCOPE

- A. Furnish labor, material, and equipment necessary to install the poured-in-place, resilient surfacing system as shown on the drawings and specified herein.
 - a. Work shall include, but not be limited to the following: layout; excavation; backfill; furnishing and installing of base material; furnishing and installing of poured-in-place, resilient surfacing and all other incidental work to provide a complete resilient surfacing system.
 - b. Poured in place playground surfacing shall consist of a polyurethane binder mixed with recycled rubber, which will make up the attenuation cushion layer. The attenuation cushion layer is capped with EPDM or TPV granules, mixed with a polyurethane binder creating the Wear Course.
 - c. Surfaces shall comply with ADA and CPSC guidelines as well as ASTM Standards. Manufacturer is to be certified by IPEMA, a third-party testing organization for playground surfaces and equipment.

1.02 PERFORMANCE REQUIREMENTS

- A. Area Safety: Poured in place within playground use zones shall meet or exceed the performance requirements of the CPSC, ADA and Fall Height Test ASTM F1292-18. The surface must yield both a peak deceleration of no more than 200 G-max and a Head Injury Criteria (HIC) value of no more than 1,000 for a head-first fall from the highest accessible portion of play equipment being installed as shown on drawings. IPEMA certification is required. (ASTM F1292-18, section 15 The laboratory test used to determine critical fall height shall have been conducted on surfacing material samples identical in design, materials, components, and thickness and manufactured as the installed playground surface).
- B. Accessibility: NOTE: Children's outdoor play areas shall be in compliance with the Uniform Federal Accessibility Standards (UFAS) FED-STD-795 and the Architectural and Engineer Instructions (9AEI) Design Criteria.
- C. The requirements of the Americans with Disabilities Act. Accessibility Guidelines (ADAAG) 28 CFR Part 36 that provide equal or greater accessibility than the requirements of UFAS must also be met in children's outdoor play areas.
- D. Poured in place surfaces intended to serve as accessible paths of travel for persons with disabilities shall be firm, stable and slip resistant, and shall meet the requirements of ASTM F 1951-14 and ASTM F1292-18.

1.03 APPLICABLE STANDARDS

- A. ASTM International
- B. ASTM D2047- Standard test method for determining the static coefficient of friction of ceramic tile and other like surfaces by the horizontal dynamometer pull meter method. This standard replaces ASTM C1028.
- C. ASTM D412 – Standard test methods for vulcanized rubber and thermoplastic rubbers and thermoplastic elastomers-tension.
- D. ASTM D624 - Standard test method for tear strength of conventional vulcanized rubber and thermoplastic elastomers.
- E. ASTM D2859 – Standard test method for flammability of finished textile floor covering materials.
- F. ASTM E303 – Standard test method for measuring surfacing frictional properties using the British Pendulum tester.
- G. ASTM F1292-18 – Standard specification for impact attenuation of surface systems under and around playground equipment.
- H. ASTM F1951 – Standard specification for determination of accessibility of surface systems under and around playground equipment.

1.04 Poured in place surfaces shall be manufactured and installed by trained, experienced company employees or certified installers who have successfully completed the “Certified Installers Training Program”.

1.05 SUBMITTALS: THE FOLLOWING SHALL BE SUBMITTED

- A. The Contractor shall submit a complete set of the material submittals, as required, including manufacturer’s name and address, specific trade names, catalog and model numbers, illustrations and descriptive material, and samples of the proposed material for this project clearly marked as to proposed items for approval by the Owner’s representative.
- B. Products submitted as equal must include hard copies of manufactures written specifications, warranty, purchase and use of materials.
- C. Manufacturer’s descriptive data and installation instructions.
- D. Manufacturer’s details showing depths of wear course and sub-base materials, anchoring systems and edge details.
- E. Upon request, a listing of at least five installations where products similar to these proposed for use have been installed and have been in service for a minimum period of three years. The list shall include owner or purchaser, address of installation, date of installation, contact person, and phone number.

- F. A signed statement by an authorized official certifying that the surfacing system meets the requirements of ASTM F1292-18, section 15 for a head-first fall from the highest accessible portion of the specified playground equipment.
- G. A signed statement from the manufacturer of the poured in place surfacing attesting that all materials under this section shall be installed only by the Manufacturer's Trained Installers.
- H. A Certificate of Insurance shall be provided by the Manufacturer for poured in place surfacing for use as playground safety surfacing, covering general and product liability, of not less than \$1,000,000 for each occurrence, \$2,000,000 general aggregate, with an excess/umbrella liability of \$25,000,000. The issuing underwrite shall be AA rated.

I. IPEMA Certification mandatory

- 1.06** Delivery, Storage and Handling: Materials and equipment shall be delivered and stored in accordance with the manufacturer's recommendations.
- 1.07** Project Site Conditions: Poured in Place surfacing must be installed on a dry sub-surface, with no prospect of rain within the initial drying period, and within the recommend temperature range of the manufacturer. Installation in weather condition of extreme heat, cold (less than 55°F), and/or high humidity may affect cure time, and the structural integrity of the final product. Immediate surrounding sites must be reasonably free of dust conditions or this could affect the final surface look.
- 1.08** Sequencing and Scheduling: Poured in Place surfacing shall be installed after all playground equipment, shade structures, signs and any other items that will be within the surfacing area. Coordinate with General Contractor.
- 1.09** Surface installation coordinated by manufacturer representative.
- 1.10** Warranty: Poured in Place surface shall maintain required impact attenuation characteristics and be guaranteed against defects in workmanship AND material for a limited five-year period or as specified and agreed upon per alternate contract. Warranty will be specific to maintenance requirements and performance standards of completed product. Warranty is void if not installed by Manufacturers Trained and Certified Poured in Place Surfacing Installers.
- 1.11** Testing: NOTE: Critical Fall Height Four feet through 10 feet have been tested in accordance with Section 15 – Critical Fall Height Test Procedure of ASTM F1292-18.

PART 2 – PRODUCTS

- 2.01** Safety surfacing shall consist of both recycled and synthetic materials meeting the requirements of this specification.
- 2.02 PRODUCT SCOPE**
 - A. Poured in Place Surface: The poured in place surface shall consist of recycled rubber mixed with a polyurethane binder, then capped with EPDM or TPV granules mixed with an aliphatic binder or

aromatic binder.

- B. It shall consist of a uniform material manufactured in such a way that the top portion meets the requirements specified herein for wear surface.
- C. The type of safety surfacing shall be a poured-in-place system and shall be indicated on the drawings.

2.03 ATTENUATION CUSHION LAYER SECTION

- A. Impact attenuation cushion layer consists of these materials; recycled styrene butadiene rubber (SBR) and/or cryogenic crumb rubber and/or pre consumer postindustrial reclaimed scrap rubber adhered with a 100% solids polyurethane binder to form a resilient porous material.
- B. Strands of SBR may vary from 0.5 mm – 2.0 mm in thickness by 3.0 mm – 20 mm in length.
- C. Chunk Premium Black Rubber Granules are 5/8” granules: This rubber is pre-consumer, post-industrial, reclaimed rubber, granulated through a 5/8” screen and contains less than 2% dust.
- D. SBR Crumb Rubber (5-9 Mesh) using sieve analysis ASTM D5644 with a fiber content of .1% or less mixed in.
- E. Binder shall be between 7-12% of the total weight of the material and shall provide 100 % coating of the particles.
- F. The attenuation cushion layer shall be compatible with the wear course and must meet requirements herein for impact attenuation.

2.04 WEAR COURSE

- A. The EPDM wear course shall consist of Ethylene Propylene Diene Monomer. The TPV wear course shall consist Thermal Plastic Vulcanized granules both shall be mixed with polyurethane binder formulated to produce an even, uniform, seamless surface. Installation of surfacing shall be seamless (unless otherwise agreed upon by owner).
- B. EPDM or TPV shall be peroxide cured with a EPDM or TPV content of 26% and shall include a processing aid to prevent hardness with 26% poly content to maintain dynamic testing characteristics, weatherization and UV stability or TPV granules.
- C. ASTM D2240 (Shore A) hardness of 55-65, not less than 26 percent rubber hydrocarbons.
- D. Size of EPDM or TPV granules shall be 1-4mm across. Binder shall be not less than 20% of total weight of rubber used in the wear surface and shall provide 100% coating of the particles.
- E. Thickness of wear course shall be a minimum .5” (12.7 mm).
- F. The wear course shall be porous.

2.05 BINDER

- A. No Toluene Diphenyl Isocyanate (TDI) shall be used.
- B. No filler materials shall be used in urethane such as plasticizers and the catalyzing agent shall contain

no heavy metals.

- C. Weight of polyurethane shall be no less than 8.5 lbs. /gal (1.02 Kg/1) and no more than 9.5 lbs. /gal (1.14 Kg/1).
- D. Manufacturer is permitted to modify the type of urethane required to match extreme weather conditions. Substitutions must be equal to or exceed original quality.

2.06 GT IMPAX ADVANTAGE INSERTS

- A. Insert – Thermal Plastic Vulcanized angular granules with a (Shore A) hardness of 65° A ± 5 and particle size between .5-1.5 mm shall be used.
- B. Thickness of the Insert shall be .5”
- C. Insert shall be porous.
- D. Aromatic or aliphatic urethane to be used as a binder.
- E. Location –Insert to be installed under swings, swing bays, slide exits (unless otherwise noted in drawings). Customer to approve location of wear mat inserts.
- F. Standard Color .5-1.5mm to be used. Colors include four standard colors: Terra Cotta Red, Blue, Green, and Beige.
- G. Size: Swing bay use locations shall have TPV Inserts inclusive of all outside bay structure poles. Singular swings and slide exits shall be 4’x4’x.5” in thickness.

2.07 MATERIALS

A. Wear Course - EPDM or TPV Granules

Manufacturers: Soflex Rubber and Urethane Sdn. Bhd.
Nantong Hongfei Rubber Products Co. LTD
Rosehill Polymers
As Distributed by: GT Impax (800) 235-2440
Location Used: Playground Area

B. Attenuation cushion layer – GT Impax Shredded and/or Chunk Rubber

As Distributed by: GT Impax (800) 235-2440
Location Used: Playground Area

C. Binder – Aromatic VORAMER MR Products

Manufacturer: DOW Chemical
As Distributed by: GT Impax (800) 235-2440
Location Used: Playground Area

D. Binder – Aromatic Urethane *Stobielast® S 1020*

Manufacturer: Stockmeier Urethanes, USA, Inc.
As Distributed by: GT Impax (800) 235-2440
Location Used: Playground Area

E. Binder – Aliphatic Urethane Premium, Non-Ambering

Manufacturer: Accella Polyurethane Systems
As Distributed by: GT Impax (800) 235-2440
Location Used: Playground Area

F. Chunk Premium Black Rubber Granules

Manufacturer: American Recycling Center, Inc. (989) 725-5100
655 Wabasse Drive
Owosso, MI 48867
As Distributed by: GT Impax (800) 235-2440
Location Used: Playground Area

PART 3 – EXECUTION

3.01 SITE PREPARATION (OWNER OR OWNERS REPRESENTATIVE SHALL)

- A. Finished Grade/Slope: Verify that finished elevations or adjacent areas are as indicated on the architectural or site plans, that the appropriate sub-grade elevation has been established for the safety surface to be installed, and that the subsurface has been installed per architectural, site or equipment plans while meeting accessibility and use zones requirements.
- B. Aggregate Sub Base: Tolerance of aggregate sub-base shall be within .5” in depth. Verify that aggregate sub-base has been fully compacted. Per ADA Guidelines: compacted Aggregate sub-base – 4” of .75” minus irregular stone with fines compacted to 95% in 2” watered lifts.
- C. Concrete Sub-Base: Tolerance of concrete or bituminous sub-base shall be with .125” (3.0 mm) in 10’ (3050 mm). Per ADA Guidelines: Concrete a minimum of 3’ – 4’ at a minimum 2500 PSI. Concrete must cure for 7 days prior to application of attenuation cushion layer. Concrete must cure 21 days if wear course is to be applied directly to concrete surface. If poured in place surfacing is installed, verify that the concrete sub- base has cured (all areas appear white in color usually at 7 days) and that all concrete curing compounds and other deleterious substances that might adversely affect adhesion have been removed. Surface shall be clean and dry.
- D. Asphalt Sub-Base: Asphalt cure time requires 21-28 days. Once the new asphalt has cured, it must be pressure washed prior to the surfacing being installed. The contractor shall be responsible for flooding the pad to ensure proper slope and tolerance. Any areas holding enough water to cover a flat nickel shall be patched prior to the arrival of our installation crews.
- E. Drainage: Verify that sub-surfacing drainage, if required, has been installed to provide positive drainage.

3.02 INSTALLATION

- A. Poured in Place Surfacing: Components of the poured in place surfacing shall be mixed on site in a rotating tumbler to ensure components are thoroughly mixed and are in accordance with manufactures recommendations. Installation of surfacing shall be seamless up to 2,000 square feet per day. Material shall cover all foundations and fill around all elements penetrating the surface.

- B. Attenuation Cushion Layer: Whenever practical, attenuation cushion layer of surfacing material shall be installed in one continuous pour on the same day of up to 2,000 square feet. When a second pour is required, step the seam (see detail) and fully coat the step of the previous work with polyurethane binder to ensure 100% bond with new work. Apply adhesive in small quantities so that new attenuation cushion layer can be placed before the adhesive dries.
- C. Wear Course: Wear course must be quality peroxide cured EPDM granules or TPV granules. Wear surface shall be bonded to attenuation cushion layer. If necessary, additional primer will be used between the attenuation cushion layer and wear course. Apply adhesive to attenuation cushion layer in small quantities allowing the wear course to be applied before adhesive dries. Surface shall be hand troweled to a smooth, even finish. Expect continuous and seamless up to 2,000 square feet per day (contact sales representative for seamless in excess of 2,000 square feet). Where seams are required due to color change, size or adverse weather, a step configuration will be constructed to maintain wear course integrity. The edge of initial pour shall be coated with adhesive and wearing surface mixture shall be immediately applied. Pads with multiple seams are encouraged to include a topcoat of urethane before being placed into use. Butt joint seams are not acceptable except for repairs. Under special conditions and with Owners written approval seams may be permitted in same color pad. Consult with Manufacturer for specific applications.
- D. Perimeter: For installations over existing concrete, the perimeter shall be saw cut to provide a keyway 1" deep x 1" wide, or formed during the pour, with surfacing rolled down into the void. Primer adhesive must be applied to all sides of the void. When connecting to a concrete curb or border, the inside vertical edge shall be primed with adhesive and the final 2" of the attenuation cushion layer shall be tapered to allow the wear surface material to be 1.5"– 2" thick where it joins the concrete.
- E. Asphalt: When installing over new asphalt, a curb or other type of border is recommended around the entire pad to separate the new surface from other ground materials. Primer adhesive must be applied to the inside vertical edge of the border before poured in place surface installation.
- F. Asphalt: When installing over existing asphalt, a keyway cut of 1" deep by 1" side for the poured in place to taper into and terminate with required ADA slope.
- G. Thickness: Construction methods such as the use of measured screeds or guides shall be employed to ensure that the full depth of specified surfacing material is installed. Surfacing system thickness throughout the playground equipment use zone shall be as required to meet the impact attenuation requirements specified herein.
- H. Clean Up: Manufacturer installers shall work to minimize excessive adhesive on adjacent surfaces or play equipment. Spills of excess adhesive shall be promptly cleaned.
- I. Protection: The safety surface shall be allowed to fully cure in accordance with Manufacturer's instructions. The surface shall be protected by the owner from all traffic during the curing period of at a minimum of 48 hours or as instructed by the Manufacturer.
- J. Manufacturer Services: For poured in place safety surfacing, a Manufacturer's representative who is experienced in the installation of playground safety surfacing shall be provided. The representative shall supervise the installation to ensure that the system meets the impact attenuation requirements as specified herein.

3.03 SITE AREA CLEAN UP

The site shall be kept clean and free of tools, trash, and debris and installation materials daily. Products may be stored on site during installation with appropriate protective measures and approval by the Owner's representative.

END OF SECTION