**SECTION 32 18 16.33**

**PLAYGROUND PROTECTIVE SURFACING**

**Solid TPV/EPDM Top, Four (4”) inches thick, yielding a twelve (12’) foot fall rating.**

**PART 1- GENERAL**

Resilient, self-interlocking (with “Button-Lock™ Technology”) unitary, rubberized safety surfacing, flooring and paver products in the tile/mat/block/paver form with bolt-down capabilities, known as the: Solid TPV/ EPDM Top, 4” thick “XL” Series offering shock resistance/impact attenuation for up to a twelve (12’) foot fall rating.

* 1. DESCRIPTION

All necessary material components and application information required to install the molded three and a half (4”) inch thick “XL” series with the new “Button-Lock™” technology, composed of clean rubber granules, using the “Step-&-Repeat” method of installation, gluing the interlocks and underside of each unit to a solid sub-base material, bolting them down, shall be by Unity Creations Ltd. / Unity Surfacing Systems.

* 1. QUALITY ASSURANCE
1. Qualifications – Manufacturer shall have manufactured and marketed this system in the United States of America for a period of ten (10) years, using clean rubber granules, that has been recycled here in the United States of America from tires and rubber derived from the same, using the same Federal Tax ID #.
2. Installation – Labor shall be completed by “certified” installers with five (5) years’ experience installing rubberized safety surfacing, flooring and paver products in the tile/mat/block form. Installation instructions shall be provided by Unity Creations Ltd. / Unity Surfacing Systems. Glue shall be applied to the “male” interlocks (both in the joint and on top of the joint) during the installation process – not afterwards. Additionally, glue shall be applied to the base (underside – outside edge of cones/feet/legs) of each unit being installed, known as product-to-sub base adhesion; Screw-bolts shall be applied through the male interlocks, and countersunk for additional strength and security.

**\* Base gluing (glue-down) and screw-bolts do not apply over loose-filled materials. Glue being applied to the interlocks, both in the joint and on top of the joint, shall be maintained.**

1. Design & Detailing – The “XL” series shall be four (4”) inch thick utilized in the safety zones under and around all areas, etc. as an impact absorbing resilient unitary rubberized safety surfacing, flooring and paver application. “XL” is designed to meet ANSI/FM, ADA, CPSC, ASTM and USGBC-LEED requirements. Conditions of all substrates with respect to structural performance shall be evaluated and approved by the certified applicator prior to installing.
2. Based on a “certified” installation, the Contractor shall furnish the manufacturer’s Standard 10-Year Limited Warranty, or the 20-Year Pro-rated Limited Warranty as outlined in the manufacturer’s warranty coverage plan prior to ordering.
3. Certified Installation/Workmanship Warranty Period Shall be a: Standard three (3) Years from date of product installation; or a Six (6) Year Pro-rated Warranty from date of product shipment shall be selected from the certified installer prior to ordering.
	1. SUBMITTALS
4. Submit product information in the form of manufacturer’s technical data, specifications, installation instructions, repair & maintenance guide, warranty coverage selected.
5. Submit 4”x4” product samples of unitary rubberized safety surfacing, flooring and pavers in the tile/mat/block form in all available Solid TPV/EPDM Top colors: Red (Terra Cotta), Brt. Red, Green, Brt. Green, Dark Green, Blue, Lt. Blue, Azure Blue (Teal), Purple, Lt. Purple, Turquoise, Beige, Eggshell (Cream), Brown, Dark Brown, Mustard Yellow, Brt Yellow, Orange, Dark. Gray, Mid-Gray, Lt. Gray, Virgin Black. *NOTE: Specifier can blend for a solid TPV top using up to three (3) color(s) at any percentage(s) desired for a custom look as indicated on the drawings.*
6. Submit product samples showing both the “male” and “female” self-interlocking connection that is built directly within the product itself, showing the male connectors of the unit being engageable with the female receptacle of the adjacent unit so that they may interlock with themselves (i.e. without the assistance of an independent piece/item, such as: pins, clips, fasteners, blocks to create an interlock).
7. Submit product samples showing the new “Button-Lock™” technology where the “projections” of a tile/mat/block (unit) are receivable by corresponding “slots” of the adjacent unit to help further strengthen the connection of the self-interlocking system.
8. Submit product samples showing a glue reservoir on the back wall of the female receptacle where excess glue will escape downwardly through the channel formed in the inner wall of the female receptacle to the sub-base and away from the top of the tiles/mats/blocks (units).
9. Submit product samples showing the bolt-down mechanism found within the “male” portion of the interlocking system where it is recessed and counter-sunk.
10. Submit shop drawings showing layout of safety surfacing, flooring and pavers; include edge detail(s) of flush mount installation, cut paver detail(s), fastening detail and details at penetrations for playground equipment.
	1. DELIVERY, STORAGE AND HANDLING

All materials shall be delivered in good condition in its original unopened packages, bound and shrink wrapped with labels intact. All materials shall be protected from weather; and the adhesive (glue) shall be stored at temperatures of 40 degrees Fahrenheit (4 degrees Celsius) or greater. All materials shall be installed without delay. Do not start the installation, then let product sit for several days or weeks before returning to complete.

* 1. JOB CONDITIONS

At the time of application ambient air temperature shall be 40 degrees Fahrenheit (4 degrees Celsius) or greater and sub-base and safety surfacing remain dry for a period of twenty-four (24) hours. Color blending may be necessary to achieve uniformity. All materials shall be protected from weather and other damage prior to application, during applications and while glue is curing.

**PART II: PRODUCTS**

2.01 GENERAL

All material components of the Solid TPV/EPDM Top “XL 4” series with the new “Button-Lock™” technology shall be obtained from Unity Creations, Ltd. / Unity Surfacing Systems or its authorized distributors and/or Sales Agents only. Shall be manufactured in the United States of America for minimum of 10 years and meet standards specifications under the LEED (Leadership in Energy and Environmental Design) criteria developed by the USGBC (United States Green Building Council) establishing a minimum of seven (7) points/credits.

2.02 MATERIALS

1. The architect and / or engineer, in writing, prior to bid date, shall approve any system or series, to be considered equal to “XL”. Samples of equal materials showing the self-interlocking connection with the “Button-Lock™” technology and bolt-down capabilities, in all Solid TPV/EPDM Top colors, must also be submitted prior to bid date.

Acceptable Manufacturer:

Sales & Marketing Dept: Manufacturing Plant:

 Unity Surfacing Systems Unity Creations, Ltd.

 56 Bloomingdale Rd. 3997 RT 9W (PO Box 9)

 Hicksville, NY. 11801 Saugerties, NY. 12477

 T: (516) 724-1357 T: (845) 246-2700

 F: (845) 246-1700 F: (845) 246-1700

 E-mail: productinfo@surfacingsystems.com techinfo@surfacingsystems.com

 Internet: [www.surfacingsystems.com](http://www.surfacingsystems.com) Internet: [www.surfacingsystems.com](http://www.surfacingsystems.com)

1. Unity Creations, Ltd. / Unity Surfacing Systems: tiles/mats/blocks shall be produced on a rectangular configuration of 22” (inches) by 44” (inches) in size [+/- one-quarter (1/4”) tolerance] with a shadow-center (fake seam) joint to achieve the use of the “step-&-repeat” method of installation to stagger (zigzag) the seams as if you were installing brickwork, lining real seam up with fake seams. As a result, symmetry of 22” by 22” squares will be seen on properly completed jobs (installations). Each tile-mat-block is 6.72 square feet in size [+/- one-quarter (1/4”) tolerance] and has a coned (feet &/or leg) bottom design. Weight to be ~54lbs per unit/~8 lbs. per square foot. Thickness is four (4”) inch thick for the “XL” series to meet a twelve (12’) fall rating. *(please confirm with the contractor, architect, and or, engineer to determine which thickness is needed based on drop height requirements).*
2. Shall be tested for shock attenuation under ASTM F 1292-04, G Max and HIC based on the thickness of material and/or drop height requirement needed.
3. Shall also have the following technical qualifications:
	1. TESTING

**ASTM**: American Standard for Testing Materials; **CPSC**: Consumer Product Safety Commission; **ADA:** Americans with Disabilities Act. **USGBC:** United States Green Build Council. **LEED:** Leadership in Energy and Environmental Design. **ANSI:** American National Standard Institute, **FM:** Factory Mutual.

**Fall Safety Heights:** ASTM F 1292-04, F-355-04. To meet a twelve (12’) foot fall rating;

**Weathering (Aging):** ASTM C-67, D-573, F1292-95. To meet a twelve (12’) foot fall rating;

**Spread of Flames:**  ASTM E108 Class A. and: E108 modified for roof coverings/testing the underside.

**Burn Pill Test:** ASTM D-2859 for Surface Flammability of Products.

**Skid Resistance**: ASTM 303-93 (2013): To measure and describe the slipperiness of the surface material.

**ADA**: ASTM F-1951-99. Standard Spec for Determination of Accessibility of Surface Systems under and Around Playground Equipment.

**LEAD Content:** CPSC-CH-E1002-08 via US Public Law 110-314 (HR 4040 act of 2008); Less than 300 ppm resulting in Lead Content that is not detectable.

**Reflectance/SRI & Emittance:** ASTM E903, E-891, E-1980 – Based on color selected by Architect.

**Water Penetration:** Storm Water Management / Sustainable Run-off via drain ability. Flow rate at body equals 6.34 gallons (24.01 liters) for every twenty-four (24) minutes. Flow rate at seams equals 9.25 gallons (35.00 liters) for every twenty (20) minutes.

**USGBC:** MR 4.1, MR 4.2, MR 5.1, MR 5.2, MR 2.1 & MR 2.2, EQ 4.1. Seven (7) LEED Points/Credits.

**Class 4 Impact Resistance (UL 2218, 2010):** Observing no damage, tearing, fracturing, cracking, splitting rupturing, crazing, or other evidence of opening of the rubber paver system over six different drop zones.

**Tensile Strength, Elongation at Break and Modulus (ASTM D 412), [MPa] & [%]:** Tensile Strength: 0.87 Mpa. Tensile Strength at Break: 0.76 Mpa. Elongation: 71.5%. Elongation at Break: 92.4%. Modulus: 3.49 Mpa **Tear Resistance (ASTM 624), [N] & [kNm]:** Peak Tearing Load: 156 N. Peak Tearing Strength: 11.3 kNm. **Taber Abrasion Index (ASTM D3389):** 0719 WC.

**Durometer Hardness (ASTM 2240):** Shore A = 54.

**Compression Deflection (ASTM 1677):** 577 kPa @ 25%.

**Coefficient of Thermal Expansion (ASTM 831):** 0013 in/ft. per degree.

**Compression Resistance (ASTM 3574), [kN] & [kPa]:** Load at Preset pt.: 2.78 kN. Comp. Resist.:1030 kPa.

**Mass & Density (ASTM 3676), psf & pcf/kg/m3:** Mass Per Area: 2.92 psf. Density Per Area: 78.8 pcf/1282 kg/m3. Recovery (D395): 90-100% w/No Cracking.

**Tensile Strength at Interlock Joint (Pull Force to Separate Interlock), two directions:** Vertical Pull Force Test: 127 PSI or Greater. Horizontal Pull Force Test: 38 PSI or Greater.

Glue: “Unity’s: Chemrex 948 Urethane (glue), shall be a one-part binder, requiring no on-site mixing. Excellent strength, tenacity and grab for male interlock-to-female interlock as well as product-to-sub base installations.

Bolts: “Unity’s Screw-Bolts” shall contain a weather-resistant beveled recess-able head to be counter-sunk through the interlock; shall be a length necessary to securely fasten the tile/mats/block to the solid sub-base material. Excellent strength and grab for product-to-sub base installations.

Color: To be determined by architect/engineer from manufacturers list of: Black, Terra Cotta Red, Grass Green, Chocolate Brown, Sky Blue, Slate Gray, Sandy Tan, Mystic White. *NOTE: Specifier can select multiple Solid TPV/EPDM Top colors that may be used for this project based on designs, layouts and patterns as indicated on the drawings.*

**PART III –EXCLUSIONS**

3.01 INSPECTIONS

Prior to application of the Unity Creations, Ltd. / Unity Surfacing Systems “XL” series: the architect, engineer, municipality, general contractor, safety surfacing manufacturer and installer shall evaluate the substrate’s structural performance. Notify all contactors, architects and engineers of all displacements or stress cracks. Work shall not proceed until unsatisfactory conditions are corrected and signed by the contractors, architects and engineers; And Unity’s installation manual/guide has been read.

* 1. INSTALLATIONS

Shall not take place unless ALL other work, including but not limited to a punch list, has been successfully completed in advance.

The installation manual / guide shall also be read in full by the General Contract’s foreman and all parties of the installation crew prior to installation.

Tiles/mats/blocks/pavers as well as sub-base material shall be clean and dry for a minimum of 24-hours prior.

Tiles/mats/blocks/pavers shall be installed in accordance with manufacturer’s specific installation instructions at any and all locations as indicated on the Drawings.

Tiles/mats/blocks/pavers shall be installed on a rectangular configuration of 22” (inches) by 44” (inches) in size *[+/- quarter (1/4”) tolerance]* with a shadow-center (fake seam) joint to achieve the use of the “step-&-repeat” systems to stagger the seams as if you were installing brickwork (zigzag). As a result, symmetry of 22” by 22” squares will be seen on properly completed jobs (installations).

Adhesive shall be applied in accordance with the manufacturers specific installation instructions for interlock-to-interlock (both inside the joint – back wall, and outside edge of interlocking joint in order for glue to ooze throughout the interlocking system), as well as product-to-solid sub-base installations. Such application will allow for proper rainwater drainage.

Maintain a straight line at the product’s real seams (usually horizontal). To keep lines straight, adjust products using a rubber mallet as they are installed. Apply a string line on the first couple of rows installed to maintain a straight line throughout. Repeat string-line process every so often to insure straightness.

Screw-bolts shall be applied through the male interlocks and counter-sunk every 22” inches into the solid sub-base material. DO NOT USE SCREW-BOLTS ON ROOFTOPS.

All posts and protrusions, etc., shall be cut and aligned as required to fit without any gaps. Said cuts, including lead-in cuts, shall be on a 30-degree angle to allow for glue to maintain on the cut unit for added adhesion.

All lead in cuts shall be done at the least visible location, usually under the playground structure. If a lead in cut is in the middle of the tile, but close to the “fake seam”, follow the fake seam first, then turn to make lead in.

* 1. PRECAUTIONS:

Remove adhesive (glue) spills from installation area using a clean dry rag and mineral spirits in accordance with manufacturer’s installation guide/manual.

If applicable, cut geo-textile fabric/landscaping mesh away from any and all drains. Do not cover drains, drain covers, drainage outlets what-so-ever.

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